Laneshift Impact Report 2025: Advancing Electric Freight Solutions

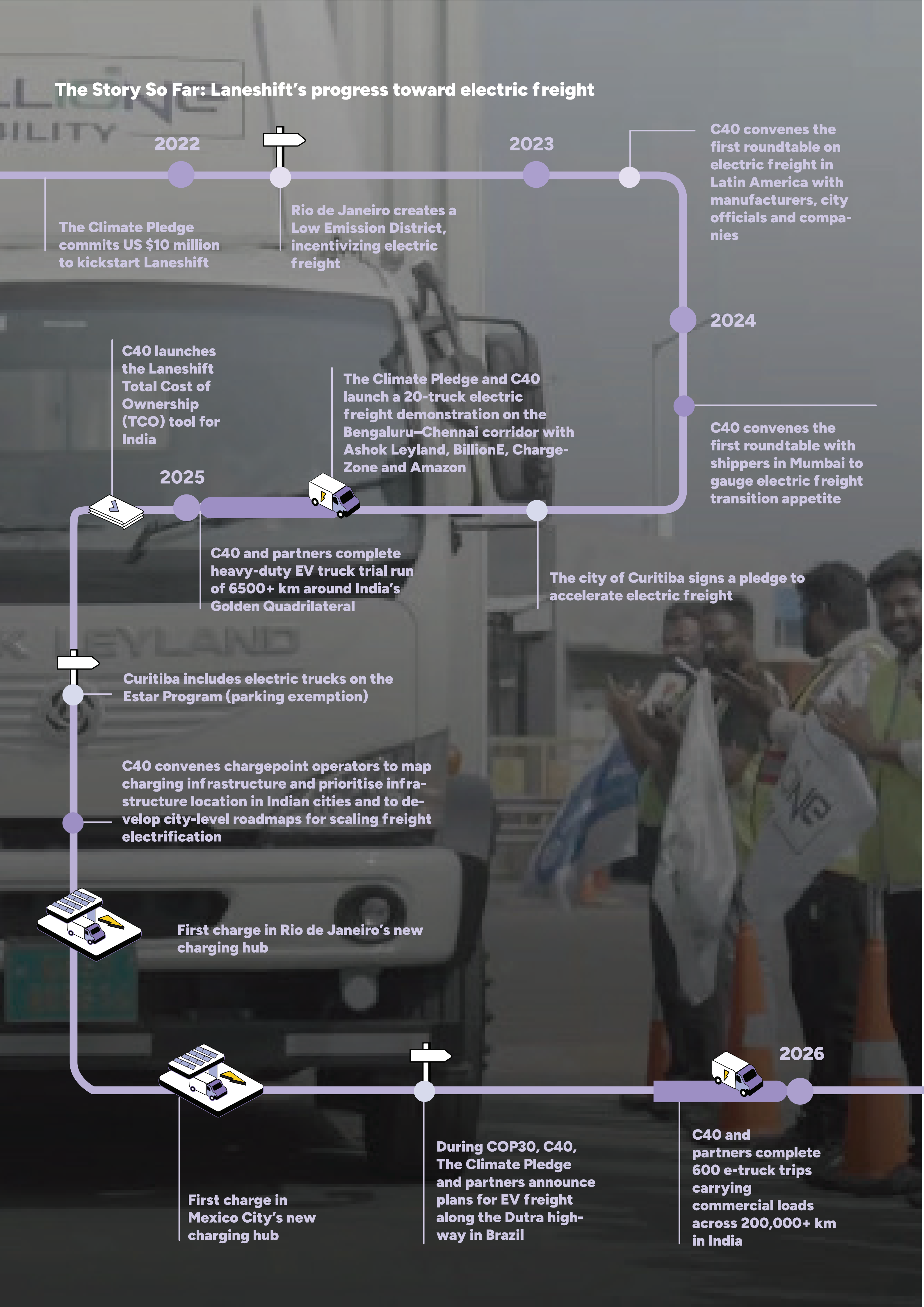
C40 Cities and The Climate Pledge developed Laneshift to accelerate the transition to electric freight trucks (EV freight) across India and Latin America.

The Laneshift Impact Report offers practical case studies from India, Brazil, and Mexico that explore how companies and the public sector can achieve measurable progress towards EV freight solutions. With real-world data and strategies, Laneshift partners have rolled out more than 350 electric freight vehicles, proven the business case for their performance and viability, and identified next steps needed for market transformation in the regions.

The report has two pillars. First, it explores the strategies Laneshift has undertaken to accelerate the transition to EV freight, such as policy and finance incentives to reach cost parity, and demonstration projects that enable businesses to test electric trucks within their daily operations. Secondly, the report examines the tangible outcomes of Laneshift's actions through 2026, including 3,215 tCO2 potential reductions in emissions and air pollution, job creation and the deployment of more than 45 EV freight charging stations.

By leveraging public-private partnerships, Laneshift has demonstrated the operational readiness of these fleets on the ground. We invite you to examine these practical, scalable models and join us in taking immediate action to drive systemic change across the global freight industry.

Photo by Marcin Jozwiak on Pexel



The Story So Far: Laneshift's progress toward electric freight

2022

- The Climate Pledge commits US $10 million to kickstart Laneshift
- Rio de Janeiro creates a Low Emission District, incentivizing electric freight

2023

- C40 convenes the first roundtable on electric freight in Latin America with manufacturers, city officials and companies

2024

- C40 convenes the first roundtable with shippers in Mumbai to gauge electric freight transition appetite
- The city of Curitiba signs a pledge to accelerate electric freight
- The Climate Pledge and C40 launch a 20-truck electric freight demonstration on the Bengaluru–Chennai corridor with Ashok Leyland, BillionE, ChargeZone and Amazon
- C40 and partners complete heavy-duty EV truck trial run of 6500+ km around India's Golden Quadrilateral

2025

- C40 launches the Laneshift Total Cost of Ownership (TCO) tool for India
- Curitiba includes electric trucks on the Estar Program (parking exemption)
- C40 convenes chargepoint operators to map charging infrastructure and prioritise infrastructure location in Indian cities and to develop city-level roadmaps for scaling freight electrification
- First charge in Rio de Janeiro's new charging hub
- First charge in Mexico City's new charging hub
- During COP30, C40, The Climate Pledge and partners announce plans for EV freight along the Dutra highway in Brazil
- C40 and partners complete 600 e-truck trips carrying commercial loads across 200,000+ km in India

2026

- Curitiba launches the first pilot charging hub (Q2 2026)
- Launch of a guidance document on electric vehicle highways in India (Q2 2026)
- Funding for Mexico small businesses to buy EV trucks with a blended financial mechanism (expected Q4 2026)
- Demonstration runs on the E-Dutra green corridor in Latin America (expected Q3 2027)

Executive Summary

The Laneshift Impact Report 2025 highlights the significant progress made by the Laneshift programme in **advancing electric freight solutions across Latin America and India.**

Through **strategic partnerships, innovative pilot projects and targeted policy interventions**, Laneshift has achieved measurable reductions in Greenhouse Gas (GHG) emissions, improved air quality and created new economic opportunities for cities and business.

Laneshift Key Impact Figures

- Laneshift's demonstration projects have saved 3,215 tonnes of CO2 emissions, with cumulative savings projected to reach **31,007 tonnes by 2035.**
- **7+ tonnes of air pollutants were reduced** (6.9t of nitrogen oxide, NOx, and 0.4t of fine inhalable particulate matter, PM2.5), helping mitigate severe respiratory risks in populated urban transport hubs.
- Policy and financial interventions are **accelerating cost parity for EVs by 5 years** in Laneshift cities

Key Achievements

Strategic Partnerships and Pilot Projects

Public and private investments in EV infrastructure and vehicles through Laneshift have resulted in 46 fast-charging hubs and supported the deployment of 357 electric vehicles. Taken together, these initiatives could reduce CO2 emissions by 3,215 tonnes per year.

In **India**, Laneshift launched and tested 20 heavy duty EV trucks along the Bengaluru-Chennai highway - covering over 200,000km - to demonstrate the feasibility of long-haul electric trucking. Across 600 commercial trips, optimized use of en-route charging and route familiarity brought travel times down from 11 hours to 9.5 hours, successfully matching the speed and performance of traditional diesel trucks.

In **Latin America**, we focused on aggregating demand for the first public fast chargers for commercial fleets. We deployed 46 fast-charging stations across Mexico City (34 chargers) and Rio de Janeiro (12 chargers), enabling the operation of 337 EVs and creating 1,023 full-time equivalent jobs.

Finance and Policy

Alongside the deployment of physical assets, Laneshift works to implement financial mechanisms with C40 cities that reduce the upfront cost of EV adoption. These initiatives, which include electric freight vehicle financing for small-and-medium-sized businesses in Mexico are expected to accelerate cost parity for EVs by 1 to 5 years, making them more affordable and accessible for businesses.

Socio Economic Outcomes

In total, the installation of these assets has generated 1,151 job-years, 140% more than their diesel equivalents. Higher-skilled maintenance jobs for EVs promise better wages and long-term economic benefits. Meanwhile, these interventions could reduce PM2.5 by 0.38 tonnes and NOx by 6.96 tonnes per year, providing health benefits for residents near major freight corridors.

Throughout 2025, Laneshift has positioned itself at the centre of the freight ecosystem. Laneshift has demonstrated the ability to drive meaningful change across urban freight systems in partnership with cities and businesses. Laneshift's real-world data and achievements to date have attracted broad interest and engagement, with the program contributing to the upcoming India Highway Electrification Roadmap which will enable long-haul electric freight in that country.

By reducing emissions, improving air quality and creating jobs, Laneshift is paving the way for a sustainable and equitable transition to electric freight.

Laneshift - Infrastructure and Demonstration Projects

Laneshift's 2025 work cut GHG and air pollution emissions, while also generating green jobs.

Laneshift on the Ground: Visualizing the Impact

Laneshift's infrastructure and demonstration projects build coalitions of businesses and local governments to deploy electric chargers, test routes, train drivers and leverage performance data to validate use cases for different sectors (ex: retail and pharmaceuticals). Across our focus regions, these infrastructure and demonstration projects are driving tangible environmental and economic impacts:

Across **Latin America**, Laneshift has implemented 46 fast-charging stations as of December 2025, significantly expanding e-freight capacity. It is estimated that 337 electric vehicles could use those chargers. In early 2026, we expect the launch of the first two fast charging hubs in Curitiba from Laneshift's collaboration with the city government, supporting 15 vehicles.

In **India**, Laneshift gathered commercial fleets to deliver a large-scale demonstration project along India's critical Bengaluru-Chennai corridor. Laneshift deployed 20 heavy-duty electric trucks. They completed 600 trips, covered over 200,000 kilometers carrying real commercial loads and proved they matched diesel transit times. A single-truck pilot proves the technology, but this volume of real-world data proved the business model, de-risking the switch for operators and securing long-term commercial contracts.

Implications for GHG Emissions*

Laneshift's efforts across cities in Latin America and India, with 337 EVs on the road across Rio de Janeiro, Curitiba and Mexico City and a further 20 circulating in India, could together reduce CO2 emissions by 3,215t per year.

From 2025 to 2035, this could avoid a cumulative 31,007 tonnes of CO2 emissions, the equivalent of the emissions of 6,462 American homes' electricity use in a year, or the carbon sequestered by 31,102 acres of U.S. forests in one year (according to the US EPA).

Different factors influence the scale of the results - the number of electric vehicles replacing combustion vehicles is the driving force. However, the scale of the change in emissions also depends on the nature of the old fleet being replaced. Older vehicles, that are both less efficient and have driven the most kilometres over their lifetime, will have a greater positive impact when they are replaced.

Additionally, the impact may also vary based on the energy production mix. Countries with a cleaner energy grid will enjoy the largest greenhouse gas emission savings. For Laneshift, this means in Brazil. Countries that use more fossil fuels in their energy mix, like India or Mexico, will see smaller benefits.

The cumulative sum is lower than the full potential annual reduction multiplied by 10 years (3,215 t * 10 = 32,150 t) because some projects are expected to have a phased adoption over the first two years, resulting in a lower upfront impact.

Mitigating Air Pollution and Improving Health*

Adopting electric vehicles improves air quality, particularly through fewer nitrogen oxides (NOx) that are produced when running an internal combustion engine. Particulate matter (PM2.5) is also reduced, both from fuel combustion and the wear of tires and road dust. Air quality improvements mean enhanced public health outcomes - reducing respiratory and cardiovascular disease risks for those living near transport hubs.

Air pollutant reductions (NO2, PM2.5) varied, with the Latin American projects (Curitiba, Mexico City and Rio de Janeiro) reducing NO2 emissions by 4.7 tonnes together, while India reduced them by 2.25 tonnes.

Job Creation and Economic Impact*

Investing in electric freight infrastructure creates jobs upfront, requiring both the installation of charging hubs and the manufacture of trucks themselves.

In the long-term, electric trucks tend to require less maintenance labour than their diesel counterparts as they have fewer components to change. However, maintenance jobs for EVs are more skilled and tend to have higher salaries.

Across Laneshift's work in Curitiba, Mexico City and Rio de Janeiro and along the Bengaluru-Chennai corridor, investments in charging infrastructure and the EVs themselves are estimated to have generated 1,151 job-years (140% more than their diesel equivalent) during their installation.

Data is needed on maintenance costs and future evaluations could integrate job-creation linked to the maintenance and operation of those trucks.

Taken together, these results show that the benefits of freight electrification extend beyond vehicle deployment. The demonstration projects generated evidence that electric freight vehicles can operate successfully in real-world conditions while also contributing to emissions reductions, improved air quality and job creation. At the same time, the programme's increasing focus on charging infrastructure highlights an important lesson for implementation: demonstrating vehicle performance is only one part of the transition. Scaling these benefits will depend on infrastructure, financing and policy support needed to enable wider adoption.

*Learn more about the impact and implications of freight and freight electrification in Annex A

EV freight demonstration project results

Laneshift's demonstration projects showcase electric freight vehicles across a range of use cases and are essential to assess the performance of both the trucks themselves and the associated charging infrastructure under operational conditions. Data runs to December 1 2025.

46 NEW fast charging stations installed directly supporting the operation of 337 electric freight vehicles

200,000 km covered in heavy-duty EV commercial test runs

31,007 tCO_2 projected to be avoided between 2025 and 2035 through current deployments

Over 7 tonnes of harmful air pollutants (NOx and PM2.5) reduced, mitigating severe respiratory risks in highly populated urban transport hubs

Mexico City

In partnership with Vemo (a signatory of The Climate Pledge) Laneshift has launched a charging hub with 34 fast charging bays in the San Antonio-Mixcoac Zone.

Capacity: 228 vehicles
Emission savings: 1,992 tCO2/year (-75% compared to their diesel equivalent)
Cumulative savings: 19,258 CO_2 for 2025-2035
Jobs created: 520 FTE during the construction, based the investment (chargers + vehicles).
Reduction in air pollution: 0.14 t/year of $PM_{2.5}$

Bengaluru-Chennai

In partnership with Billion-E, a mobility-as-a-service company, Laneshift has run 20 heavy-duty EV trucks (14T, 19T, 55T) for six months along the corridor between Bengaluru and Chennai.

Vehicles: 20 heavy-duty vehicles
Emission savings: 507 tCO2/year (-22% compared to diesel)
Cumulative savings: 5,064 tCO_2 for 2025-2035
Jobs created: 55 FTE during the construction, based the investment (chargers + vehicles)
Reduction in air pollution: 0.2 t/year of $PM_{2.5}$

Rio de Janeiro

In partnership with EZ Volt (a signatory of The Climate Pledge) Laneshift has launched two charging hubs in Avenida Brasil and Barra de Tijuca with 12 fast charging bays.
Capacity: 109 vehicles
Emission savings: 716 tCO2/year (-89%)
Cumulative savings: 6,684 tCO_2 from 2025 to 2035
Jobs created: 503 FTE during the construction, based the investment (chargers + vehicles).
Reduction in air pollution: 0.03 t/year of $PM_{2.5}$

Curitiba (Q2 2026)

The city is installing a charging hub with 2 fast charger bays near major government buildings.

Capacity: 15 vehicles
Emission savings: 109 tCO2/year (-91%)
Cumulative savings: 1,071 tCO_2 from 2025 - 2035
Jobs created: 73 FTE during the construction, based the investment (chargers + vehicles).
Reduction in air pollution: 0.01 t/year of $PM_{2.5}$

Laneshift e-Dutra Project

The Laneshift e-Dutra project is a major initiative launched to foster the development of electric freight transport along Brazil's Dutra highway corridor, aiming to decarbonize road transport between Rio de Janeiro and São Paulo. Launched in November 2025 during COP30 in Belém, this public-private partnership will deploy 1,000+ electric trucks and establish a high-capacity charging network along the Rodovia Presidente Dutra Highway by 2030.

Unlocking financing in India

Laneshift is helping logistics partners unlock financing opportunities. Through this initiative, the program supported BillionE, an e-mobility-as-a-service company, in securing the acquisition of more than 200 electric trucks over the coming years. This effort is projected to prevent over 40,000 tons of CO_2 emissions over the next ten years.

Accelerating the Transition - Finance and Policy

Laneshift is enabling mechanisms that bring costs down now and into the future.

Laneshift brings together business, cities and finance to accelerate the positive tipping point for electric freight, making the technology more **affordable, accessible and attractive** than conventional fossil fuel alternatives. Addressing high upfront costs is a critical first step in accelerating adoption and Laneshift has worked with partners to deploy financial mechanisms to improve the affordability of electric freight vehicles - not just at the time of purchase but also during their lifespan.

Laneshift accelerates the transition to EV freight by 1 to 5 years

While EV vehicle retail costs are still higher than their diesel equivalents, prices have decreased in recent years and continue to come down. Laneshift's work with financial institutions helps unlock finance and makes cost parity a reality sooner.

In Mexico, Laneshift is working together with NAFIN within the Mueve tu Pyme program, unlocking funds for electric freight vehicle financing for small-and-medium-sized businesses, to be released in 2026. This programme reduces the cost of electric freight vehicles and makes them more affordable than internal combustion engine (ICE) alternatives five years earlier than the current trends.

EVs are already more cost effective to maintain and operate and Laneshift brings costs down even further

In both India and Latin America, cost parity has already been met when maintaining and operating electric vehicles, according to our estimates. To make EVs even more cost effective, in Brazil and Mexico the team has analyzed strategic locations for charging points to ensure that vehicles can easily find charging locations, decreasing overall operational costs as vehicles can quickly recharge without having to commute back to the warehouse.

In Curitiba, Laneshift is raising awareness among logistics companies about the city's EstaR initiative. By securing parking fee exemptions for more than 100 electric vehicles (EVs), the effort is projected to save companies over $300 per vehicle annually.

Laneshift has dispelled myths on the performance and convenience of electric trucks

In India, 20 pilot EV trucks ran 600 trips to evaluate the performance of e-freight vehicles in real-world scenarios. After a preliminary route analysis, travel time was brought down from 11 hours to around 9.5 hours, matching diesel trucks. Route familiarity, driver experience and the effective use of en-route chargepoints helped bring e-freight travel times down during the demonstration.

In Curitiba, the city conducted four tests using electric trucks for waste collection. The results showed that adopting EV trucks could reduce fuel costs by up to 77% compared to diesel vehicles. Battery range exceeded operational requirements, meaning that mid-shift charging became unnecessary, with all vehicles completing their scheduled routes with charge to spare.

Ensuring the local and national institutions are engaged with the EV freight transition

In India, Laneshift proposed a strategic network of high-capacity charging stations along the Bengaluru-Chennai highway corridor to accelerate the adoption of electric trucks and generate emission savings in India. Laneshift's real-world data identifies priority corridors and infrastructure requirements, a direct contribution to the forthcoming India Highway Electrification Roadmap.

While vehicle costs are falling, the findings show that financing mechanisms and policy incentives can play an important role in accelerating adoption and bringing cost parity forward by up to five years in some cases. This matters because it highlights the role that financial support and enabling policies can play in reducing barriers to adoption and helping operators transition to electric freight sooner.

Finance and policy results

To evaluate how Laneshift promotes a quicker transition to electric trucks, we modelled the evolution of costs of Capital Expenditures (CAPEX) and Operational Expenditures (OPEX) until 2040, with the new policies and finance schemes unlocked by Laneshift.

Laneshift accelerates cost parity for investing in electrics by up to...

5 years

Operating and maintaining (O&M) electric vehicles is already

10% cheaper

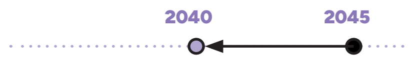
across all regions and Laneshift is increasing the difference

The high upfront cost of electric trucks remains a key barrier to adoption, but Laneshift helps address this by unlocking incentives that make the transition faster and more accessible.

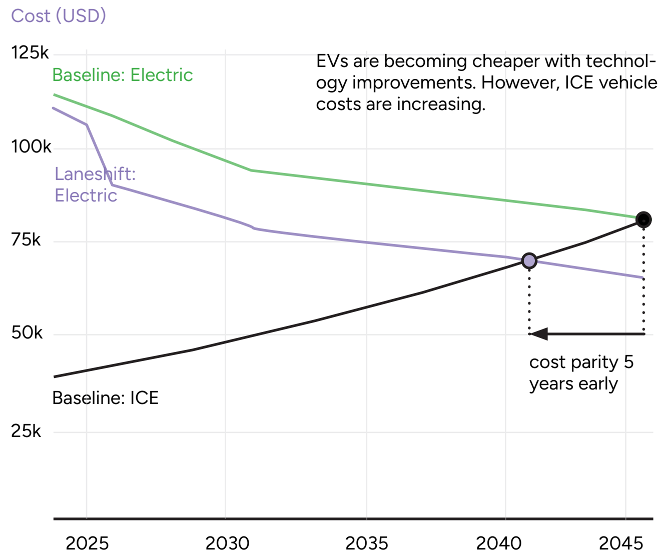
Laneshift in Mexico

Mexico is accelerating the transition to electric trucks by combining centralized charging hubs with financing for small and medium-sized businesses to purchase EV freight vehicles.

Projected parity status-quo: 2045
Projected parity with Laneshift: 2040



In detail: the graph on the right shows the evolution of acquisition (or purchasing) costs of light-duty trucks for ICE, EVs and EVs after the implementation of Laneshift policies.



Baseline: Electric — Laneshift: Electric — Baseline: ICE

Laneshift in Rio and Curitiba

Charging hubs with a subscription model offer lower rates without the need to install costly self-owned assets.

Projected parity status-quo: 2032
Projected parity with Laneshift: 2031

Laneshift: Challenges, Lessons and Next Steps

Laneshift has demonstrated that the transition to EV freight is already underway – with the right policies, infrastructure, finance, and collaboration, electric trucks are delivering commercial loads today in Brazil, Mexico, and India. **By successfully deploying 357 electric trucks and enhancing the fast-charging networks to sustain them, Laneshift has provided a definitive proof of concept for cities, businesses, and investors worldwide.** Investors no longer have to speculate on viability; our data confirms the business case for electric trucks that match fossil fuel vehicles in performance, while meaningfully reducing greenhouse gas emissions and pollution. These tangible results offer an undeniable blueprint for action, and they are precisely why this vital work must now be scaled globally.

Laneshift revealed that freight electrification priorities shifted as the programme progressed. While early efforts focused on vehicle viability, experience showed that wider adoption requires broader enabling conditions. In India, 200,000 kilometres of demonstration projects confirmed performance and feasibility. Feedback in Latin America identified charging infrastructure as the primary barrier to scale. This insight shifted the programme's focus toward public charging hubs and corridors, including 46 charging bays and projects like the Curitiba hub and e-Dutra corridor. Consequently, finance and policy work transitioned from proving vehicle performance to developing mechanisms for large-scale adoption.

Challenges and Barriers

The programme highlighted several challenges that continue to slow the transition to electric freight. Though targeted incentives and financing mechanisms could accelerate cost parity by between one and five years, affordability remains a significant barrier for many operators, particularly small businesses with limited access to financial institutions. Small businesses in the informal economy deliver a substantial proportion of freight in Latin America and India, highlighting the importance of sector-specific financial mechanisms to unlock market transformation.

The demonstration projects also highlighted the need for coordinated timing between city governments, fleet operators and financiers, as in some cases infrastructure deployment, policy incentives, financing, and operator readiness did not progress at the same pace. This difficulty in aligning public-private coordination directly impacted the programme's geographic footprint. While Laneshift initially launched across six Latin American cities, the timing was not right for full-scale demonstration projects in Colombia (Bogota and Medellin) and Ecuador (Quito). In addition to a lack of shared objectives between city governments and companies, EV freight battery performance was affected by the terrain in each city - making cost of ownership difficult for carriers trying to manage potentially frequent replacement costs. To ensure maximum delivery relative to resources in the final year of the project, a strategic decision was made to drop Bogota, Medellin and Quito and reallocate resources to support the activities in Brazil and Mexico in 2025.

Infrastructure gaps remain substantial, along with the need for capacity building and matchmaking to ensure incentives are applied effectively. The Laneshift approach of demonstration projects at urban charging hubs and inter-city corridors has been effective in identifying location-specific barriers within freight ecosystems, that were different in India, Brazil, and Mexico.

Lessons Learned

Several important lessons emerged through the programme implementation. First, freight electrification should be approached as a systems challenge rather than a vehicle challenge alone. The deployment of 357 electric vehicles, charging infrastructure investments and the programme's work on financing and policy all demonstrated that successful adoption depends on aligning technology, infrastructure, finance and policy. Second, demonstration projects play an important role beyond vehicle deployment by generating evidence, building confidence among stakeholders and informing future investment decisions.

Finally, the activities across India, Brazil and Mexico reflected different local priorities and approaches to supporting freight electrification. Interventions must be adapted to local market conditions, policy environments and infrastructure readiness.

The programme also demonstrated that the benefits of freight decarbonisation extend beyond emissions reductions. Laneshift's interventions contributed to the avoidance of 3,200 tonnes of GHG emissions while supporting over 1,100 job-years and generating air quality benefits across programme regions. These findings reinforce the broader environmental, economic and public health value of accelerating the transition to electric freight.

Next Steps

Looking ahead, future efforts will focus on scaling the enabling conditions identified through Laneshift. Opportunities to build on the programme's foundations are already emerging through initiatives like the e-Dutra corridor linking Rio de Janeiro and São Paulo, the India Highway Electrification Roadmap, and financing mechanisms being explored to support small business adoption in Mexico. Together, these initiatives reflect the next stage of the transition, moving from demonstration and evidence generation towards wider implementation and scale.

Annex A | Understanding the freight sector’s impact on Laneshift cities

Photo by Kelly on Pexel

Estimating current greenhouse gas emissions from trucks in cities

To establish GHG emissions estimates, we gathered information on two themes:

Transport activity

Represented by total vehicle kilometres travelled (VKT) by freight. This indicator can also be broken down into further categories of freight characteristics for better accuracy, such as: by fuel, freight classes, engine type and age. This can also include road characteristics such as speed, slope and congestion. The transport activity is specific to each city and will vary each year (see details in the table on the right).

Emission factors

Total emissions per VKT and the total energy consumed by freight (either kWh or GJ) per kilometre. For EVs, we consider the grid characteristics in order to represent the increase in energy demand. Emission factors are specific to vehicles and can be estimated using international datasets such as the EMEP/EEA (2019) database.

All sources of activity data and fleet information have different methodologies regarding vehicle categories, which required assumptions in order to ensure consistency between the cities. For limitations and details, please refer to the methodology annexes.

Table: Main sources of activity and fleet data

Activity data (km/year or liter/year) x **Emission factors & energy needs (per km)** = **Emission (tonnes/year)**

Location	Activity data	Fleet composition
Bengaluru-Chennai	Toll vehicle counts	Official national data (2017)
Rio de Janeiro Curitiba	Fuel sales from Official National data	Vehicle breakdown from official National data
Mexico City	Official city records Origin destination survey reports Emission inventories	

The GHG emissions analysis highlights why freight should be a priority within wider transport decarbonisation efforts. Although freight vehicles make up a relatively small share of vehicles on the road, they contribute disproportionately to transport related greenhouse gas emissions. This means that targeted action in the freight sector can deliver significant climate benefits and help cities make progress towards their emissions reduction goals.

Photo by Marcin Jozwiak on Pexels

Key findings

Freight vehicles across Laneshift's 3 Latin American cities and the Bengaluru-Chennai corridor in India travel around 9.4 billion km in a year. This is equivalent to a **truck going around the Earth every 2 minutes, for a year.**

Emissions from freight represented nearly 3.2 million tonnes of CO_2 during the same year. **This is the equivalent of Miami's yearly emissions.**

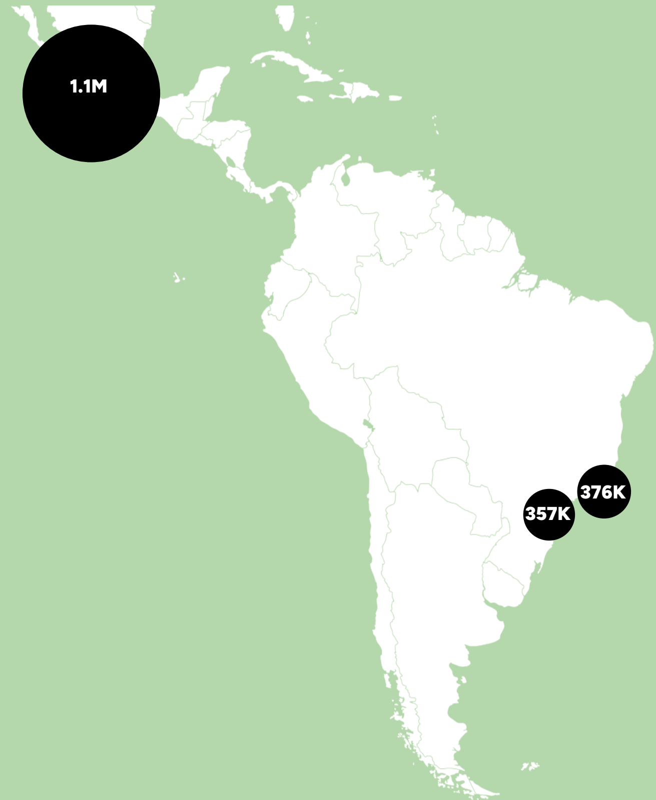
Findings in Mexico City, Curitiba and Rio de Janeiro

Information from light, medium and heavy-duty freight vehicles was collected across Mexico City Metro region, Curitiba and Rio de Janeiro fuel sales and registration databases. While freight vehicles only cover 9% of total vehicle movement, they were responsible for an equivalent of 12% of the cities GHG transport emissions.

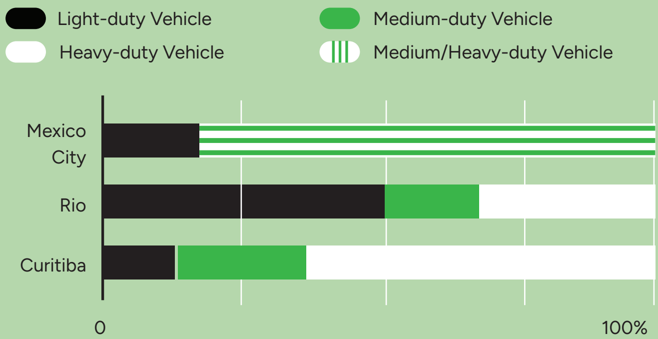
Freight was about **9% of total city vehicle activity** (6-15% of total kilometres travelled in each city)

But is represented **12% of cities yearly GHG transport emissions** (6-18% of the cities transport greenhouse gas inventory)

Map of GHG emissions per city (in tonnes of CO_2 emissions per year)



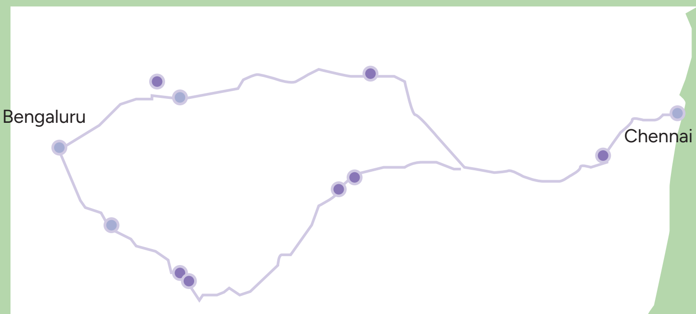
Proportion of emissions by vehicle category



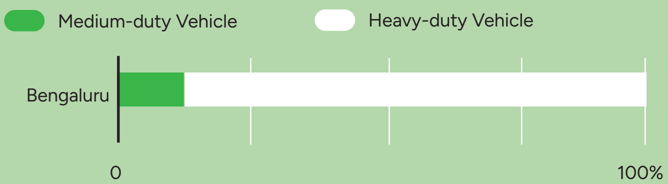
Findings across the Bengaluru-Chennai corridor

Vehicle toll counts were collected for the freight corridor between Bengaluru and Chennai. Freight travel along this single corridor accounts for approximately 600 million kilometres travelled by freight vehicles annually. This represents roughly 264,000 tonnes of CO_2 emissions each year, the equivalent of the energy used by 35,200 American homes over the same period.

Map of Bengaluru-Chennai corridor



Proportion of emissions by vehicle category



Collecting information on jobs along the supply chain

When considering the land road freight sector, truck drivers are the first jobs that usually come to mind. We have also looked at dispatchers that plan and organize the shipments, mechanics, warehouse workers and their managers and the freight manufacturing industry in each location.

We used national statistics for the automotive industry employment to estimate the current jobs for each city in Latin America and at national level for India. While job categories may vary per country, we reported on the following categories:

- Manufacture of freight vehicles
- Sale of vehicles
- Maintenance and repair of vehicles
- Freight road transport operations

Warehouse operations have not been reported as no common definition was consistent between countries and are also often overlapping with rail, water and air freight transit. This method may also have limitations for reporting informal jobs across countries, as national statistics may or may not report those jobs. For limitations and details, please refer to the methodology annexes.

In Mexico City, Curitiba and Rio de Janeiro, the freight sector employs 101,600 workers across vehicle manufacture, sales and operations (excluding warehouse cargo handling). This represents 1.3-2.2% of the total city workers.

Table: National job statistics available to date

City	Granularity	Date
Rio de J.	City	2021
Curitiba	City	2021
Mexico City	National, scaled down to city	2022
India	National	2022

Table: Sales and production of vehicles

Country	Data source	Date
Brazil	ANFAVEA (2022)	2022
Mexico	INEGI (2022)	2022
India	OICA (2022)	2022

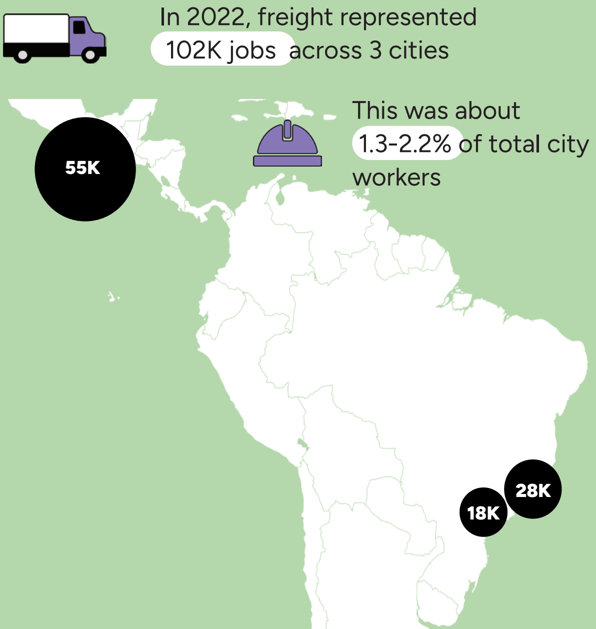
The jobs identified across the wider freight electrification system, including vehicle manufacturing, charging infrastructure, operations and maintenance, demonstrating that the impacts of freight electrification extend beyond emissions reduction alone. This is important because it shows that freight decarbonisation is not simply a climate intervention but the fact that it can also support economic development and workforce opportunities, helping ensure that the benefits of the transition are shared more broadly.


Photo by the Vanity Photograph on Pexels

Findings in Mexico City, Curitiba and Rio de Janeiro

The majority of jobs cover freight operations on the road, directly related to haulage. Curitiba is unique as it has several manufacturing plants located around the city and has a larger share of manufacturing jobs. Please note that warehouse jobs would also account for a significant amount of the jobs involved in the sector, but have not been included for this analysis.

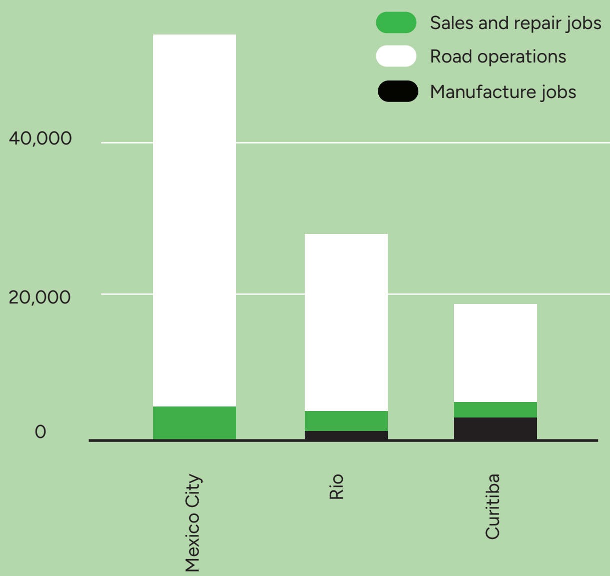
Map of the number of workers identified per city



Findings in India

Findings for India are estimated at the country level. It is estimated that there are around **7.6 million workers across freight manufacture and operations** (excluding warehouse cargo handling). This is based on national reported statistics but a lot of uncertainty remains over this sector that has a high level of informal jobs.

Number of reported workers from freight manufacture, sales and operations

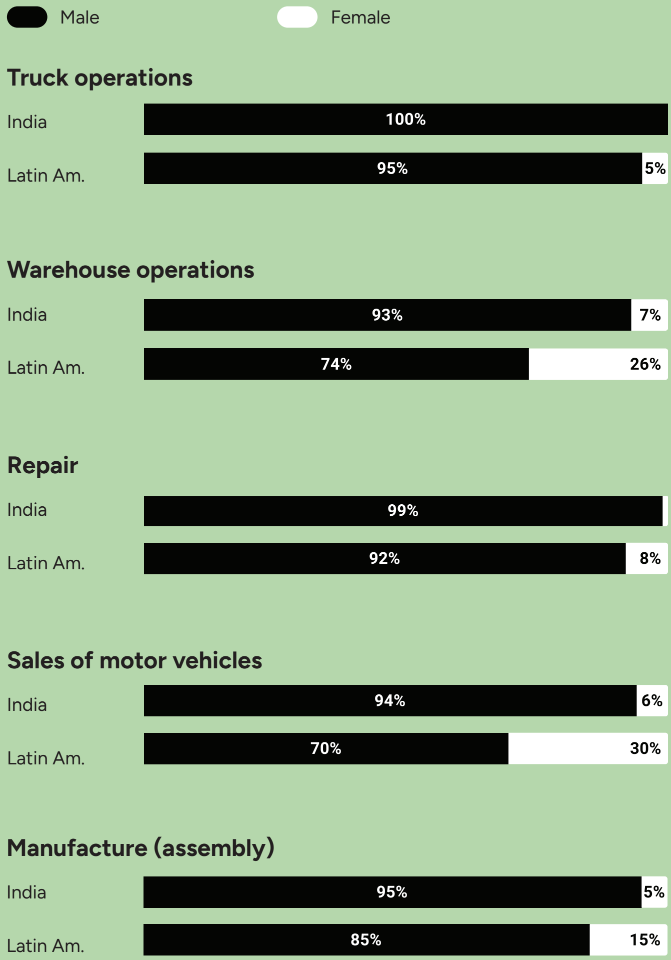


The majority of those jobs cover truck operations, with a reported 7.3 million workers. Additional research is needed on understanding the condition of truck drivers, but also the network of indirect jobs connected to freight, as the roadside restaurants dedicated to drivers.

Gender distribution

The sector is very strongly male-dominated, across both operational jobs, sales and manufacture. The graphs below show the proportion of genders across several categories.

Gender distribution across sub-sectors



Understanding truck contribution to local air pollution and residents' health in Latin American cities

Curitiba, Mexico City and Rio de Janeiro continue to undergo rapid urban growth and are having to rethink urban transport by enhancing street access and safety, expanding their cycling and pedestrian networks, reimagining active mobility for children on their way to school and improving public transport.

However, transport still represents a significant part of cities' air pollution concentration. The maps below show that the concentration of pollutants such as nitrogen dioxide (NO_2) near roads is much higher than other parts of the city. **Transitioning to electric is an important step to effectively tackle air pollution. Air pollutants can penetrate deep into the lungs and are linked to respiratory and cardiovascular illness and death, even at low concentrations.**

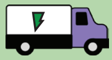
Vulnerable groups such as children, pregnant women and the elderly and individuals with pre-existing heart and lung disease, are particularly affected. High concentrations of tiny particles smaller than 2.5 micrometers" ($PM_{2.5}$) annual air pollution concentration is estimated to cause 8,620 premature deaths across Curitiba, Mexico City and Rio de Janeiro.

Freight activities represented around 2.0% on average of the city $PM_{2.5}$ annual concentration that year (0.26 μg/m³). The most affected city was Curitiba with 3.3% (0.4 μg/m³). Roadside concentrations of air pollutants can get much higher, especially during rush hour.

Switching to EVs could reduce **NOx freight emissions by 100%** along the road and P**$M_{2.5}$ freight emissions by 77% on average in cities, compared to current emissions.** Remaining $PM_{2.5}$ emissions originate from tires, brakes and road wear. The variation of reduction of $PM_{2.5}$ emission between cities (66% in Bogotá to 86% in Rio de Janeiro) comes from the difference of the fleet composition and age of vehicles.

In 2022, $PM_{2.5}$ air pollution was linked to **8,620 premature deaths** across Curitiba, Mexico City and Rio de Janeiro

It is estimated that freight in Curitiba, Mexico City and Rio de Janeiro was responsible of **2.0% of the city annual average $PM_{2.5}$ concentration.**

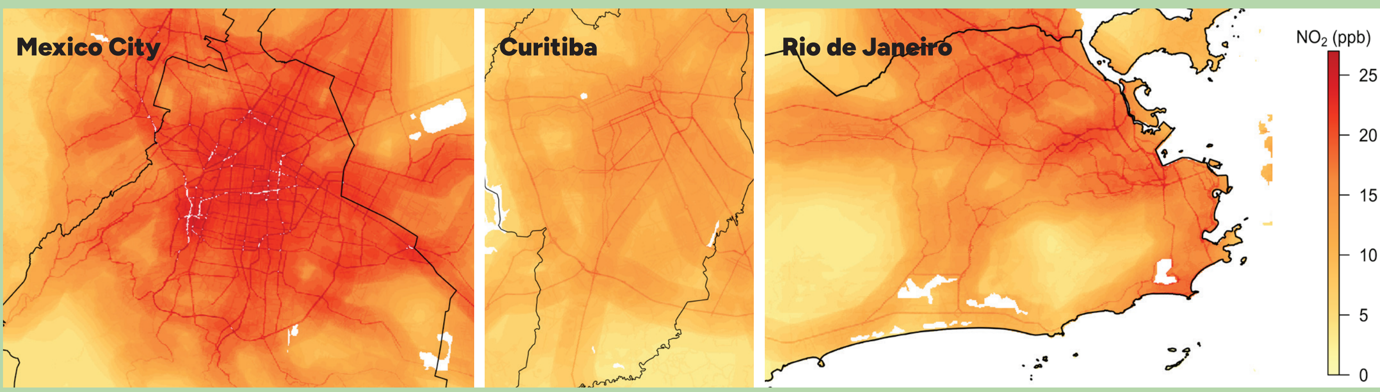


Switching to electric vehicles could reduce **NOx freight emissions by 100% along the roads and $PM_{2.5}$ freight emissions by 77% on average.**

Premature deaths linked to air pollution were estimated based on the current concentration of air pollution and methods from the Global Burden of Diseases (2019). Concentration of $PM_{2.5}$ attributable to freight have been estimated based on the emissions from vehicles and the AQUA tool.

More information can be found in the annexes.

Air pollution is most severe along major roads: NO_2 concentrations at 50m gridded data from Larkin et al 2022. While those maps indicate air pollution coming from all sources, the main axes of transport are clearly visible at a granular level in the city. This shows that neighborhoods near main roads experience poorer air quality than other locations in the city.

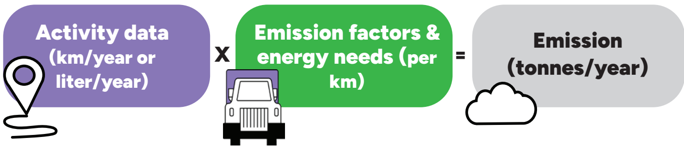


Annex B | Methodology

Methodology part 1

This section assesses the current impact of freight emissions and employment across Laneshift cities, with data up to May 2024.

1. Greenhouse Gas (GHG) modelling



1.1 Transport activity

Total kilometres travelled (VKT) by freight vehicles or total fuel used by vehicles in a year. This indicator needs to be broken down into further categories of freight characteristics for better accuracy, such as by fuel, freight classes, engine type and age.

A literature review of available data sources in each location is described in Table 1.

Table 1: Main sources of activity and fleet data aggregated for the analysis

City	Activity data	Fleet composition
Indian corridors	Toll counts specific to each corridor, on the period of 2022-23, collected for the programme	National breakdown from 2017 study (here)
Rio de J.	Annual diesel sales per city - Official national registry (2019)	Official national registry (2022)
Curitiba	Diesel consumption for freight vehicles - CETESB, São Paulo (2022)	
Mexico City (Metro region ZMVM)	Kilometers by vehicle category and age - Mexico City Inventory (2022)	Vehicles by type and fuel - Mexico City Inventory (2022)

Table 2: Assumptions on vehicle categories per city

Available vehicle categories	Proposed vehicle categories	City
Truck	LDV (2 axis) MDV (3 axis) HDV (3 or more axis)	Rio de Janeiro Curitiba
Tractor truck	HDV	
Vehicles up to 3.8 t	LDV	Mexico City
Vehicles greater than 3.8 t	MDV/HDV	

However, each source reported vehicles across different categories, so assumptions to match vehicles by age and type were essential. Vehicle category assumptions for this analysis (see details in Table 2 against):

- LDV: Light Duty Vehicle (GW < 3.8t);
- MDV: Medium Duty Vehicle (3.8 <= GW < 12t);
- HDV: Heavy Duty Vehicle (GW >= 12t).

Categories for ages were based on Euro standards:

- 1992-older: pre-euro
- 1993-1997: Euro I
- 1998-2000: Euro II
- 2001-2009: Euro III
- 2010-2016: Euro IV
- 2017-2020: Euro V
- 2021-newer: Euro VI

1.2. Emission factors and vehicle efficiency

Total emissions per kilometer travelled by the vehicle and the total energy consumed by freight (either kWh or GJ) per kilometer. We used the EMEP/EEA (2019) database and diesel sulphur content from ICCT (2019) for the diesel vehicles.

1.3. Grid emission factors

For electric vehicles, we consider instead the grid characteristics in order to represent the increase in energy demand. See Table 7 in the section 2.

1.4. Limitations and future areas of progress

Methodology consistency between the different data sources. This study needed to aggregate various sources. Vehicle categories sometimes don't match between databases within and between cities. In addition, fleet and fuel data for each city may not reveal the actual trucks that are circulating within the city - trucks from elsewhere may be circulating inside and trucks from the city may be circulating outside. Finally, the date of publication needs accounting for, as we needed to align several data sources, some sources were spreading over several different years.

2. Modelling the job baseline

We used national statistics on automotive industry employment to estimate the current jobs for each city. This is then scaled down to the freight sector based on the proportion of freight amongst other vehicles. For example, the proportion of sales (in USD) that would cover medium and high-duty vehicles compared to cars and motorcycles.

2.1. Registered workers in each sector

We considered the following sections of the International Standard Industrial Classification, abbreviated as ISIC:

- 34 (also C29) : Manufacture of motor vehicles, trailers and semi-trailers
- 50 (also G45): Sale, maintenance and repair of motor vehicles
- 60 (also H49): Land transport. In this category, we can isolate freight operations from public transport and rail activities
- H52: Warehousing and support activities for transportation
- Other categories reflecting the petroleum industry and the grid electricity could be also considered in a wider scope, in the future

See Table 3 for the source of national job statistics used.

Table 3: National job statistics available to date

City	Granularity	Date
Rio de J. Curitiba	City (4 digits in the ISIC classification)	2021
Mexico City	National, 2 digits, scaled down to city	2022
India	National, 2-4 digits	2022

Warehouse operations have not been reported as no common definition was consistent between countries. Warehouse operations are also often shared with other modes of transport which are out of the scope of this report, including rail, water and air freight transit.

2.2. Scaling factors

To scale down the number of workers in the automotive industry (for sales and manufacture), we used the proportion of sales and production of vehicles that referred to trucks compared to other light-duty vehicles at a national level. As Mexico City has no truck manufacturing facilities within city limits, the scaling factor for manufacturing for the city is zero. See the scaling factors data sources in the Table 4.

Table 4: Production and sales of freight vehicles based on their economic value

Country	Production	Sales	Data source
Brazil	33.5%	11.5%	ANFAVEA (2022)
Mexico	17.2%	11.4%	INEGI (2022)
India	17.0%	NA	OICA (2022)

2.3. Limitation

This method may have limitations for reporting informal jobs across countries, as national statistics may or may not report those jobs. This is particularly relevant for India, where the amount of data was not available at a very granular level.

2.4. Gender distribution

We used the same categories of classifications broken down per gender groups. This approach is complementary to the work of local inclusive climate action teams who will look into qualitative aspects of the transition - what does it mean for the workers in terms of skills, relocation and what communities might be impacted?

3. Air pollution modelling

Emission factors for air pollutants (NOx, PM2.5) from EMEP/EEA (2019) were applied for each vehicle age and fuel category to the transport activity described in chapter 1.

Baseline annual PM2.5 concentrations were estimated by integrating information from satellite-retrieved aerosol optical depth, chemical transport modelling and ground monitor data. PM2.5 concentrations are at 0.01 degree grids (V5.GL.03) - from Van Donkelaar et al at Washington University.

Health modelling is using C40 AQUA tool (2023). The baseline health data is coming from Global Burden of Disease (2019) and Oxford Economics for the population disaggregation per age group. Health functions are taken from GBD2019 as well.

The AQUA Transport tool (2023) was used to calculate the air pollution concentration coming from the freight sector across the Latin American cities. This tool enables to model the concentration from emissions coming from within the city. This is why it cannot be applied in the context of Indian cities where the source of emissions start outside the city boundaries. This is also why it can be used to assess the annual average city air pollution concentration, but cannot assess any local spikes of air pollution.

Table 5: Concentration of PM2.5 (city average, 2022)

City	City average	Share of freight PM2.5
Curitiba	10.7 µg/m3	3.83%
Mexico City	21.0 µg/m3	0.62%
Rio de Janeiro	14.3 µg/m3	1.68%

Methodology part 2

This section assesses the impact of Laneshift's work on policy and Total Cost of Ownership across Laneshift cities, with data up to May 2026.

1. Greenhouse Gas (GHG) modelling .

Emission savings were calculated by comparing the emissions from the projected EVs to the emissions they would produce if they were diesel vehicles.

1.1 Transport activity

Total kilometres travelled (VKT) by freight vehicles. Data collection varied by city and region. In Latin America, for all cities it came from Mexico City's emission inventory (2022), as the data available for the Brazilian cities (a combination of fuel sales and national vehicle registration databases) was considered unreliable. In India, based on runs from demonstration vehicles on the Bengaluru-Chennai corridor, it was assumed that vehicles would travel 350 km per day. Table 6 details the values.

Table 6: kilometers travelled per vehicle per year

City	km travelled per vehicle per year	Source
Mexico City Rio de Janeiro Curitiba	21,802	Emission Inventory (2022)
India	93,600	Pilot runs on Bengalore-Chennai corridor (2025)

1.2. Fleet projections Business-as-usual (BAU)

For Latin America, it was assumed that all vehicles should be diesel, while in India we worked with RMI Consultant Company and this figure was calculated using RMI's internal truck stock growth model.

1.3. Fleet projections under an electric scenario

For Latin American cities, the number of electric trucks under the projected scenarios comes from the charging hubs' specifications. We use data such as the chargers' capacity (kW), the number of chargers and the average consumption of electric trucks to understand how many vehicles could be charged at each hub (therefore, the hub capacity).

After estimating the capacity, we assumed the charging hubs would be able to promote an uptake that would be enough to fulfil 50% of their capacity. For Mexico, we also modelled the impact of the small-business financing for electric freight trucks scheme where 69 new vehicles are going to be purchased, in comparision to diesel counterparts.

For India, we assumed that the 20 vehicles deployed would be instead of diesel vehicles.

1.4. Energy consumption and emission factors

The total energy consumed by freight (either kWh or GJ) per kilometre and the emission factors for CO_2, NO_x and PM2.5.

Energy consumption

For 2025 for Latin America, we used data available from manufacturers from a mix of light and medium-duty vehicles. Data included energy consumption (kwh/km) for EVs and their diesel equivalent. In the case of Rio de Janeiro, where we already have e-trucks using the charging hubs, we were able to collect real-world data on energy consumption.

For future years, we assumed that diesel vehicles would have an increase in vehicle efficiency of 7.5% in 10 years and EVs would have an increase in vehicle efficiency of 11% in the same period. We then calculated the yearly rate and applied this to each year.

Emission factors (diesel)

We used the EMEP/EEA (2019) database and diesel sulphur content from ICCT (2019) for PM2.5 and NO_x emission factors (tons/km). For CO_2 we used emission factors from IPCC (2006) (ton/ GJ). For new vehicles we assumed that they would be an average between light and medium-duty Euro IV vehicles.

Emission factors (electric)

For EVs, we accounted for grid characteristics to represent the CO_2 emissions coming from the grid. In most of Latin America (excluding Mexico City), we assumed the grid is already sufficiently clean and stable, with no significant variations expected in the coming years. For Mexico City and India, we considered that the grid would become cleaner over time. Table 7 details those values and sources.

Table 7: Grid emission factors in 2025 and 2035, in tonnes of CO_2 /MWh

Location	2025	2035	Data source
Mexico City	0.435	0.29	City GPC inventory. Projections to 2035 follow the same assumption from India (4% every year)
Rio de J.	0.093	0.093	City GPC inventory, kept constant over time.
Curitiba	0.075	0.075	
Delhi	0.606	0.333	State factors and projections from India's Central Electricity Authority (CEA). The state-level emission factors for years in-between were estimated assuming a linear relationship (4% every year)
Haryana	0.567	0.312	
Rajasthan	0.540	0.297	
Maharashtra	0.599	0.324	
Gujarat	0.544	0.294	
Karnataka	0.409	0.236	
Tamil Nadu	0.505	0.273	

1.5. Limitations

The programme progress is based on the early data from cities in November 2025 and will be updated in 2026 to reflect the evolution of the programme. It may be subject to change following political shifts within cities.

The evolution of the EV market beyond Laneshift is based on high-level assumptions on market share and is only illustrative of the potential scale of impact if cities were to see this assumed market share.

2. Total Cost Ownership (TCO) modelling

The Total Cost of Ownership (TCO) estimation is segmented into two primary components—Acquisition Cost (buying) and Operational Cost (owning)—for both electric vehicles (EVs) and diesel vehicles. Buying cost uses the vehicle's initial price, accounting for policy variables like estimated subsidies, taxes, the cost of charging infrastructure and projected battery price evolution. With this information, we are able to simulate the current and future price (until 2040) of buying a diesel and an EV.

Operational cost includes recurring expenses such as taxes, insurance, maintenance, the cost of fuel or charging, parking fees and driver wages. The impact of the proposed Laneshift policy is calculated by adjusting the specific financial parameters within both the buying and operational categories that are directly affected by the policy's actions.

Table 8: TCO data sources

Data	Source
Vehicle Price (diesel and electric equivalents)	Laneshift internal data from OEMs
Charger price	ICCT (2019). Estimating electric vehicle charging infrastructure costs across major U.S. metropolitan areas
Learning curve (how much the different technologies will be cheaper in the future)	ICCT (2022). Assessment Of Light-Duty Electric Vehicle Costs And Consumer Benefits In The United States In The 2022–2035 Time Frame
Maintenance cost	Laneshift internal data from OEMs
Taxes, Insurance	LATAM: Federal Institutions India: Laneshift internal data from OEMs
Energy tariffs	LATAM: Operators India: Laneshift internal data
Energy consumption from vehicles	Laneshift internal data from OEMs
Drivers wage	Rio/Curitiba: Economic Research Institute India: Laneshift internal data

To simulate the impact of Laneshift policies, we then changed the inputs where the actions are going to be effective. In detail, see Table 9.

Table 9: Laneshift TCO policies

City	Policy	How it was modelled
Rio/ Curitiba/ Mexico City	Charging hubs	With the charging now being delivered through charging hubs, the operators wouldn't be required to buy chargers anymore. The impact was calculated by removing the charging cost from the buying cost and moving it to the owning cost
CDMX	Electric freight Small-business financing scheme: Offering a financial incentive for purchasing a new electric vehicle when owners retire and scrap their diesel vehicle at the end of its service life	The program will offer up to 16% of the vehicle buying cost as a voucher. The impact was calculated by applying a 16% discount to the vehicle price and comparing to no discount

We modelled the evolution of costs of Capital Expenditures (CAPEX) and Operational Expenditures (OPEX) evolution until 2040, **evaluating how Laneshift promotes a quicker transition to electric trucks.**

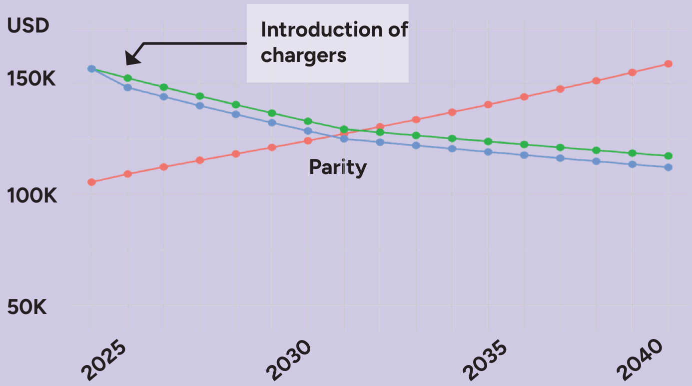
Analysis of cost trajectory for <u>investing</u> in a light-duty truck, by region

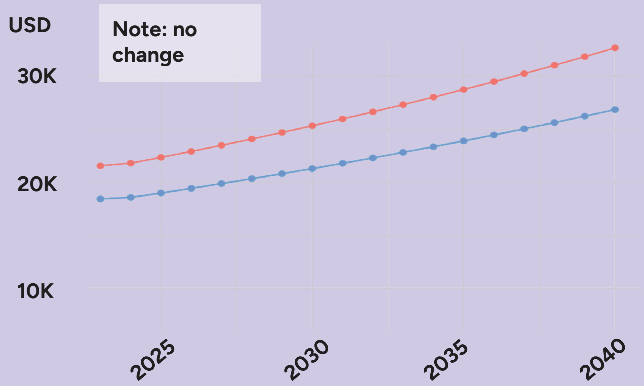
- Baseline: ICE vehicle investment cost
- Baseline: Electric vehicle investment cost
- Laneshift: Electric vehicle investment cost

Analysis of cost trajectory for <u>operation and maintenance</u> (O&M) costs in a light-duty truck, by region

- Baseline: ICE vehicle O&M cost
- Baseline: Electric vehicle O&M cost
- Laneshift: Electric vehicle O&M cost

Rio and Curitiba





Mexico City