

# Global Perspectives

August 10, 2021



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- 6/29 – Maintenance, Training, Safety
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- 7/27 – Sustainable Value Chains
- **8/10 – Global Perspectives**
- 8/24 – Driver Behavior & Experience





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# Before we get started:

## Q&A

Submit your questions to the host using the Q&A box in the upper right-hand corner.

## Survey

There will be a 30-second survey shown at the end. We appreciate your feedback!

## Presentations

A recording of today's webinar will be available on the ACT News website, and you will be emailed a link by early next week.

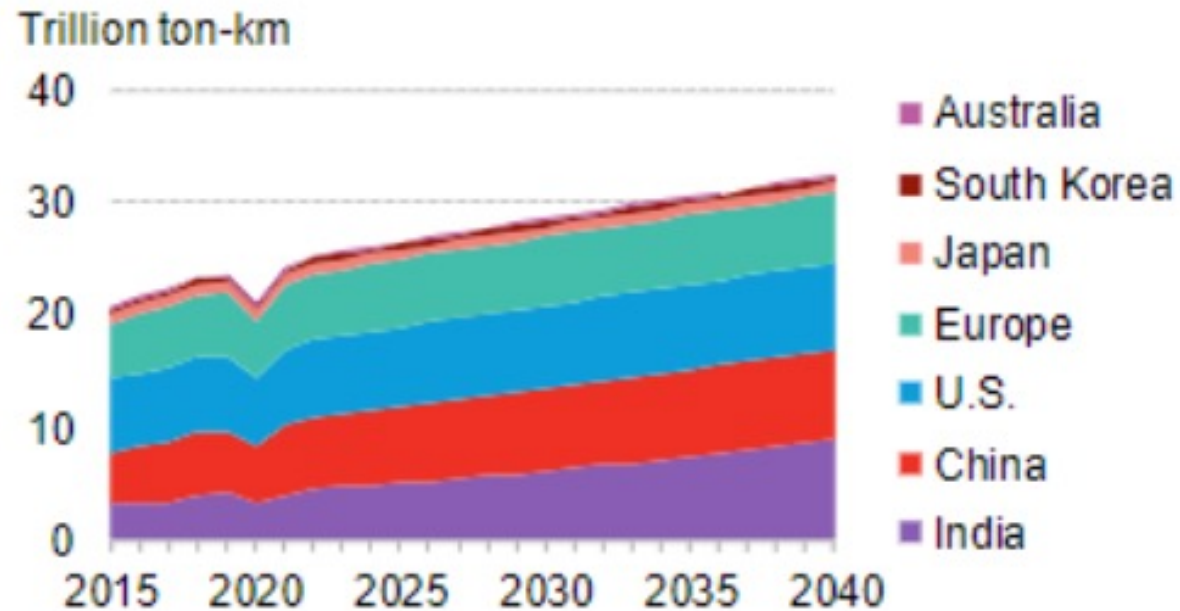
## Technical Issues

Contact Benjamin Chan at:  
[benjamin.chan@gladstein.org](mailto:benjamin.chan@gladstein.org)  
or call 310-573-8545 for assistance.



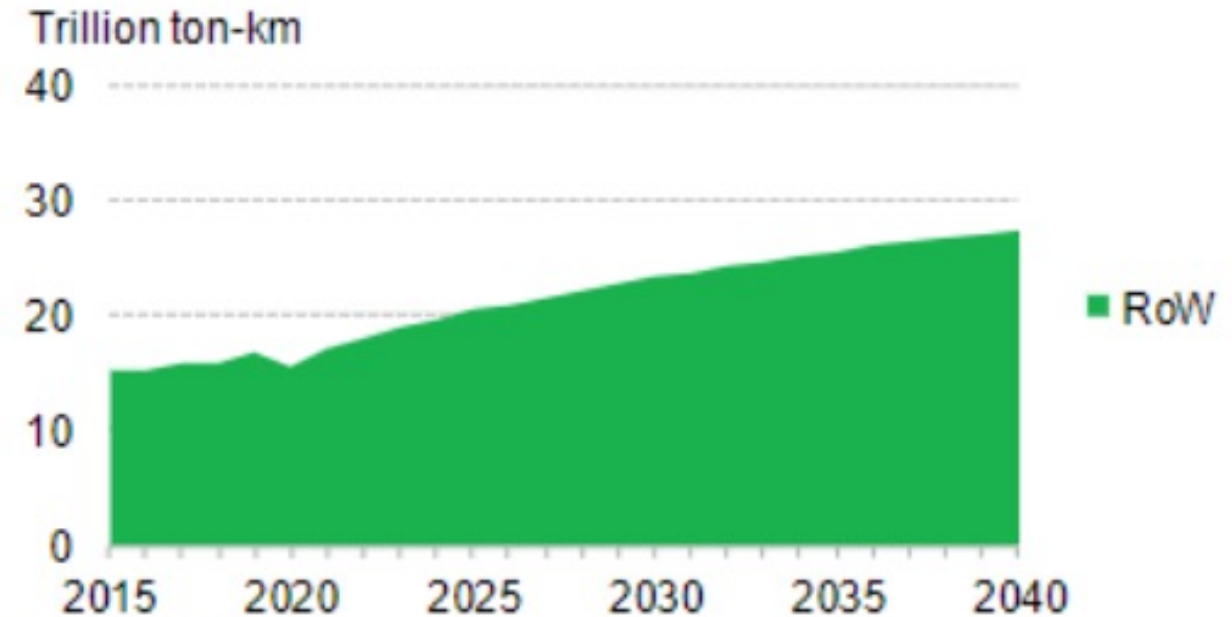
# Global Freight Demand Projections

Figure 181: Freight demand in the U.S., China, Europe, India, Australia, Japan and South Korea



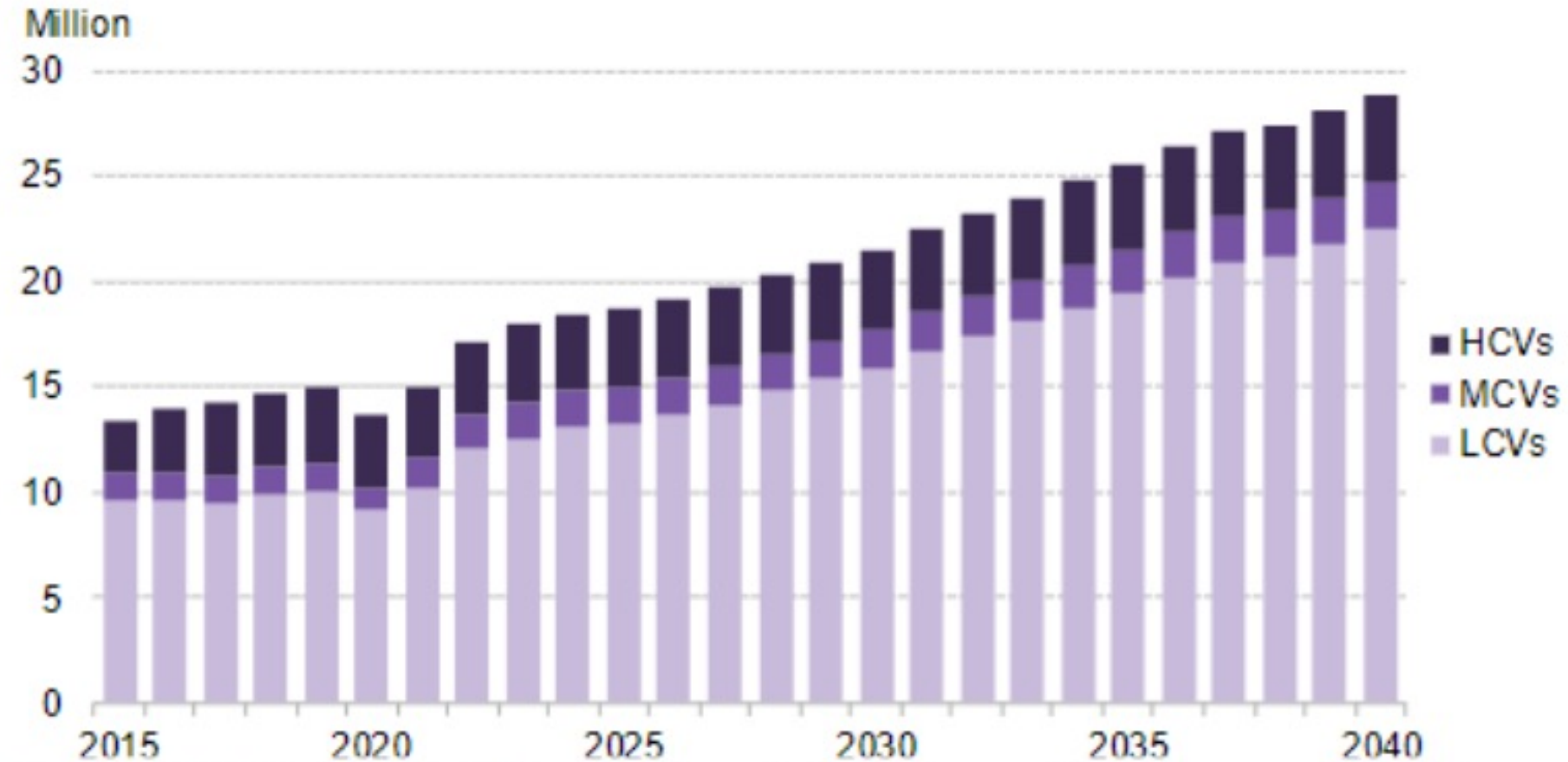
Source: BNEF.

Figure 182: Freight demand in Rest of World



Source: BNEF.

# Global Commercial Vehicle Sales Outlook by Class



Source: BNEF. Note: LCV, MCV and HCV are light, medium and heavy commercial vehicles.



# Global Commercial EV Sales & Fleet Share by Class

Figure 191: Global commercial EV sales share outlook

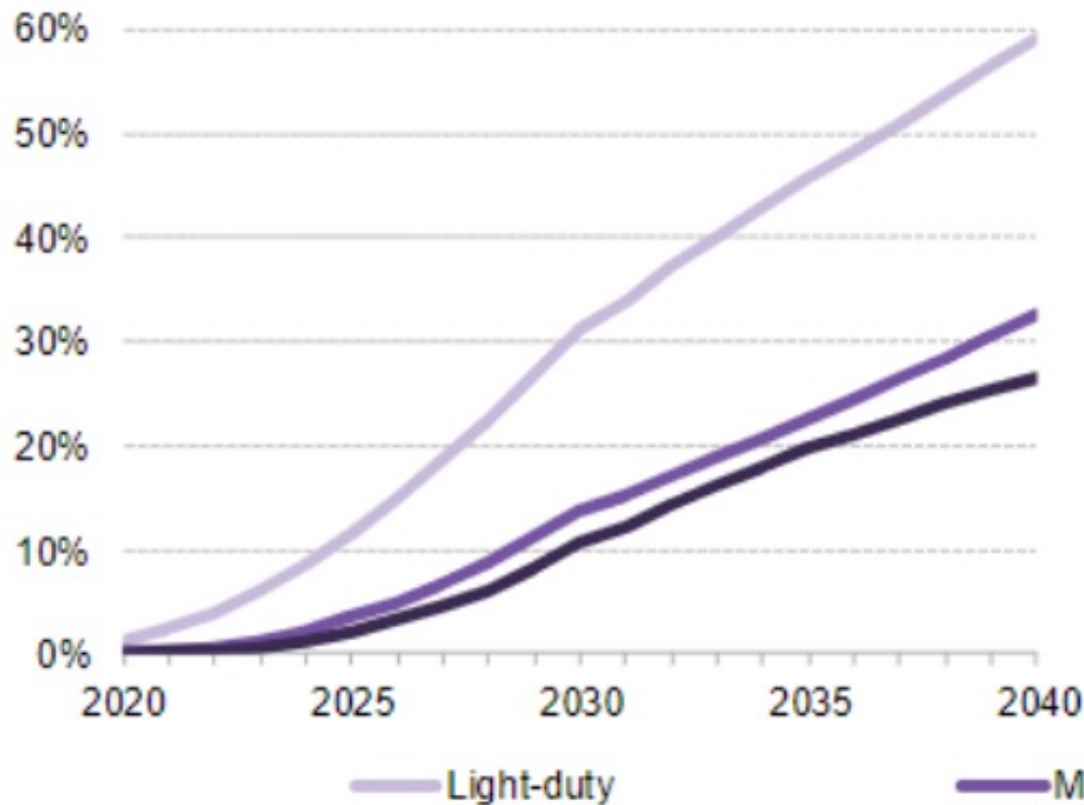
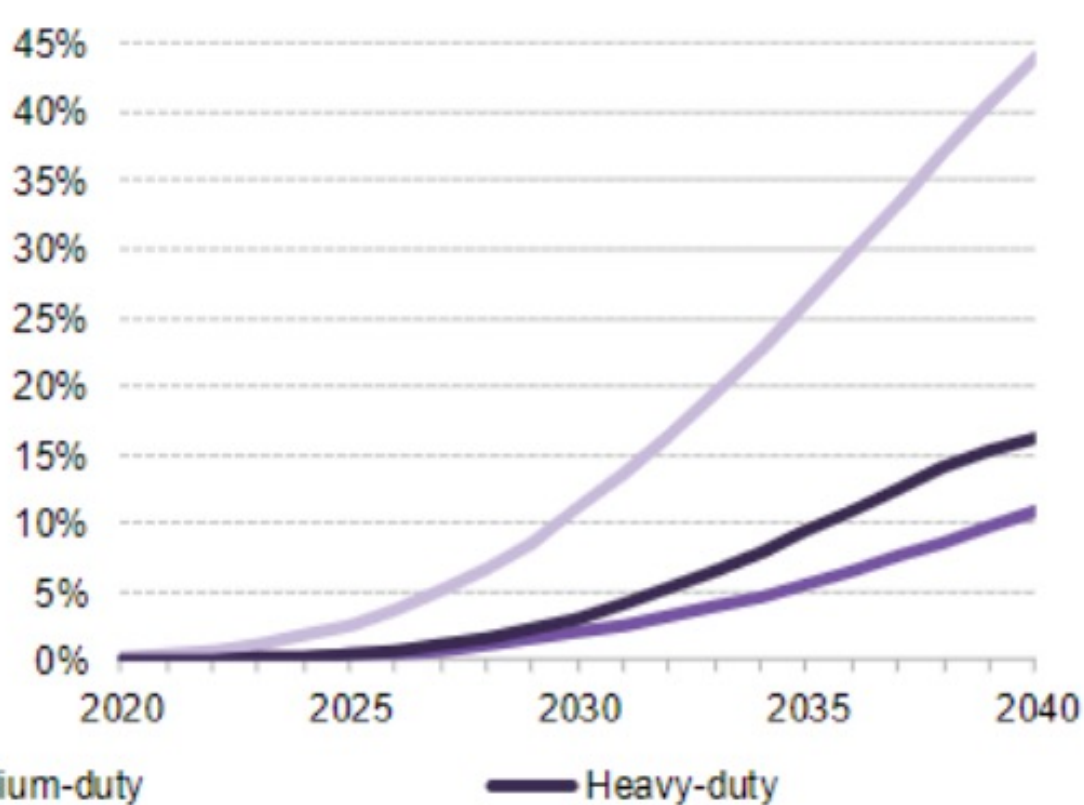


Figure 192: Global commercial EV fleet share outlook

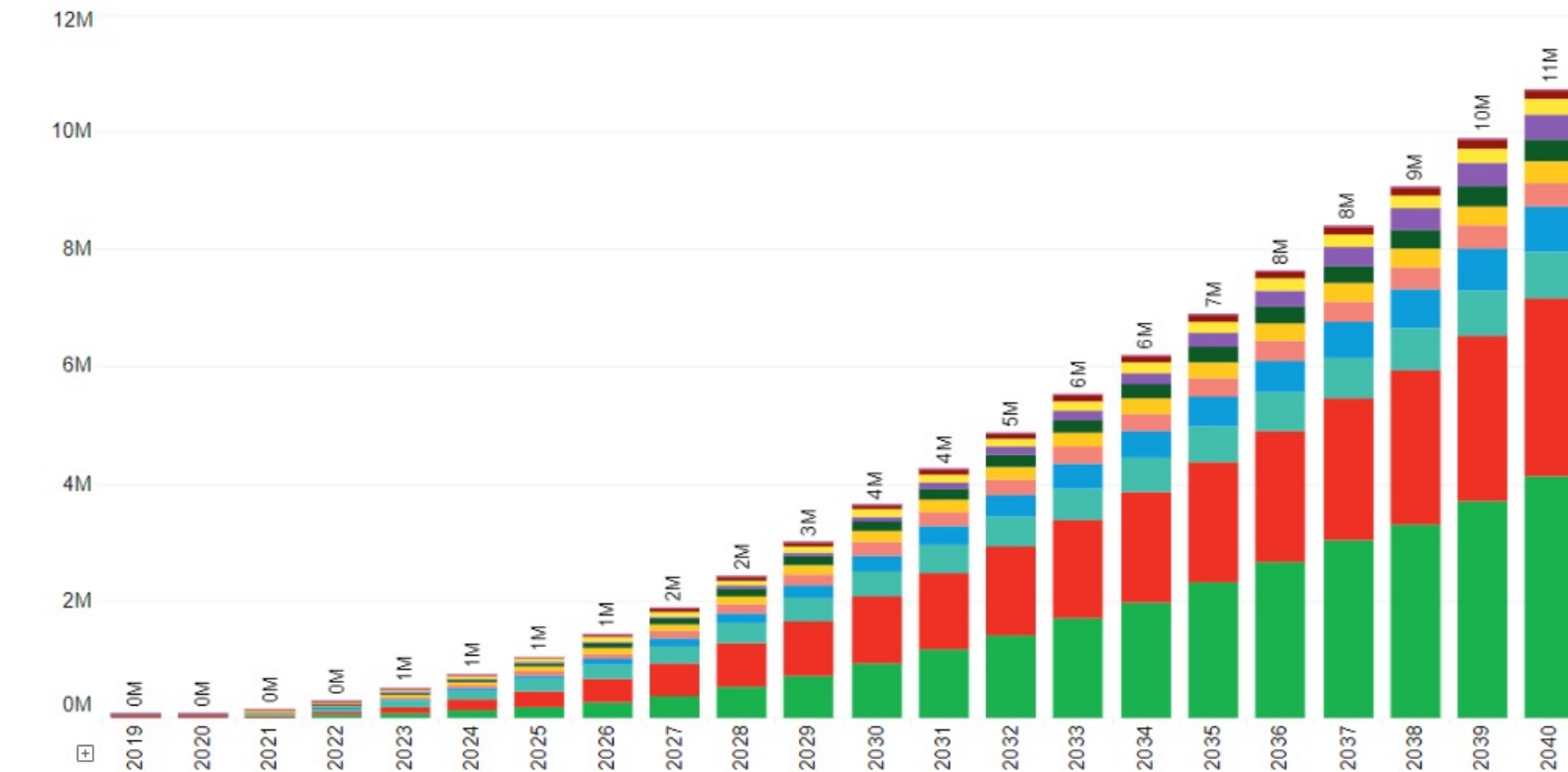


Source: BNEF. Note: EV is electric vehicle and includes battery-electric, plug-in hybrid and range-extender.



# Global Commercial BEV Sales Projections by Region

Commercial vehicle sales  
(Vehicles)



Country/region

Australia  
South Korea  
Germany  
India

U.K.  
France  
Japan  
U.S.

Rest of Europe  
China  
Rest of World

Data disclaimer

Source: BloombergNEF

Drivetrains: NGV (natural gas vehicles), BEV (battery electric vehicles), PHEV (plug-in hybrid electric vehicles), FCV (fuel cell vehicles)

Last updated: 9 June 2021

Update frequency: Annual



# Today's Speakers:



**Oscar Delgado**

*Manager, Zero-emission Fleets  
Center*

*The International Council on  
Clean Transportation (ICCT)*



**Dave Mullaney**

*Principal, Carbon-Free Mobility  
RMI*



**Cristiano Façanha**

*Global Director  
CALSTART*



**Samhita Shiledar**

*Manager, India Program  
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RMI*



# Zero-Emission Buses in Latin America

E-Truck Bootcamp – Global Perspectives  
August 10, 2021

Oscar Delgado, PhD  
Zero-Emission Fleets Center Manager

# ZEBRA Partnership



Funding Agency



Lead Partners



WORLD  
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<https://theicct.org/spotlight/zebra>



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Programme Director for  
Transportation & Urban Planning  
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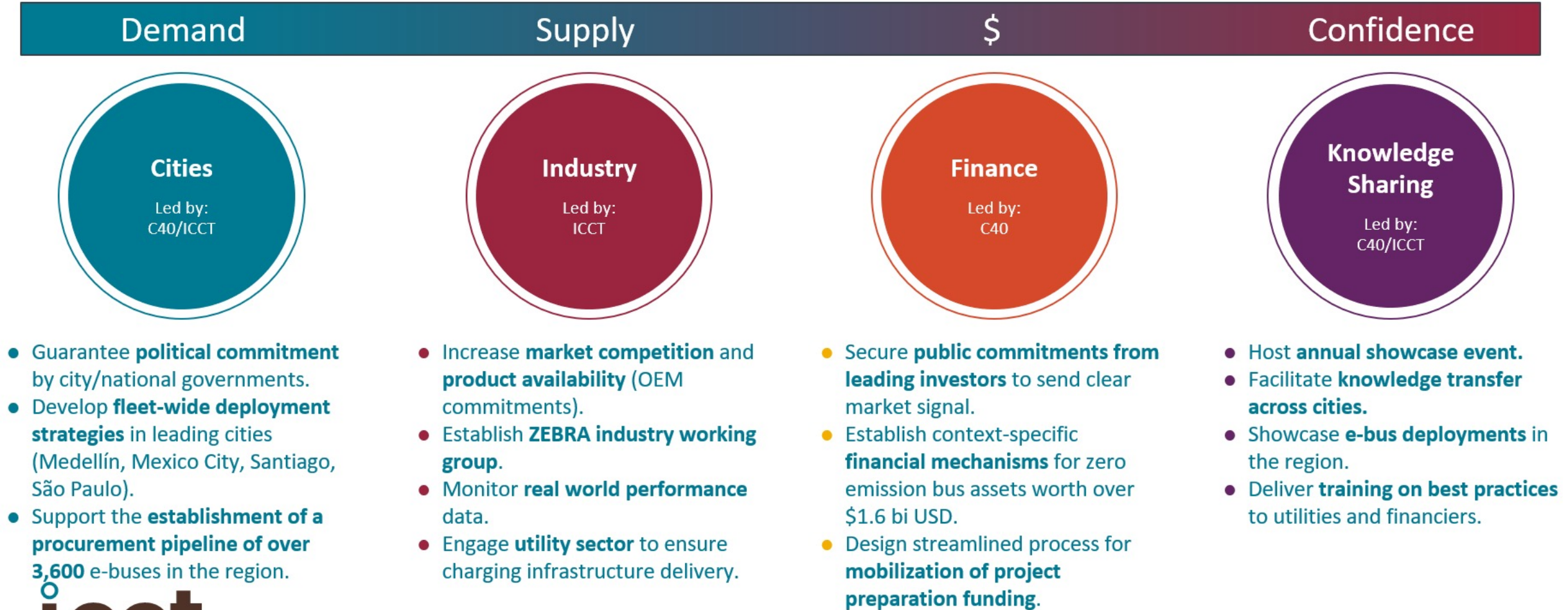
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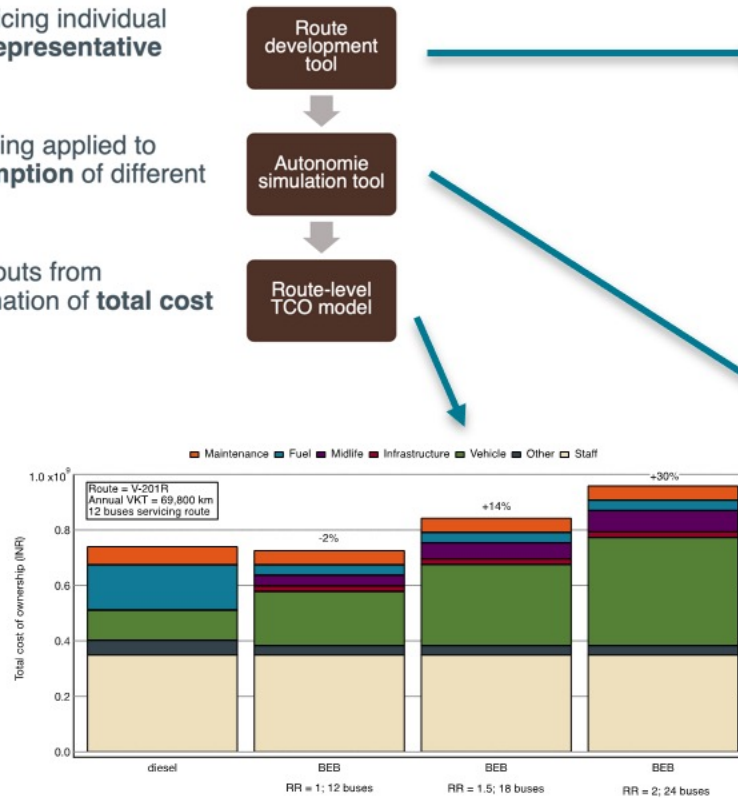
# ZEBRA approach to transform the market



# Fleet-wide Deployment Strategies

## Route-level TCO Methodology

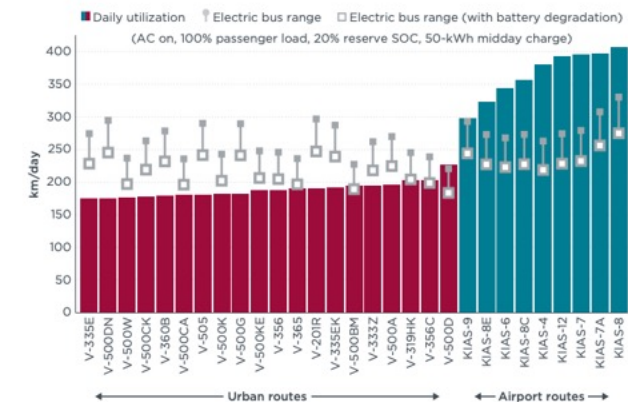
- GPS data for buses servicing individual routes used to develop **representative drive cycles**
- Vehicle simulation modeling applied to estimate **energy consumption** of different technology options
- Energy consumption outputs from simulations used in estimation of **total cost of ownership**



Effect of replacement ratio on route-level TCO (illustrative example)



Illustration of a drive cycle developed for a route from real-world operational data.  
<https://theicct.org/publications/zev-bus-fleets-dev-drive-cycles>



Estimated range by route compared with average route-level daily utilization of the existing diesel fleet.

<https://theicct.org/publications/deploying-zero-emission-bus-fleets-jun2021>



# ZEBRA Manufacturer and Investor Commitments

## Mexico M



## Colombia C



## Chile CL



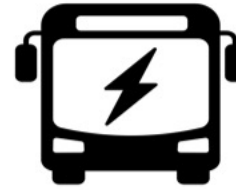
## Brazil B



Featured multilateral partners: IFC IDB | Invest

<http://theicct.org/events/zebra-pact-ebus-dec2020>

# E-Bus Radar



[www.ebusradar.org](http://www.ebusradar.org)

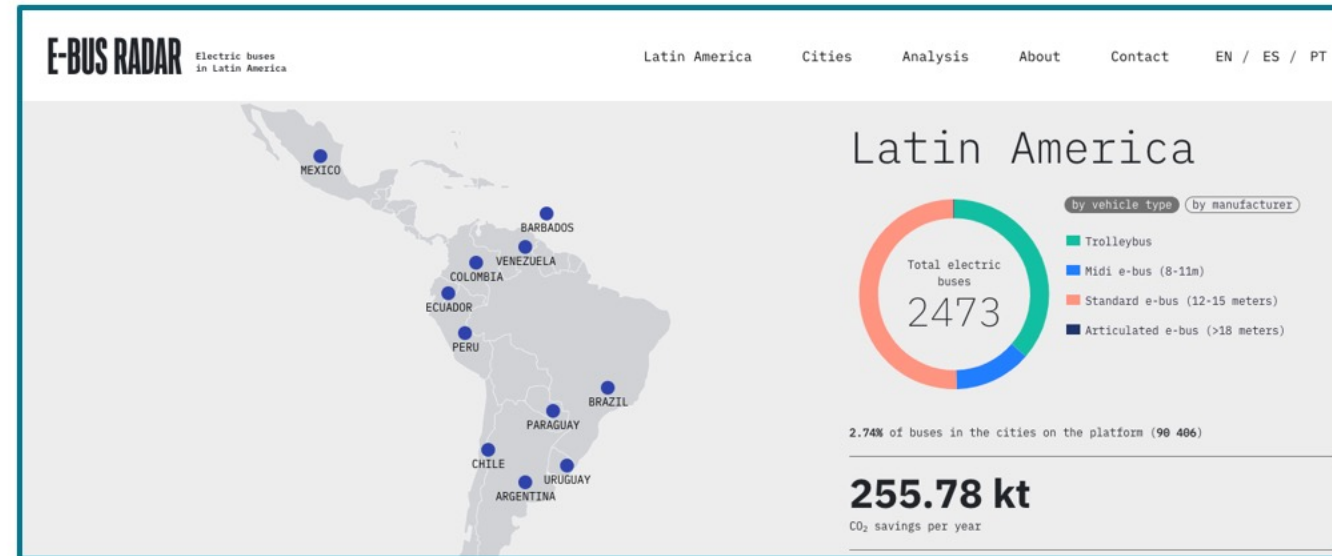
A virtual platform to track e-bus fleets in Latin American cities and CO<sub>2</sub> emissions saved each year

Results as of July 2021:

- **30 Latin American cities**
- **Over 2400 e-buses**
- **Over 250 CO<sub>2</sub> kt saved per year**

Developed in  
collaboration with:

**LABMOB**





Thank you!



THE INTERNATIONAL COUNCIL  
ON CLEAN TRANSPORTATION

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*The International Council on  
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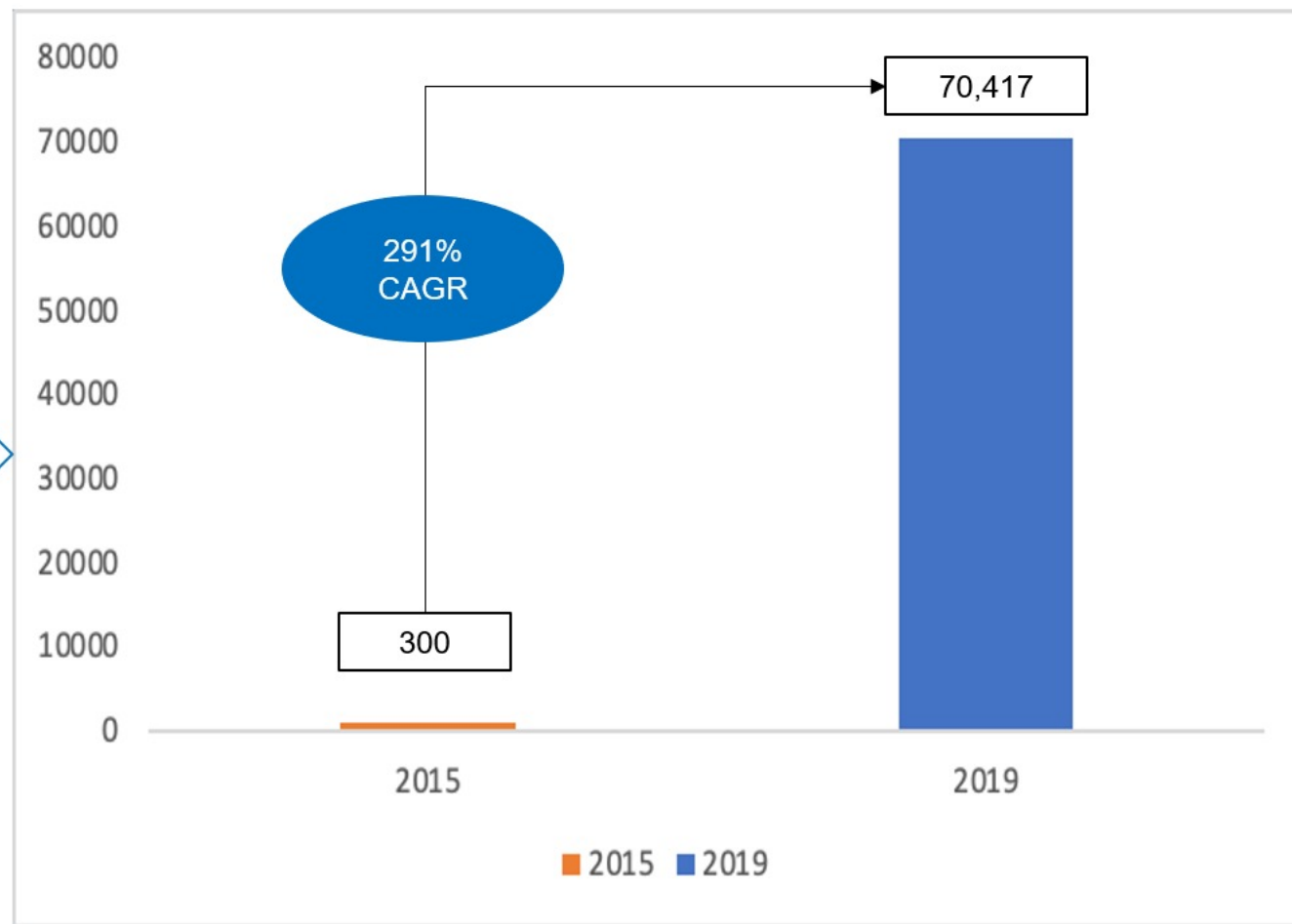
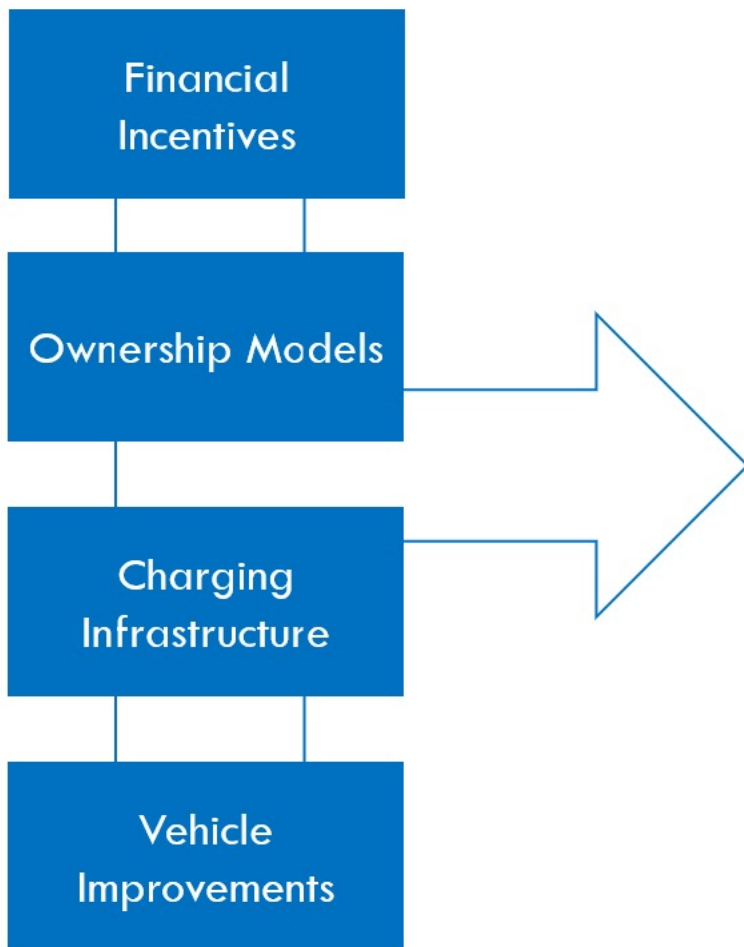
# Shenzhen's Experience with Electric Logistics Vehicles

RMI

August 2021



# Four Complimentary Factors Led to an Explosion in Electric Truck and Van Sales in Shenzhen



# Cost Competitiveness is Critical – without it Adoption Slows

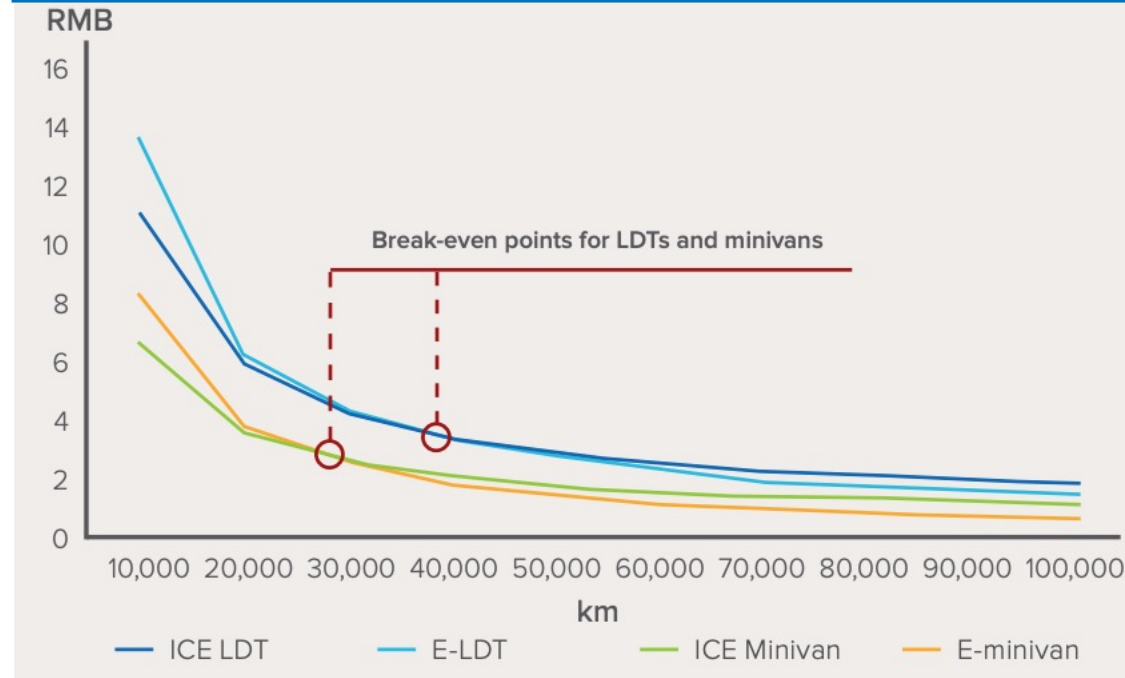
Financial  
Incentives

Ownership Models

Charging  
Infrastructure

Vehicle  
Improvements

TCO of ICE and Electric Vehicles



- Industry will not adopt EVs if the TCO case is not there – that is true in any geography.
- Financial incentives, currently worth between \$5,000-\$10,000, have been a key
- Magnitude of incentives are altered every year to maintain a breakeven point with ICE vehicles at utilization levels that are easily achievable in the market.

# EVs are an entirely different financial and operational proposition from ICE vehicles – they need new ownership models

Financial  
Incentives

Ownership Models

Charging  
Infrastructure

Vehicle  
Improvements

Short-term rental and leasing models account for over 90% of electric vehicles. These models offer key benefits at early stages of EV market development:

- **Up-front Cost Elimination:** Rent is paid on a monthly or yearly basis – no need to have cash on hand or access to large credit facilities.
- **Flexibility:** Rental agreements range from month-by-month to up to a year. Fleets do not have a long-term obligation to a particular vehicle.
- **After Sales Support:** No need to worry about schedule maintenance or battery replacements, just get the vehicle and drive.
- **Risk Management:** Operators do not shoulder the risk of vehicle failure or loss of residual value.



# Public Charging is Critical for EVs to Go Mainstream Beyond Large Fleets

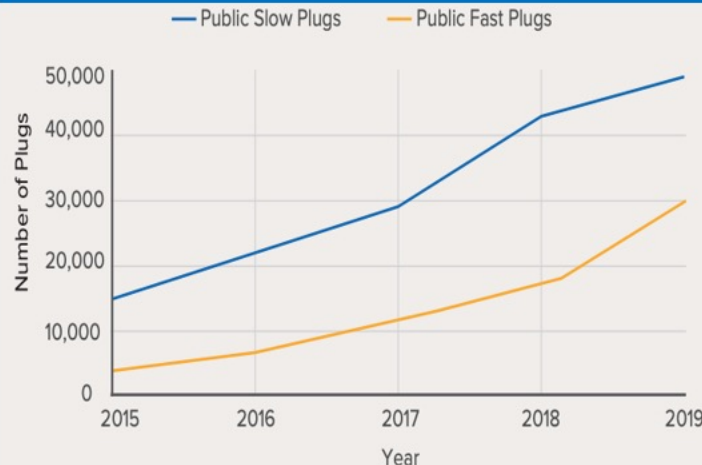
Financial  
Incentives

Ownership Models

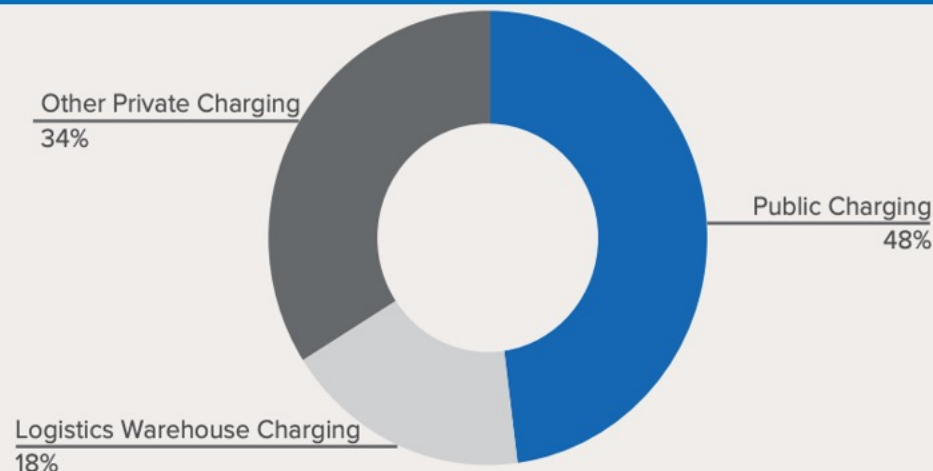
Charging  
Infrastructure

Vehicle  
Improvements

## Public Charging Plugs in Shenzhen



## kWh dispensed freight vehicles in Shenzhen



- Depot Charging is great for early mover fleets who can make it work, but they are a minority of the market.
- For owner operators and small fleets, depot charging often is not viable.
- Shenzhen's 80,000 public charge plugs (of which 30k are DCFC) provide half of the electricity that urban freight vehicles require.

# Vehicles, Especially their Range, must meet operational requirements

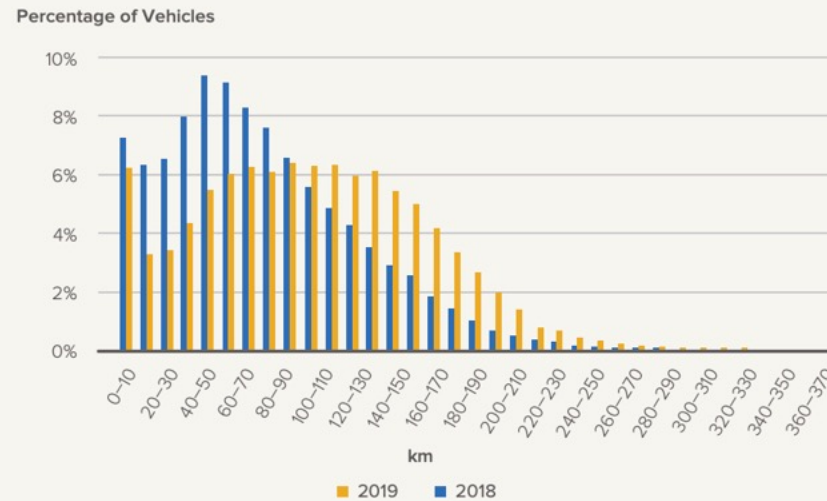
Financial  
Incentives

Ownership Models

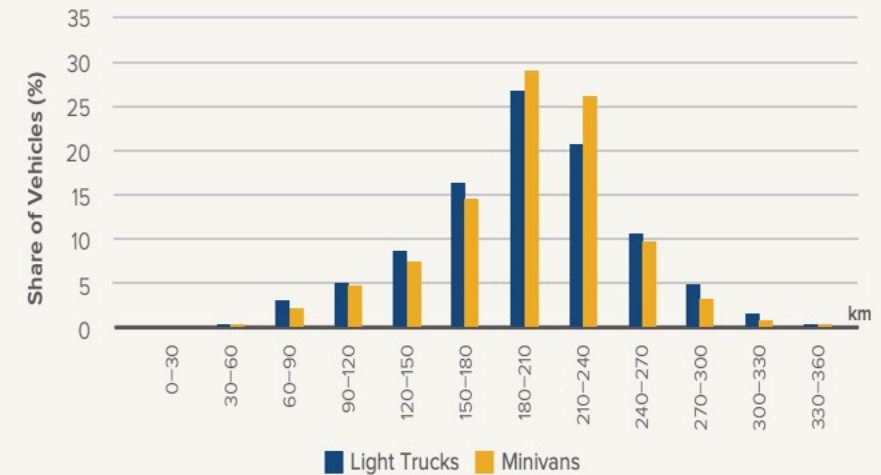
Charging  
Infrastructure

Vehicle  
Improvements

## Mean Actual Daily Travel Distances



## Estimated Vehicle Ranges - 2019



- EVs start out in short, low demand use cases and get deployed to longer, more challenging routes as operator confidence and charging infrastructure improves
- Observed daily mileage of EVs in Shenzhen.
- Average distance traveled grows predictably with advertised range of vehicles, typically average distance travelled is about half of the advertised range of vehicles.

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CALSTART*



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# Global progress and momentum towards zero-emission trucks

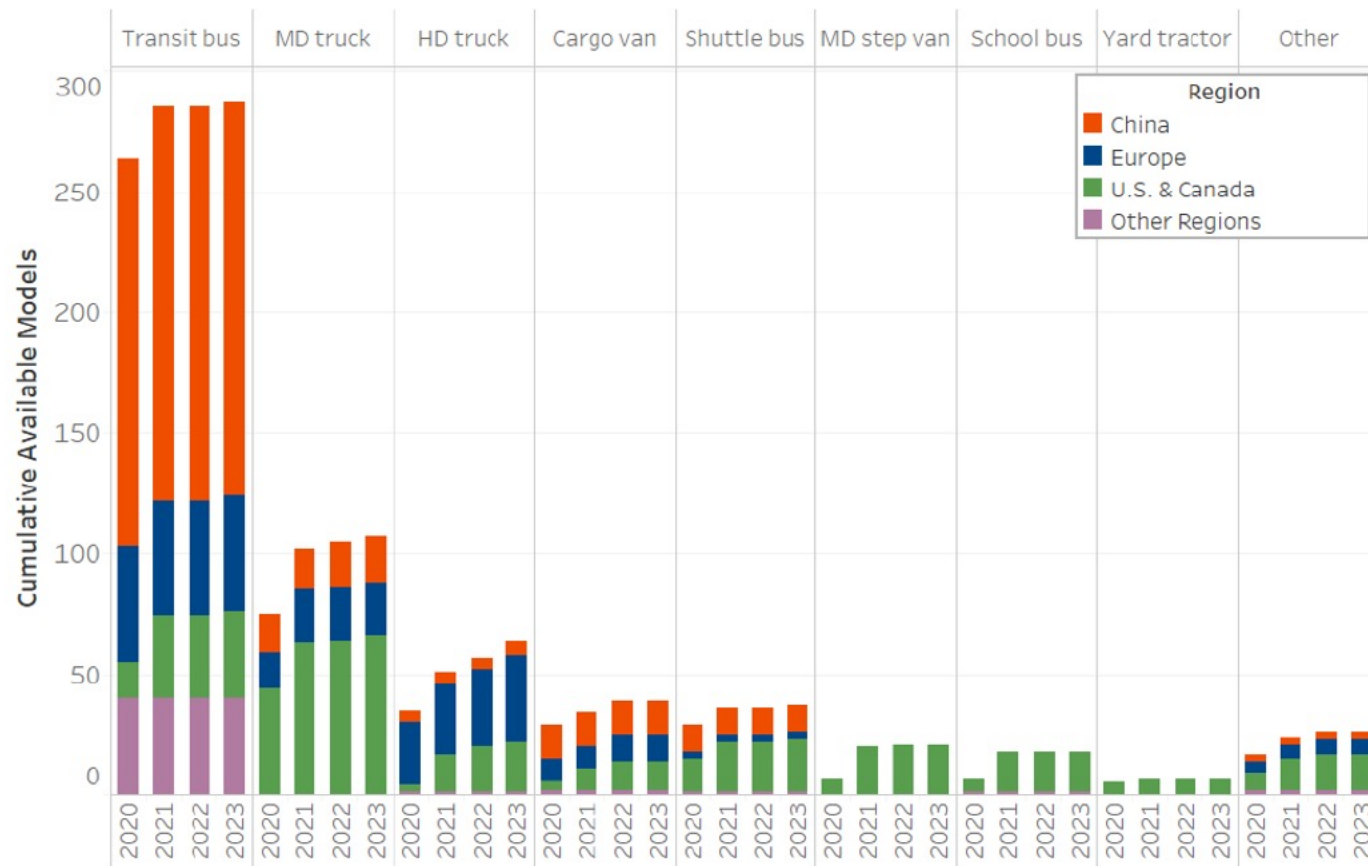
Electric Truck Bootcamp – Global Perspectives  
August 10 2021

# Model availability is healthy and rising, with 400+ existing and announced zero-emission commercial vehicle models



Source: Zero-emission Technology Inventory Tool (ZETI)  
<https://globaldrivetozero.org/tools/zero-emission-technology-inventory/>

Figure 4. Number of ZECV models by year, platform, and region (CALSTART, 2021a)<sup>xviii</sup>

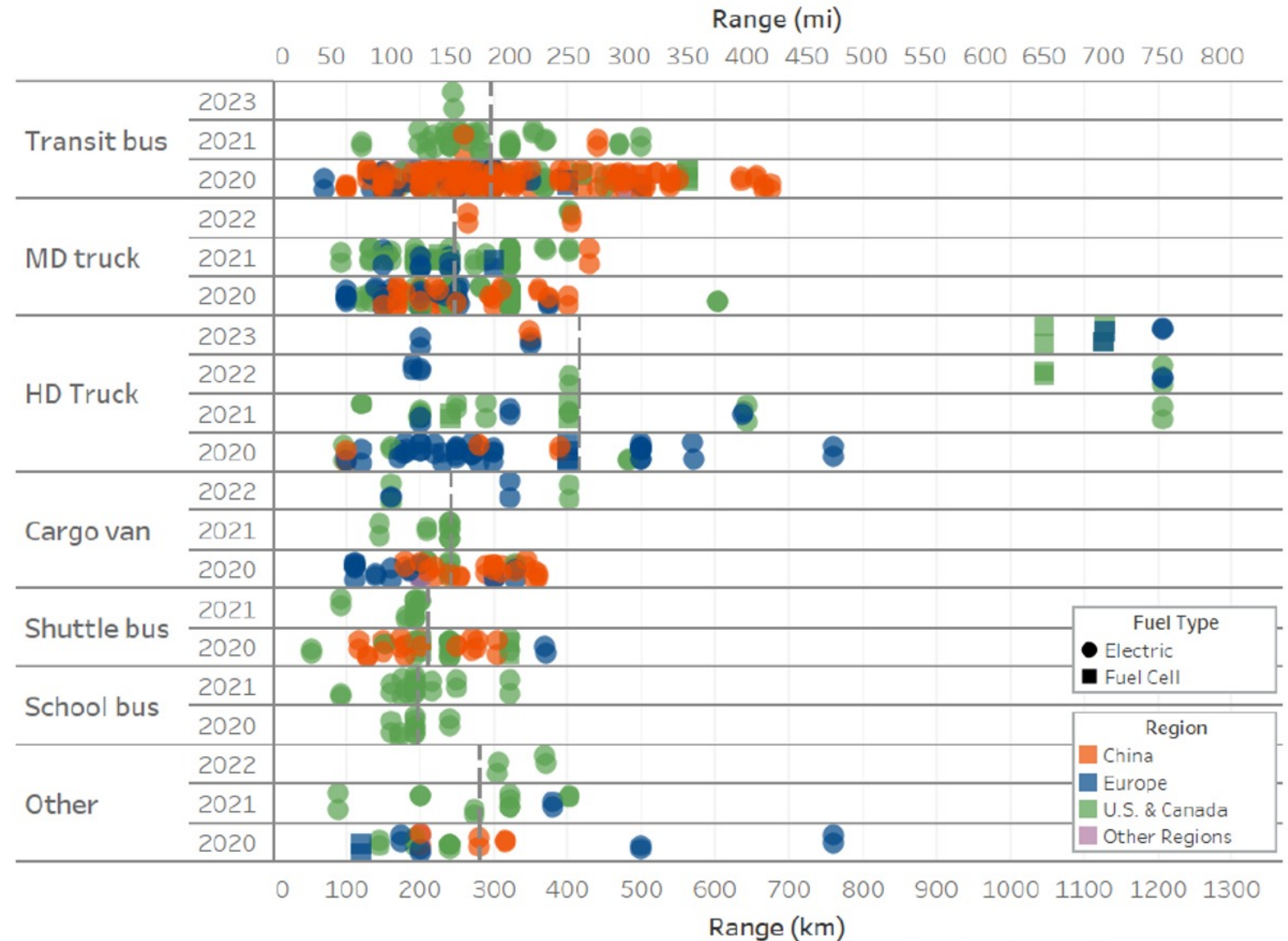


Source: MacDonnell & Façanha (2021): How Zero-Emission Heavy-Duty Trucks Can Be Part of the Climate Solution



**Figure 3.** Current and announced ZECV models by year, driving range, platform, fuel type, and region (CALSTART, 2021a)<sup>xxvi</sup>

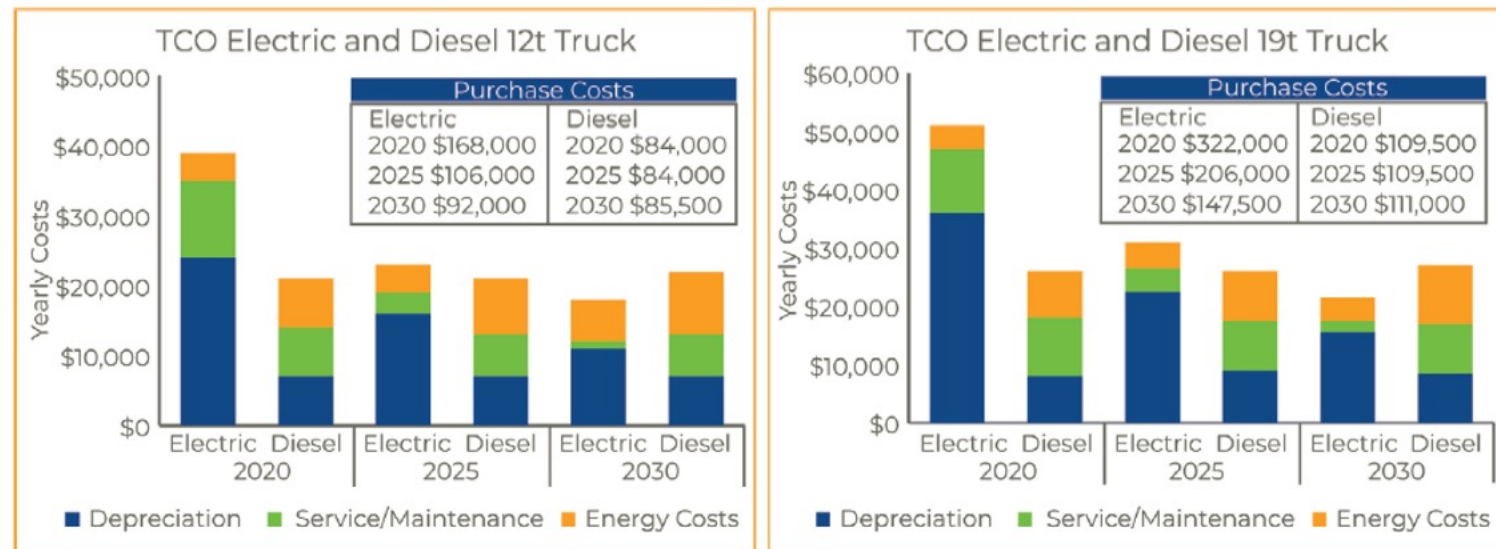
Zero-emission trucks already have ranges commensurate with fleet needs



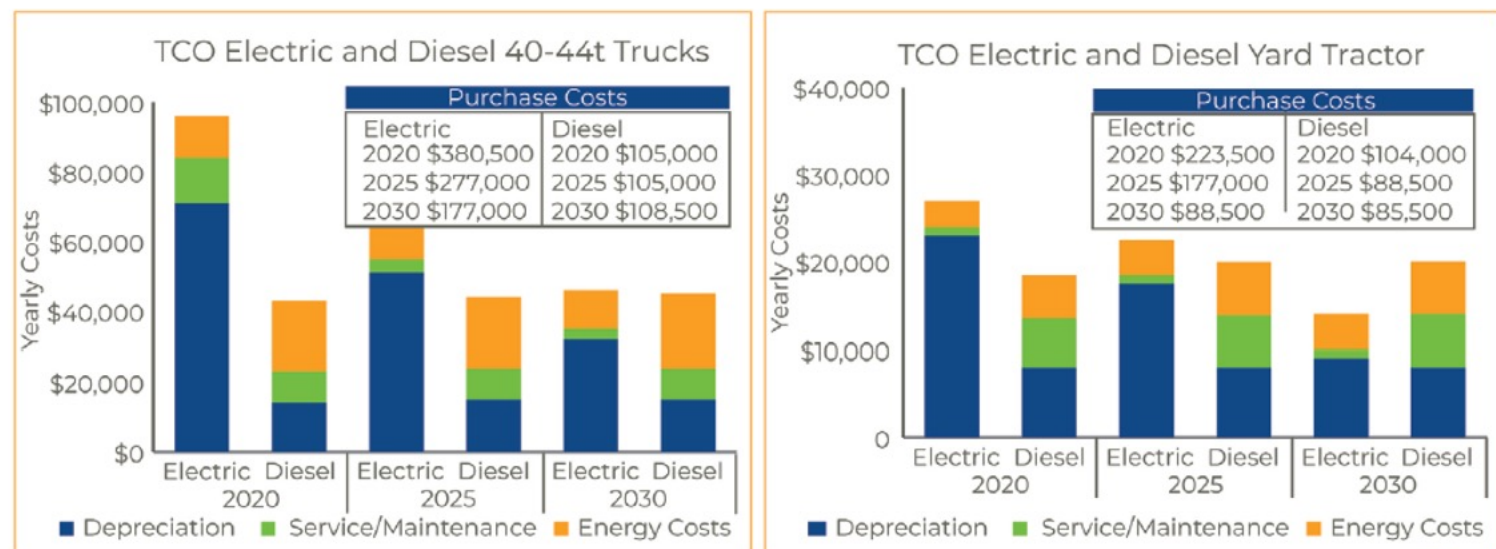
Source: MacDonnell & Façanha (2021): How Zero-Emission Heavy-Duty Trucks Can Be Part of the Climate Solution



**Figure 2-5.** TCO for cargo vans (12T) and medium-duty trucks (19T)



**Figure 2-6.** TCO for heavy-trucks (40-44T) and yard tractors



Zero-emission trucks will achieve cost parity by 2030

Source: Welch et al (2020): Moving Zero-emission Freight toward Commercialization

# 100+ organizations worldwide have joined CALSTART's Drive to Zero program

## THE PLEDGE

Cities, governments, manufacturers, fleets and fuel suppliers agree to:

- Work together to accelerate early markets for zero- and near-zero emission trucks, buses and equipment.
- Share information with peer regions.
- Access best tools, research, assistance, data.

## REGIONAL AND NATIONAL GOVERNMENT

Bay Area Air Quality Management District (BAAQMD)  
British Columbia Province, Canada  
California Air Resources Board (CARB)  
California Energy Commission (CEC)  
Canada  
Chile  
Chile Sustainable Energy Agency  
China  
Finland (Ministry of Economic Affairs and Employment)  
Foothill Transit  
Germany (VDI/VDE Innovation + Technik GmbH)  
Japan (Ministry of Economy, Trade and Industry) (observer)  
K'uL Group, Canada  
Los Angeles Department of Transportation (LADOT)  
Netherlands (Ministry of Infrastructure and Water Management)  
New York State Energy Research & Development Authority  
Norway (Norwegian Public Roads Administration)  
Quebec Province, Canada  
South Coast Air Quality Management District (SCAQMD)  
Sweden  
Västra Götaland Region, Sweden

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City of Madison, WI, USA  
City of Vancouver, Canada  
New York City, NY, USA  
Raymond Johansen, Mayor of Oslo  
The Honorable Darrell Steinberg, Mayor of Sacramento  
The Honorable Eric Garcetti, Mayor of Los Angeles  
The Honorable Michael D. Tubbs, Mayor of Stockton

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Nikola Corporation  
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The Lion Electric Co.  
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Unique Electric Solutions LLC  
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Viatic  
Workhorse  
XL Fleet  
XOS  
Zenith Motors

## FLEETS AND USERS

Blue Mountain Resorts  
East Bay Municipal Utility District  
Fresh City Farms  
Ingka Group (IKEA)  
Mayor Logistics  
Revolv  
Ryder  
Sim International  
The Green Cab

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Black & Veatch  
East Bay Community Energy (EBCE)  
Green Energy Technology  
San Diego Gas & Electric (SDG&E)  
Siemens  
Southern California Edison  
USGRDCO  
West Valley Construction Company

## KNOWLEDGE AND SERVICE ORGANIZATIONS

Auto Research Center (ARC)  
AVL  
Charge across town  
Clean Energy Canada  
Coast to Coast Smart e-Mobility  
Denver Metro Clean Cities  
Dunksy Energy Consulting  
East Bay Clean Cities Coalition  
Electric Vehicle Association of Atlantic Canada  
Empire Clean Cities  
Geotab  
Greener by Design, LLC  
Hubject  
The Pembina Institute  
Prospect Silicon Valley  
Windfall Ecology Centre  
ZEV2030



# URGENT CALL FOR GLOBAL ZERO-EMISSION MHDV MOU

\*MHDV: MEDIUM- AND HEAVY-DUTY VEHICLES



AUSTRIA



CANADA



CHILE



GERMANY



GREECE



NETHERLANDS



NORWAY



SWEDEN

Eight countries called on leading nations to jointly pursue global agreement on zero-emission MHDVs to meet Paris climate goals



# Thank you!

Cristiano Façanha  
CALSTART

[cfacanha@calstart.org](mailto:cfacanha@calstart.org)

For more information:  
[www.globaldrivetozero.org](http://www.globaldrivetozero.org)



**@TeamDriveToZero**

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# Freight electrification in India

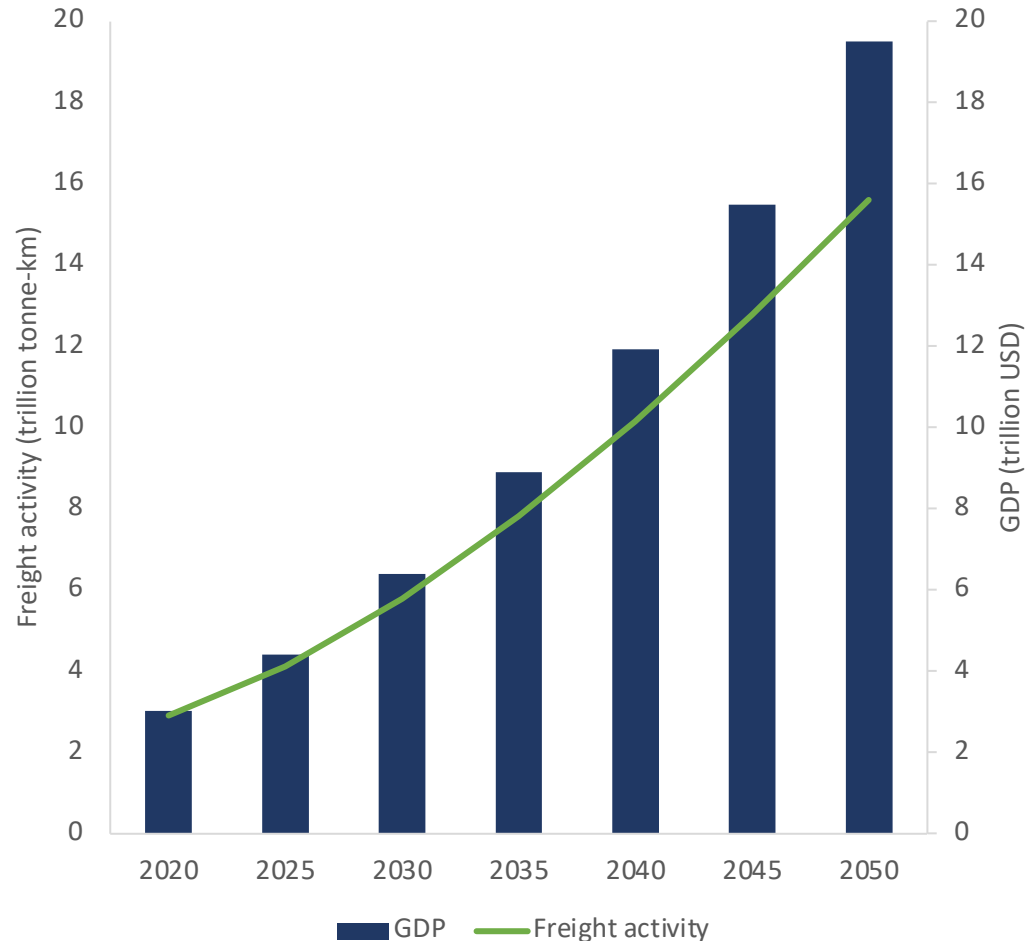
Samhita Shiledar  
August 2021





# Freight sector in India is growing at the rate of 6%

Freight activity and GDP growth in India



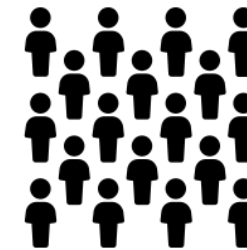
## Drivers for freight growth



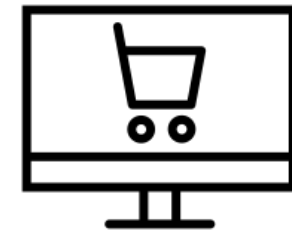
Increase in  
GDP



Urbanization



Growing  
population



Growth in  
E-commerce

# Urban freight demand is met by two- and three-wheelers while the long haul is carried out on trucks



0.2 tons payload  
3 kWh battery (125 km range)



0.5 tons payload  
8 kWh battery (85 km range)



0.7 tons payload  
14 kWh battery (100 km range)

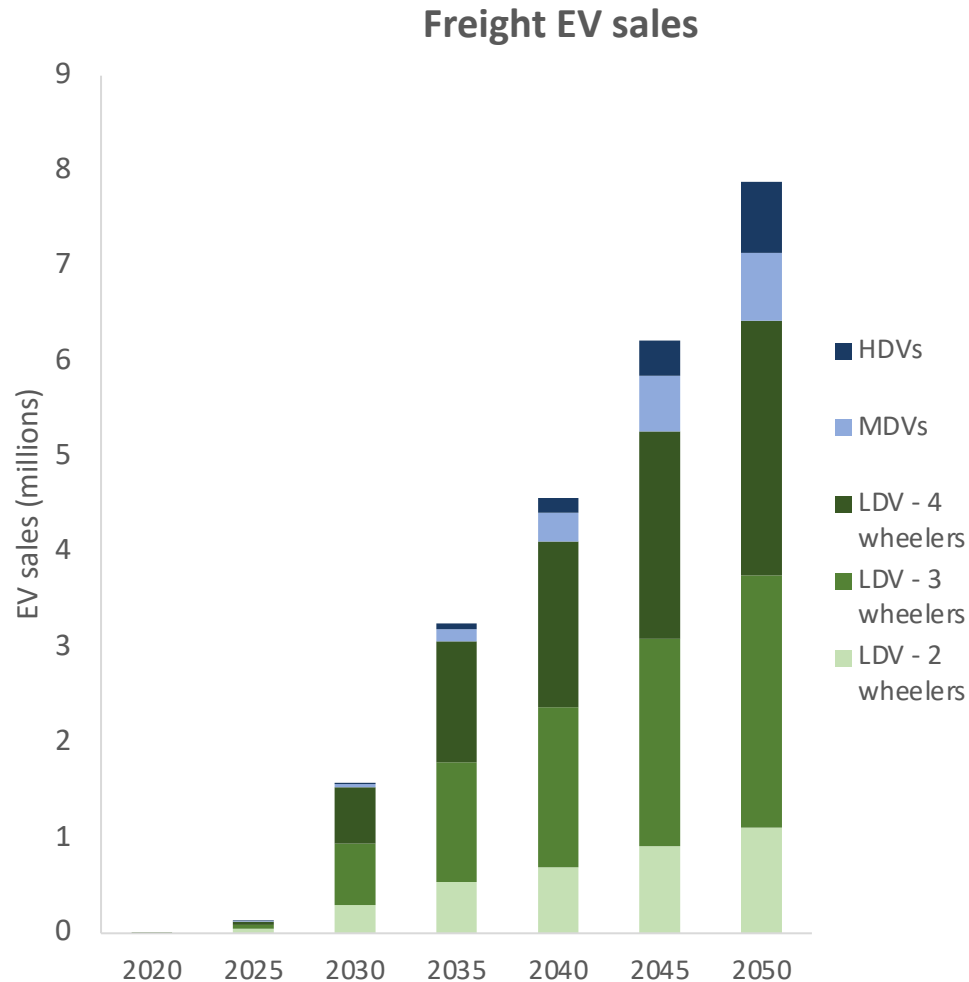


8 tons payload  
150 kWh battery (200 km range)



23 tons payload  
500 kWh battery (250 km range)

# India has national and state level policies to cultivate the EV ecosystem



## National Electric Mobility Mission Plan (NEMMP)

A national mission that provides the vision and roadmap for faster adoption of EVs

## Faster Adoption and Manufacturing of Electric Vehicles Scheme

INR 10,000 crore (\$1.4 billion) for direct purchase incentives for EVs and incentives for setting up charging infrastructure until 2022

## EV charging station policy by Ministry of Power

In 2018, the MoP released guidelines for public charging infrastructure for long range heavy duty EVs

## Production linked incentives scheme for Advanced Cell Batteries

Government of India recently approved production linked incentives for advanced cell battery manufacturing worth INR 18,100 crore (\$2.4 billion)

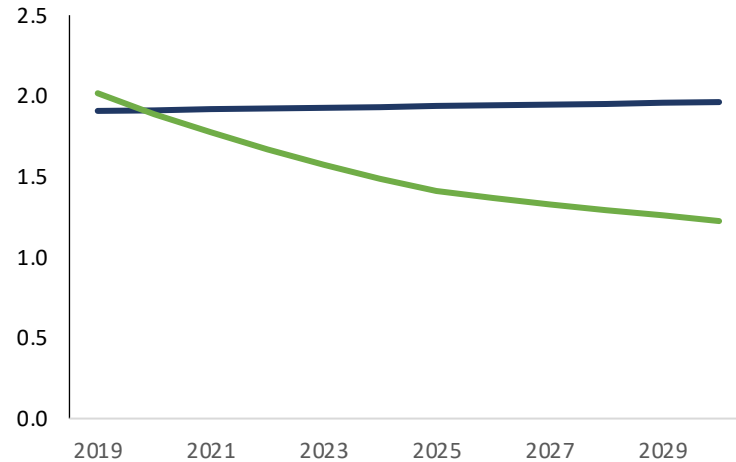


# Declining battery cost, improved infrastructure and economies of scale will bring down cost of EVs

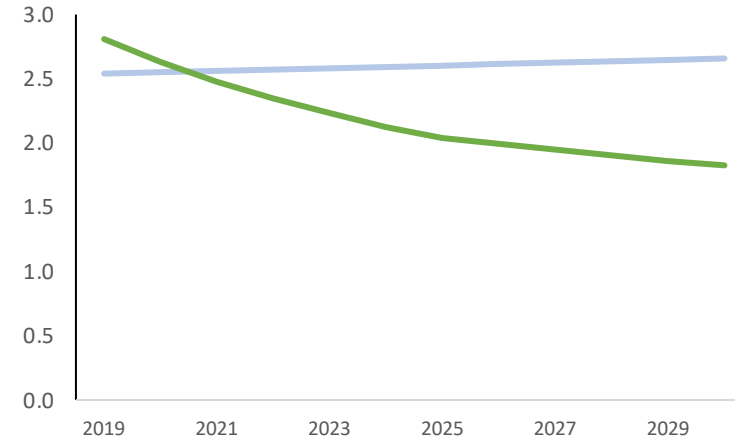
Total cost of ownership (INR/km)

Petrol CNG Diesel  
BEV FCEV

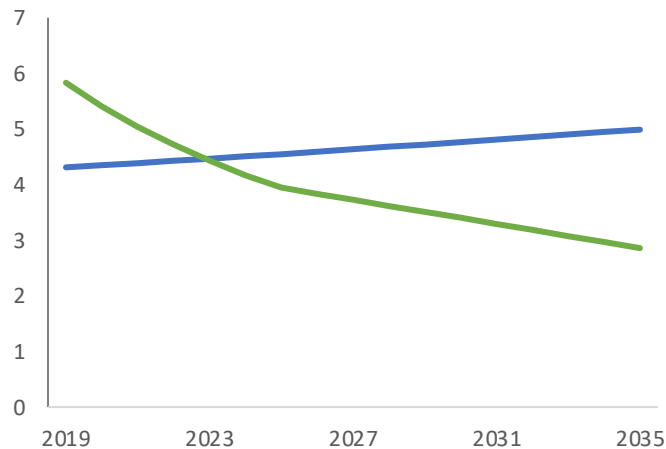
Two-wheelers



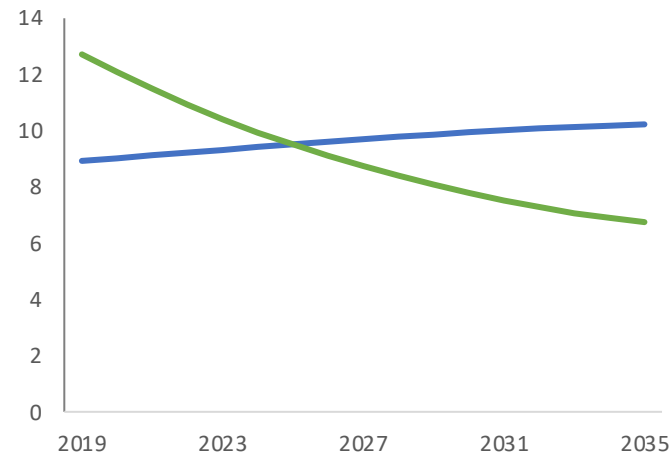
Three-wheelers



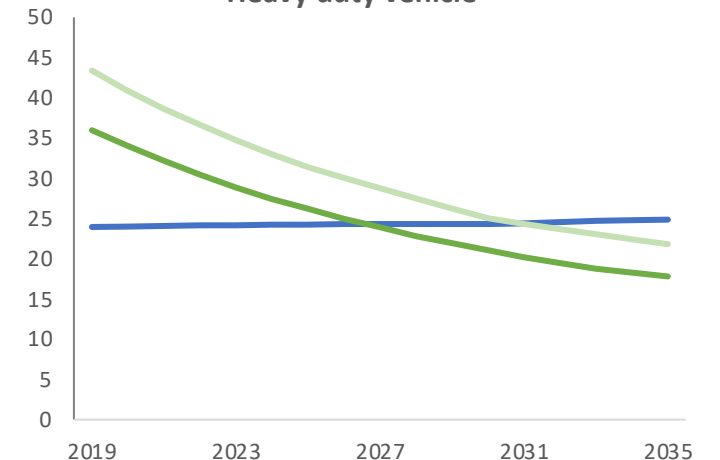
Light duty four-wheeled vehicle



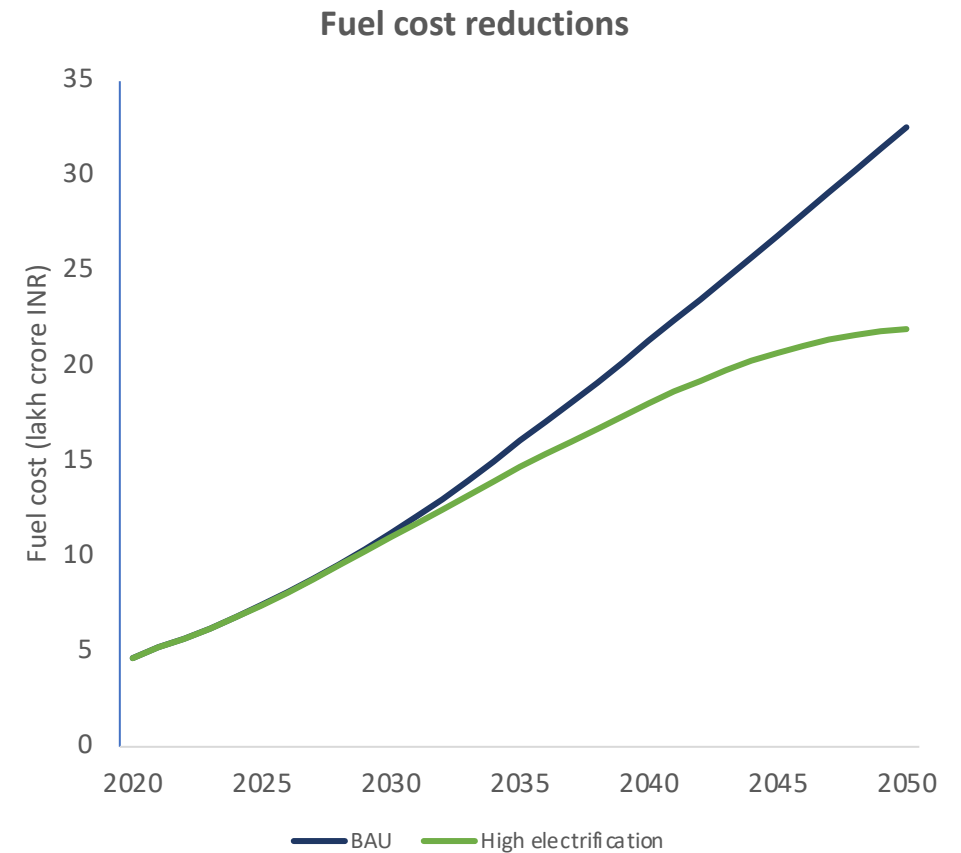
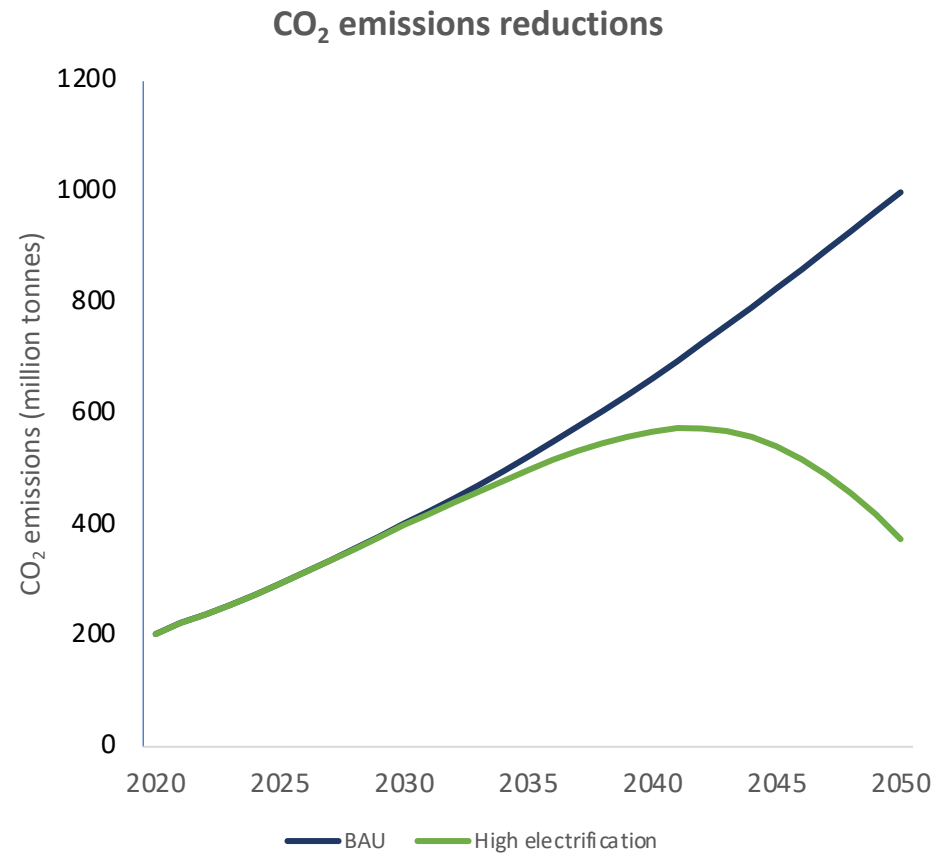
Medium duty vehicle



Heavy duty vehicle



# Electrification presents an opportunity to decarbonize the freight sector and reduce logistics costs



# RMI is enabling public private collaboration to accelerate the deployment of EVs in the country

## Deliver Electric Delhi



Pilot with the Delhi Government on deploying EVs for final mile deliveries

## Shoonya – Zero Pollution Delivery



National-level campaign with NITI Aayog which includes corporate certification for EV deliveries and consumer awareness drives on benefits of EVs

## State EV policy accelerator



Partnership with state governments on designing EV policies



# Q&A:



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# Thank you!

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Electric Truck Expert badge, please  
visit: [www.RunOnLess.com](http://www.RunOnLess.com)



Our final training is **August 24 on Drivers**

