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ZERO-EMISSION LOGISTICS VEHICLES PROMOTION CHALLENGES AND EXPERIENCES: BEIJING CASE STUDY

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International Forum on Low Carbon Cities, 23-24 November



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A New Climate Economy Special Initiative



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FINANCING
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New Urban
Mobility
alliance



TUMI
Transformative Urban Mobility Initiative

BACKGROUND

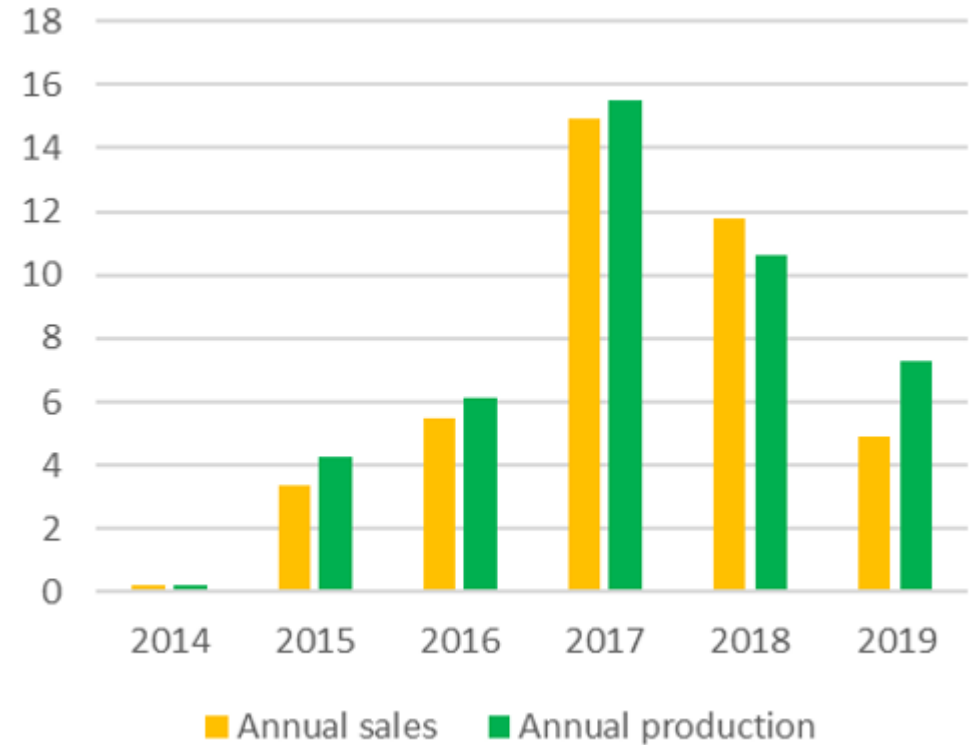
Targets

Development Plan for the New Energy Vehicle Industry (2021-2035)

from 2021 onwards, the proportion of the vehicles newly added and replaced to the public sector, such as logistics, will be at least 80 percent in national ecological civilization pilot zones and key areas for air pollution prevention and control.

Beijing Three-year Action Plan for Winning the Blue Sky War

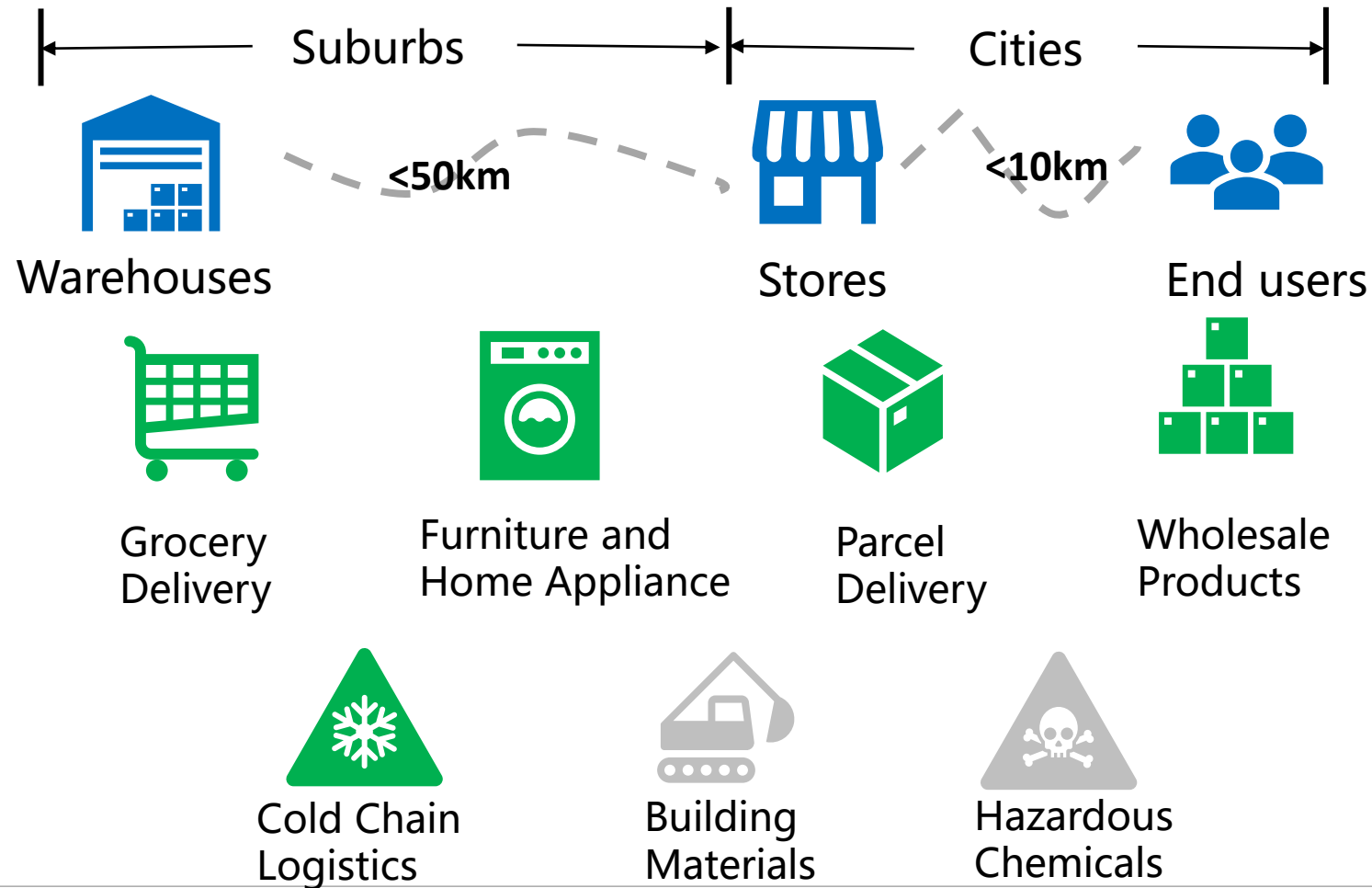
By 2020, urban logistics vehicles (below 4.5 tons) should be primarily replaced by electric vehicles.



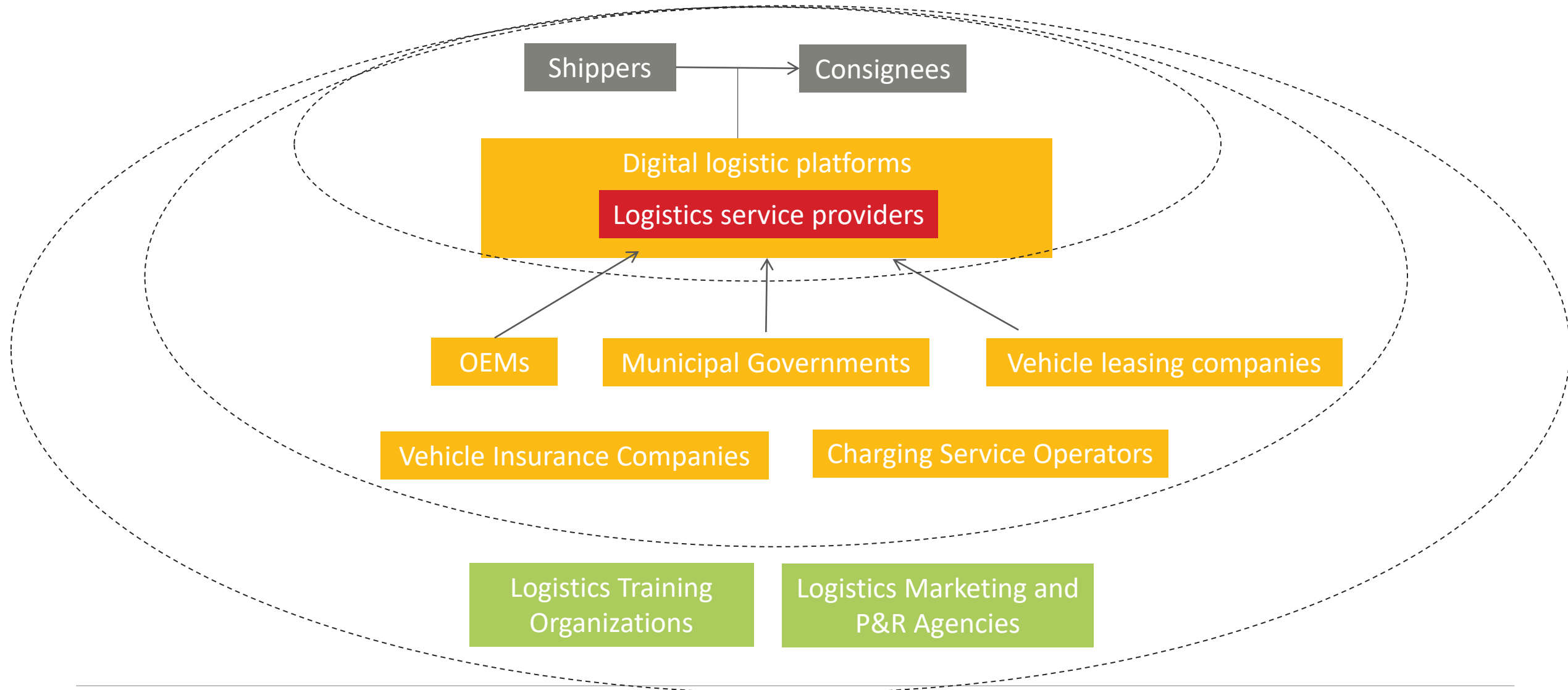
Annual production and sales of electric logistics vehicles in China from 2014 to 2019 (unit: 10,000 vehicles)

BACKGROUND

Application Scenario



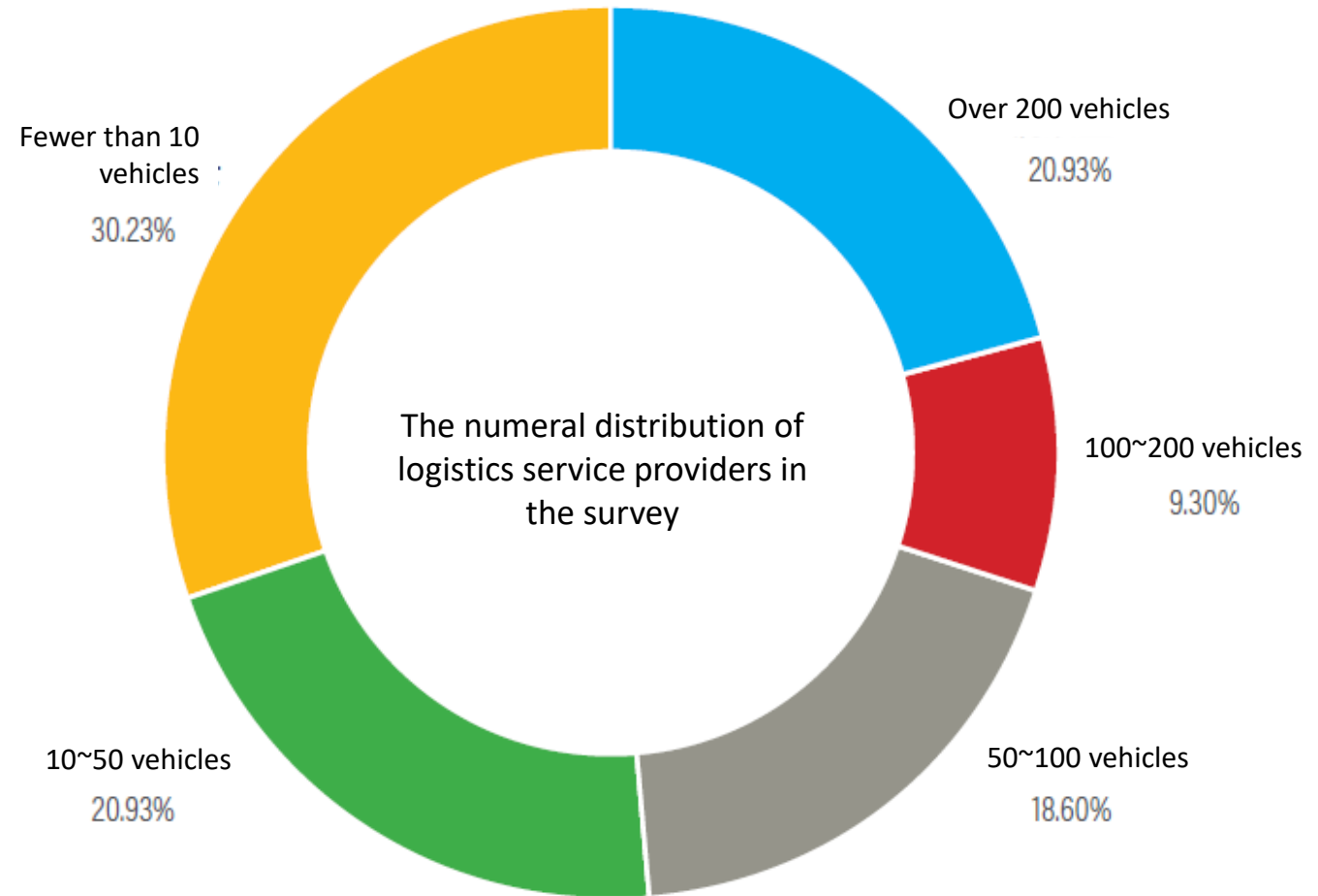
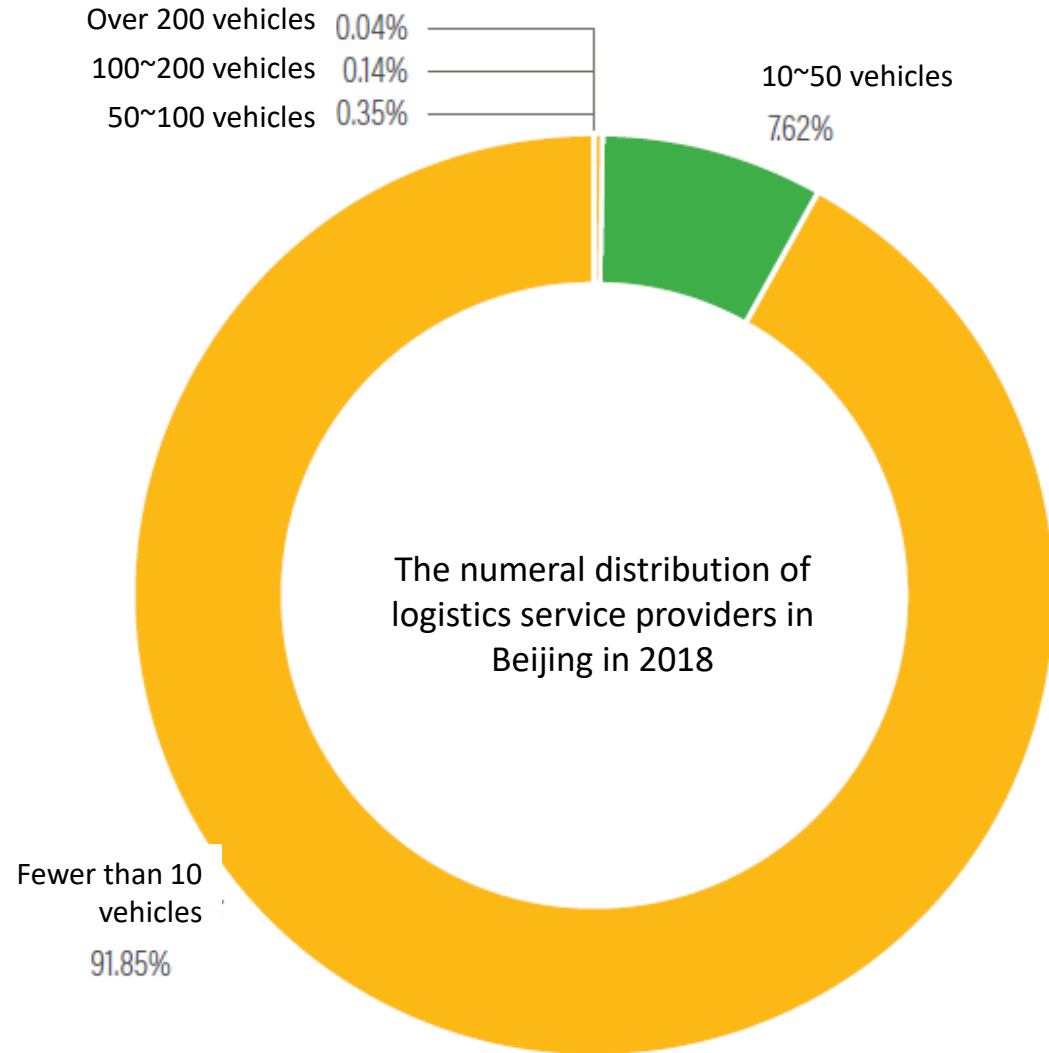
KEY STAKEHOLDERS



SURVEY SAMPLES

Application Scenario	Features of Each Scenario	Number of Logistics Service Providers	Usage of e-LDV	Ownership of e-LDV
Grocery delivery	Involving the largest number of companies, including supermarkets, logistics service providers, family-run shops	25 (including AEON Beijing distribution center, Saizeriya Beijing logistics center etc.)	Small and medium-sized companies barely use e-LDV, some large companies use e-LDV	Small businesses choose to lease vehicles, while large companies choose to both lease and purchase vehicles.
Parcel delivery	Oligopolistic competition, mainly large logistics service provider	4 (JD, SF-express etc.)	High employment rate of e-LDV	Leased or self-owned
Furniture and home appliance delivery	Including shippers' self-owned logistics, large third-party logistic service providers, platform-based companies	6 (Suning, Lalamove etc.)	Small and medium sized companies hardly use e-LDV, while large enterprises use e-LDV	Mainly leased by small and medium sized businesses, and mainly owned by large companies
Wholesale products delivery	Mainly individual vendors	2 (Xinfadi individual vendors)	Mainly use ICE-LDV	-
Cold chain logistics	Mainly professional cold chain logistics service providers	6 (Wuhuan Shuntong, Sanxin Refrigeration etc.)	Mainly use ICE-LDV	Mainly leased by companies

SURVEY SAMPLES



RESEARCH METHOD: TCO OF FIRST-OWNERS

$$\text{TCO Difference} = \text{Operation Efficiency} \times \left(\text{Acquisition Costs Difference} + \text{Operation Costs Net Present Value Difference} - \text{Vehicle Residuals Net Present Value Difference} \right)$$

- **Acquisition**

- Vehicle cost
 - Cost of financing*
 - Purchase subsidy
- (Charging infrastructure investment)

- **Depreciation**

- Depreciation or residual values

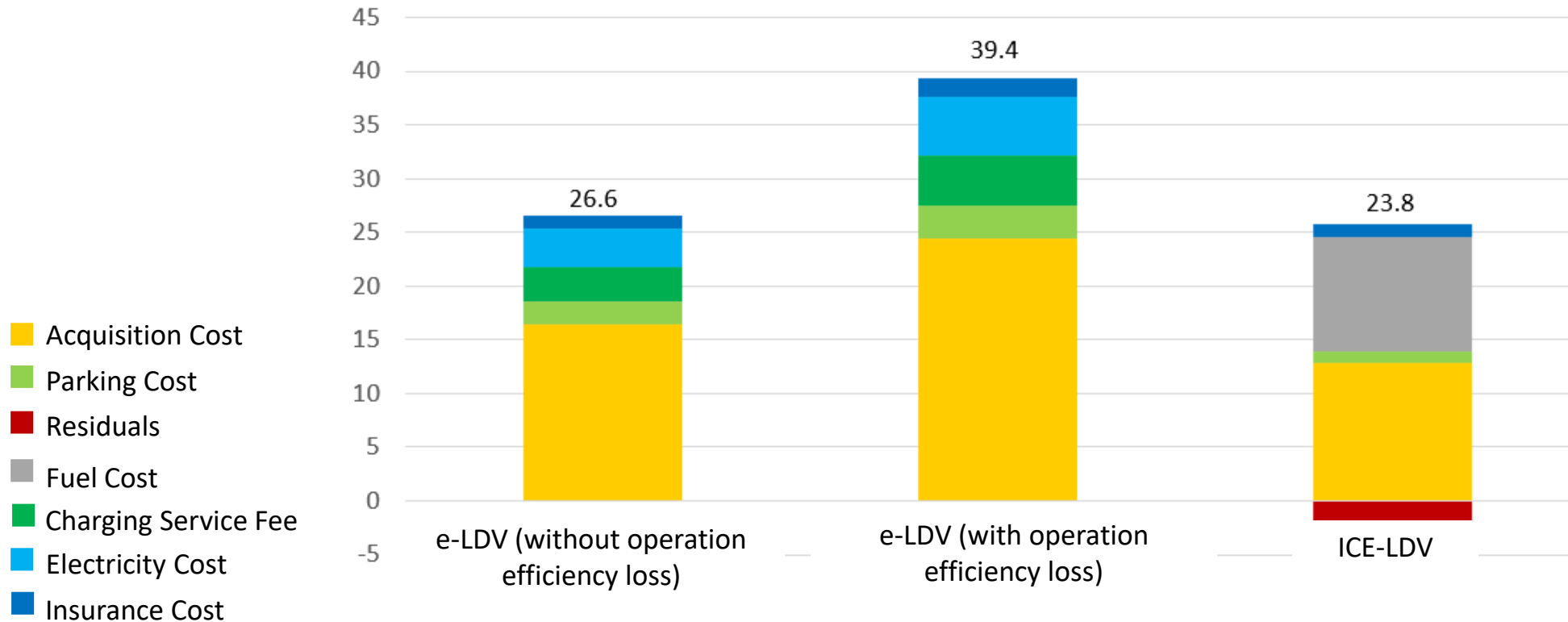
- **O & M**

- Fuel/electricity cost
- Parking cost
- Maintenance cost
- Labor cost
- Insurance
- Operation subsidy

- **Operation Efficiency**

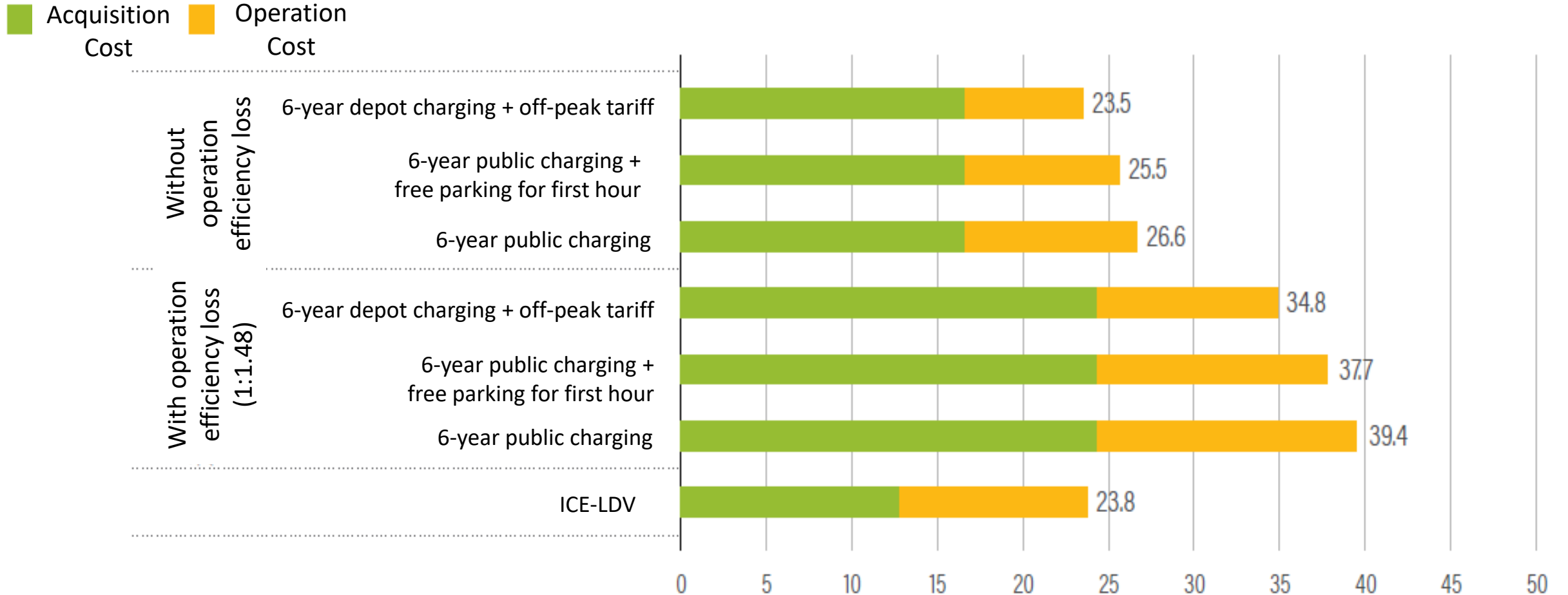
- Operation efficiency loss
- Road access privileges

TCO OF FIRST OWNERS



e-LDV and ICE-LDV: Comparison of 6-year TCO Net Value (Unit: 10000 yuan)

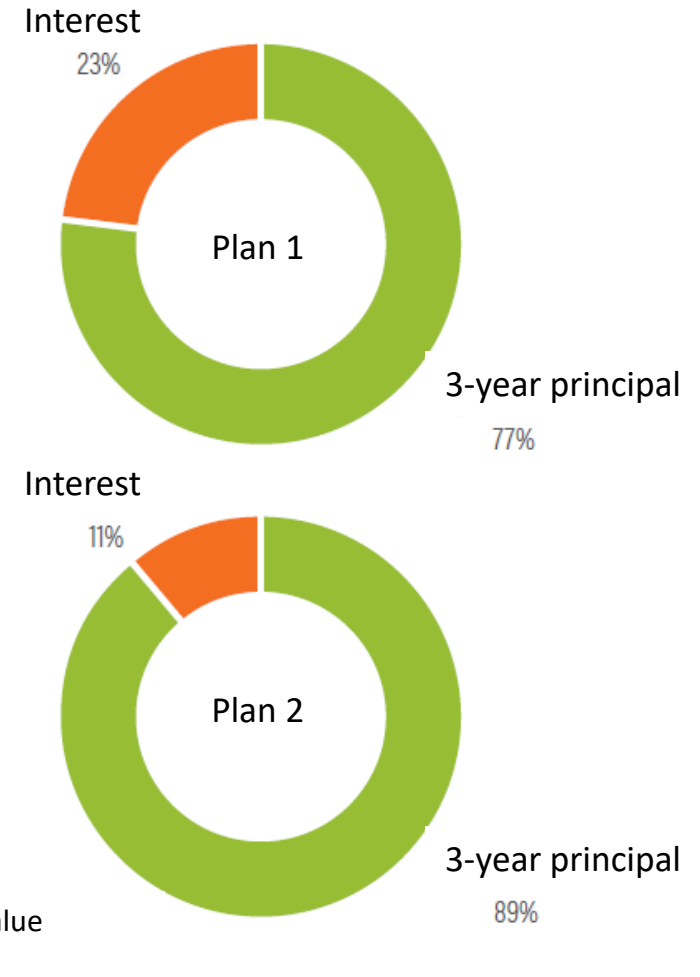
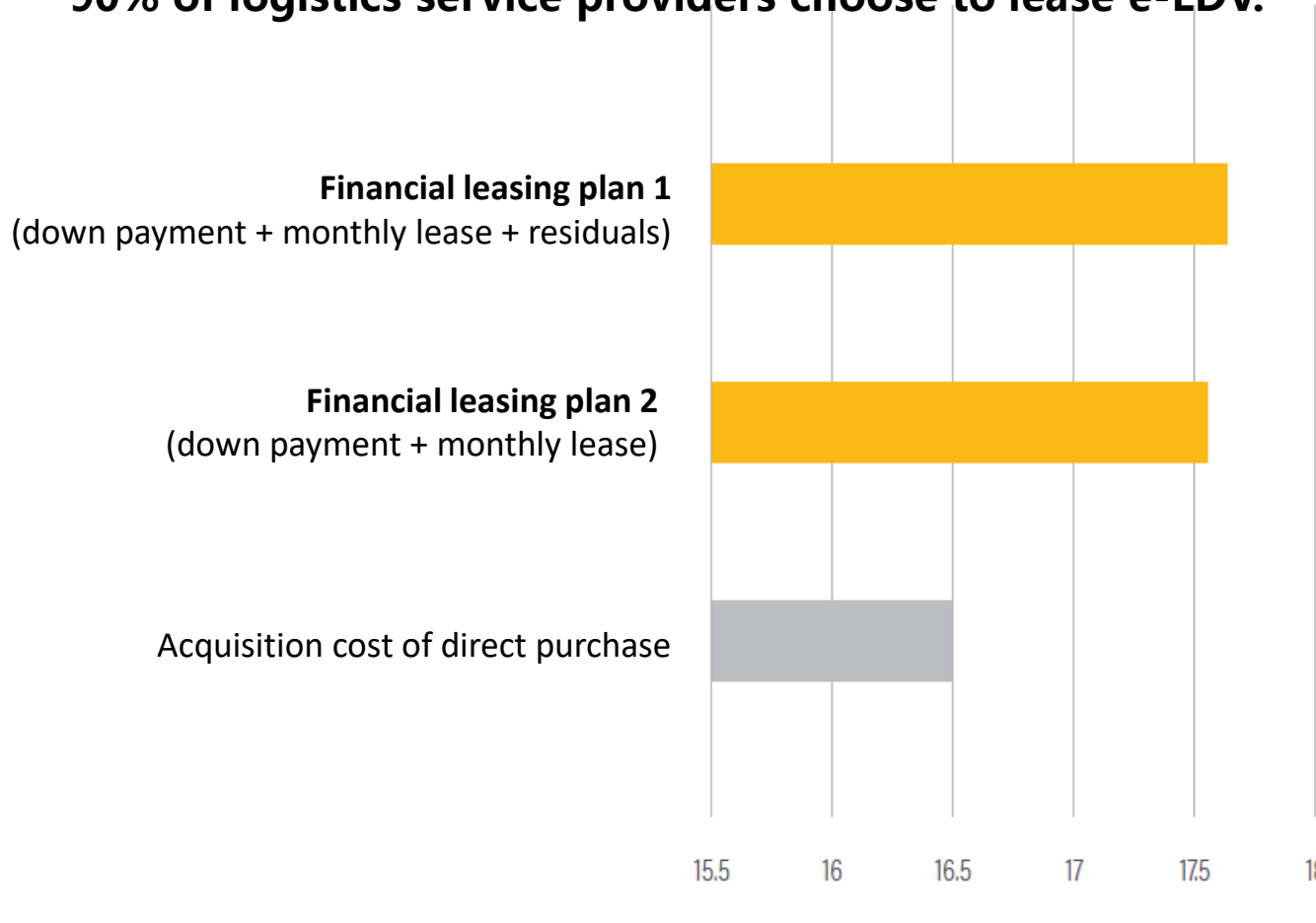
TCO OF FIRST OWNERS



e-LDV and ICE-LDV: Comparison of 6-year TCO Net Value under Different Scenarios
(Unit: 10000 yuan)

TCO OF FIRST OWNERS: Leasing vs. Direct purchase

90% of logistics service providers choose to lease e-LDV.



MAIN FACTORS THAT INFLUENCE TCO OF FIRST-OWNERS

Acquisition cost of e-LDV is higher than ICE-LDV, even with purchase subsidy.

Vehicle prices

Operation Efficiency Loss

Operation efficiency loss because of range, charging duration, and payload limitation.

Low vehicle residual values due to lack of proven EV residual value assessment system and dedicated insurance for EV.

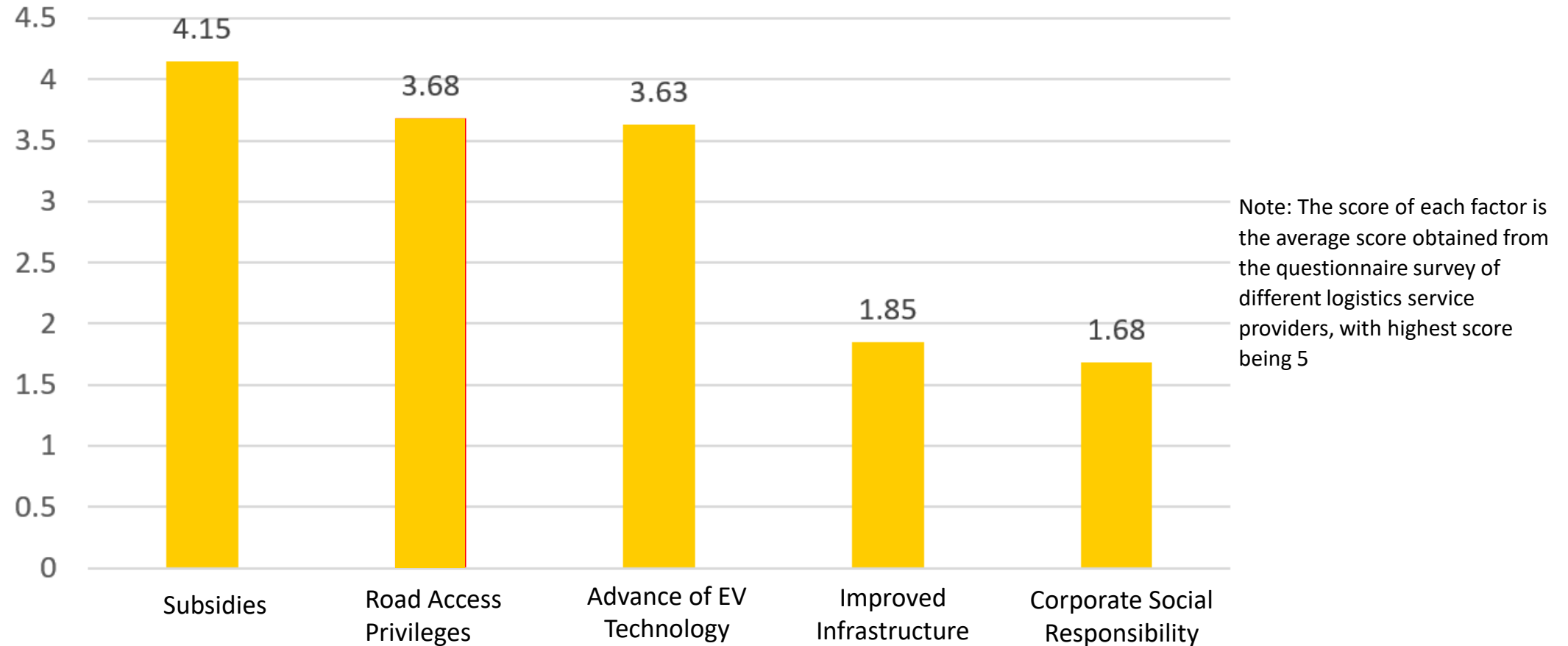
Residuals

Maintenance Cost

Poor vehicle quality and after-sales services resulting in high maintenance costs.

CLOSE THE GAP

Factors that can encourage logistics service providers to purchase and use e-LDV



CLOSE THE GAP – Operation subsidies

	Beijing	Shenzhen
Subsidy amount and method	CNY 70,000 yuan per vehicle, distributed in three years, with annual assessment	No more than CNY 75,000 yuan per vehicle, distributed in three years, with annual assessment
Annual mileage requirements	No less than 10,000 km annually	No less than 15,000 km annually
Requirements for logistics service providers	At least 5 light-duty logistics vehicles registered in Beijing are replaced by zero-emission vehicles.	Own at least 300 commercial logistics vehicles, no less than 100 of which are electric ones, or own at least 50 refrigerated trucks/ electric container tractor.

CLOSE THE GAP - Road access privileges

	Chengdu	Shenzhen	Beijing
Access restrictions for zero-emission logistics vehicles	No road access restrictions	No road access restrictions	Have road access restrictions Need to apply for city access permit
Access restrictions for fossil fuelled logistics vehicles	Bid to obtain a limited number of city access permits annually Unlikely to obtain a permit as the city downsizes the pool of permits	Allow access based on odd-even license plate parity Ban fossil fuelled vehicles from entering the ten green logistics zones in the city.	Allocate the city access permits quarterly according to a merit-based system. Require 90% of the permits go to zero-emission logistic vehicles in 2020

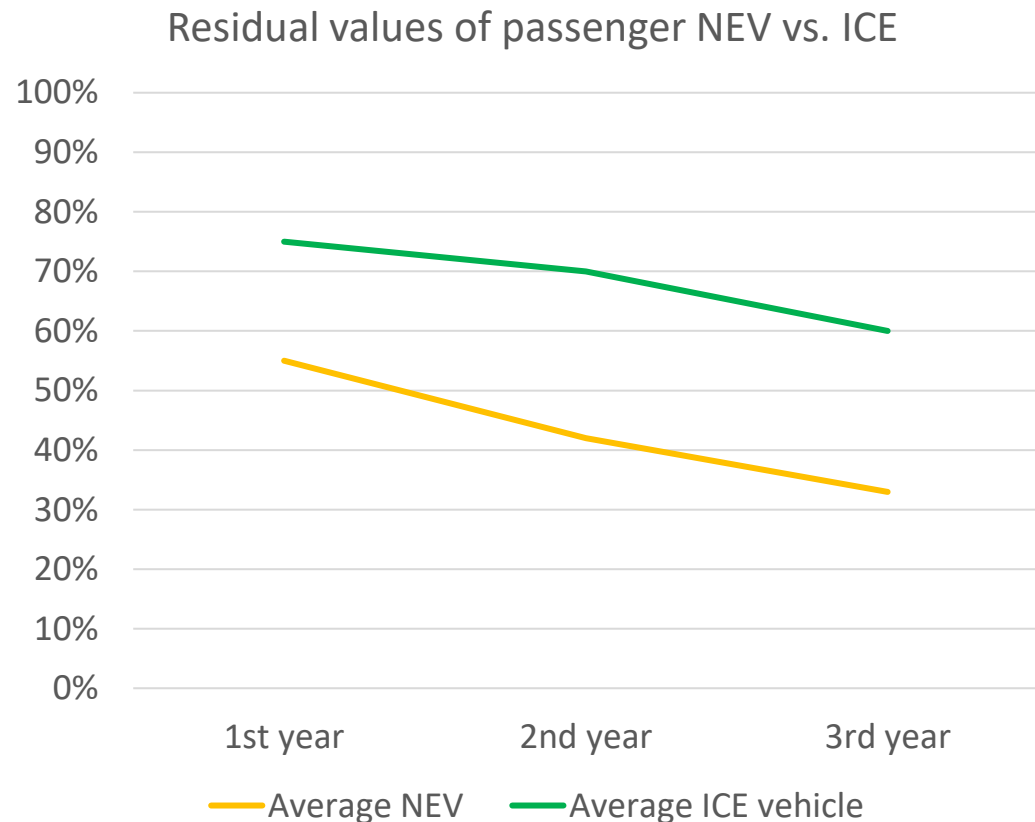
CLOSE THE GAP - Accelerate the adoption in specific use cases

Use cases	Delivery Features	Possibility of Electrification
Grocery delivery	Average shifts per day: 1~2 Average daily VKT: 80~100 km Cargo type: measurement cargo, deadweight cargo	Medium
Parcel delivery	Average shifts per day: 3 Average daily VKT: 130~160 km Cargo type: measurement cargo	Medium
Furniture and home appliance delivery	Average shifts per day: 3~4 Average daily VKT: 200 km Cargo type: deadweight cargo	Low
Wholesale products delivery	Average shifts per day: 1 Average daily VKT: 50 ~ 80 km Cargo type: measurement cargo	High
Cold chain logistics	Average shifts per day: 3~4 Average daily VKT: 200 km	Low

CLOSE THE GAP – Improve charging infrastructure network

Charging Type	Charging Scenario	Charging Station Type	Charging Station Location	Difficulty of Charging Station Planning
Charging after delivery <ul style="list-style-type: none"> • Depot 	Overnight charging	(Dedicated) fast-charging or slow-charging points	Logistics centers/parks in suburbs	Low Grid capacity constraint is not obvious on the suburbs, but due to property rights, it is difficult to install chargers on the leased land
Charging during delivery <ul style="list-style-type: none"> • Distribution center • Store 	Daytime recharging	(Dedicated) fast-charging points	Office buildings, shopping malls or industrial parks in cities	Medium Need to expand grid capacity, consult property owners. Utilization charging points could be a concern.
Charging during delivery <ul style="list-style-type: none"> • Public charging station 	Daytime recharging	(Dedicated) fast-charging points	Public charging station in cities or suburbs	High Plan the charging stations according to the delivery routes and operational need, and may affect the operation efficiency (such as taking detours to find available points)

CLOSE THE GAP – Increase residual values



The rapid depreciation of new energy vehicles is caused by:

- increasing driving range and battery energy density
- decreasing battery prices and the new car discounts
- lack of residual values evaluation criteria
- consumers' concerns about battery degradation

Possible actions to increase residual values include:

- enhance brand image
- generate revenues through battery or vehicle second-life usage
- extend battery warranty
- specialized assessment and certification for NEVs
- over-the-air updates (OTA) for early vehicle models.

The depreciation of e-LDV is faster than e-PV. **The residual values of different vehicle models are different, which requires further research.**

RECOMMENDATIONS

On the national level

- Establish a national-level mechanism to support local governments in formulating policies to promote electric logistics vehicles from the perspective of carbon emission reduction and air pollutants control.
- Improve the quality assurance system for electric logistics vehicles and regulate after-sales service.
- Establish a national testing, scoring and noticing system for electric logistics vehicles to progressively eliminate the inferior vehicles.
- Encourage the promotion and application of new technologies and new modes, such as autonomous driving, high-power charging, separation of vehicle and battery, and transport capacity sharing, etc.

RECOMMENDATIONS

On the local level

- Set concrete promotion targets of electric logistics vehicles for the 14th Five Year period and accelerate the electrification of existing vehicles in urban logistics.
- Grant road access privileges to electric logistics vehicles, and consider the introduction of zero-emission freight zones.
- Consolidate deliveries and improve operation efficiency, build a digital freight platform, establish a green shippers alliance, and strengthen public education.
- According to the operational duty cycles, improve the planning and layout of charging infrastructure.
- Promote leasing models and innovative financing schemes, explore reasonable risk sharing mechanisms and new business models.

An aerial photograph of a city skyline. In the foreground, there is a large green park with a winding path and a small lake. To the left, there is a modern building with a distinctive facade of vertical columns. The middle ground is filled with a dense urban landscape of various high-rise buildings, including several prominent skyscrapers. The background shows a hazy horizon under a sky filled with soft, grey clouds. The text "Thank You!" is centered in the middle of the image in a large, white, sans-serif font.

Thank You!