全球重型商用车低碳化及零排放化发展和政策

Global development and policies for zero-emission heavy commercial vehicles

发言人：Dr. Felipe Rodríguez，HDV Program Lead

NDC Transport Initiative for Asia 2021 Event Series – Decarbonising Transport.
China Annual Workshop – Planning and Major Policies for Peaking Carbon Dioxide Emissions from Transportation and Carbon Neutrality

国家自主贡献亚洲交通减排倡议2021年系列活动——交通脱碳
中国年度会议——交通碳达峰、碳中和政策技术交流会

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Introduction

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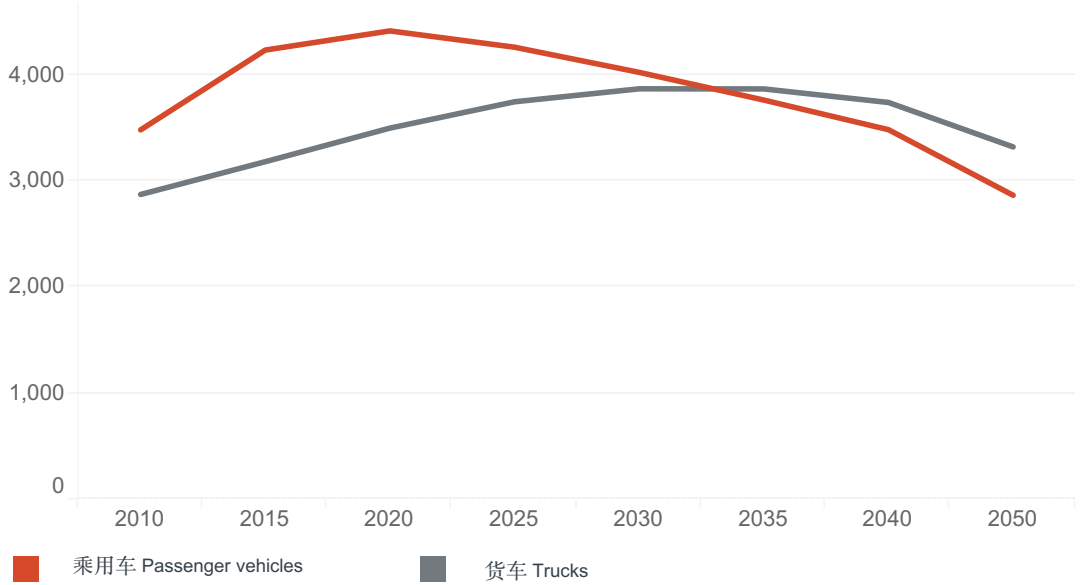
HDVs will contribute more to transport GHG emissions over time
重型车未来还将产生更多的交通领域温室气体排放

在交通去碳电动化政策情景下，轻型乘用车和卡车的直接二氧化碳排放量（百万吨CO2/年）



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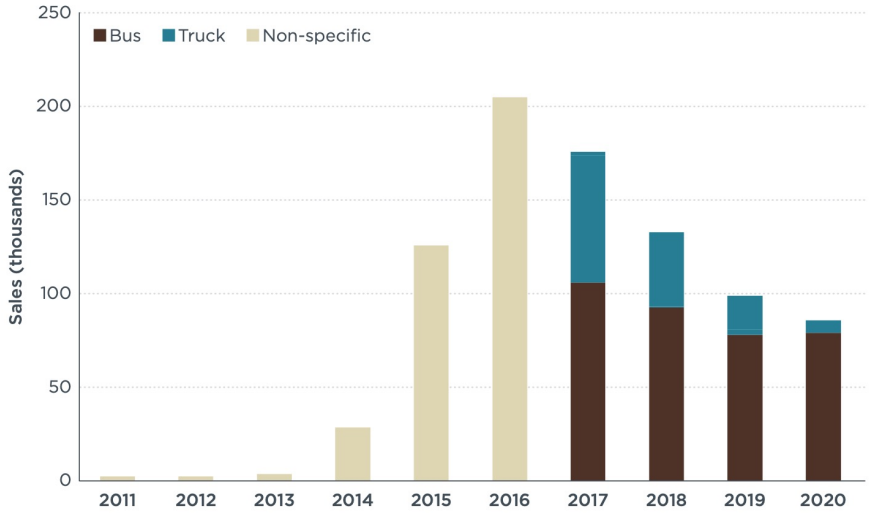
China HD ZEV Sales are Large but Falling
中国的零排放重型车销量大，但正在呈现下滑趋势

China Sales of Zero Emission Buses and Trucks, 2011-2020
2011-2020年中国零排放公交客车和货运卡车销量



Areas of Concern

- No national 100% HD ZEV goal
- No performance-based technology forcing standards
- Declining fiscal incentives
- No national HD ZEV infrastructure program

需要考虑的问题

- 国家尚未出台重型车100%零排放目标
- 没有推动技术应用的强制性性能标准
- 财税激励退坡
- 国家尚未出台零排放重型车充电基础设施建设方案

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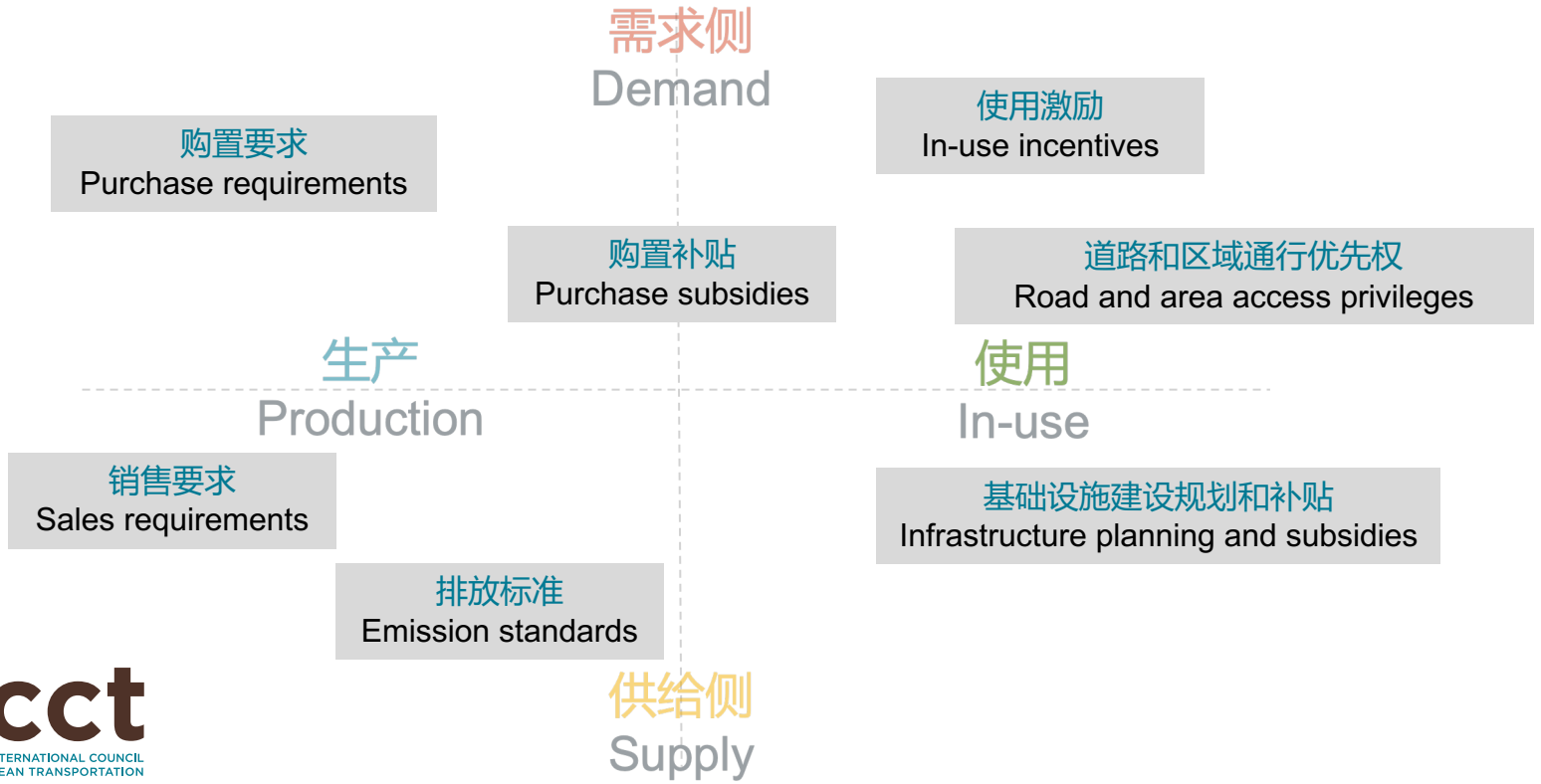
来源：Mao, Shiyue, and Felipe Rodríguez. 2021. “Race to Zero: How Manufacturers Are Positioned for Zero-Emission Commercial Trucks and Buses in China.” *International Council on Clean Transportation*, August, 42. https://theicct.org/publications/china-race-to-zero-aug2021

Accelerating Zero-Emission Medium and Heavy-Duty Vehicles (ZE-HDVs) adoption needs a suite of policies
加速中重型商用车零排放化需要各方面政策合力



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鼓励零排放商用车推广的主要政策工具
Main policy instruments to encourage ZE-HDV adoption

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1. Setting long-term targets for ZE-HDVs
1. 为零排放商用车设立长期、宏观的产销目标

Global MoU commitments are not yet reflected in the map.

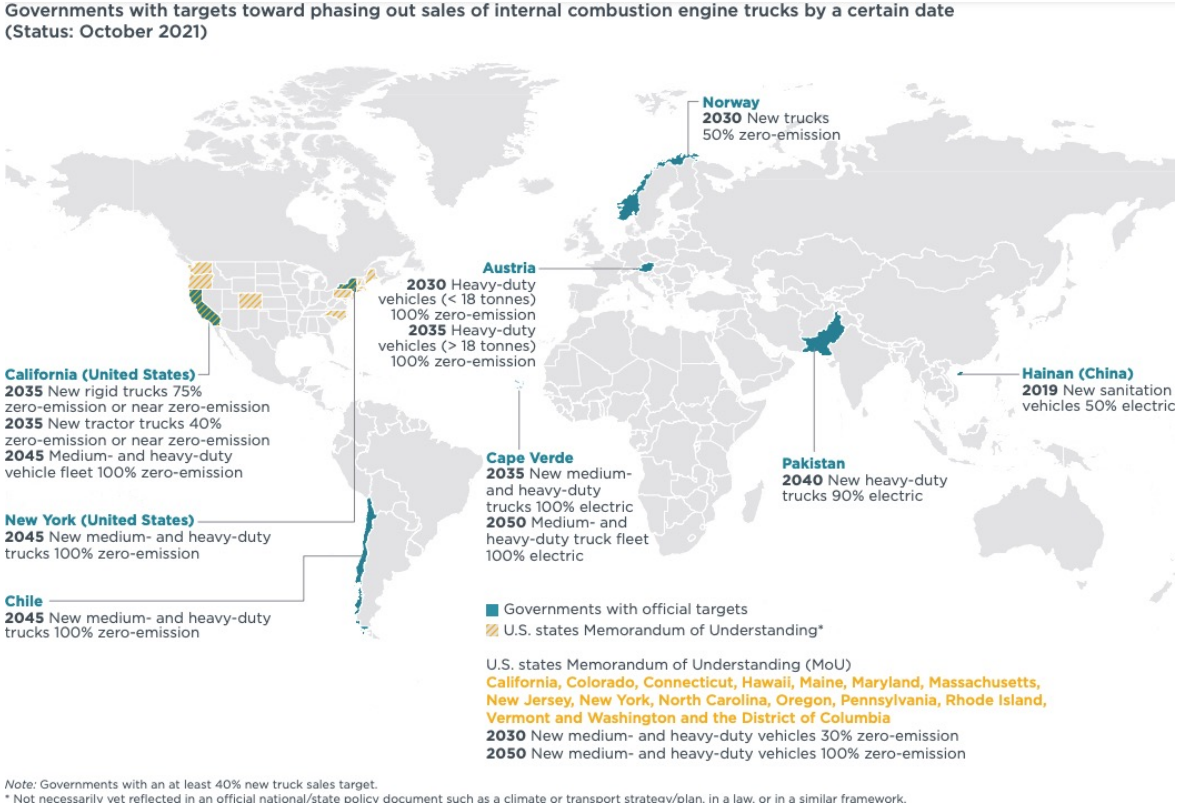
- Austria, Canada, Chile, Denmark, Finland, Luxembourg, Netherlands, New Zealand, Norway, Scotland, Switzerland, Turkey, United Kingdom, Uruguay and Wales

https://globaldrivetozero.org/mou-nations/

地图中尚未展示出签署全球备忘录承诺的国家和地区：

- 奥地利、加拿大、智利、丹麦、芬兰、卢森堡、荷兰、新西兰、挪威、苏格兰、瑞士、土耳其、英国、乌拉圭和威尔士

https://globaldrivetozero.org/mou-nations/



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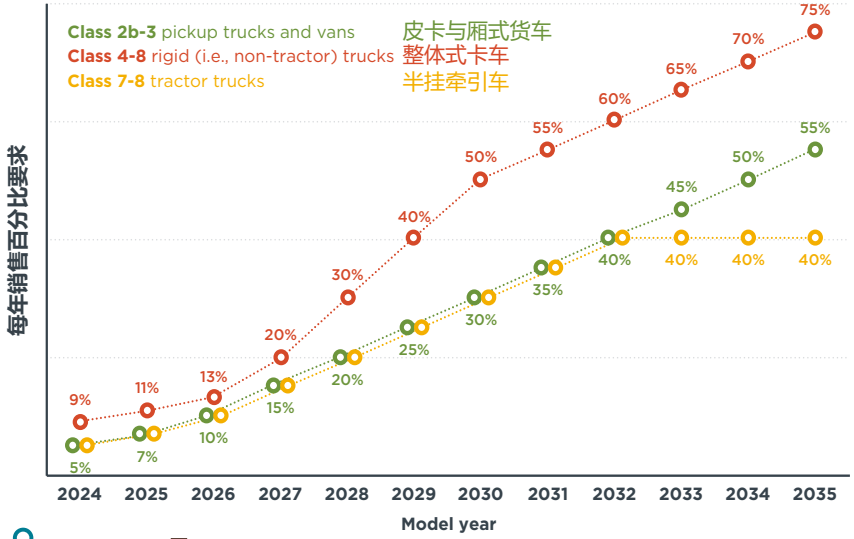
2. Targets translated to regulations: sales requirements for OEMs
2. 将目标转化为管理要求：对生产企业的销量要求

加州先进清洁卡车法规(ACT)中提出的逐年零排放销量要求
Annual sales targets in California's Advance Clean Trucks regulation



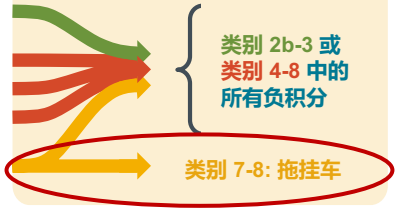
积分价值

	ZEV	NZEV
类别 2b-3	0.8	根据全电里程，最高75%ZEV积分
类别 4-8	1	
类别 4-5	1.5	
类别 6-7	2	
类别 8	2.5	
类别 7-8 拖挂车		

分数计算

车辆销售数
x
销售要求比例
x
各车型类别重量级乘数

达标方式



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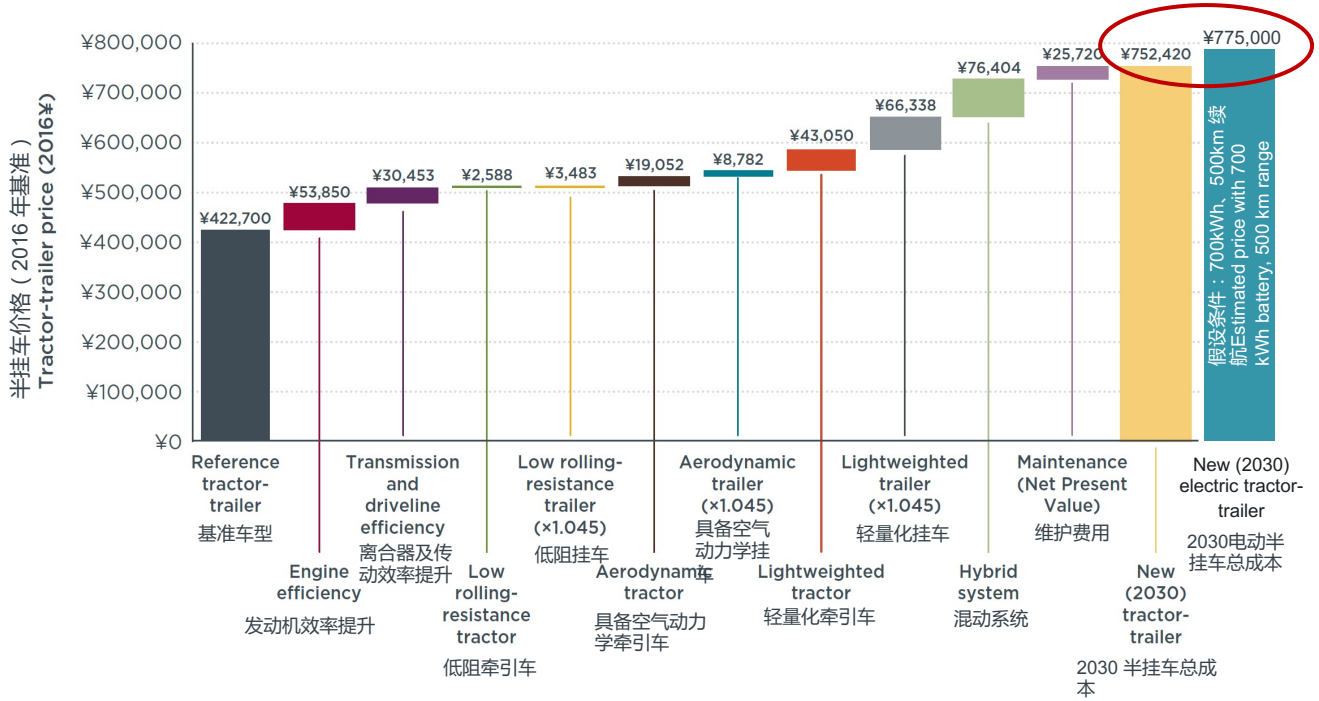
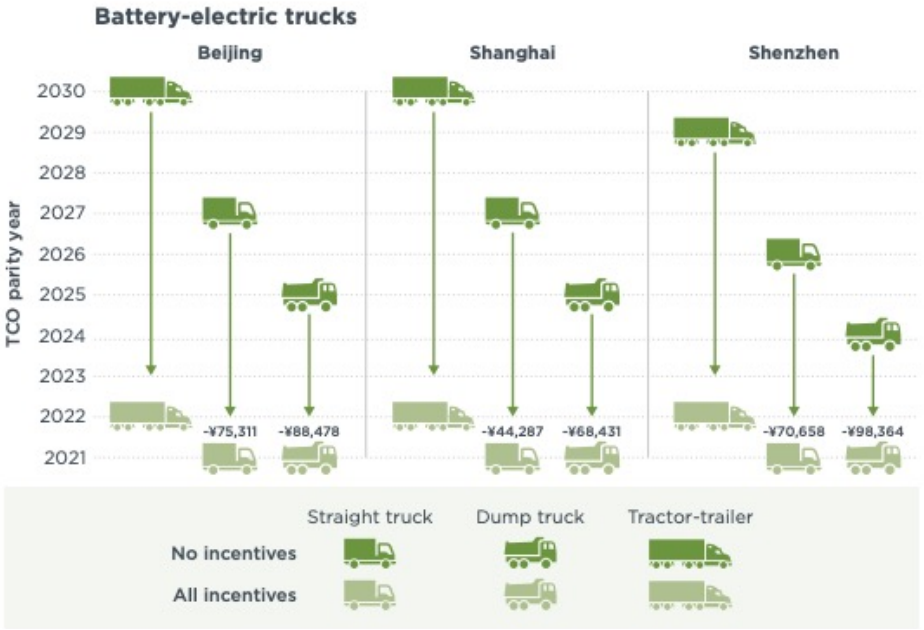
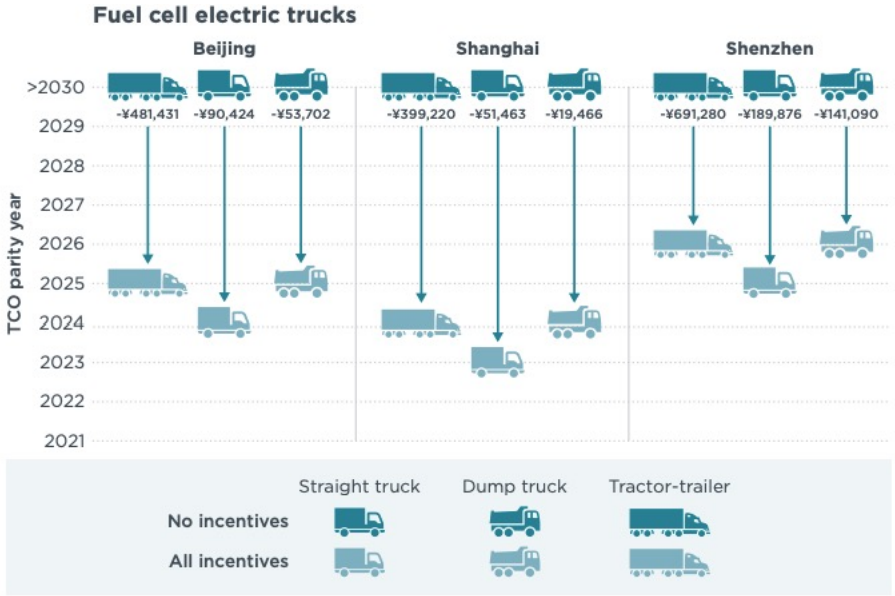
3. More stringent GHG standards
3. 更严格的温室气体排放标准



资料来源 Source: ICCT

Demand side policies can accelerate TCO parity
从需求侧出台政策可以加速车辆拥有总成本平价





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https://theicct.org/publications/ze-hdvs-china-tco-CH-nov21

4. Purchase subsidies
4. 购置补贴优惠

Given that subsidies are not fiscally sustainable in the long term, they can be limited in duration to generate sufficient demand during market ramp-up and can be phased out as manufacturing costs drop through economies of scale

长期提供补贴在财政上是不可持续的，因此可在规定时间内通过补贴来为早期市场创造足够的需求，随着规模经济形成生产成本下降，补贴可以逐步退坡取消。

Table 24. TCO parity year for analyzed truck segments, with purchase premiums

		Beijing		Shanghai		Shenzhen	
		w	w/o	w	w/o	w	w/o
Dump truck	BET	**2024**	2025	**2024**	2025	**2023**	2024
	FCET	**2028**	> 2030	**2028**	> 2030	**2029**	> 2030
Straight truck	BET	**2026**	2027	**2026**	2027	**2025**	2026
	FCET	**2027**	> 2030	**2027**	> 2030	**2029**	> 2030
Tractor-trailer	BET	2030	2030	2030	2030	2029	2029
	FCET	> 2030	> 2030	> 2030	> 2030	> 2030	> 2030

ICCT研究报告：《中国重型货运卡车的拥有总成本对比分析：纯电动、燃料电池和柴油货运卡车.》
https://theicct.org/publications/ze-hdvs-china-tco-CH-nov21

5. In-use fleet incentives
5. 车队运营和使用补贴

Exempting HD-NEVs from road tolls could help BETs reach TCO parity by 2024 – 2027 for all segments: Road tolls constitute a significant cost component of the TCO of trucks, especially for tractor-trailers. Partial exemption (75%) from road tolls can help ZE-HDVs achieve TCO. This is already implemented or to be implemented soon in several European countries.

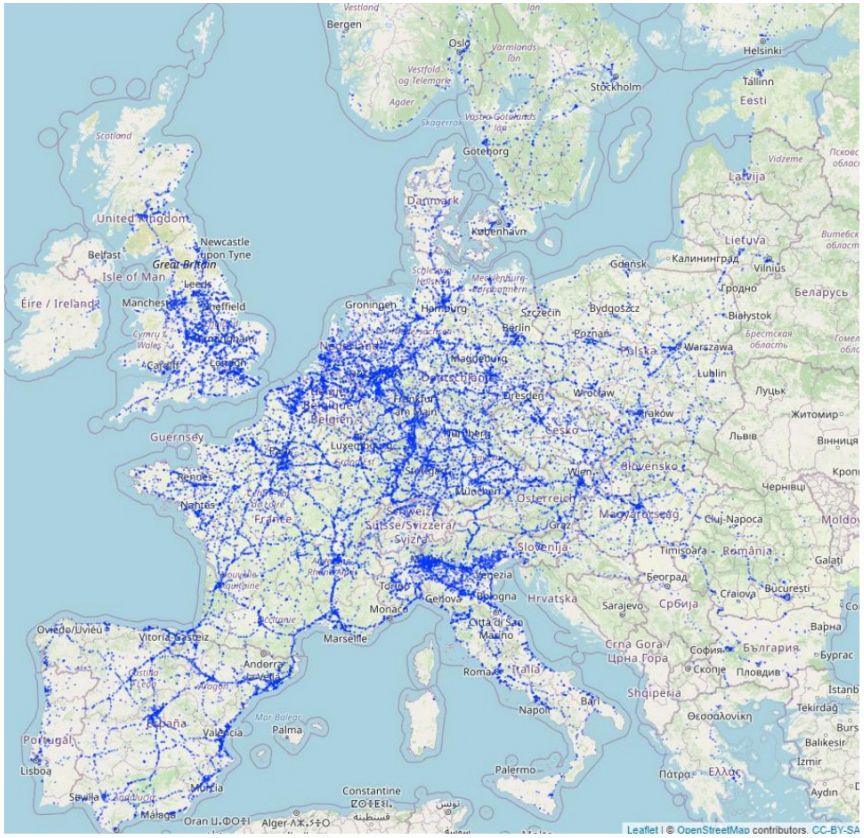
减免新能源重型车的道路通行费能够帮助所有类型的纯电动货运卡车（BET）在2024-2027年之间实现与燃油车之间的成本平价：道路通行费是货运卡车拥有总成本（TCO）中的重要构成部分，特别是对于半挂牵引车而言。减征一部分（75%）道路通行费能够帮助零排放重型车实现成本平价，一些欧洲国家已经开始或即将开始实施这一做法。

Table 26. TCO parity year for the different analyzed truck segments with road charges exemption

		Beijing		Shanghai		Shenzhen	
		w	w/o	w	w/o	w	w/o
Dump truck	BET	**2024**	2025	**2024**	2025	**2023**	2024
	FCET	> 2030	> 2030	**2030**	> 2030	> 2030	> 2030
Straight truck	BET	**2025**	2027	**2025**	2027	**2024**	2026
	FCET	> 2030	> 2030	**2030**	> 2030	> 2030	> 2030
Tractor-trailer	BET	**2027**	2030	**2027**	2030	**2026**	2029
	FCET	> 2030	> 2030	> 2030	> 2030	> 2030	> 2030

6. Infrastructure programs and incentives for ZE-HDVs
6. 基础设施建设规划和补贴

欧洲主要长途卡车站点位置
Aggregated long-haul truck stop locations in Europe



AFIR proposal in Europe 欧洲的AFIR提案

	Targets 目标		
	Density 密度	Recharging Pool [1] Power Capacity 充电能力	
		31 Dec, 2025 2025年12月31日	31 Dec, 2030 2030年12月31日
TEN-T [3] Core Network [4]	Max of **60 km** between any **TWO** recharging pools in **both directions** of travel 在行驶路途双向，**两个**充电站点之间的最大间隔距离为**60公里**	At least **1,400 kW** including at least **ONE** recharging station [2] with an individual power output of at least **350 kW** **单个**充电站至少**1400kW**，独立充电桩至少**350kW**	At least **3,500 kW** including at least **TWO** recharging stations with an individual power output of at least **350 kW** **单个**充电站至少**3500kW**，独立充电桩至少**350kW**

图片来源 Source: https://www.isi.fraunhofer.de/

7. Other policies incentivizing ZE-HDVs
7. 其他鼓励零排放商用车的政策工具

加州先进清洁车队(ACF)拟定的私人、联邦车队零排放目标

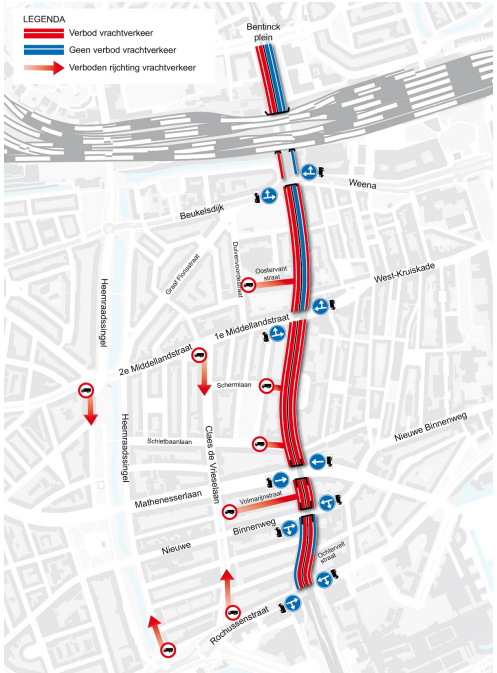
Preliminary HD-ZEV phase-in schedule for private and federal fleets in Advanced Clean Fleets regulation

零排放车队占比	10%	25%	50%	75%	100%
箱式货运卡车，两轴公交客车，场站驳运车	2025	2028	2031	2033	2035
其他非牵引车货运卡车、日间驾驶半挂牵引车、三轴公交客车	2027	2030	2033	2036	2039
卧铺半挂牵引车、特种车辆	2030	2033	2036	2039	2042

来源 Source: CARB

荷兰鹿特丹市零排放货运区

Zero-emission delivery zone in Rotterdam, Netherlands



图片来源 Source: www.rotterdam.nl/

总结与建议

Summary and recommendations

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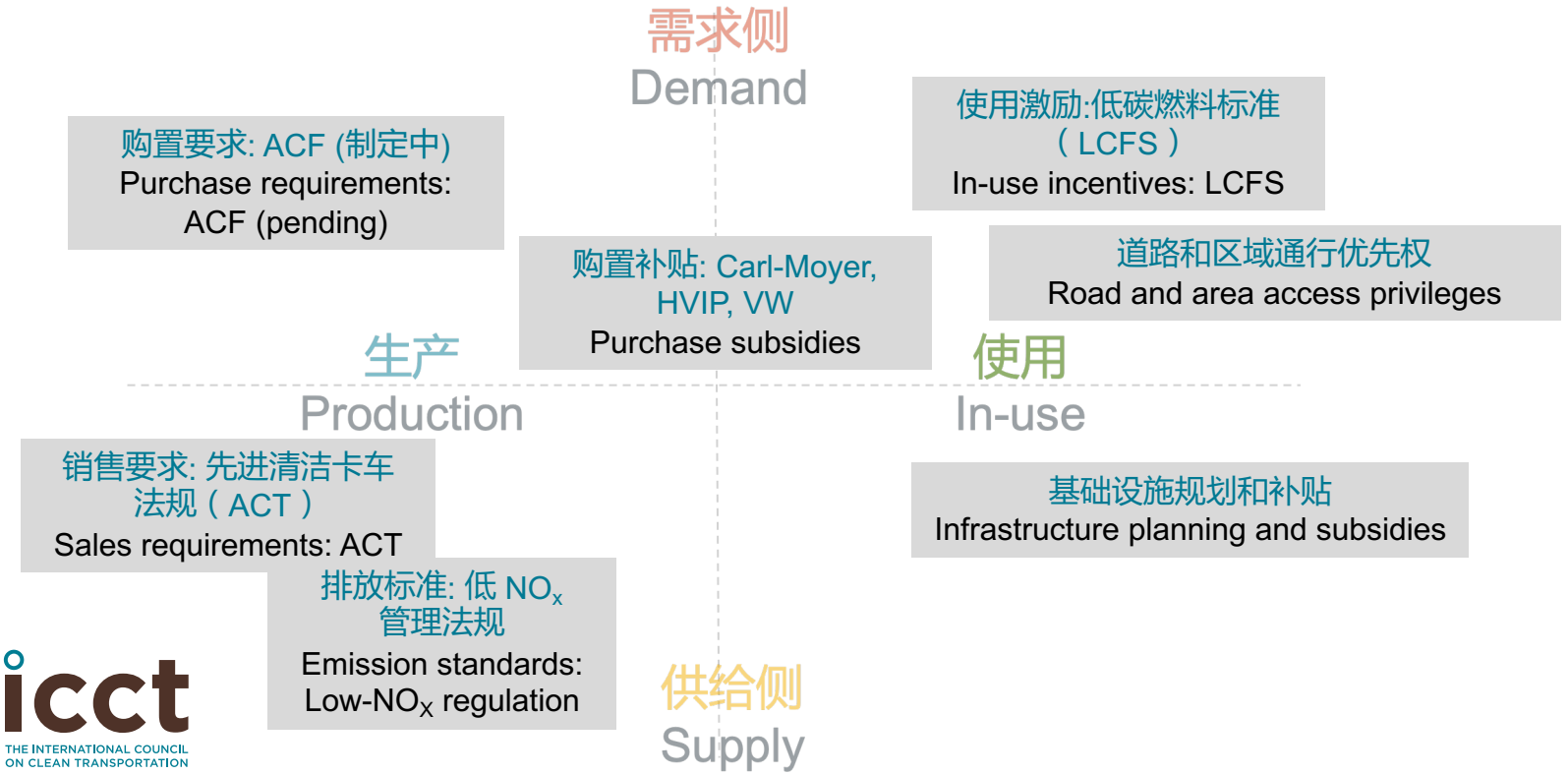
International practice demonstrates the need for a suite of policies for accelerated ZE-HDV transition
加速中重型商用车零排放转型需要形成政策合力



Felipe Rodríguez
f.rodriguez@theicct.org

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