CALSTART | GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO | Government of the Netherlands

GLOBAL MEMORANDUM OF UNDERSTANDING

MOU SUMMIT 2 JUNE 2025

Arnhem, Netherlands

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UNLOCKING THE POTENTIAL OF SUPPLY-SIDE REGULATIONS

SESSION 1. ECONOMIC BENEFITS

ZEV-RESET SETUP

1. Open your computer or partner with someone who has a computer
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MEMORANDUM OF UNDERSTANDING

UNLOCKING THE POTENTIAL OF SUPPLY-SIDE REGULATIONS
SESSION 1. ECONOMIC BENEFITS

1. What are supply-side regulations and what are their economic benefits?
2. Regulation in practice: California's Advanced Clean Trucks regulation
3. Modelling session: ZEV-RESET Tool
4. Takeaways and next steps

WHAT ARE SUPPLY-SIDE REGULATIONS AND WHAT ARE THEIR ECONOMIC BENEFITS?



FELIPE RODRIGUEZ

Program Director

ICCT



AMIR AKTHER

Research Scientist

University of Exeter

Supply-side regulations for heavy-duty vehicles

Felipe Rodríguez, PhD. Deputy Managing Director ICCT Europe

Global MOU Summit 2025

June 2, Arnhem

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

The ICCT is an independent, nonprofit research organization advancing clean transportation globally.

We conduct research, provide technical expertise, and advance policies to reduce greenhouse gas emissions and air pollution from the transportation sector.

170+
DIVERSE STAFF

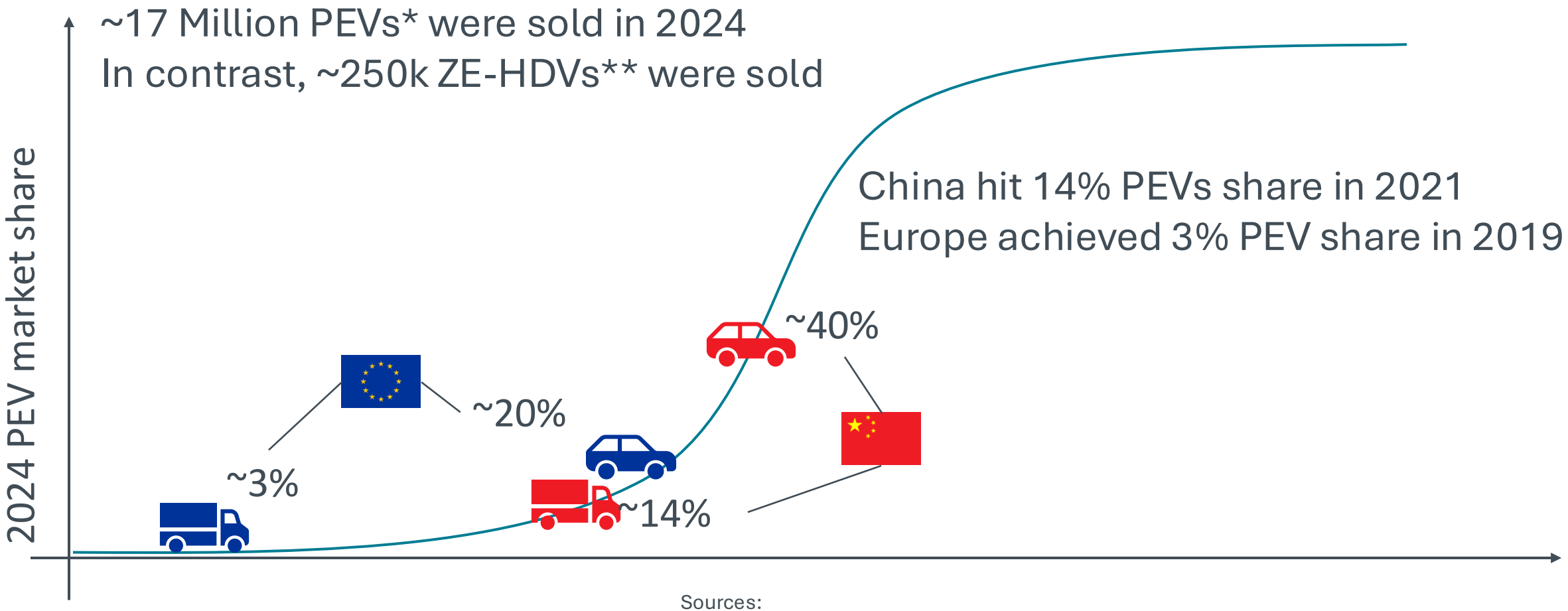
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CONTINENTS

250+
ORIGINAL RESEARCH PUBLICATIONS ANNUALLY

50+
POLICIES AND REGULATIONS DIRECTLY SHAPED BY OUR WORK IN THE PAST 5 YEARS ALONE

2+ BILLION
TONS OF CO_2 ABATED

E-truck transition lags electric cars by about 3-5 years

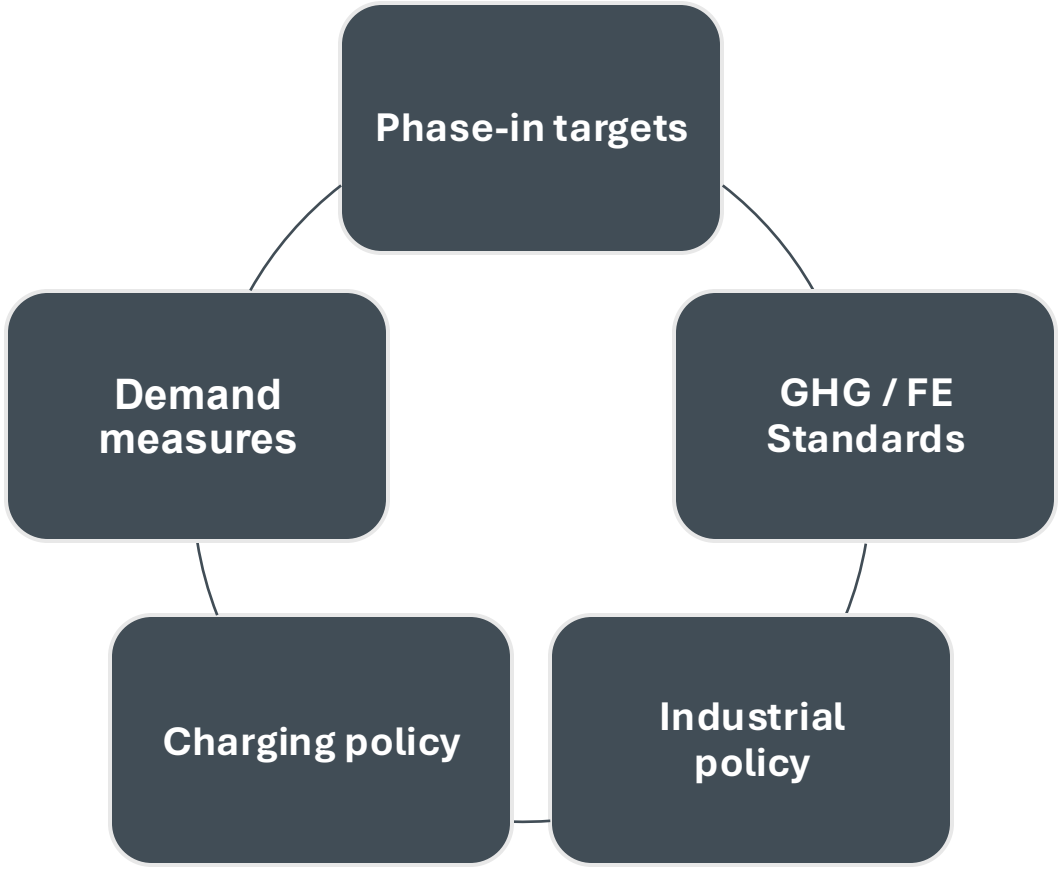


*BEV+PHEV, below 3.5 tonnes
**BEV+FCEV, above 3.5 tonnes.

Sources:
ICCT, https://theicct.org/publication/global-ev-market-monitor-ldv-2024-h1-dec24/
ICCT, https://theicct.org/publication/r2z-eu-hdv-market-development-quarterly-jan-dec-2024-feb25/
ICCT, https://theicct.org/publication/ze-mhdv-market-china-january-june-2024-nov24/

What can we learn from the EV transition in cars?

- Clear political ambition provides long-term certainty for industry and consumers.
- Coordinated policies drive supply, demand, and infrastructure for electrification.
- Manufacturing incentives through effective industrial ensure EV production at scale.
- Purchase incentives and fiscal policies accelerate market adoption.
- Charging infrastructure investment enables real-world fleet deployment.



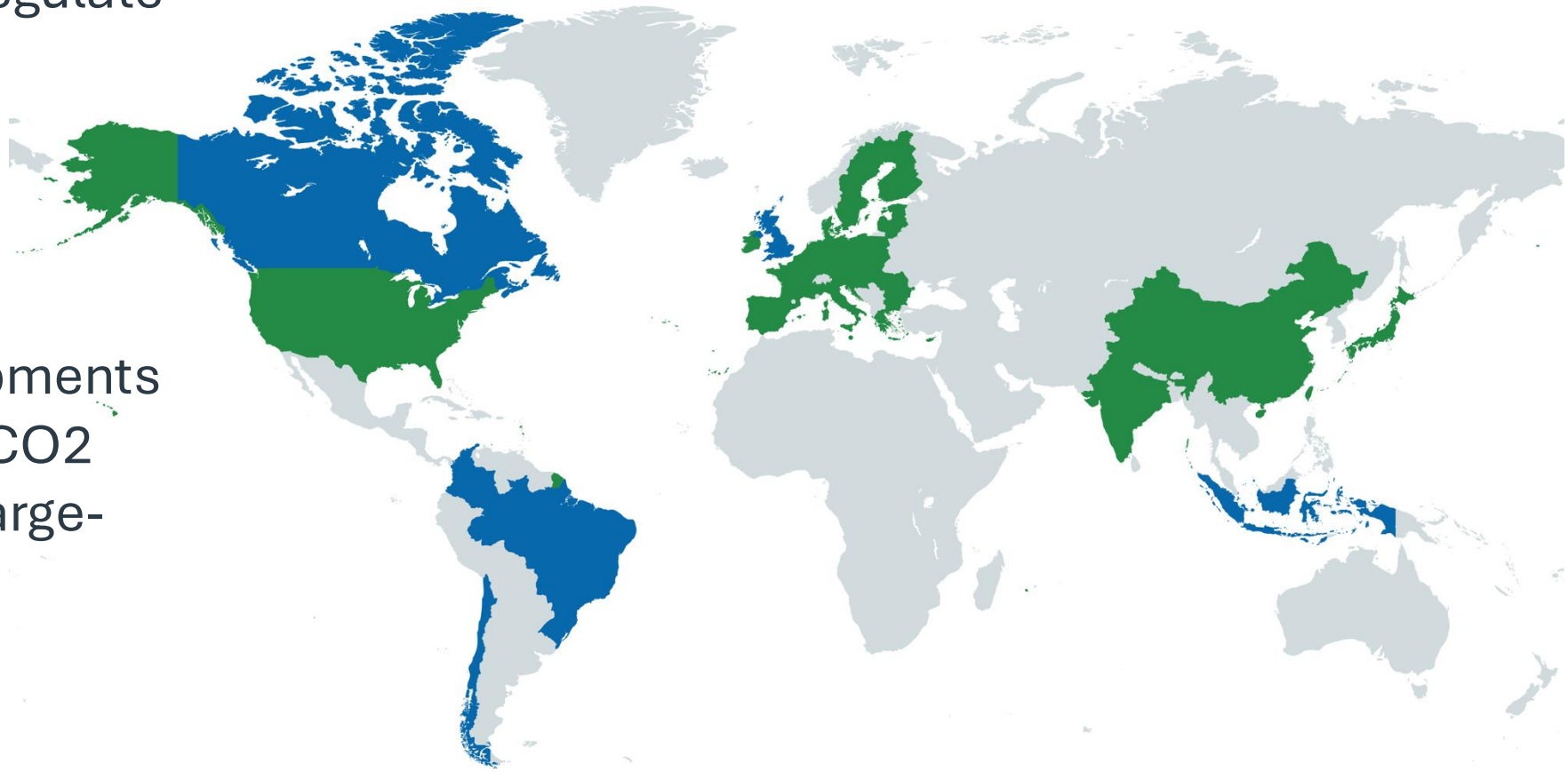
Source: ICCT, https://theicct.org/publication/zevtc-effective-policies-dec2021/

Where are the truck supply-side regs. happening?

Most major markets regulate truck efficiency improvements.

Recent policy developments aim to reduce freight CO2 emissions and drive large-scale electrification.

Truck Efficiency and Electrification Regulations Green – Adopted, Blue – Emerging



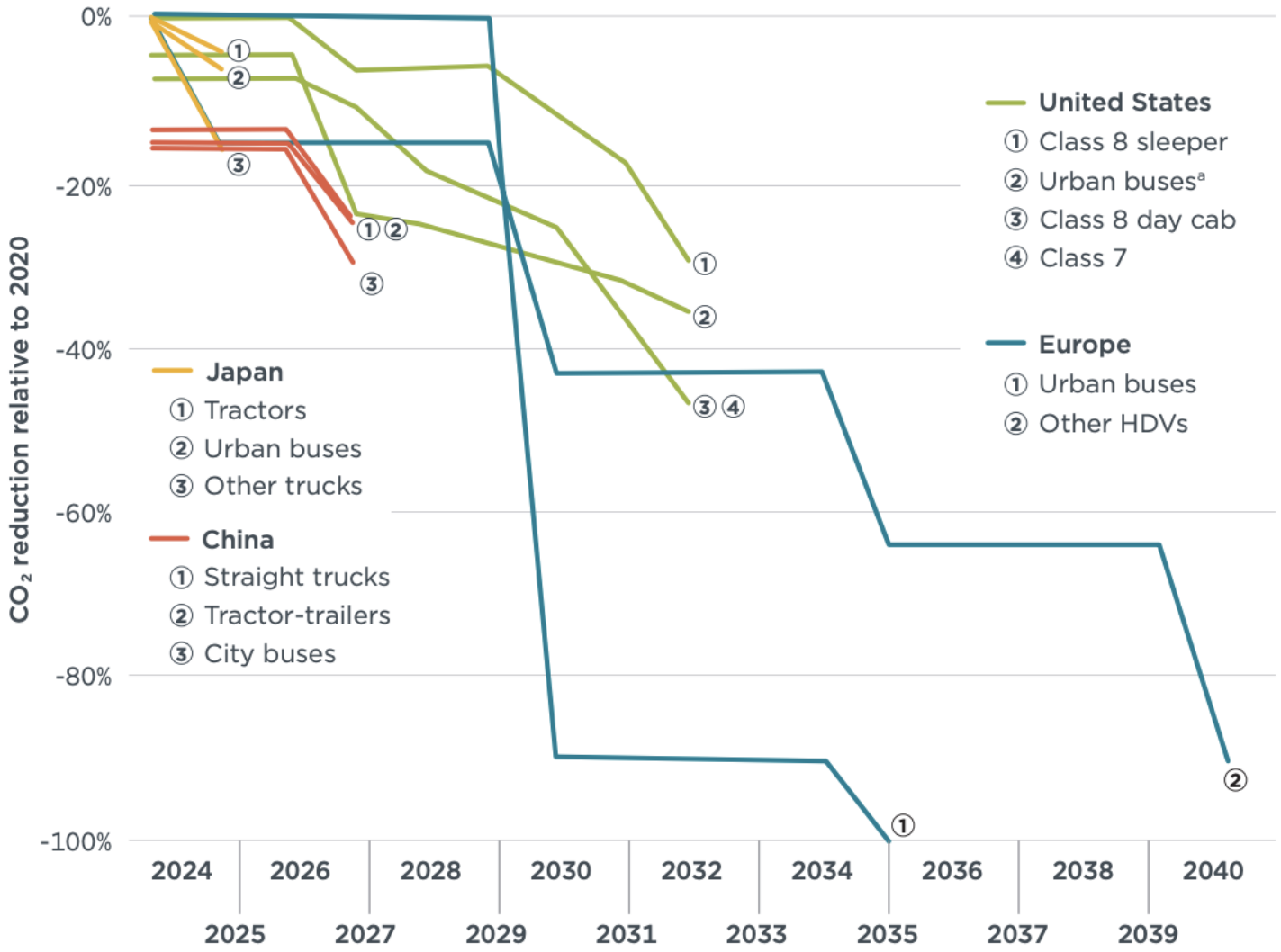
Source: ICCT, https://theicct.org/zev-phase-ins/

Examples of SSR's scopes

Jurisdiction	Years *(proposed in italics)*	Regulation type; metric	Vehicles covered
Canada	2018–2027[a]	Manufacturer average GHG and fuel efficiency; g CO_2/ton-mile and gallons/100 miles	Buses and trucks with GVW ≥ 8,500 lbs
China	2019–2021, *2022–2026*	Vehicle fuel consumption limit; L/100 km	Vehicles with GVW ≥ 3.5 tonnes
EU	2019–2040	Manufacturer average GHG; g CO_2/tonne-km	Rigid and tractor trucks with maximum mass over 16 tonnes, buses
India	2021	Vehicle fuel consumption limit; L/100 km	Diesel vehicles with GVW ≥ 3.5 tonnes
Japan	2019–2025	Manufacturer average fuel efficiency; km/L	Diesel trucks and buses with GVW ≥ 3.5 tonnes
UK	2019–2025	Manufacturer average GHG; g CO_2/tonne-km	Rigid and tractor trucks with maximum mass over 16 tonnes
U.S.	2018–2032[a]	Manufacturer average GHG and fuel efficiency; g CO_2/ton-mile and gallons/100 miles Engine CO_2 emissions and fuel consumption; g CO_2/bhp-hour and gallons/100 bhp-hour	Buses and trucks with GVW ≥ 8,500 lbs

Source: ICCT, https://theicct.org/publication/aligning-regulations-and-standards-with-zev-targets-sept24/

Stringency of selected SSRs



Source: ICCT, https://theicct.org/publication/china-stage-4-fuel-consumption-standard-hdvs-dec24/

RESEARCH BRIEF

FEBRUARY 2025

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Supply-side regulations to accelerate the market for zero-emission heavy-duty vehicles: Best practices from major policies

Yihao Xie

BRIEFING PAPER SEPTEMBER 2024

ZEV TRANSITION COUNCIL

Meeting the mark:
Aligning regulations and standards with ZEV targets

DALE HALL

icct

THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Dr. Felipe Rodríguez
f.rodriguez@theicct.org



EEIST II
Driving the transition to zero emission trucks: evaluating policy options

Dr. Amir Akther,

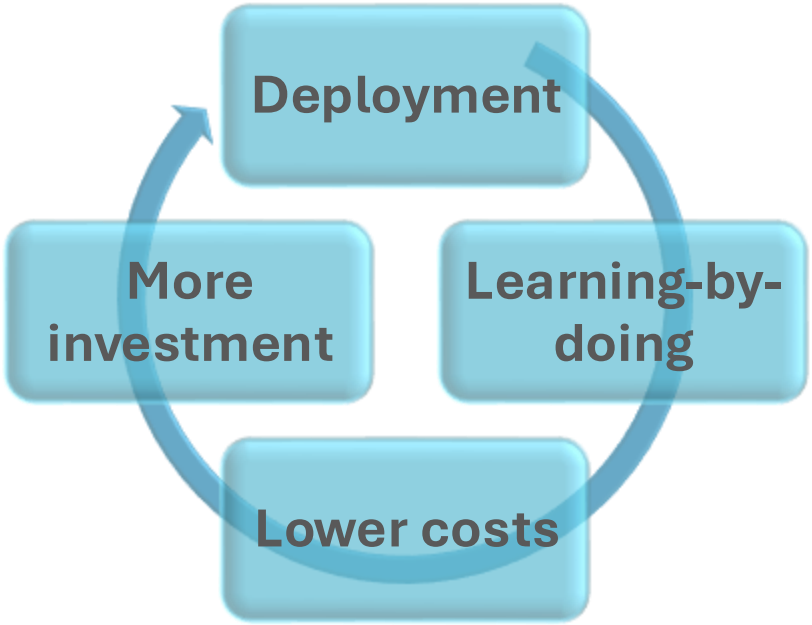
Dr. Felipe Rodríguez

University of Exeter
s-curve economics
WRI INDIA
cambridge econometrics
icct THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION
Department for Business, Energy & Industrial Strategy

The Future Technology Transformation Overview

Dynamics	**Investor choices** based on perceived costs **Replicator dynamics**: large industries add more capacity per year **Inertia:** lifetime of technologies considered
Non-pecuniary aspects	Calibrated from historical data

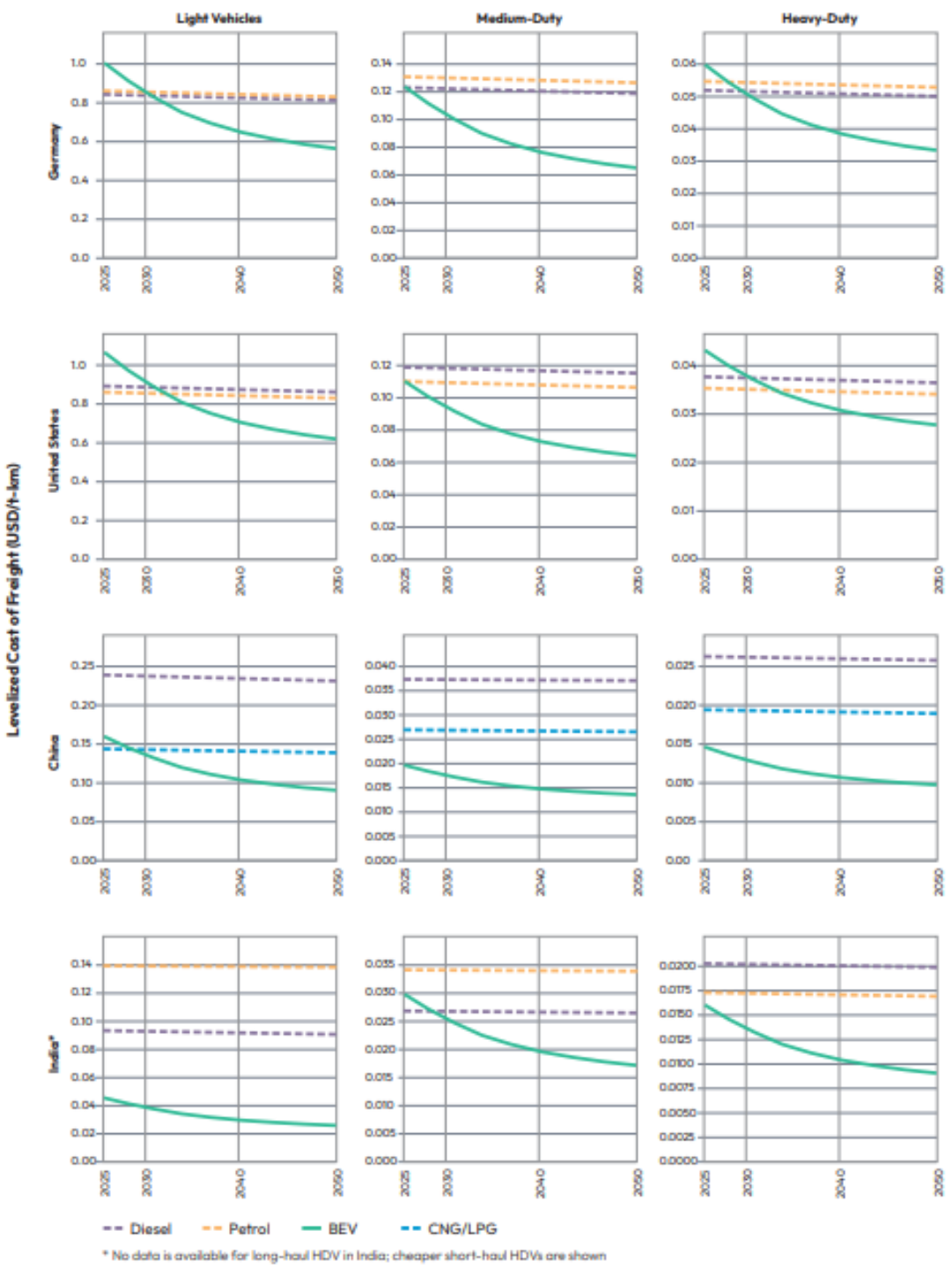
Core feedback



Freight

- Early in the transition, what policy are most effective at accelerating uptake of zero-emissions vans and trucks?
- ICCT and WRI India have provided cost and technical data.
- Scenarios developed with ICCT and WRI India policy experts.
- Is the cost of the transition simply too great?

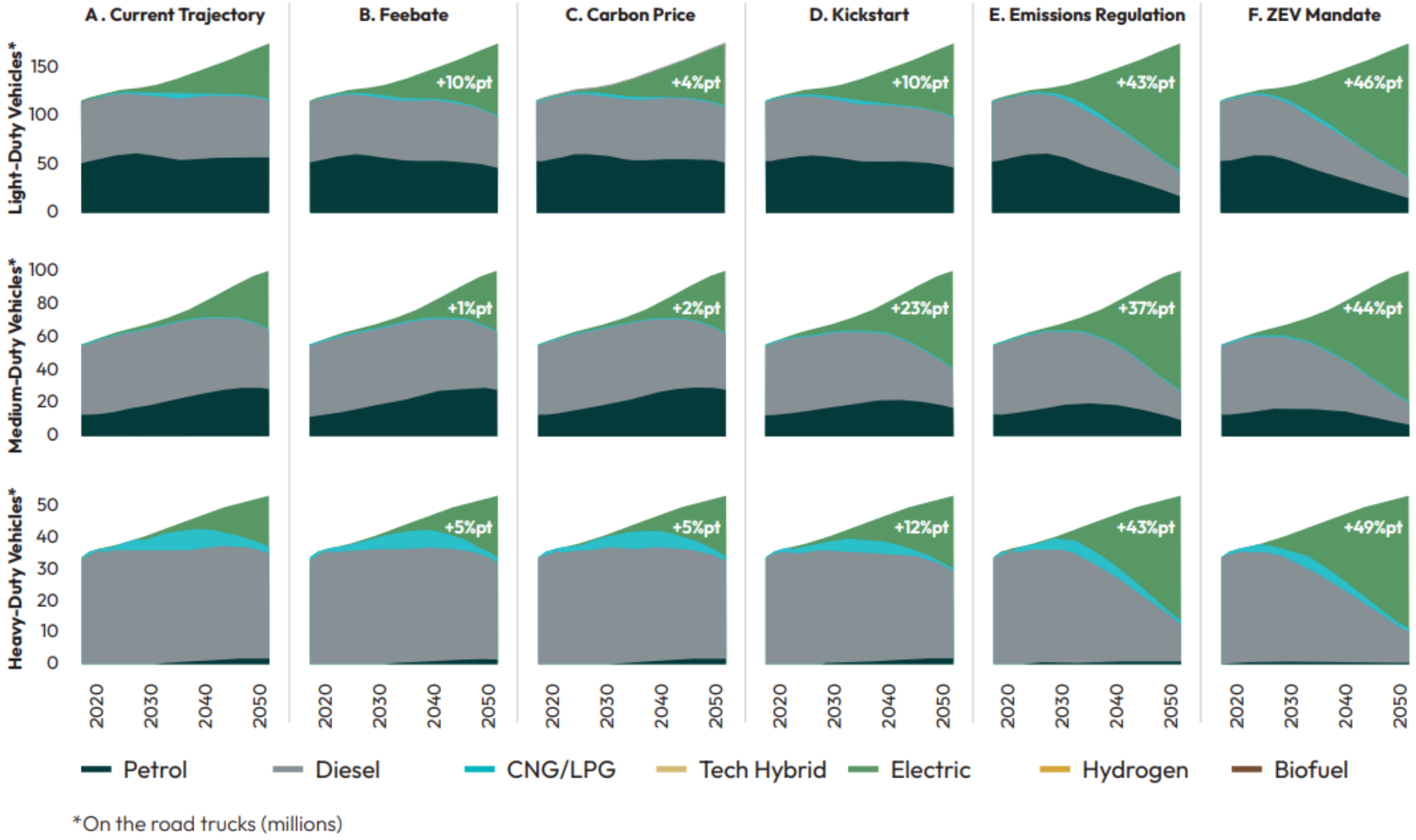




The EV transition, cheaper than we think!

It has always been an assumption that the freight sector will be more challenging to transition than typical road transport largely due to the costs, surprisingly the costs are remarkably close to passing parity already!

Policy effectiveness at the global scale

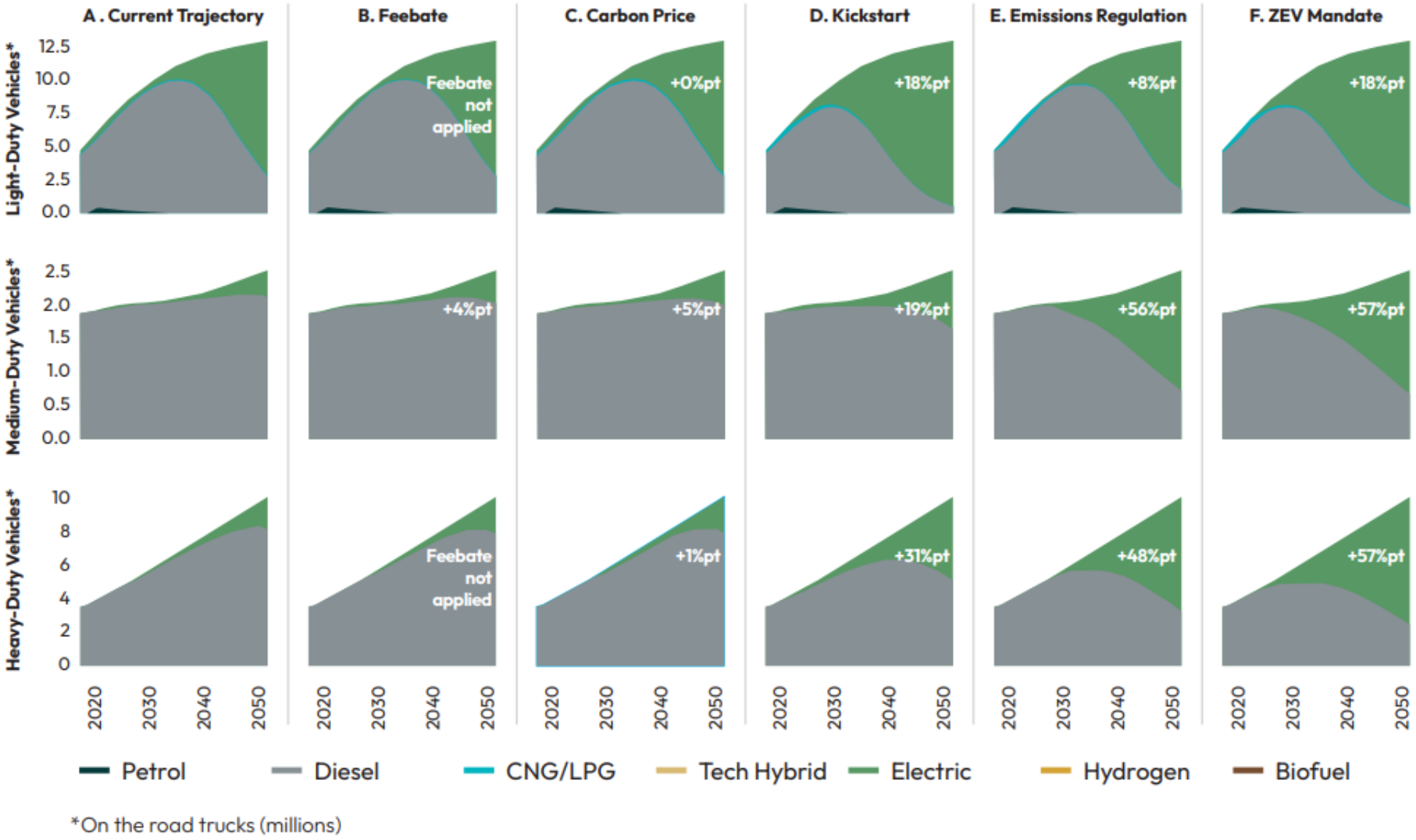


*On the road trucks (millions)

We test two major mechanisms and find routinely that one is more effective than the other.

Regulatory policies are simply far more effective at transitioning the freight sector.

Policy effectiveness at the national level

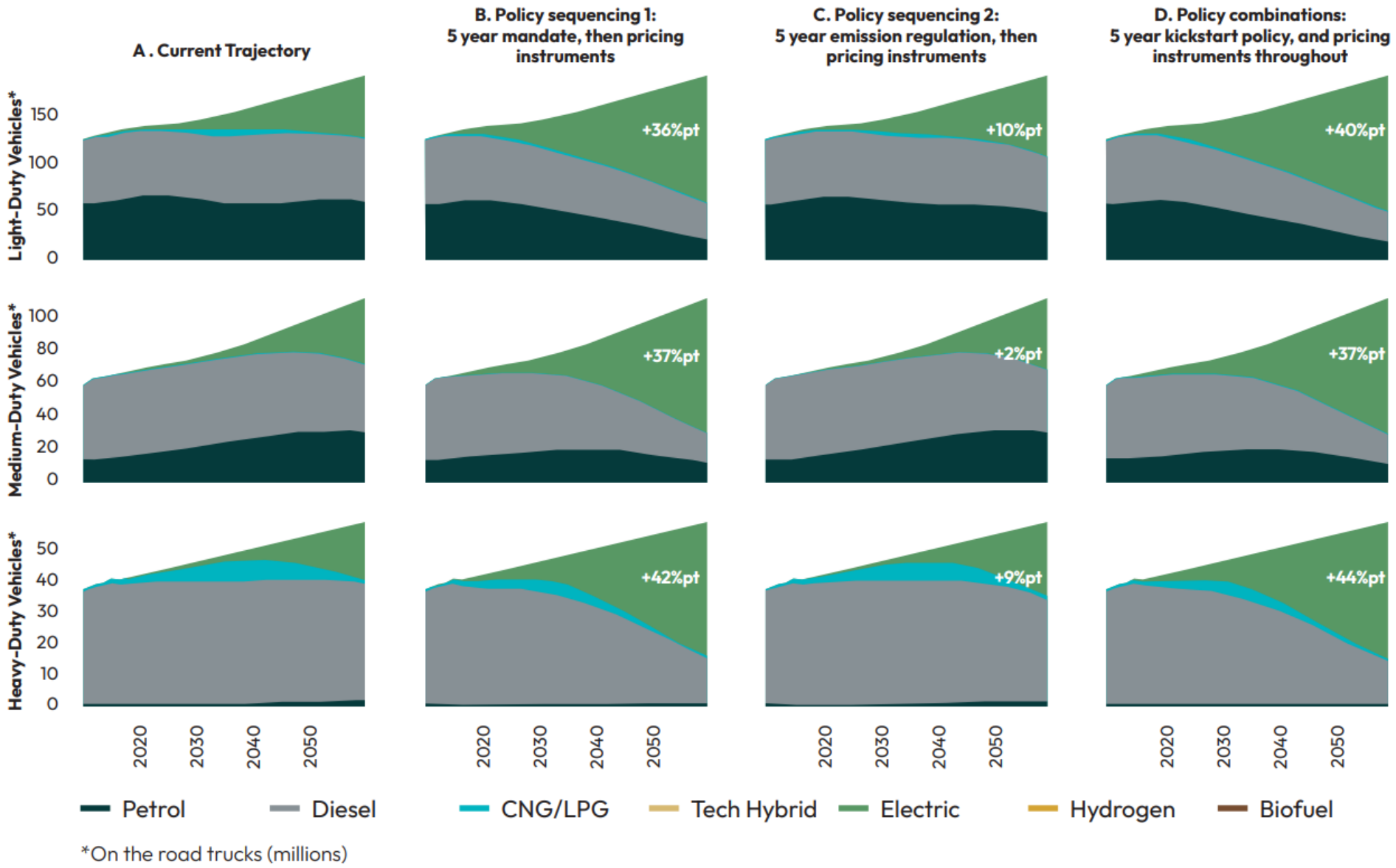


*On the road trucks (millions)

FTT allows us to achieve granularity at the national level, here we have India.

We once again observe regulatory mechanisms to be the most effective way of speeding up the transition!

Policy sequencing at the global scale



Policies don't exist in isolation, here we observe considerably greater effects for pricing policies once take-off for adoption rates have increased.

Conclusions

- If we want the Freight transition to occur it's clear that we need strong policies that go beyond pricing.
- Put simply not all policies are equal, mandates can be 10 times more effective than feebates alone.
- Policy sequencing can assist greatly; short term mandates combined with pricing policies can produce huge knock-on effects.
- It will be costlier to not deploy these robust policies. We observe that mandates will save the Indian economy approximately $1.5 trillion cumulatively from 2025-2050.

REGULATION IN PRACTICE: CALIFORNIA'S ADVANCED CLEAN TRUCKS REGULATION



CHRISTOPHER GRUNDLER

Deputy Executive Officer – Mobile Sources & Incentives

California Air Resources Board (CARB)

MODELLING SESSION: ZEV-RESET TOOL

CALSTART

GLOBAL COMMERCIAL VEHICLE DRIVE TO ZERO™

The **ZEV Regulation Savings Estimation Tool** (ZEV-RESET) helps policymakers estimate the potential **economic savings of supply-side regulation** aligned with the targets of the **Global MOU**.

ZEV-RESET SETUP

1. Open your computer or partner with someone who has a computer
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TAKEAWAYS

NEXT STEPS



UNLOCKING THE POTENTIAL OF SUPPLY-SIDE REGULATIONS SESSION 2. IMPLEMENTATION

1. Hear from **Chile** how they got their Fuel Efficiency Standards in Place
2. Learn about approaches to implement and the toolkit developed by **UC Davis**
3. Answer key questions to facilitate the development of **implementation plan**
4. Get in-depth, tailored **technical assistance** for implementation

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FOR MORE INFORMATION, VISIT: HTTPS://GLOBALDRIVETOZERO.ORG/MOU/

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