

MAKING ZERO EMISSIONS, 1.5°C-ALIGNED TRUCKING POSSIBLE



MAKING ZERO-EMISSIONS, I.5°C-ALIGNED TRUCKING POSSIBLE



1 The solutions

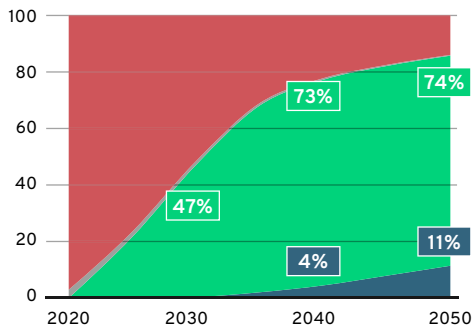
An early transition to battery electric trucks (BETs) and hydrogen electric trucks (HETs) powered by fuel cells will avoid cumulative emissions of 30–37 Gt CO₂e in the four regions modeled in this report

Regions modeled

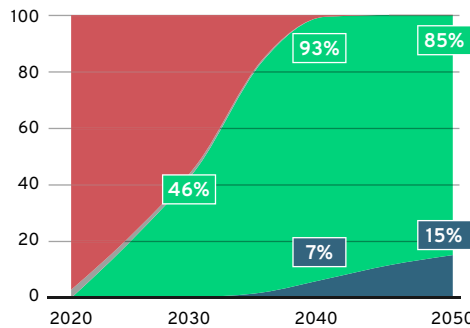


Sales share, % ■ Diesel ■ Biodiesel ■ BET ■ HET

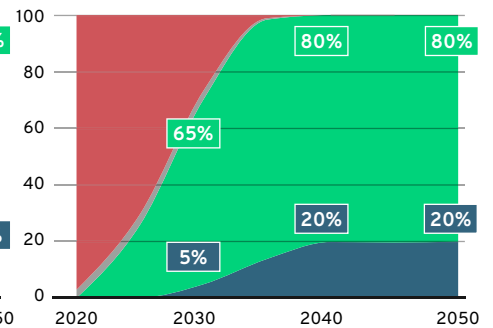
Expected Adoption scenario
Total cost of ownership minimisation



Zero-Emissions scenario
2040 diesel phase-out



Accelerated Zero-Emissions scenario
Carbon cost



Cumulative emissions savings versus fully diesel “Do Nothing”

-24 Gt CO₂e

-30 Gt CO₂e

-37 Gt CO₂e

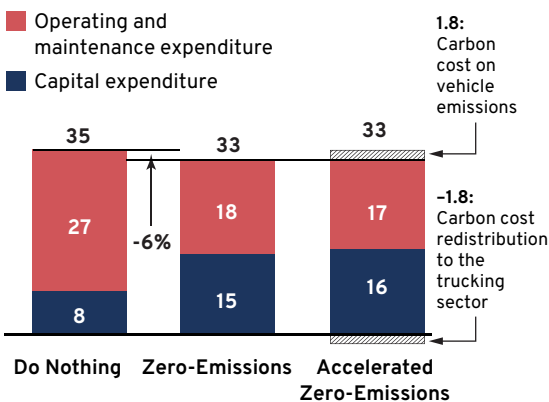
2 What it will take

Transitioning to zero-emissions trucking is cheaper than continuing to burn fossil fuels

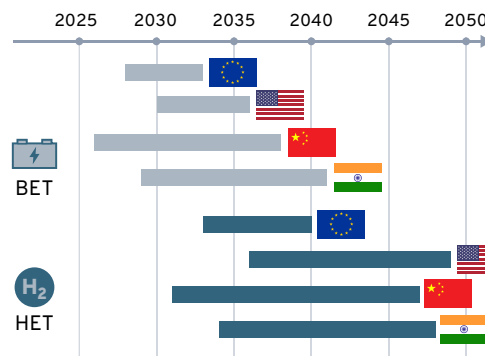
Most urban and regional zero-emissions trucks will reach total cost of ownership (TCO) parity between 2025 and 2034, with long haul following shortly after

Electricity and hydrogen demand is massive but manageable

Cumulative capital investments and operational expenditure 2020–50, trillion \$

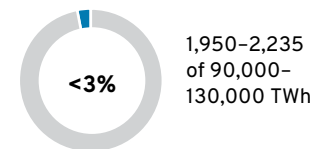


Year of zero-emissions truck TCO parity with diesel varies depending on usage, technology development, and policy choices, by region for long haul

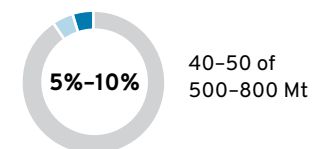


Resource requirements by 2050

Electricity for charging



Green hydrogen for refuelling



Parity can be accelerated by:

- Technology breakthroughs in battery cost and weight

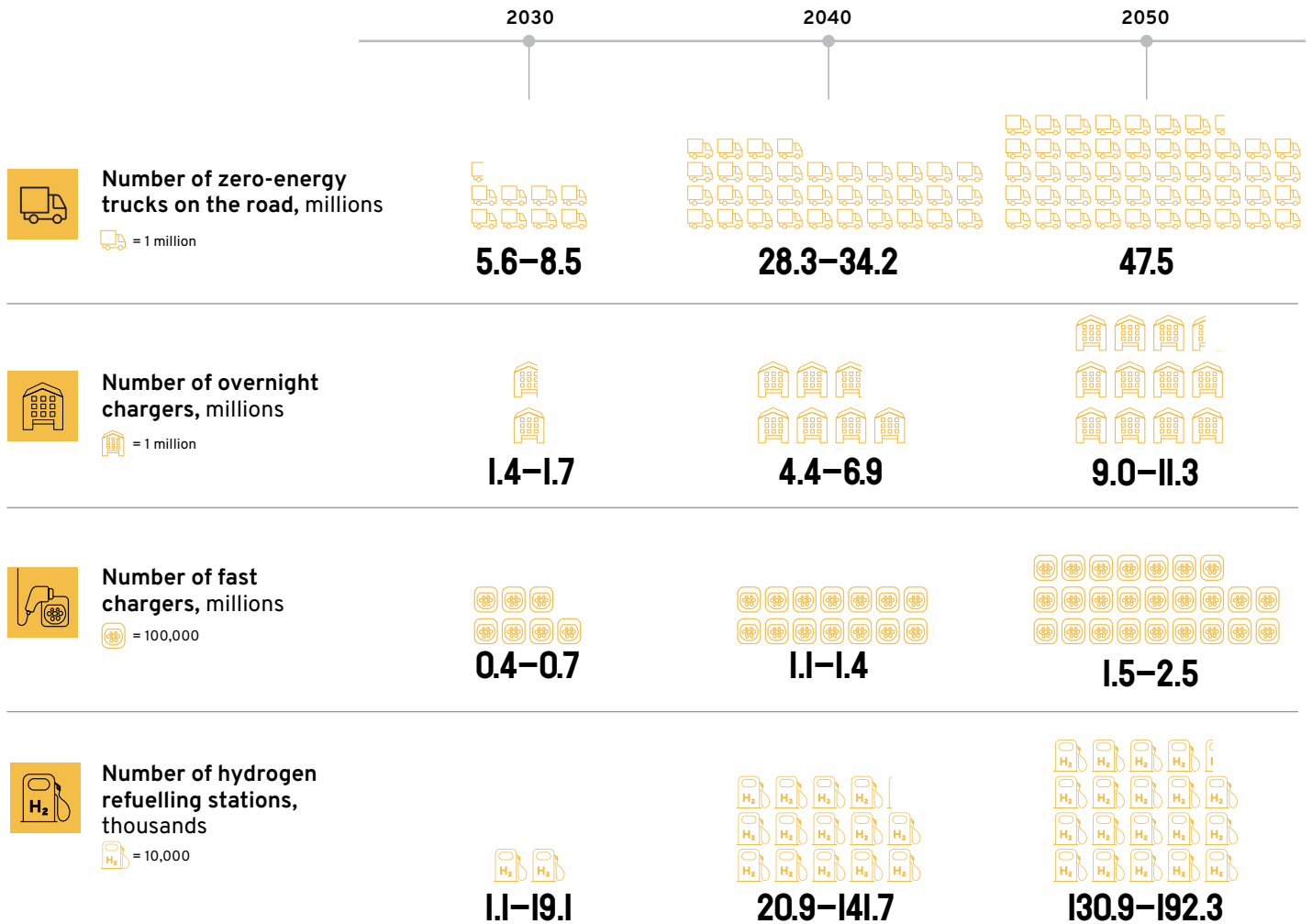
- Increasing operational efficiency and high-powered charging

- Cost reductions in electricity and green hydrogen production

- Carbon pricing or other policies

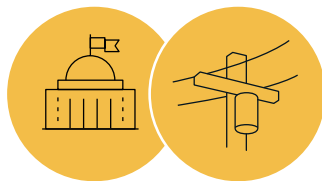
Note: total cost of ownership (TCO) includes vehicle, maintenance, and fuel costs.

3 Key milestones



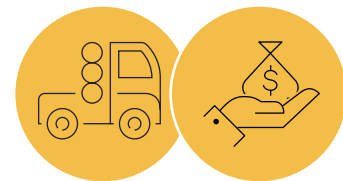
4 Priorities for this decade

GOVERNMENT AND UTILITIES



- Stimulate the early market through vehicle and infrastructure subsidies and fair allocation of policy costs
- Support high-powered charging and hydrogen fuelling stations to enable vehicle usage and optimised battery sizing
- Increase economies of scale by coordinating with other sectors on grid upgrades, hydrogen and biofuel production
- Monitor and address grid constraints

INDUSTRY AND FINANCE



- Reduce buyer risks with extended warranties
- Use financing to reduce upfront vehicle costs
- Improve battery energy density to increase hauling and/or range performance
- Increase residual value and environmental benefits with battery recycling and second life uses