



Hydrogen Electric Trucks – an update

7th March 2023

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Head of Hydrogen

For Fuelling the Future H2FC Conference, NCC

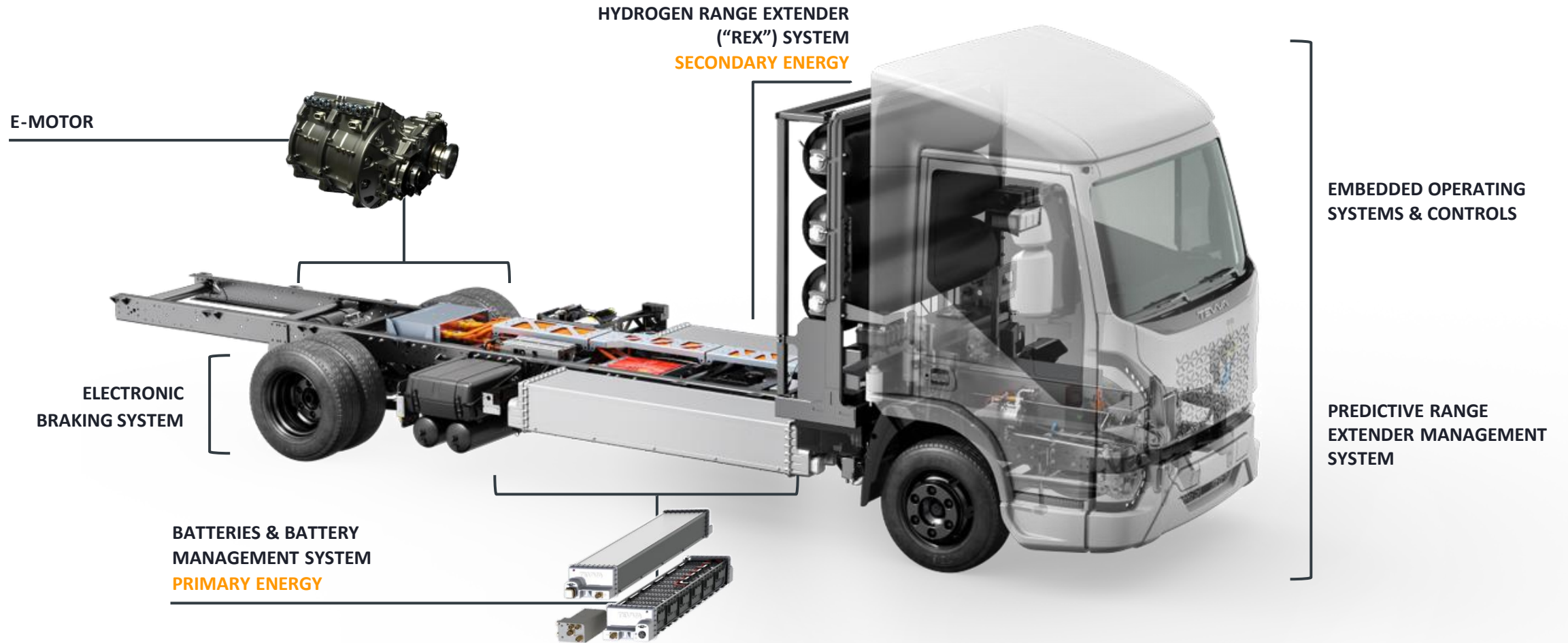


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Tevva's Journey



CUTTING EDGE TECHNOLOGY



2x56kWh side pods = 112kWh



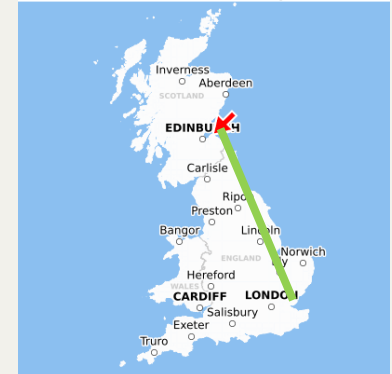
Fuel Cell Cooling pack



H2 Tanks

Fuel Cell

Example 350 mile run without recharging or refuelling



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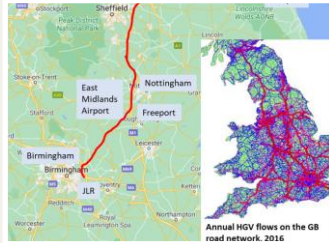
Even in cold weather

Fleet operators are encouraged by the opportunities from hydrogen electric trucks

Site constraints



Routes, ranges
(inc. variability)



Payload & ancillary
energy loads



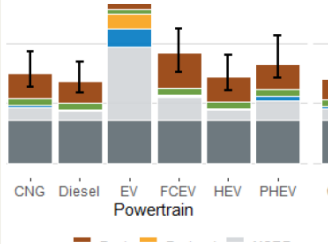
Uptime



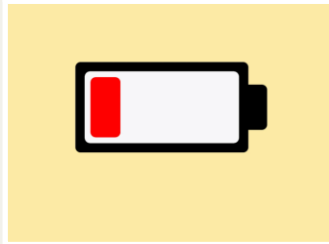
Familiarity & added
services



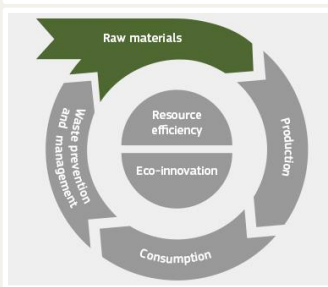
Economics



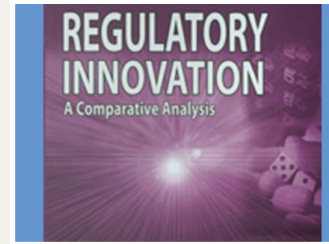
Energy security



Resource
management



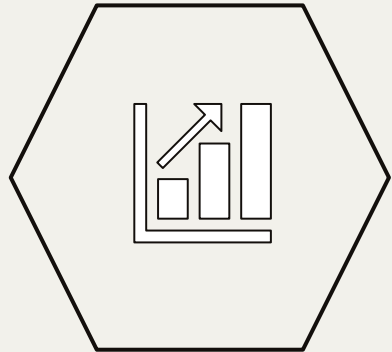
Clean Air Zones



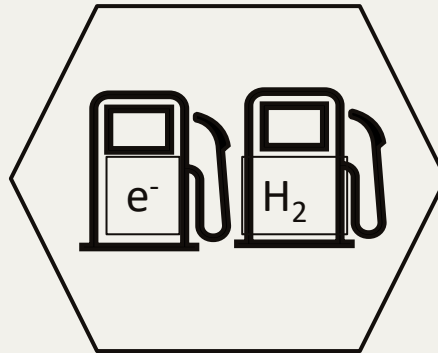
Net Zero



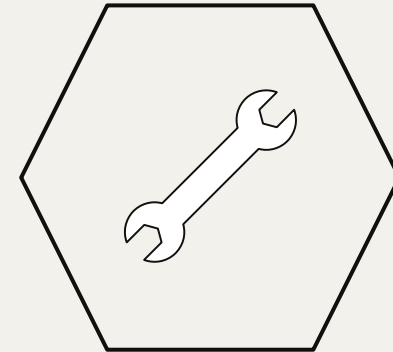
Challenges for hydrogen fuelling



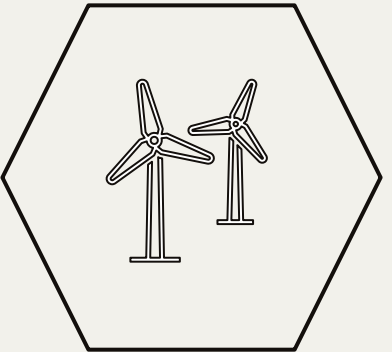
Understanding needs



Safe and convenient refuelling



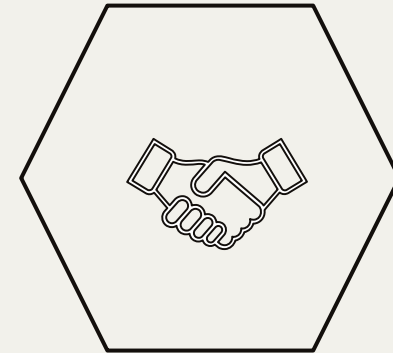
Installation
Operation
Maintenance
Upgrades
Aftercare
End-of-life



Lowest carbon footprint



Costs



Aligning multiple stakeholders

Tevva Hydrogen Services



CONVENIENT

- Hydrogen needs assessments
- Turnkey customer depot refuelling
- Access to public hydrogen station
- Simplified billing & data
- Choice of suppliers and commercial models
- Scalable approaches



AFFORDABLE

- Low up-front costs
- Economies of scale and scope
- Grants and subsidies
- Cost and risk sharing
- Use of low cost hydrogen supply
- Green financing

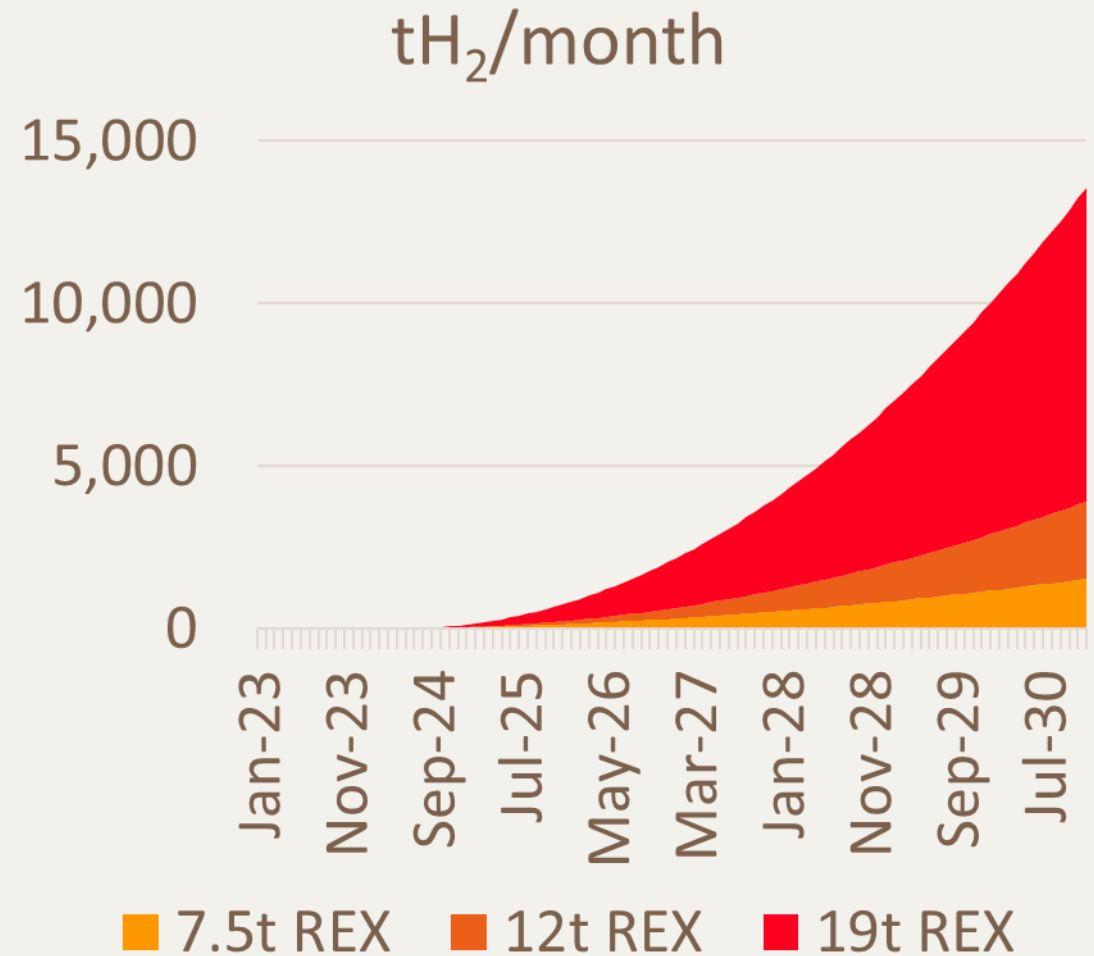
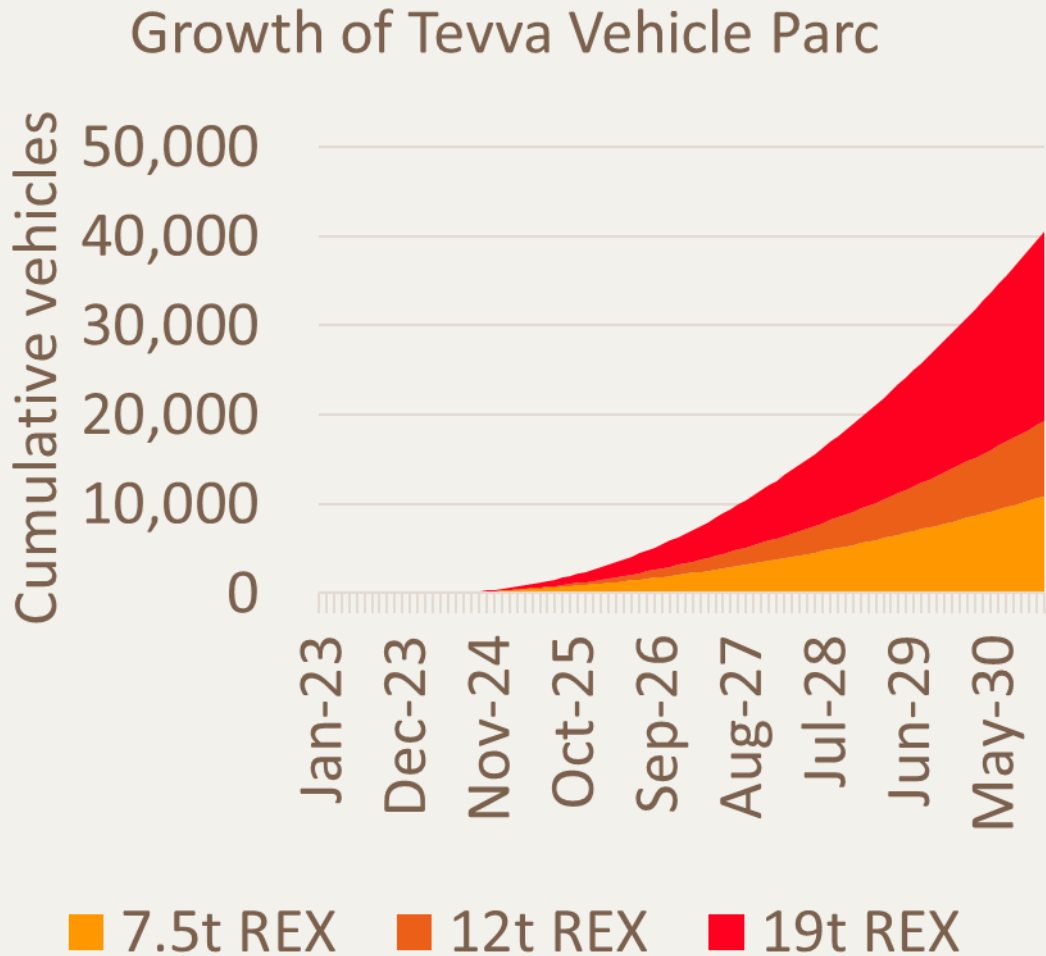


SUSTAINABLE

- Safety first
- Green hydrogen available
- Latest technologies to minimise lifecycle carbon footprint
- Support for carbon reporting
- Stakeholder management

Rising Tevva vehicle parc creates a new and rapidly rising hydrogen demands

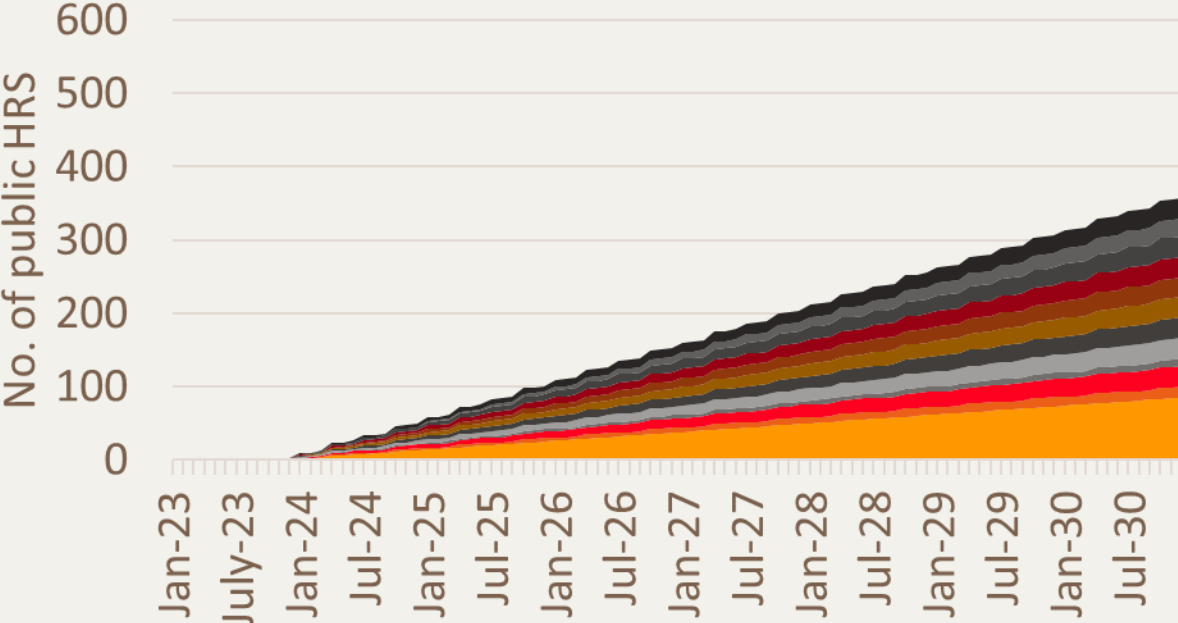
Rising Hydrogen demand



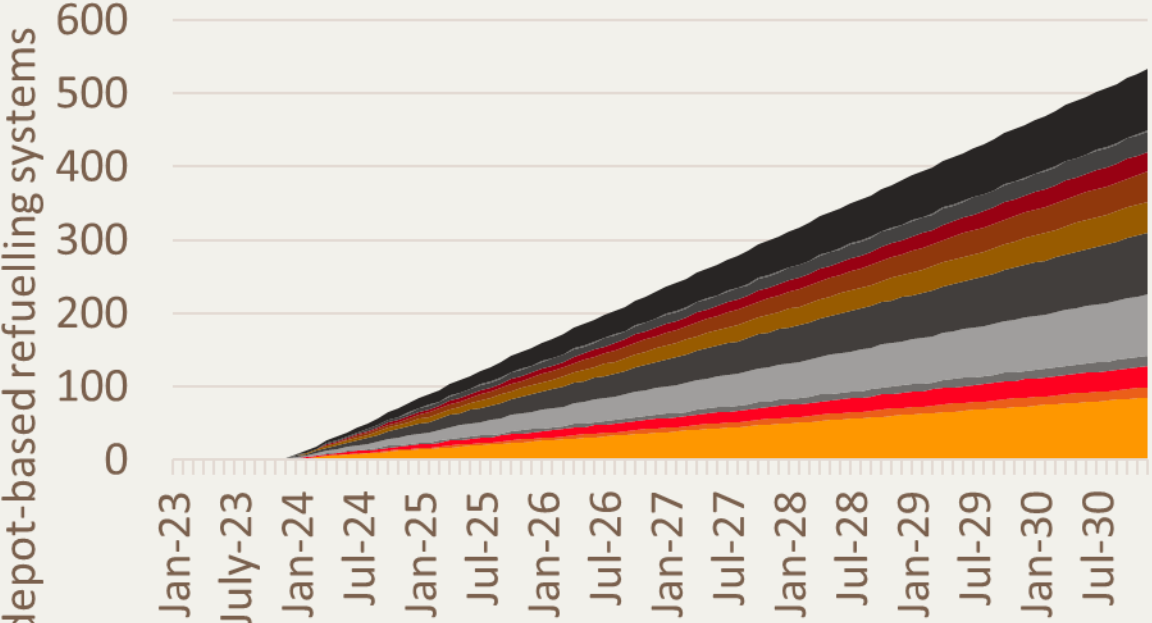
By 2030 Tevva fleet operators might need to fill hydrogen trucks at hundreds of different locations, in depot and public stations.

Geographically disperse

Public HRS



Depot refuelling

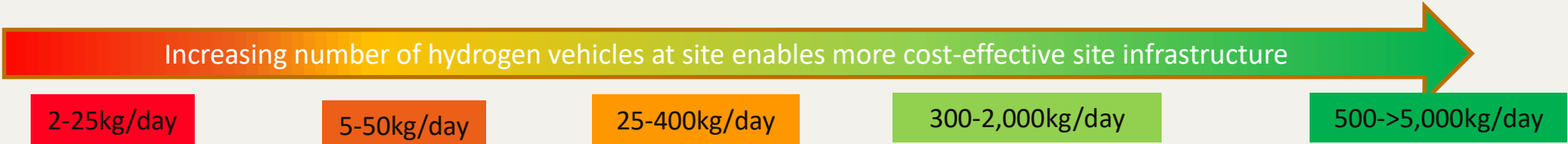
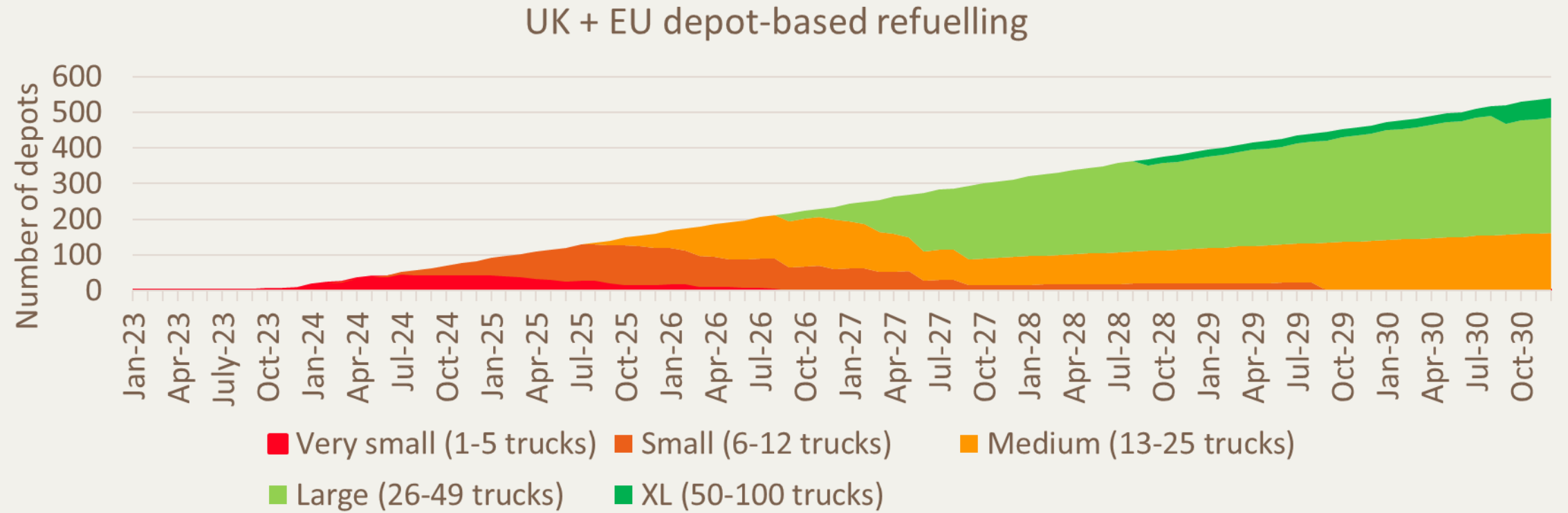


- England
- Wales
- Scotland
- Northern Ireland
- Germany
- France
- Spain
- Italy
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- Netherlands
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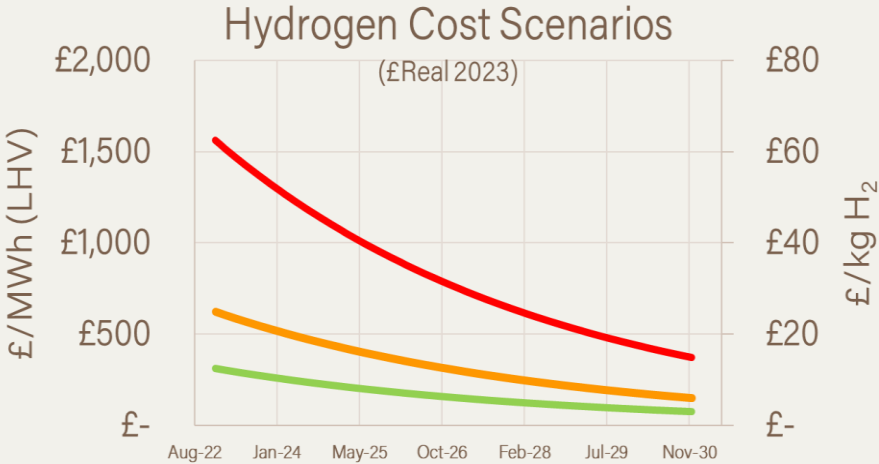
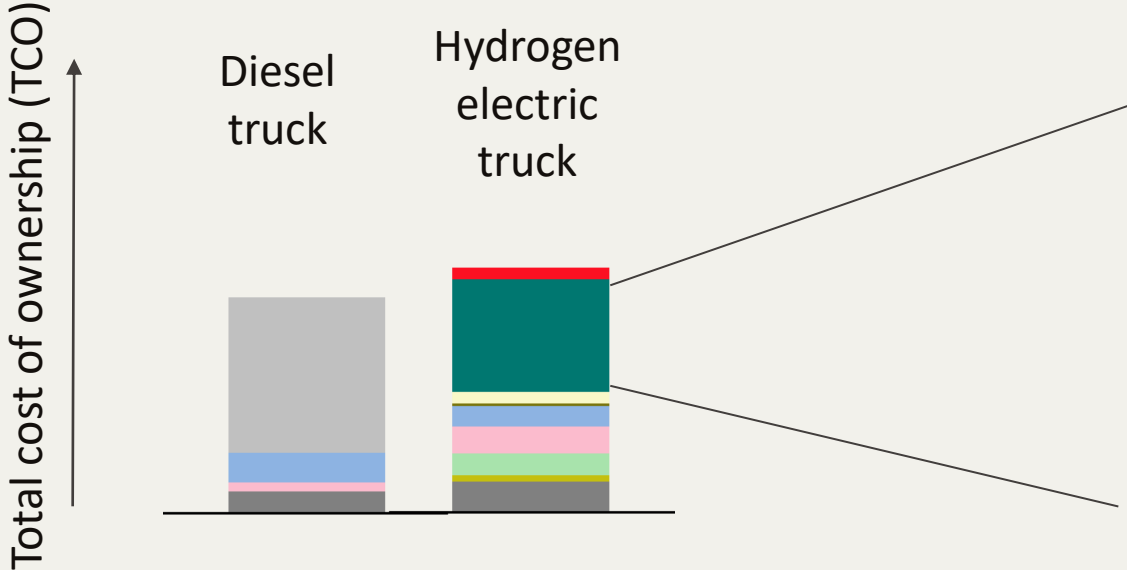
Need for scalable depot-based refuelling

Site scale-up



**Today, as a new product with a novel fuel
Hydrogen Electric Truck TCO is higher than for
diesel trucks.**

But TCO parity should be achieved from the mid 2020s for many locations, partly through hydrogen cost reduction.



- Vehicle depreciation (incl subsidies)
- VED
- Electricity
- Battery depreciation
- Maintenance
- Hydrogen
- FC and fuel tank depreciation
- Charger infrastructure
- Additional operator costs
- Vehicle finance costs
- Diesel
- Loss of payload

Tevva building partnerships to maximise service offerings



TEVVA VEHICLES



WARRANTY



REPAIR &
MAINTENANCE



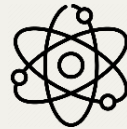
ASSISTANCE



INSURANCE



FUELLING &
CHARGING



ENERGY



TELEMATICS



TRAINING



FINANCING

TECHNOLOGY THAT MATTERS AND MAKES A DIFFERENCE TO HUMANITY

£170BN+ MARKET⁽¹⁾ IN NEED OF DISRUPTION

Global market opportunity in medium & heavy-duty (class 5-8) trucks continues to grow

HYDROGEN RANGE EXTENDER SOLUTION AVAILABLE IN 2023

Hydrogen fuel cell range extender solution delivers superior ownership economics and first-of-its-kind commercial vehicle power application

REAL WORLD VALIDATED PRODUCTS

~400,000 km already driven on-road by existing customers

INTEGRATED TECHNOLOGY SOLUTIONS ENABLE OUR PATH TO SUSTAINABLE TRUCKING

Unique use of cutting-edge technology with first mover advantage and established roadmap for next generation of zero-emission battery electric + hydrogen electric dual-energy trucks

AGILE MANUFACTURING METHODOLOGY

Low capex and flexible production approach can be easily replicated in 6-12 months anywhere in the world

MISSION-DRIVEN LEADERSHIP

Dynamic and innovative roster of executives with backgrounds in Automotive, EV and Tech



Tevva appreciates the ongoing support of hydrogen partners

Partners



If you'd like to work with Tevva on hydrogen please email Harsh.Pershad@tevva.com



WE'RE MISSION LED

We do technology because it matters and makes a difference to humanity



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