



Hydrogen Electric Trucks

9th February 2023

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For Foresight Events, Liverpool

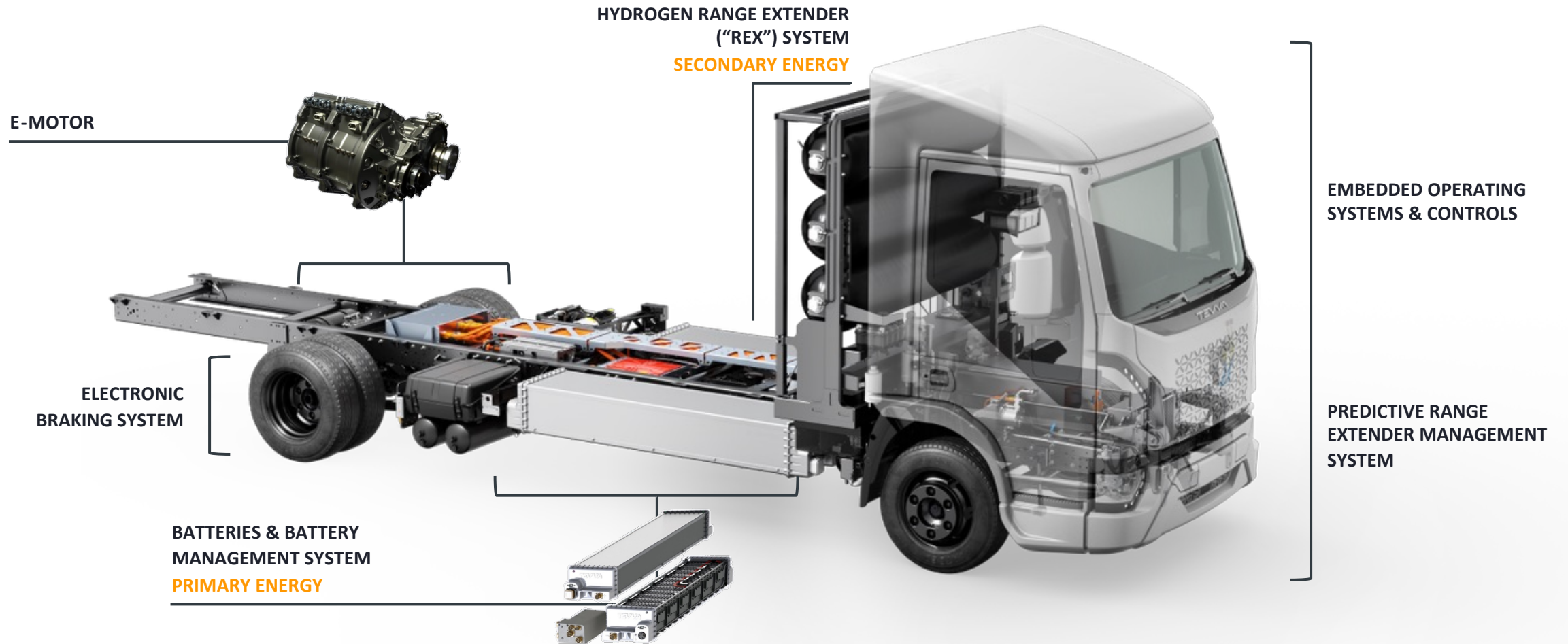


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Tevva's Journey



CUTTING EDGE TECHNOLOGY



2x56kWh side pods = 112kWh



Fuel Cell Cooling pack



H2 Tanks

Fuel Cell

A hydrogen electric truck journey

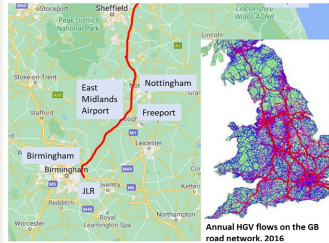


Fleet operators are encouraged by the opportunities from hydrogen electric trucks

Site constraints



Routes, ranges
(inc. variability)



Payloads, volume,
energy loads



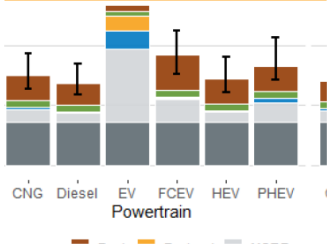
Uptime



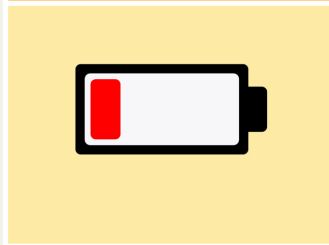
Familiarity & added
services



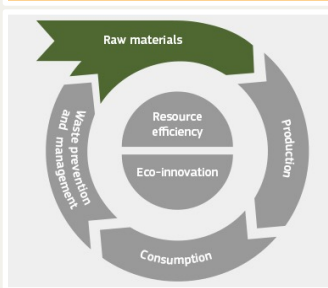
Economics



Energy security



Resource
management



Clean Air Zones



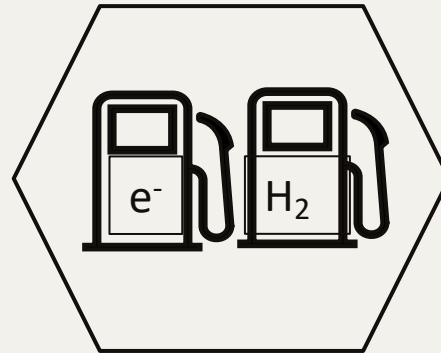
Net Zero



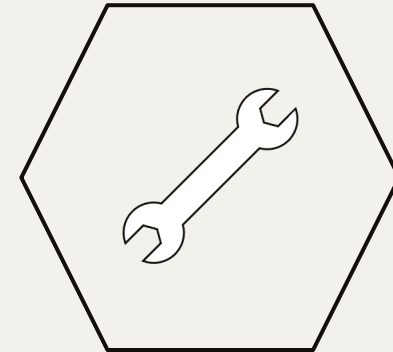
Customer challenges for hydrogen fuelling



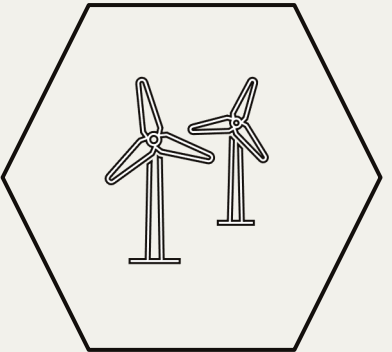
Understanding needs



Safe and convenient refuelling



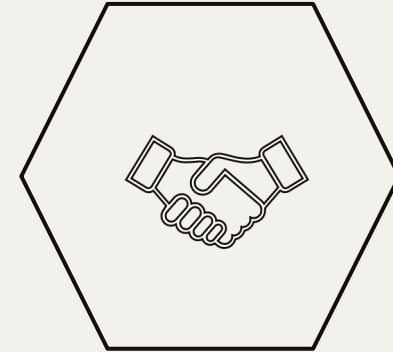
Installation
Operation
Maintenance
Upgrades
Aftercare
End-of-life



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

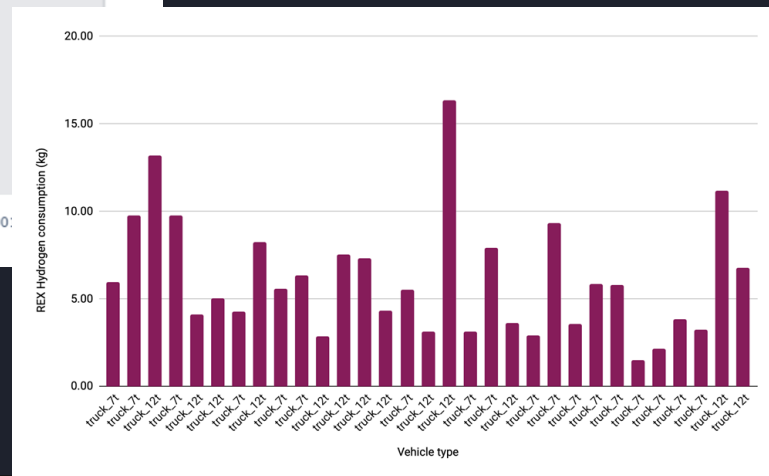
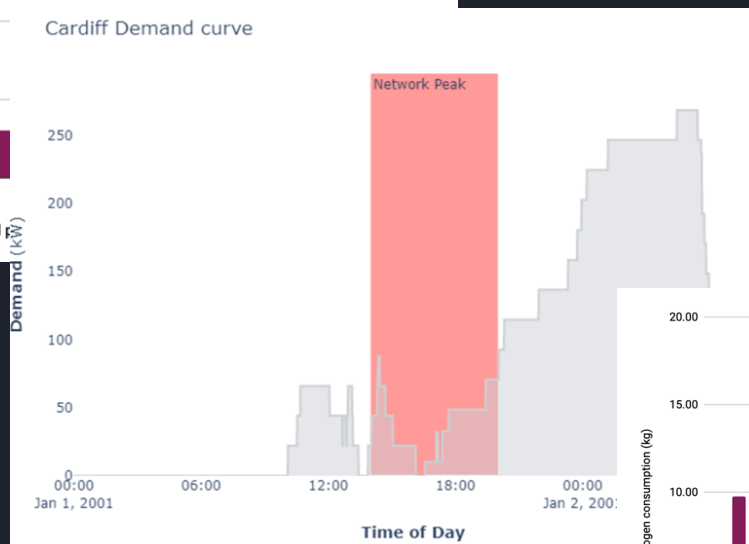
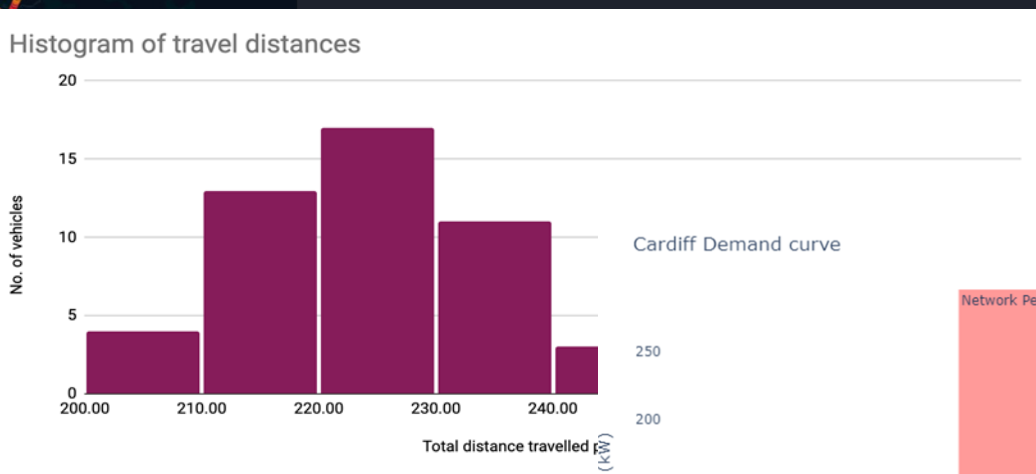
- Low up-front costs
- Economies of scale and scope
- Grants and subsidies
- Cost and risk sharing
- Use of low cost hydrogen supply
- Green financing



SUSTAINABLE

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

Example – assessing energy needs for large fleets



Teva working in partnership with

AECOM

EVENERGI

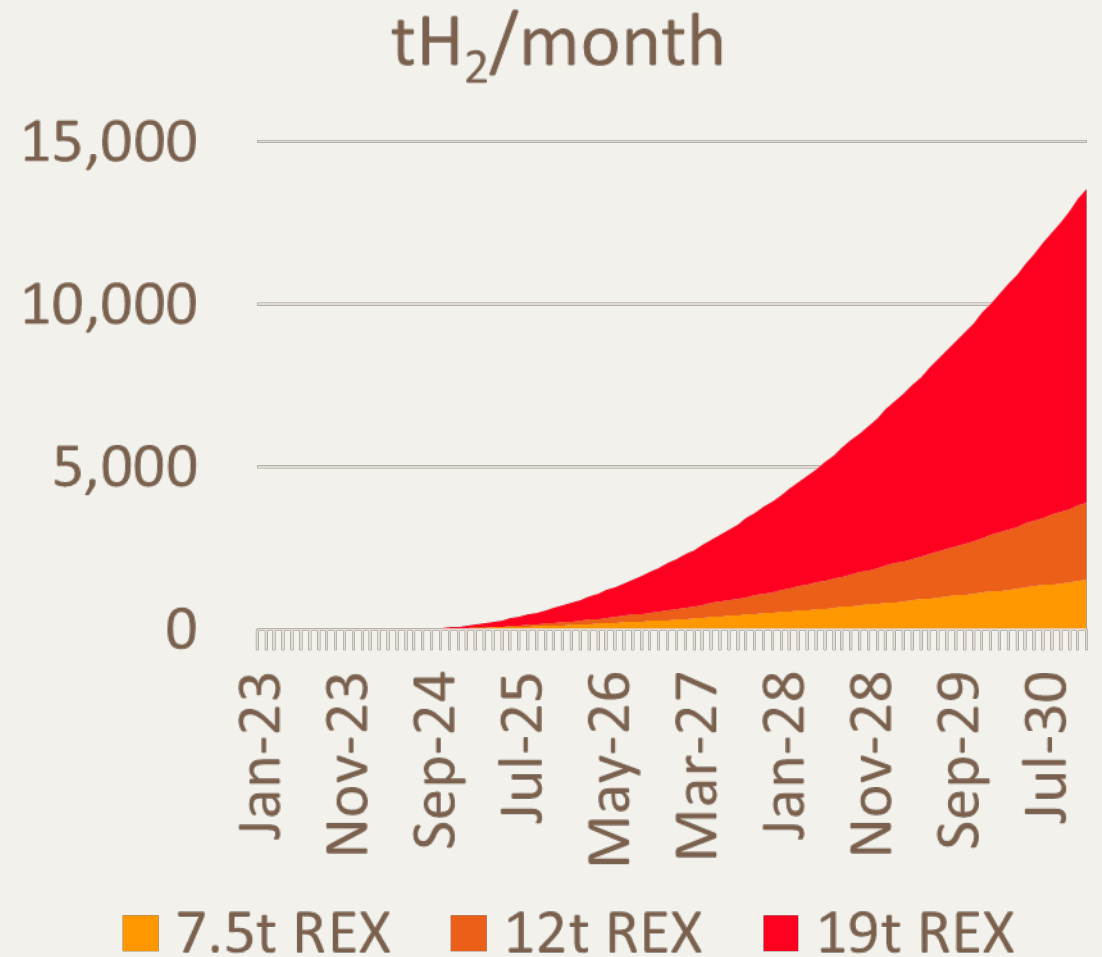
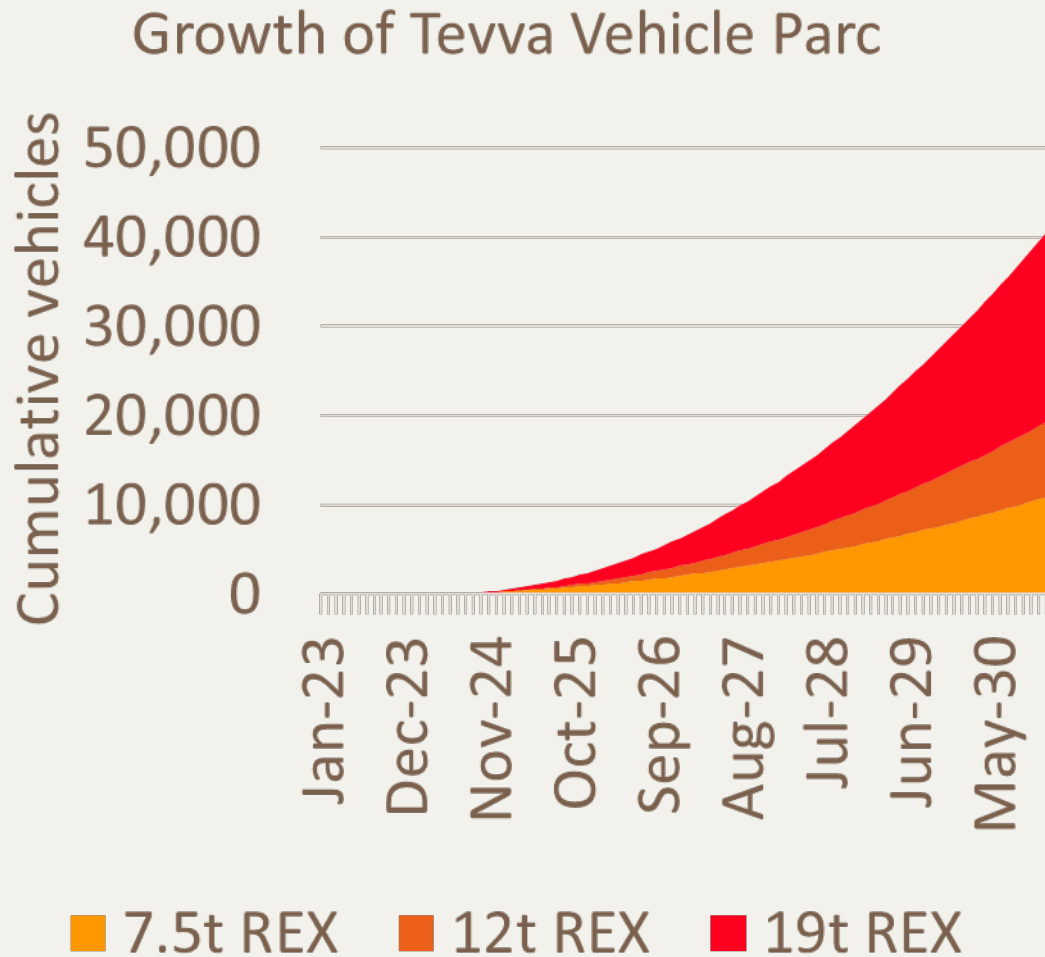
1. Analyse fleet
2. Quantify energy demand variability
3. Understand charging opportunities
4. Quantify hydrogen needs
5. Recommendations for infrastructure

TEVVA

TEVVA

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

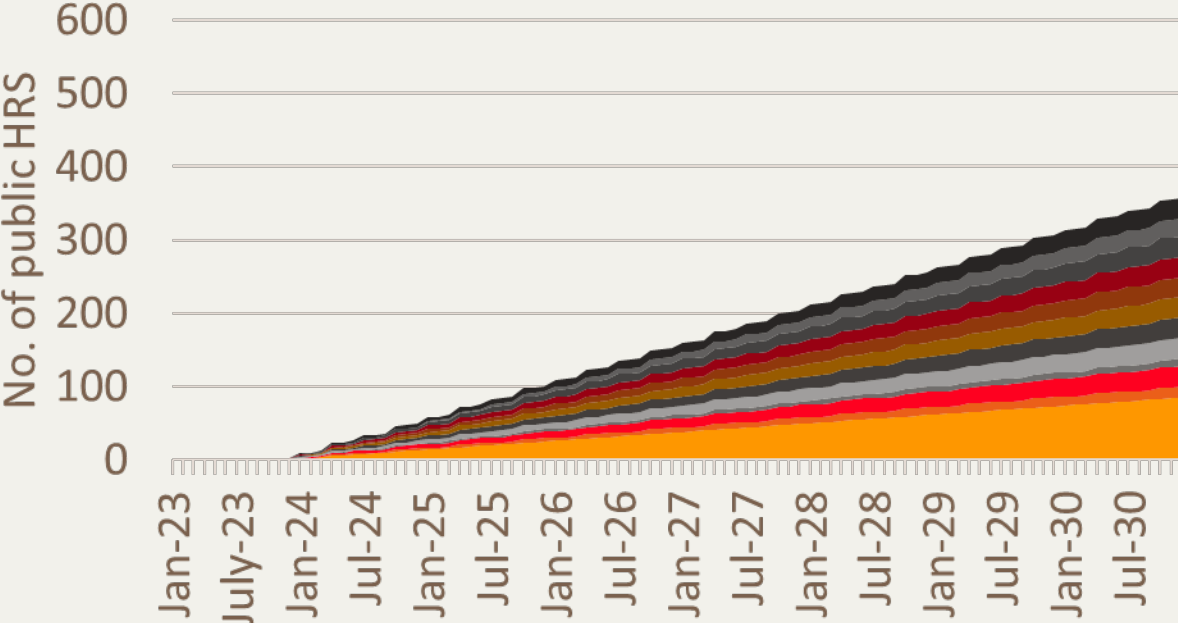
Rising Hydrogen demand



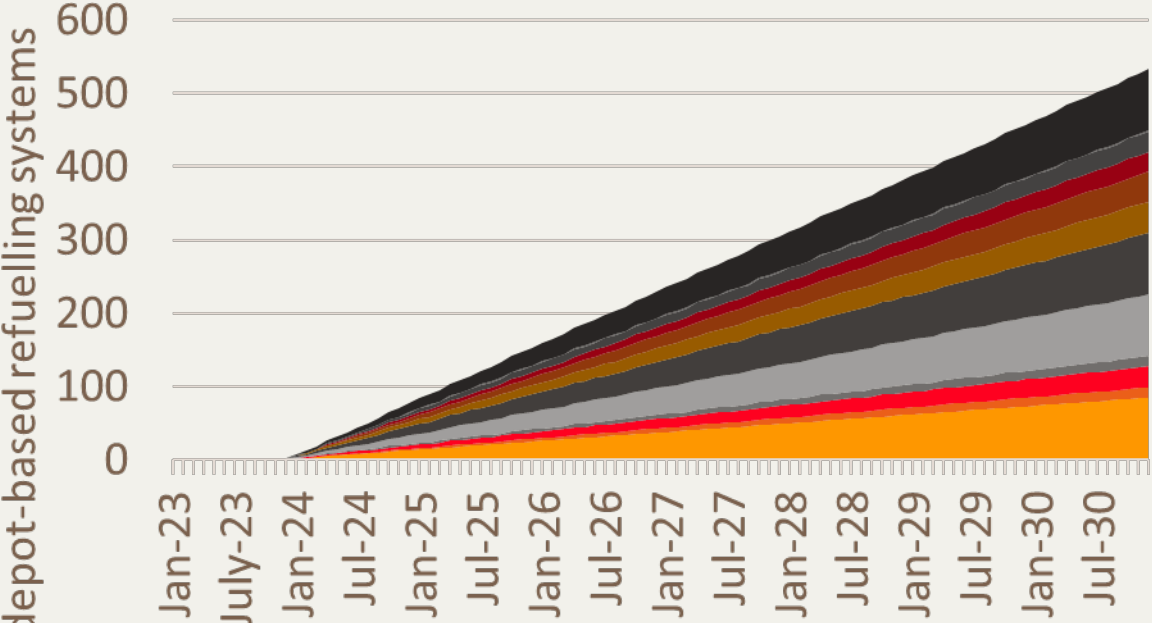
By 2030 Tevva fleet operators might need to fill hydrogen trucks at hundreds of different locations, in depot and public stations.

Geographically disperse

Public HRS



Depot refuelling

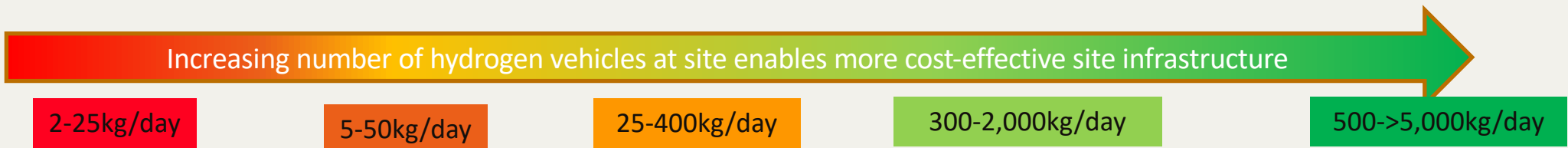
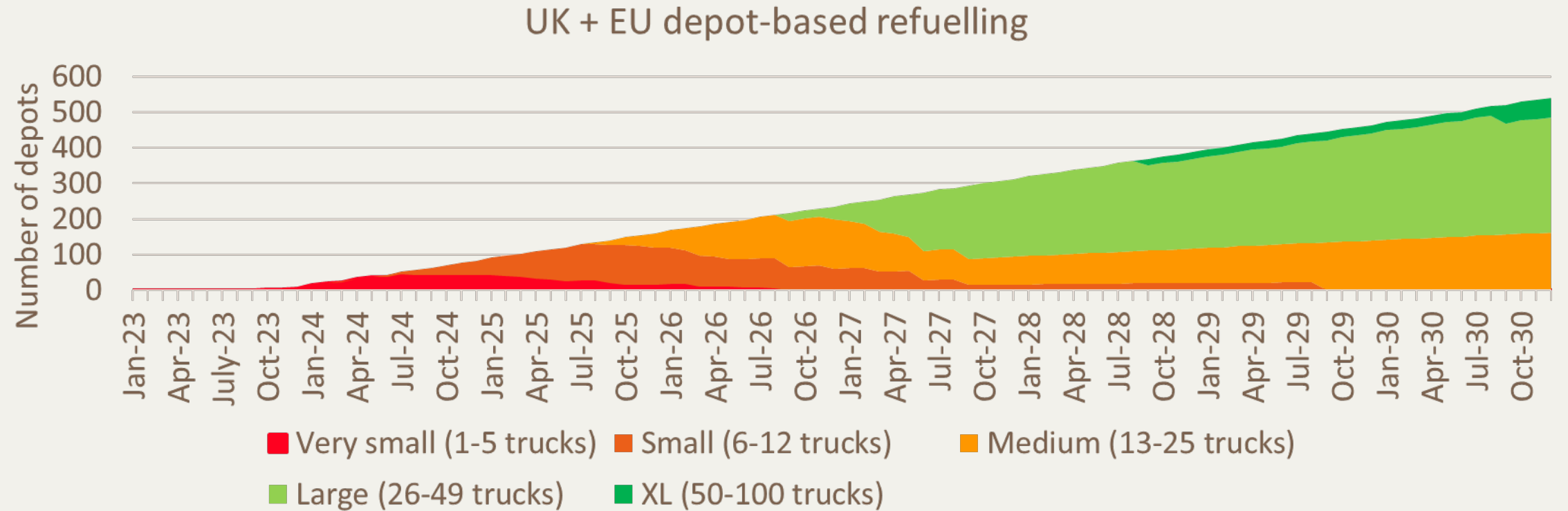


- England
- Wales
- Scotland
- Northern Ireland
- Germany
- France
- Spain
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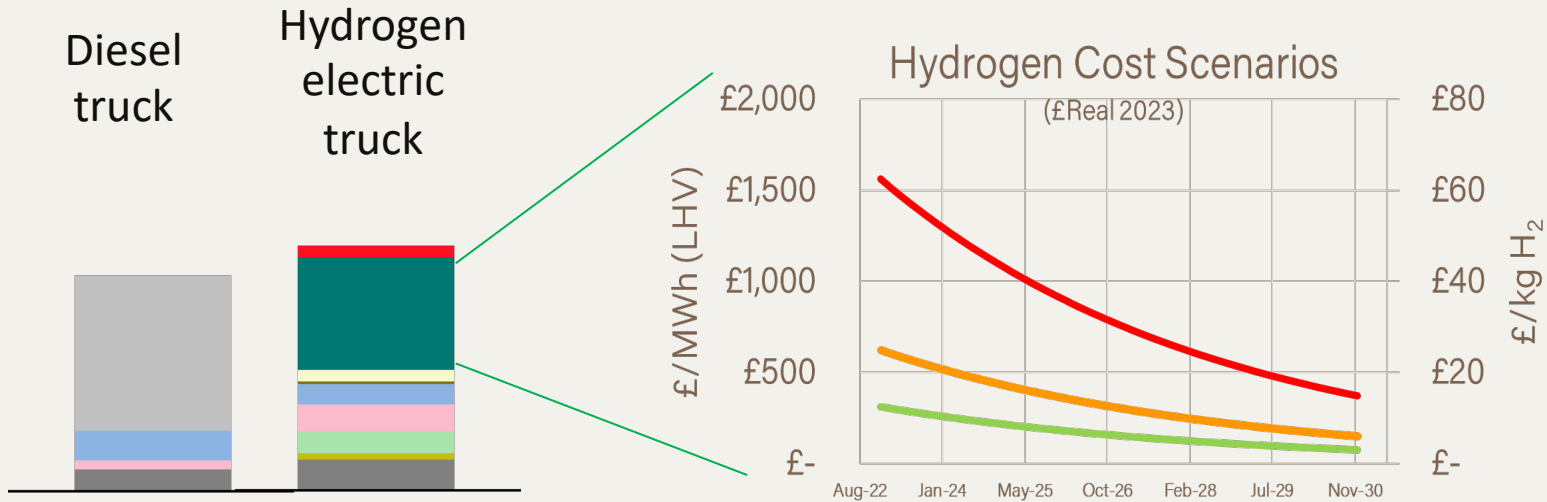
Need for scalable depot-based refuelling

Site scale-up



Today Hydrogen Electric Truck total costs of ownership are today higher than for diesel trucks. However costs will reduce rapidly over the 2020s in locations with the highest alignment and support across industry and public sector

Cost variability



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

Truck-as-a-Service - Extending functions



TEVVA VEHICLES



WARRANTY



REPAIR &
MAINTENANCE



ASSISTANCE



INSURANCE



FUELLING &
CHARGING



ENERGY



TELEMATICS



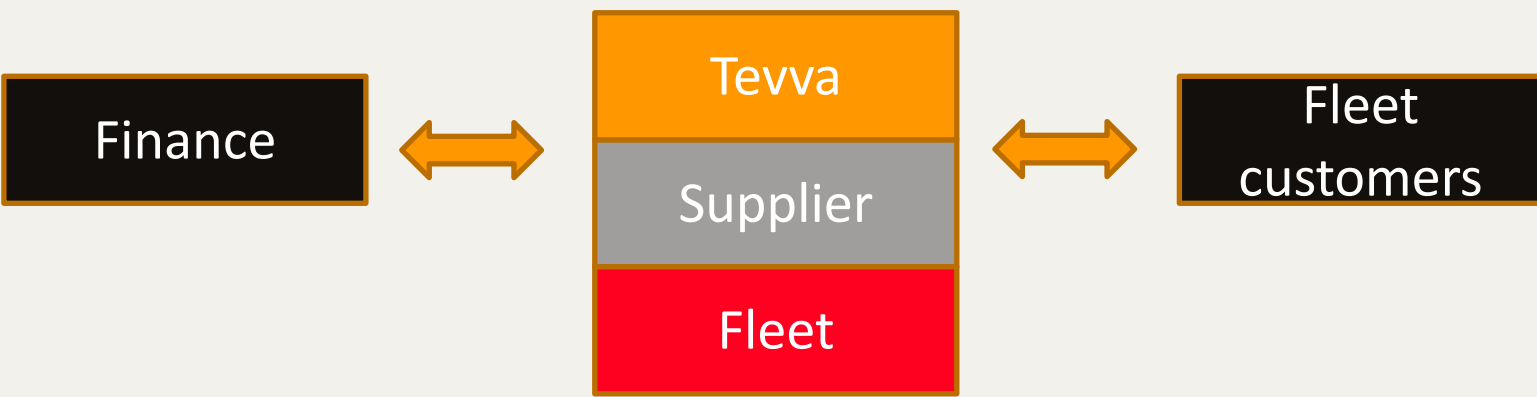
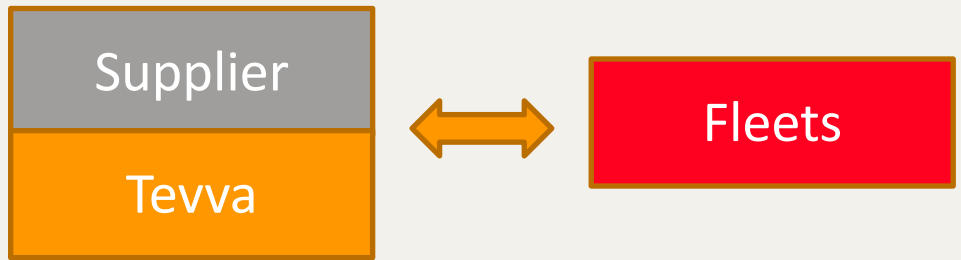
TRAINING



FINANCING



Commercial model
variability



Tevva is exploring different risk reduction strategies with hydrogen suppliers to ensure successful launch of hydrogen trucks

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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