

# Driving Zero Emissions

**Rob Yates – Regional Business Manager  
FAUN Zoeller - ENGINIUS (UK) Ltd**

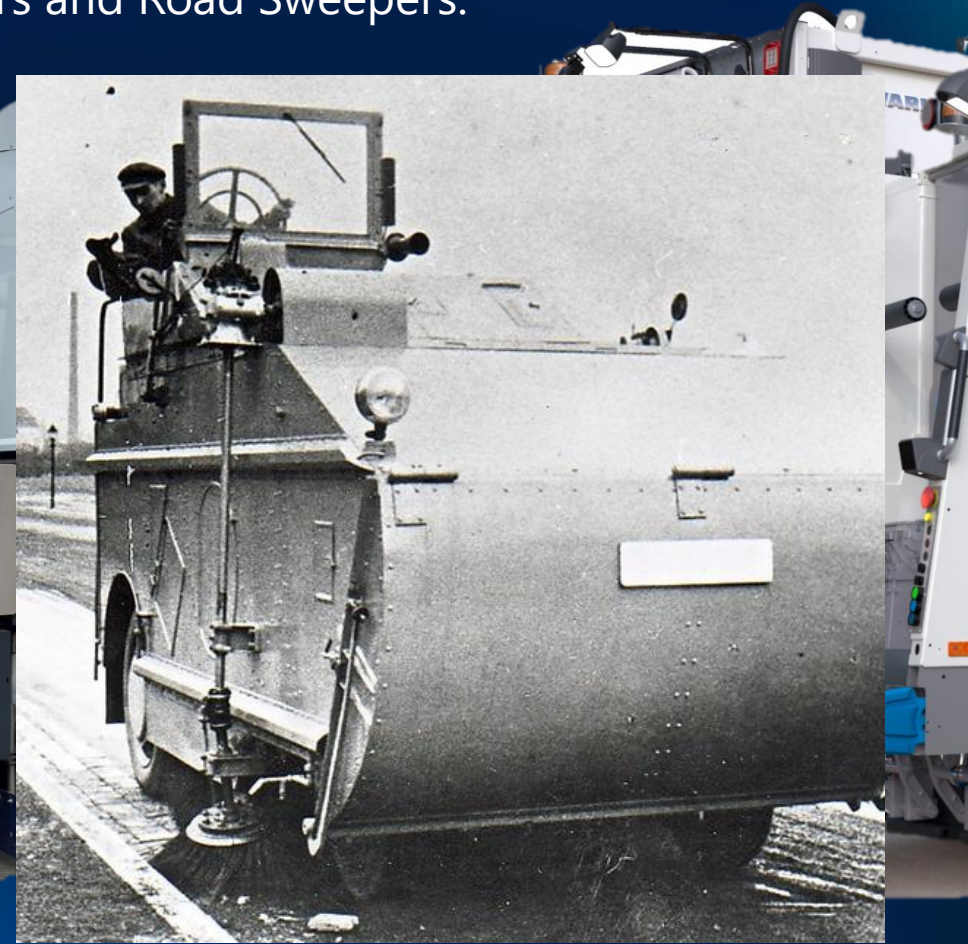


**ENGINIUS<sup>®</sup>**  
FAUN GROUP



# Introduction

- **FAUN Zoeller:** Predominantly known for the production of Refuse Collection Vehicle bodies, Bin Lifters and Road Sweepers.



# Introduction

- **ENGINIUS UK.** FAUN Group have been on an alternative drivetrain journey for quite some time....



01 / 2006  
Start of concept  
development



01 / 2009  
Validation  
DUALPOWER



07 / 2009  
20 DUALPOWER  
vehicles in the field



10 / 2009  
H2 fuel cell in waste collection  
vehicle FUELCELL



06 / 2011  
FUELCELL-vehicle  
in Berlin



05 / 2018  
Concept presentation  
BLUEPOWER at IFAT



08 / 2020  
Validation BLUEPOWER in  
Bremen



05 / 2021  
Delivery of pre-series  
vehicles



05 / 2022  
Launch ENGINIUS as  
own brand



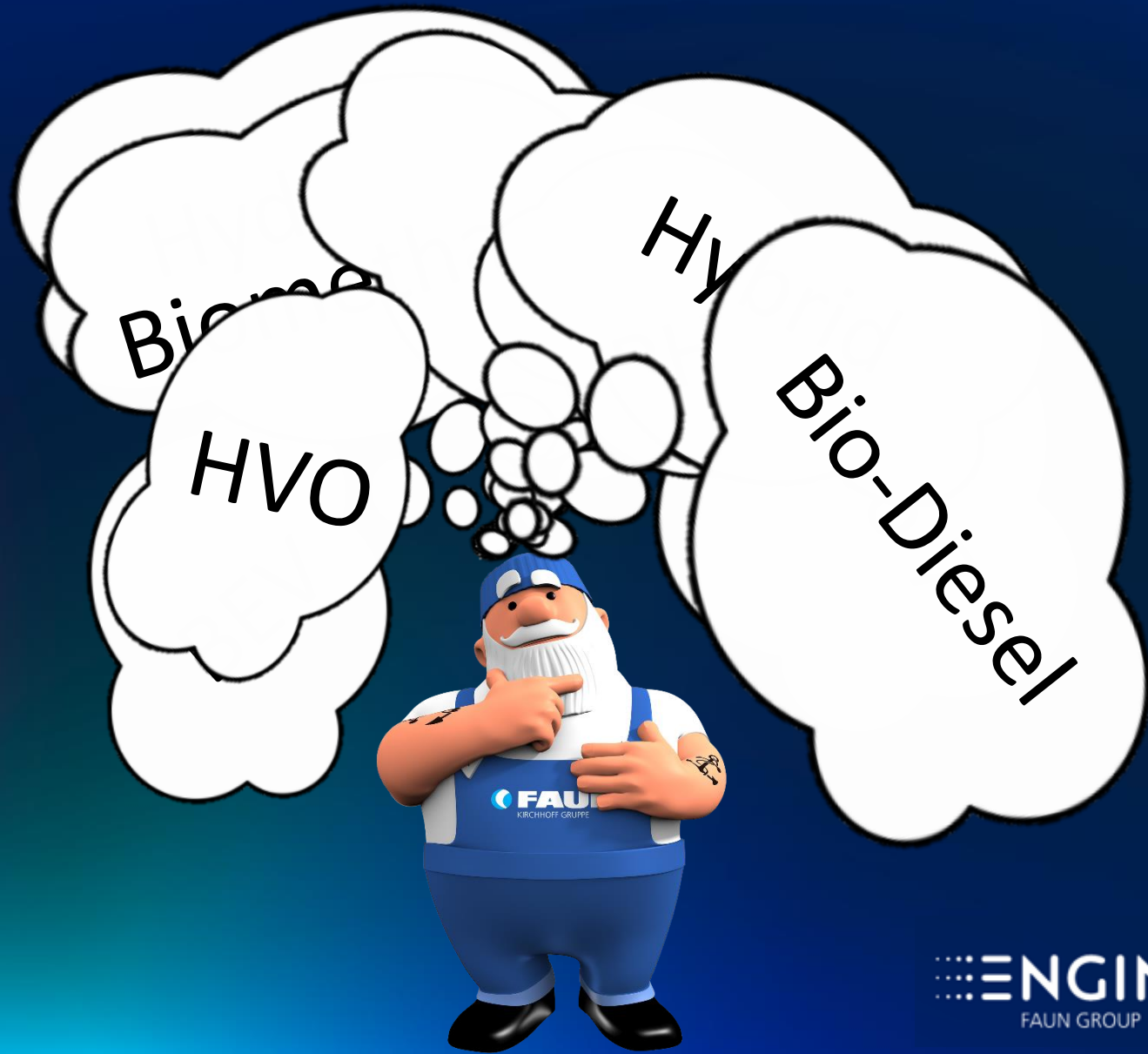
05 / 2022  
Start of series production



10 / 2022  
Concept presentation CITYPOWER at  
the IAA transportation in Hanover



# State of Innovation in the HGV Market





# State of Innovation in the HGV Market

The heavy goods vehicle (HGV) market, accounts for approximately 20% of the UK CO<sub>2</sub> emissions from transport, and is rapidly evolving to meet zero-emission goals, driven by regulatory pressures and the need for sustainability, with advances in electric and hydrogen technologies.

Here are some of the key innovations and trends in this area:

- **Battery Electric Vehicles (BEVs):** Leading OEM companies have all developed battery electric trucks.
- **Advancements in Battery Technology:** Improvements in battery energy density, charging speed, weight and cost are critical.
- **Charging Infrastructure:** Investment in high-capacity charging stations is essential for widespread adoption.

# State of Innovation in the HGV Market

- **Hydrogen-Powered Trucks:** Large Companies like Hyundai and Toyota are at the forefront of hydrogen fuel cell truck development, and in Europe our own HFCEV the Enginius Bluepower has seen massive growth in the Refuse Collection Market especially in Germany.
- **Hydrogen Production and Distribution:** Innovations in green hydrogen production, using renewable energy for electrolysis, and the expansion of hydrogen refuelling infrastructure are key to making hydrogen a viable option
- **Range Extender Technologies:** These combine electric powertrains with small fuel cells that act as generators, extending the range of electric trucks.

# State of Innovation in the HGV Market

- **Optimized Routing and Efficiency:** Advanced telematics systems enable real-time monitoring and route optimization to maximize the efficiency of zero-emission trucks – Dataloggers installed on trucks to monitor real world usage figures.
- **Predictive Maintenance:** Using data analytics to predict and prevent issues before they occur, reducing downtime and improving the reliability of electric and hydrogen trucks.
- **Lifecycle Emission Reduction:** Focus on reducing emissions throughout the vehicle's whole lifecycle, from embedded Carbon in the production to end of life recycling.
- **Total Cost of Ownership (TCO):** As battery and hydrogen technology costs decrease and efficiency improves, the TCO of zero-emission HGVs becomes more competitive with traditional diesel trucks.

# What are the Real Challenges?

- Products
- Infrastructure & Fuelling
- Funding & Operations
- Skills, People & Engagement





# Products

- **The product is the easier bit....** There are an abundance of options out there to suit various applications available right now to enable the transition to 100% zero tailpipe emissions e.g.....
- CNG and Biomethane is an established fuel source for HGV offering 10 – 15% carbon emission reduction and can be an intermediate solution for those considering Hydrogen in the long term
- LNG and Bio LNG produced from organic waste is again a well established source with good availability offering a 10 – 20% reduction in CO<sub>2</sub> emissions compared to diesel.
- HVO is ideal as another intermediate solution which can be used with most existing Diesel trucks offering reductions in Carbon & GHG emissions
- H<sub>2</sub> Dual Fuel Conversion by ULEMCo offers another gateway to Hydrogen adoption giving the benefit of mixing Hydrogen and Diesel to displace 30 – 70% of the CO<sub>2</sub> depending on the mixture

# Battery Electric Vehicles

- **FAUN Zoeller** are 'technology agnostic' when it comes to emission free RCV applications...



# Enginius Bluepower

The logo features the word "ENGINIUS" in a bold, sans-serif font. The letters are filled with a horizontal gradient from red on the left to blue on the right. To the left of the text is a graphic element consisting of three horizontal rows of small dots, each row containing five dots. The dots are colored in a gradient matching the text, transitioning from red to blue. A small registered trademark symbol (®) is located at the top right of the word "ENGINIUS".

ENGINIUS®



# Infrastructure & Fuelling

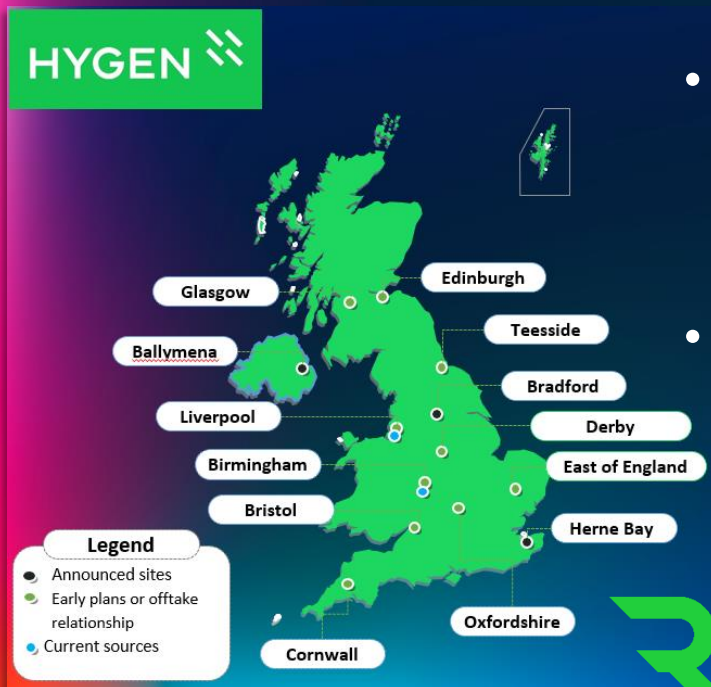
**HFCEV or BEV....** Infrastructure is vital to either solution

- Public charging for BEV cars and light vans is very well established and getting better all the time, but for HGV the outlook is not quite the same
- Gridserve announced it's role last year in the installation of a network of public EV chargers for HGV's, the so called "*Electric Freightway*", at motorway service stations and truck stops.
- BEV or HFCEV Refuse Collection Vehicles, refuelling or charging is mainly carried out 'back at the base' which brings added difficulties when dealing with large fleets. In Europe public Hydrogen filling stations are far more abundant



# Infrastructure & Fuelling

- The public Hydrogen refuelling scene looks bleak at the moment but plans are in place to improve this.....
- **FAUN Zoeller - Enginius UK** provide solutions for Hydrogen refuelling to support our customers by partnerships with leading companies in the field such as;
  - Element 2
  - Ryze
  - Haskel



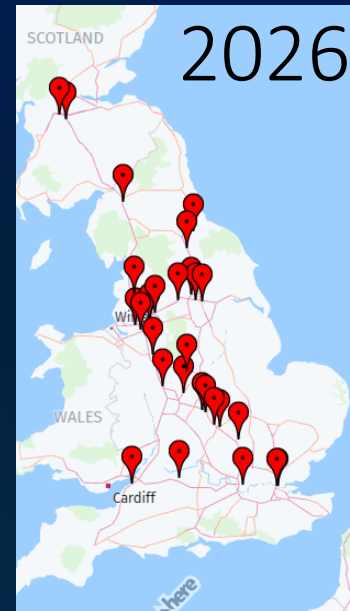
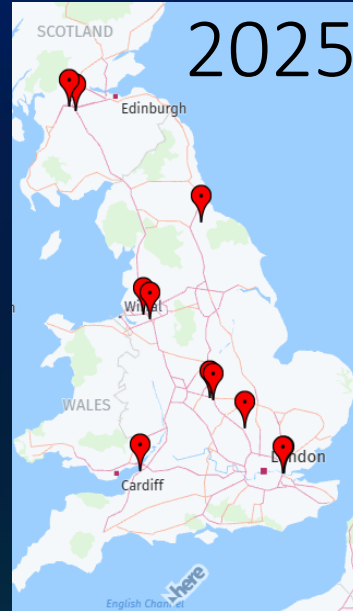
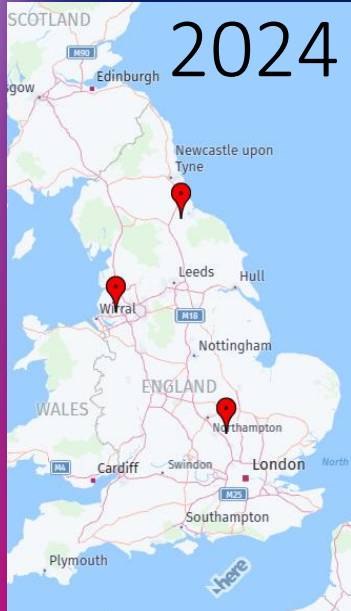
- Hygen, Ryze's H2 production sister company, has numerous sites in the UK to create a green hydrogen production network from renewable energy assets.
- Hygen has recently won funding for the **largest electrolyser project, 25MW**, in DESNZ's Hydrogen Allocation Round at Bradford.

Courtesy of:

**RYZE**  
HYDROGEN

**ENGINIUS**<sup>®</sup>  
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# Infrastructure & Fuelling



## Key initial / flagship / funded sites

- Teesside International Airport (part-funded)
- UTAC Millbrook - engine testing
- Liverpool area (Knowsley / St Helens)
- *Exelby sites (timing – tbc)*
- *3 sites – 9 major depots nearby*

## Distribution centre focus

- North-West England
- East and West Midlands
- Glasgow
- *12 sites – 64 major depots nearby*

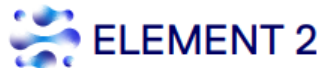
## Linking distribution areas

- Include Yorkshire & Humber region
- M6 corridor focus
- Exelby sites
- *30 sites – 144 major depots nearby*

## Initial national coverage

50 sites – 176 major depots nearby

Figures courtesy of:





# Funding & Operations

We recognise that the capital investment of climate-neutral trucks is significant and requires a different thought process and longer term planning to make an informed decision.

- Banks such as HSBC, have appetite to support green businesses and investment where the structures are supportable – Green Funding options
- CAPEX v OPEX ( *variable options – lease, full R&M, Price / mile via CPD* )
- Do Not compare Technologies – *Diesel / EV / HFCEV*
- Operational Use – *Double shifting possible with H<sub>2</sub>?*
- Total Cost of Ownership models



# Funding & TCO - Conclusion;

- We can't simply compare existing financial models with Fossil fuels vs new green technology fuels.
- TCO is our recommended financial metric to appraise capital investment and will reflect the financial impact over the entire lifespan of the product.
- Sensitivity of future costs (batteries, diesel, hydrogen, electricity) and impact on TCO.
- There are many variables, and each customer's TCO model will be slightly different, however our expectation is that there will be a price premium vs battery electric vehicles with benefits realised for the operation including range and charging / filling time with improved vehicle up-time.
- The group has a number of procurement offerings from capital purchase to contract hire and lease through CP Davidsons supported by HSBC.



# Skills, people & Engagement





# Bluepower – now just another truck in the fleet



ST HELENS  
BOROUGH COUNCIL

# Automotive Engineering Qualifications





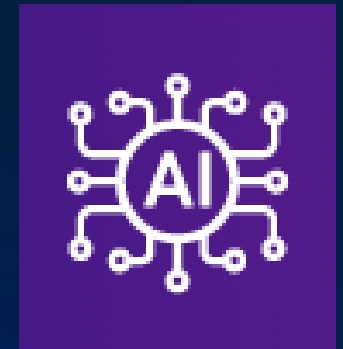
# Other exciting innovations in our field

Aside from technology advancements with de-carbonisation, in the RCV industry we are constantly looking into new ways to improve safety.

At the recent IFAT 2024 trade show in Munich we showcased some of our latest products:

**SMART HOPPER CONTROL**, the working area is monitored by an AI-controlled camera. This captures the area in front of the lift and inside the hopper. From the combination of bin type, bin size and hopper utilisation, AI automatically calculates the optimal time when the compaction process should start.

**ALL-ROUND VIEW WITH PERSON DETECTION** Improves safety with complete all-round monitoring of the vehicle and display for the driver. This makes it easier to manoeuvre safely in road traffic



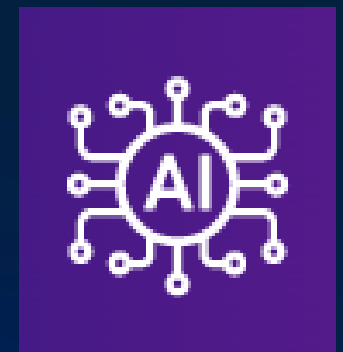
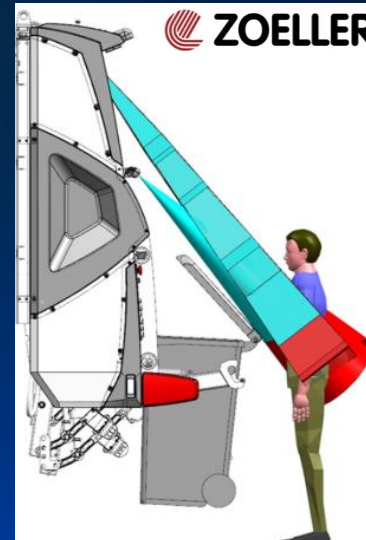
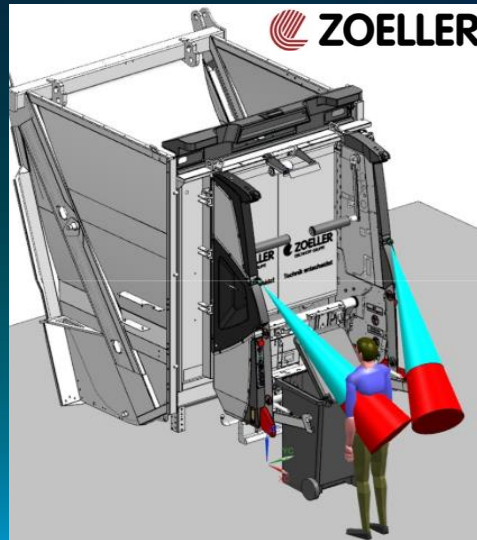
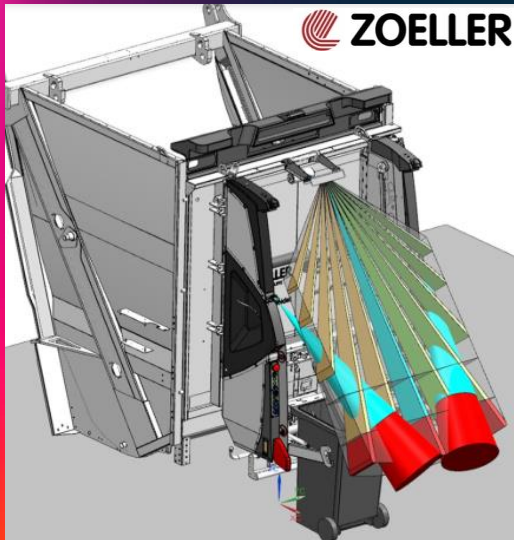


# Other exciting innovations in our field

**WORKSPACE MONITORING WITH PERSON DETECTION** Monitoring of the working area at the rear of the vehicle. This also gives the driver an overview of what is going on in the loader's working area

**WORKER PROTECTION SYSTEM II (WPS II)** is designed as an assistance system intended to prevent serious injury of the operator if caught within the danger zone.

**FAUN connect** transmits vehicle and tour-relevant data to a cloud. This information is made available to the operators in a targeted manner. Allowing routes to be optimised and planning to be simplified.



# Thanks for your kind attention!

