# HyDrive & H2 Van Trial

Innovation Summit
Liverpool, 2024


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# H2 Van Trial

## What was our motivation?

### Detailed study of WWU (and NGN) fleet duty cycles by Cenex in 2021:

- Less than 50% of WWU journeys could be completed by battery electric vehicle (BEV)
- More than 95% of WWU journeys could be completed by hydrogen Fuel Cell Electric Vehicle (FCEV)

## What are the advantages of using FCEV vs. BEV for fleet

- Operational Efficiency (similar to diesel)
- Greater payload.
- Towing capacity.
- No range reduction in low ambient temperatures.
- Refuelling time equivalent to ICE at 700bar.
- On-board power generation.

**But they may cost more to buy and operate in the short to medium term.**


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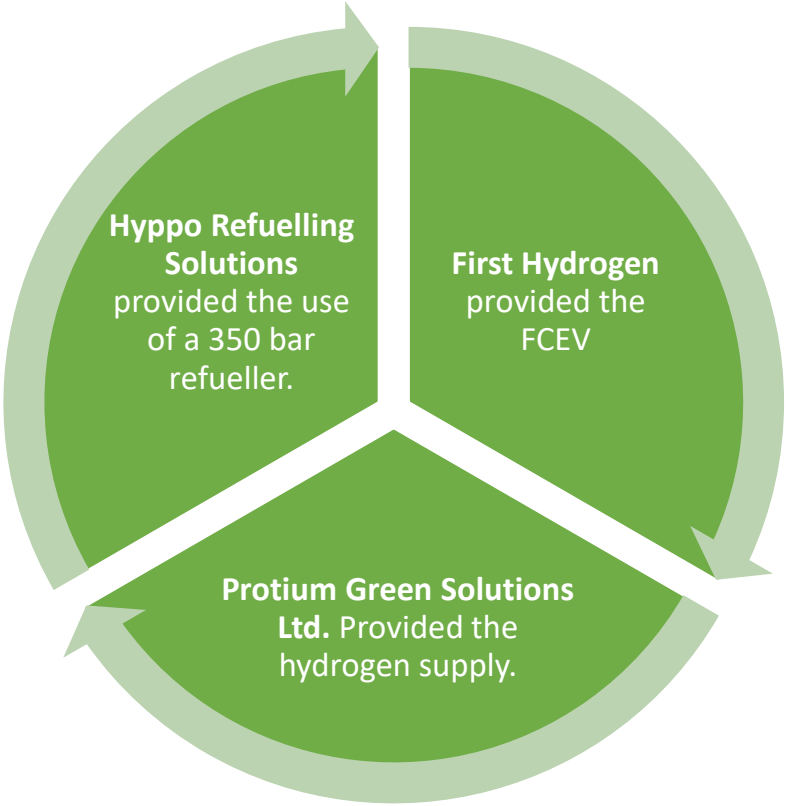
# H2 Van Trial





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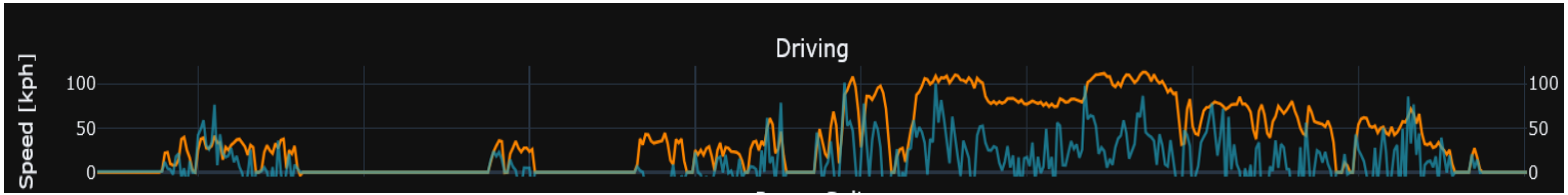
# H2 Van Trial

- Essential to use the van in a front-line role for credibility: FCO chosen
- Avg. 5-6  call-outs/75-160 miles per day.
- Vehicle operated under urban and highway conditions.
- No range penalty under cold temperature operation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# HyDrive

## A Hydrogen Refuelling Feasibility Study

April 24 – Dec 25


COSTAIN

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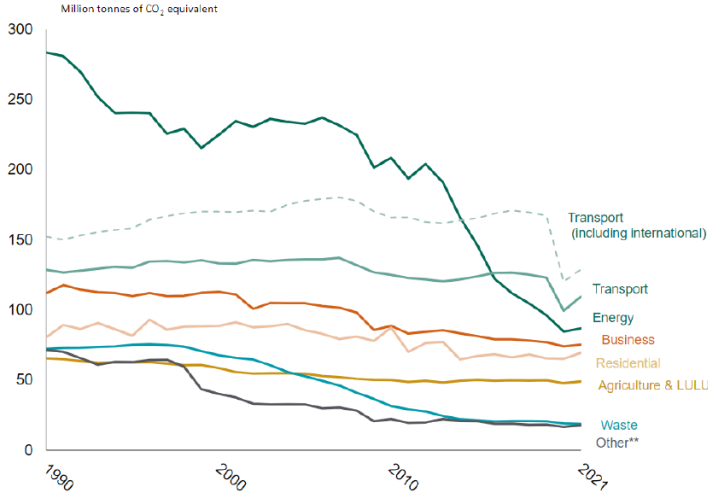
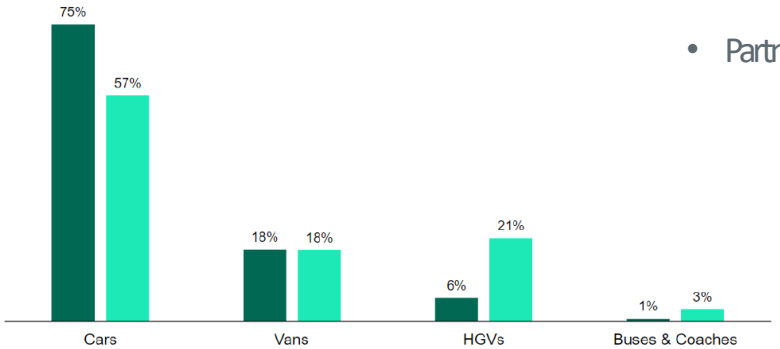
# Motivation

## Investigate the UK's transport demand and feasibility of connecting a hydrogen refueller to the gas network




2021 GHG emissions by sector




2021 Mileage and GHG emissions by vehicle type

NIA Innovation projected Funded by OFGEM.

- Partnered with Costain

- UK has one of the most robust gas networks in the world. As we transition to a net zero society, finding an additional purpose for our network as gas demands are changing.
- Investigating a practical solution to decarbonising transport, especially for heavy vehicles which are more difficult to decarbonise.
- Giving consumers an alternative to electric vehicles, if they do not suit their needs.

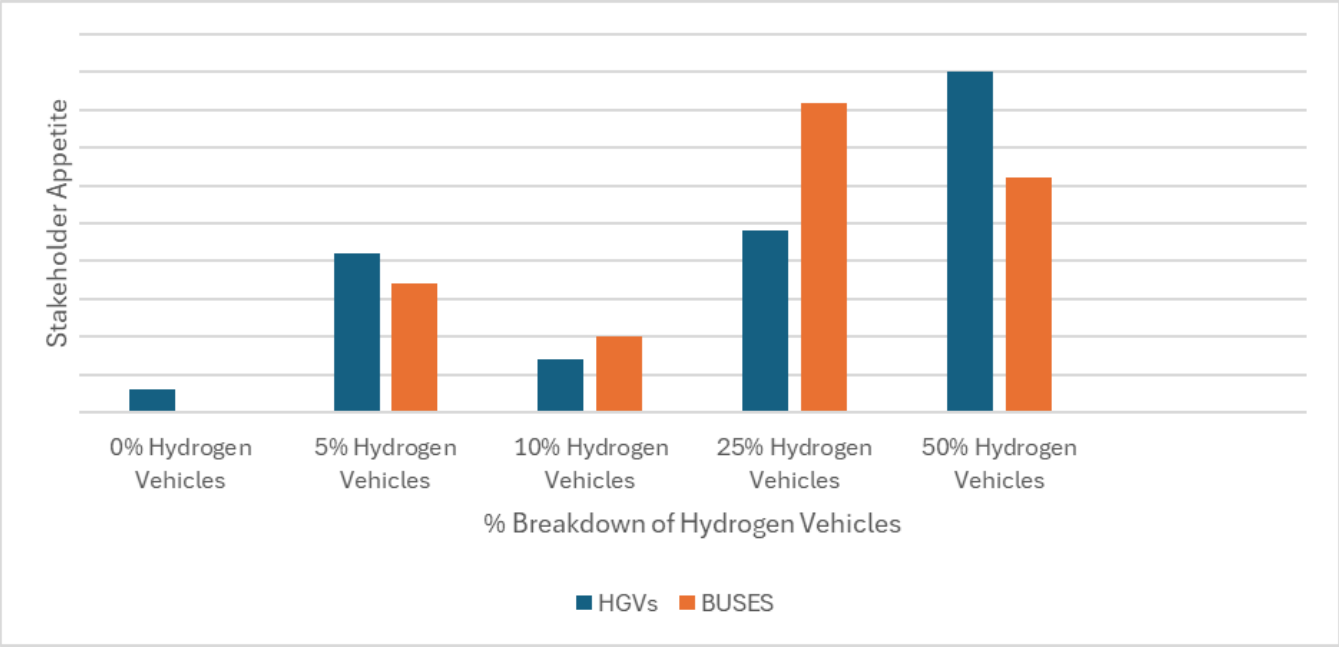
# HyDrive Overview

## Can we connect a hydrogen refueller to our network?

- Investigate current transport demand on an hourly basis, separated by vehicle type.
- Interview stakeholders to test the hydrogen appetite.
- Build a hydrogen transport forecast model.
- Identify locations with the most potential; both suitable for connection to our network and to have a high hydrogen refuelling demand.
- Analyse WWU fleet's behaviours as a case study.
- Choose a site location and conduct detailed analysis on constructing a hydrogen refuelling station.

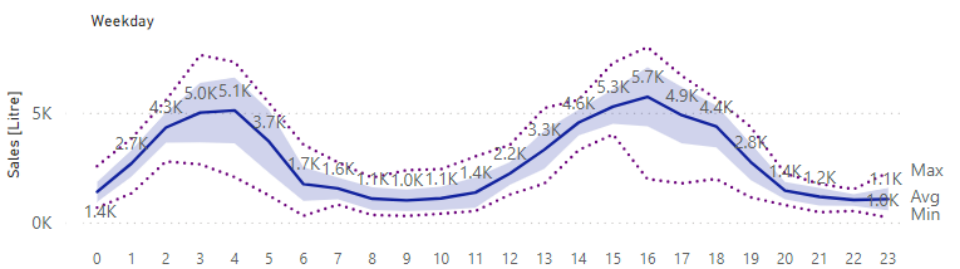
# Stakeholder Engagement

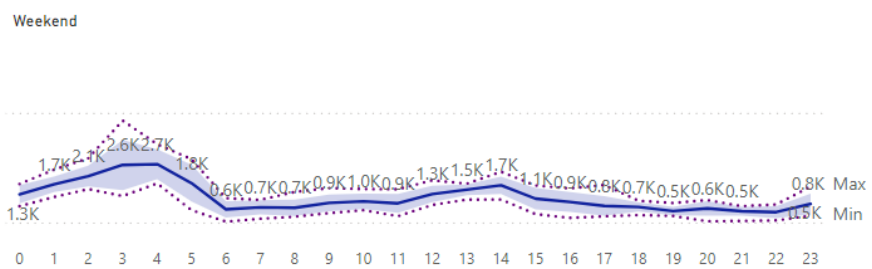
## Hydrogen Appetite

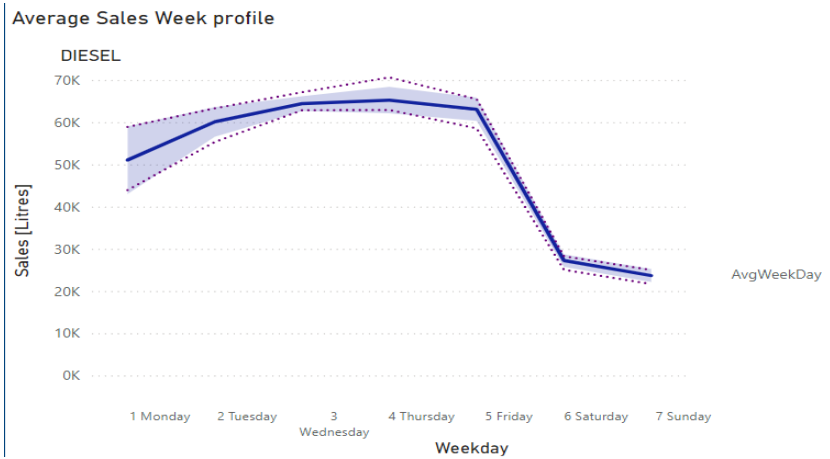


# Modelling Results

## Refueling behaviors – Typical Freight




- Peak times for refuelling is weekday mornings and afternoons.
- Weekend trends are much more linear but overall, much lower quantities.

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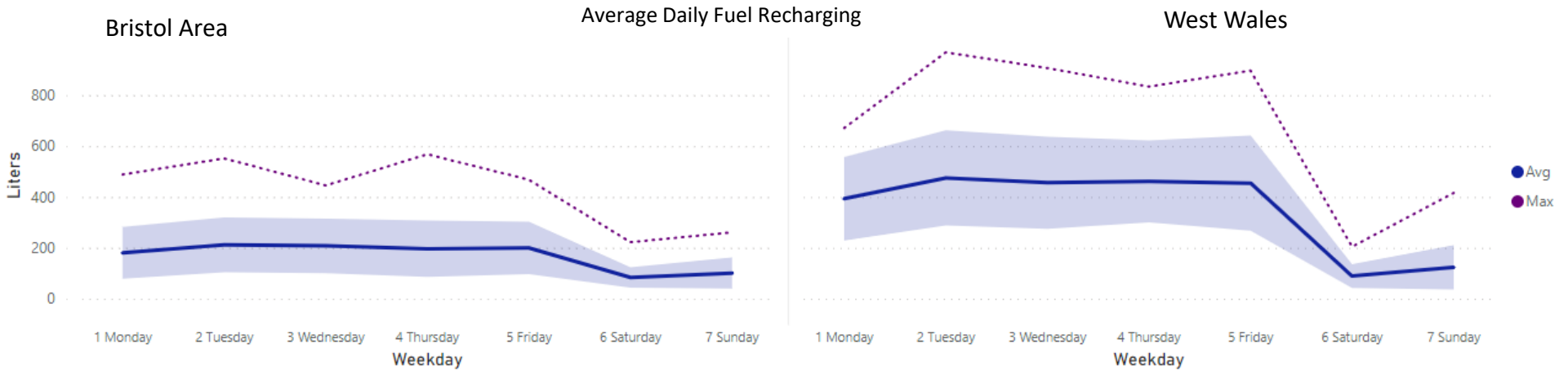
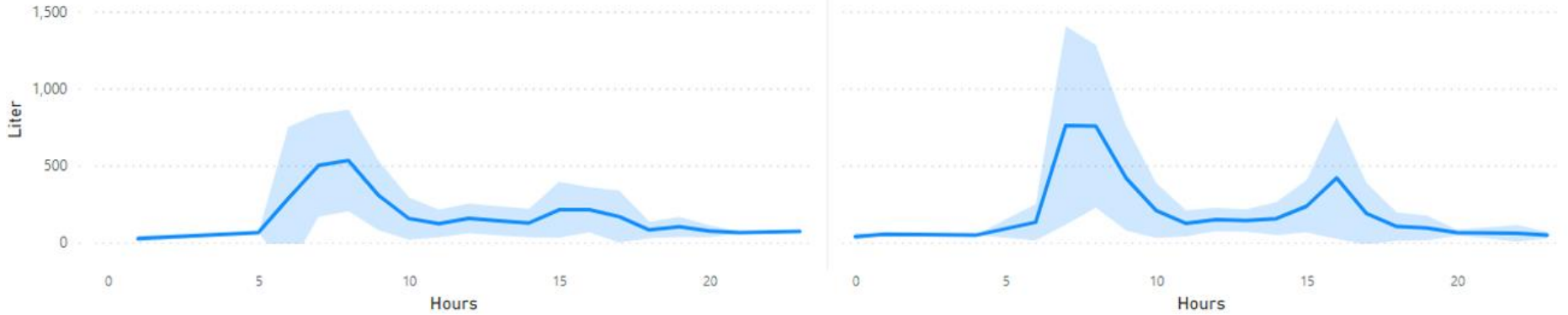
# WWU Fleet Study



# Criteria for Site Selection

## Filtered on the following criteria:

- Located near a high pressure or intermediate pressure pipeline.
- Adequate diesel sales in the past year.
- High population density.
- HGV friendly site.
- Bunkered site.

## Scored the plausible locations on:

- Potential hydrogen production nearby.
- Proximity to high pressure or intermediate pressure pipeline.
- Number of HGV friendly site within 10km radius.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# Choosing a Case Study

## 3 Sites were chosen initially:

- North & Mid-Wales: Flint **(71%)**
- South Wales: Swansea / Port Talbot **(88%)**
- South-West England: Avonmouth / Bristol **(59%)**

# Final Case Study – Swansea Area

## Ongoing Work

- Select an exact location
  - We are discussing choosing an HGV friendly site close to suitable road infrastructure, with adequate space. In addition, the potential demand would be pre-established.
- Develop an in-depth design plan including:
  - A physical plan to connect a refueller to WWU network
  - Design safety assessment
  - CAPEX and OPEX cost estimations
  - In-depth Economic Analysis:
    Identifying low-regret infrastructure investments,
    Comparing alternative refuelling methodologies,
    Understanding opportunities for waste streams etc.

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# What's Next?

## The most obvious is to turn this into a physical solution

- This feasibility study will allow us to analyse whether this is a viable solution or not.
- If it is, we shall have identified the next steps and potential barriers.

## We have developed a methodology for analysis transport demand and site selection

- Extend this to other types of transport e.g., trains, aviation.
- Analyse transport means on a smaller but more detailed scale e.g., bus routes, emergency vehicles etc.

# Thank you

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