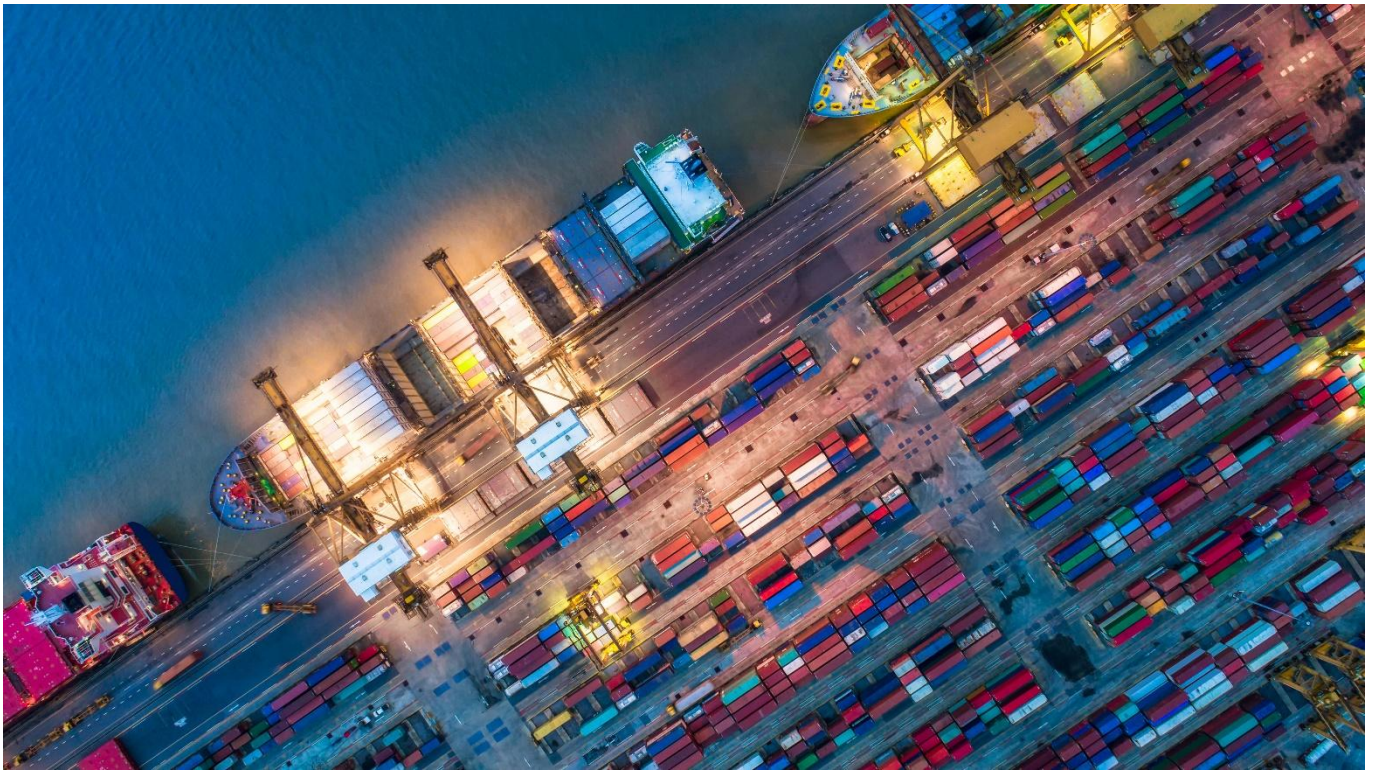


Monitoring Report
March 2026

LMT monitoring report: progress and insights from the Zero Emission HGV and Infrastructure Demonstrator Programme



Innovate UK
Our ref: 245-747-02

LMT monitoring report: progress and insights from the Zero Emission HGV and Infrastructure Demonstrator Programme

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List of acronyms and abbreviations

Acronym	Meaning
BEV	Battery Electric Vehicle
BSI	British Standards Institution
CCAM	Commercialising Connected and Autonomous Mobility
CO ₂	Carbon Dioxide
CPO	Chargepoint Operator
CRM	Customer Relationship Management
DfT	Department for Transport
DLM	Dynamic Load Management
DNO	Distribution Network Operator
DVSA	Driver and Vehicle Standards Agency
eHGV	Electric Heavy Goods Vehicle
EPC	Engineering, Procurement & Construction
EV	Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
fcHGV	Fuel Cell Heavy Goods Vehicle
FOAK	First Of A Kind
HGV	Heavy Goods Vehicle
IP	Intellectual Property
IUK	Innovate UK
LMT	Land and Maritime Transport
MCS	Megawatt Charging System
MSA	Motorway Service Area
MSP	Monitoring Service Provider
NZP	Net Zero Propulsion
OEM	Original Equipment Manufacturer
PM	Project Manager
PR	Public Relations
QMS	Quarterly Monitoring Scores
QRM	Quarterly Review Meeting
R&D	Research & Development
SLA	Service Level Agreement
SME	Small and Medium Sized Enterprises
TCO	Total Cost of Ownership

Acronym	Meaning
TDD	Transport Decarbonisation Demonstrator
TRL	Technology Readiness Level
TVH	Tees Valley Hydrogen
UKRI	UK Research & Innovation
ZEHD	Zero Emission HGV and Infrastructure Demonstrator
ZENFreight	Zero Emission National Freight

Executive Summary

The Zero Emission Heavy Goods Vehicle and Infrastructure Demonstrator (ZEHID) programme, delivered by Innovate UK (IUK) in partnership with the Department for Transport (DfT), aims to accelerate the decarbonisation of the UK's heavy goods vehicle (HGV) sector. By deploying and demonstrating zero-emission HGVs and supporting infrastructure, the programme seeks to unlock environmental, economic, and operational benefits across the freight industry.

Overview of delivery

- **Projects:** Four projects¹ (Electric Freightway, eFREIGHT2030, HyHaul and ZENFreight) involving 41 unique partners. Across the four grants awarded (one per project), there have been 37 individual funding contributions made to project partners.
- **Activities:** Project activities have focused on procuring vehicles and building charging and fuelling infrastructure, alongside disseminating lessons learnt during this first phase.
- **Timescale:** The programme is being delivered over seven years, with phase one focused on procurement and infrastructure development, with most assets live by the end of the funded period in March 2026, and phase two on real world demonstration and data collection until 2030/31.
- **Funding:** Up to £200 million has been allocated across the programme. The (programme-wide) average partner grant value is £3.5 million.

Key findings

Technology development and commercialisation

- Most projects are working with advanced technologies, with over half of beneficiaries reporting Technology Readiness Levels (TRL) between 7 and 9. While intellectual property generation has been limited, reflecting the programme's focus on deploying existing technologies, innovations such as the e-Trailer² and HyperCharger³ demonstrate potential for future patents and commercial applications.
- Although commercialisation remains in its early stages, ZEHID has enabled participating organisations to enhance their market positioning, broaden their professional networks, and increase their visibility both within the UK and internationally. External interest is growing as the first sites and vehicles move into operation.
- In terms of the pathway to commercialisation, partners and stakeholders interviewed anticipate that the real-world data being collected by the projects will support the development of new products, such as software and planning tools for other fleets aiming to decarbonise and transition to zero-emission operations. Programme developments, such as the first Mega Charging System-enabled site, are already generating operational learnings that will inform future system design.

¹ As of December 2025, the HyHaul project has closed.

² Berkeley Coachworks Bulldog e-Trailer is a trailer with 200 kWh of battery that can increase the range of an HGV by 150 miles without impacting payload.

³ Voltempo's Hypercharger is a 1 MW capable charger.

Partnerships and organisational development

- The programme has had a positive impact on fostering collaboration, with new and strengthened relationships emerging through procurement activities, consortium meetings, individual initiative, and facilitation by IUK. These partnerships have supported smoother delivery, reduced fragmentation and accelerated knowledge transfer across consortia.
- Beneficiaries described these relationships as constructive and well-aligned with project goals. As the programme enters the demonstration phase, these partnerships are expected to evolve further to support operational needs, such as co-learning and shared use of charging infrastructure.
- Most beneficiaries reported that participation in ZEHID contributed to meaningful organisational growth. For Small and Medium-Sized Enterprises (SMEs), of which there are around 18 across consortia, this was particularly evident in enhanced capabilities, improved confidence in engaging with government-backed initiatives, and increased visibility through association with the programme. Larger organisations highlighted benefits such as cross-functional working and behavioural change.
- While job creation was not universal, ZEHID has supported meaningful employment opportunities, particularly in regions with limited economic activity. It has also played a key role in safeguarding existing roles by enabling upskilling and the evolution of responsibilities, helping organisations better prepare for the transition to zero-emission technologies. Incremental improvements suggest some progress in addressing the logistics sector's structural HGV driver skills gap, which is shaped by an ageing workforce, constrained entry pipelines, and emerging capability demands linked to decarbonisation and zero-emission technologies.

Barriers and enablers

- The main barriers to programme delivery included delays from project change requests, issues in navigating the grant management portal and the administrative burden for smaller scale partners. Larger beneficiaries noted that fixed grant timelines can clash with internal business-cycle approvals.
- Commercialisation barriers included the lack of regulatory or legislative incentives for zero-emission HGV adoption, payload limitations linked to battery weight, and power-supply constraints and energy pricing at sites.
- Key enablers included strong day-to-day communication and support provided by IUK, which beneficiaries consistently praised. This encompassed guidance during the application process, responsiveness during delivery, and proactive facilitation of dissemination and publicity opportunities.

Next steps for the programme

- Electric Freightway (Appendices B and C) is planning the roll-out of eleven Motorway Service Areas (MSA) sites, two of which are now in construction. The project is also hoping to increase the number of public sites, but this is still to be decided.
- eFREIGHT2030 (Appendices D and E) are committing to installing 35 depot charging hubs, with a total of 180 charging bays. One site has already been completed, featuring six high-power DC bays with dynamic load distribution, and is generating early operational learning for the consortium.
- ZENFreight has scheduled a total of 54 Battery Electric Vehicles (BEVs) for delivery in autumn 2025, supporting the electrification of 18 depots. Full implementation is

expected by March 2026. The fleets will operate across the UK, from Devon to the Shetland Isles, and will include three Hydrogen Fuel Cell Vehicles deployed in Scotland alongside a depot-based hydrogen refuelling station.

- Electric Freightway and eFREIGHT2030 are now beginning to transition toward the data-collection phase, where operational insights and telematics evidence will form a core part of the programme's contribution to wider policy, regulatory and commercial development.

Recommendations for future evaluation

Many of the anticipated impacts of the ZEHID programme will emerge over the demonstration phase and beyond. To capture them fully, a future evaluation should:

- Undertake follow-up tracking of projects approximately every 12 months to assess the impact on zero emission HGV uptake outside the programme, and the influence on regulatory and policy development. 12 months is seen as a realistic timeframe in which projects should make significant and tangible progress. However, this timeline may need to remain flexible, as the exact timing of full deployment and demonstration of all vehicles in each project is planned but still uncertain.
- Measure environmental outcomes, as technologies scale, including verified reductions in carbon emissions, improvements in air quality, and operational efficiencies.
- Strengthen economic impact analysis, extending beyond initial job creation to include supply chain localisation, assessment of logistics operators' businesses pre- and post-fleet decarbonisation, and new investment and export contracts.
- Capture social and workforce impacts, including driver health and wellbeing. Early insights suggest that reduced noise, vibration and stress in electric HGVs may lead to improved alertness, lower fatigue and fewer occupational-health issues. The programme presents a unique opportunity to measure such outcomes systematically.

Overall conclusions

The ZEHID programme is still in the early stages of delivery, but it has already laid important groundwork for the decarbonisation of the UK's HGV sector. Despite initial delays across the three ongoing projects, deployment is now underway, and beneficiaries report that the majority of programme objectives remain on track. Early operational learning is beginning to emerge as vehicles, depot chargers and the first Megawatt Charging System (MCS) has enabled public sites to become active, strengthening confidence in the technologies being demonstrated.

Early successes include the sharing of lessons learned, which has already contributed to the development of new BSI standards and regulatory clarifications, demonstrating ZEHID's potential to shape the wider policy landscape. The programme has also delivered early benefits in terms of skills development, organisational maturity, and partnership building, particularly among SMEs. Important cultural shifts, such as greater cross-functional working and a growing test-and-learn mindset, are helping organisations adapt to fast-moving technology deployment. While job creation has been modest, ZEHID has helped safeguard existing roles and contributed to addressing long-standing skills gaps in the logistics sector.

Despite progress, differences in Total Cost of Ownership (TCO) between the zero-emission HGVs participating in the ZEHID programme and conventional diesel vehicles

continue to pose a barrier to adoption. The zero-emission HGVs within ZEHID, some of the heaviest battery-electric and hydrogen fuel cell vehicles on UK roads, are typically the most expensive and challenging to decarbonise. Wider barriers, including payload constraints, power-supply challenges, and internal business-cycle pressures, also continue to limit uptake. Without further government intervention, through policy, regulation, or financial incentives, widespread commercial uptake is unlikely in the near term.

Looking ahead, continued evaluation will be essential to track the realisation of anticipated benefits. This includes monitoring environmental outcomes, commercial progress, and economic impacts such as supply chain localisation and regional development. It will also be important to capture emerging social impacts, including evidence of improved driver health and wellbeing. These insights will be essential for understanding ZEHID's role in advancing transport decarbonisation and wider impacts on the logistics sector.

1 Introduction & methodology

Introducing the LMT portfolio

- 1.1 The LMT portfolio comprises seven grant-funding programmes spanning a range of technologies, transport modes (including rail, road and maritime), and objectives. The seven programmes which make up the LMT portfolio are: the Zero Emission Heavy Goods Vehicle and Infrastructure Demonstrator (ZEHID) programme; Maritime Decarbonisation programme; Commercialising Connected and Autonomous Mobility (CCAM) programme; Tees Valley Hydrogen (TVH) Transport Hub programme; Rail First of a Kind (FOAK) programme; Net Zero Propulsion (NZP) programme; and Transport Decarbonisation Demonstrator (TDD).
- 1.2 The seven programmes vary in objectives, size, complexity and duration. Constituent projects can range from single applicant six-month feasibility studies costing around £25k to deliver, to four-year multi-partner collaborative research and development (R&D) projects which can cost millions of pounds.

Purpose of this report

- 1.3 Steer-ED and Technopolis were commissioned by IUK, in partnership with the Department for Transport (DfT) to conduct a monitoring commission on behalf of the LMT portfolio and the constituent seven programmes. This report is one of seven LMT programme reports focusing on ZEHID, presenting final findings, synthesised from across a range of evidence sources, described below.

Introducing the ZEHID Programme

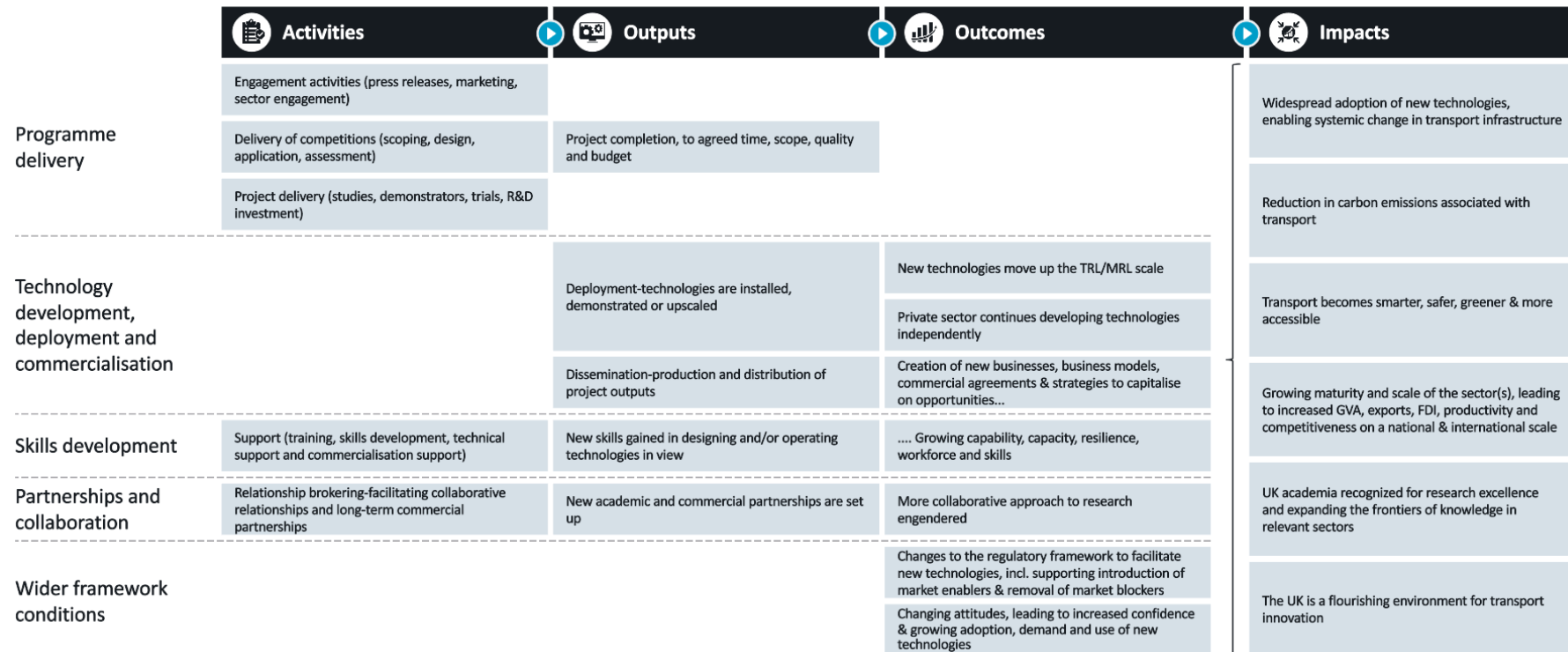
- 1.4 The Zero Emission HGV and Infrastructure Demonstrator (ZEHID) programme, which received up to £200 million funding from the Department for Transport and Innovate UK, aims to tackle the challenge of decarbonising heavy goods vehicles (HGVs). These vehicles are integral to the UK's supply chain but account for ~16% of domestic transport CO2 emissions.
- 1.5 The programme plans to deploy around 297 BEVs and 3 FCEVs HGVs on UK roads and fund over 70 public and depot-based infrastructure installations, with most in place by March 2026. In terms of programme timelines, ZEHID takes places across two key phases:
- **Procurement and infrastructure development (2023-2026):** Building foundations with charging and refuelling infrastructure.
 - **Demonstration (2026-2031):** Demonstrations of zero-emission HGVs, testing their capabilities in different operational scenarios.

Monitoring approach adopted

The LMT portfolio monitoring framework and logic model

- 1.6 This programme level report (and the wider LMT monitoring framework) is structured around the portfolio logic model, presented in Figure 1-1. This shows the causal relationships between activities conducted and how those are expected to lead to long-term programme impacts, via outputs and outcomes. The logic model is divided into five themes, reflecting five key underlying mechanisms: programme delivery; technology development, deployment and commercialisation; skills development; partnerships and collaboration; and wider framework conditions. Each of the subsequent chapters of this report is titled after one of these five themes, providing a structured exploration of the causal mechanisms.

Figure 1-1: LMT portfolio high-level logic model

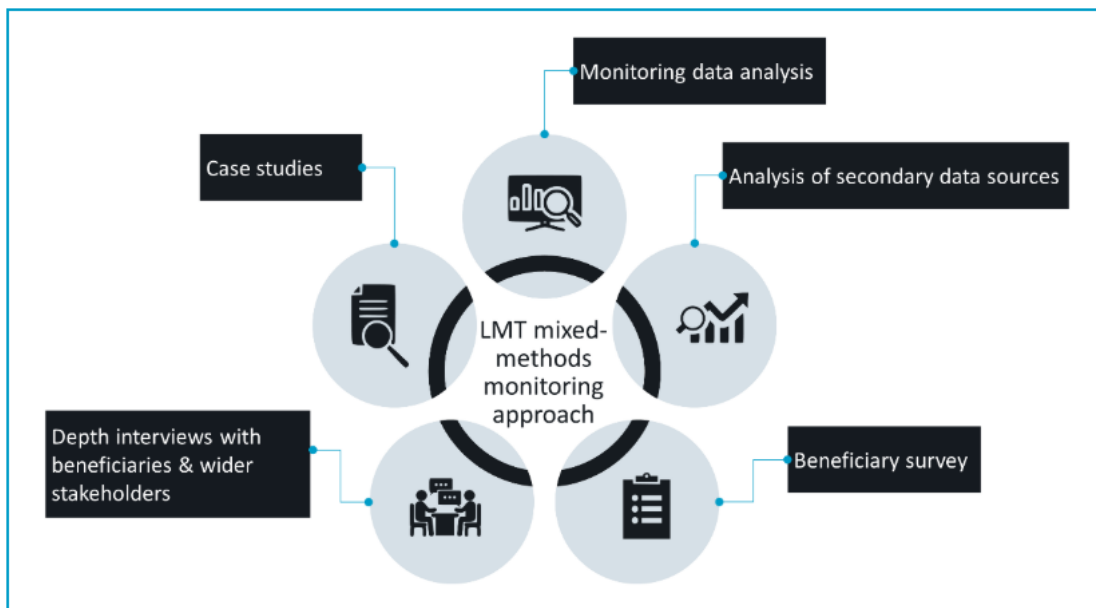


Source: Steer-ED and Technopolis, 2024

Sources of evidence utilised

- 1.7 Fieldwork was conducted over a three-year period and structured into three waves of activity, referred to as Waves 1, 2 and 3, with the following timescales:
- Wave 1: Fieldwork took place between July and August 2024.
 - Wave 2: Fieldwork took place between July and September 2025.
 - Wave 3: Fieldwork took place between January and February, focusing on extended ZEHID projects.
- 1.8 This final ZEHID programme report brings together evidence collected across all three research waves (Waves 1, 2 and 3)⁴, providing a consolidated account of findings to date. This final version builds on the Wave 2 ZEHID programme report and incorporates newly available evidence from Wave 3.
- 1.9 Figure 1-2 below sets out the five types of evidence collection utilised for this monitoring commission. These evidence strands were selected in order to provide a broad and deep understanding of the portfolio, triangulating across a range of qualitative and quantitative research methods, and gathering inputs from a range of different perspectives.

Figure 1-2: Sources of evidence utilised within the monitoring approach



Source: Steer ED, 2024

- 1.10 A detailed description of the scope and coverage of methods deployed across the portfolio is presented in Appendix A and is briefly summarised for the ZEHID programme below.
- 1.11 **Monitoring data analysis** – spanning two data sources: applicant information data and Quarterly Monitoring Scores (QMS)⁵. [Note that a third source, Impact Management

⁴ Wave 1 research helped form the foundation for the subsequent waves. While it provided important context, the findings presented in this report are mainly derived from waves 2 and 3.

⁵ QMS scores are provided by Monitoring Service Providers as part of Quarterly Review Meetings (QRM) with each project.

System data, was collected for some parts of the LMT portfolio, but not the ZEHID programme].

1.12 **Analysis of secondary data** – including:

- Crunchbase to further explore whether businesses participating in LMT programmes are attracting external investment⁶;
- Meltwater, a media monitoring platform to assess the public dissemination; and
- Dimensions, a research database that provides patent and publication data⁷.

1.13 **Beneficiary survey** – An online survey for beneficiaries was developed (a range of multiple choice and free text questions) and distributed to project leads and partners, enabling multiple responses from each project, across all programmes within the scope of the research waves. The response rates across all research waves combined is presented within Appendix A. The response rates for Wave 2 and Wave 3 for ZEHID are detailed below⁸:

- **Wave 2:** There was a 71% response rate, which covered all four of the ZEHID projects.
- **Wave 3:** There was a 69% response rate, which covered three of the ZEHID projects (HyHAUL being terminated by this point).

1.14 It is important to highlight that the survey respondents from the three waves differed. As such, while the findings offer valuable insights, they present a cross-sectional comparison rather than a longitudinal comparison across waves.

1.15 **Depth interviews** – comprised one-hour depth interviews conducted with programme beneficiaries and a selection of wider stakeholders (knowledgeable industry stakeholders from both commercial and academic institutions). The number of interviews undertaken varied by programme, in accordance with the number of stakeholders involved. A total of 35 interviews were conducted across Waves 2 and 3 for ZEHID (with a further breakdown provided in Appendix A).

1.16 **Case studies** – four case studies have been undertaken for this programme (a total of 21 across the portfolio). For the ZEHID programme, the case studies selected were: Project Electric Freightway and eFREIGHT2030, with two undertaken for each. Findings are integrated across this report and are presented as vignettes with separate full write-ups presented within the appendices. All case studies have been reviewed by the programme's independent panel of subject-matter experts, selected for their expertise in relation to the programme or technology in question.

⁶ Crunchbase data has been included in the Appendix A. Although it provided some useful insights, the number of organisations identified was limited, making it premature to draw conclusions about any link between funding achieved and LMT.

⁷ This data was based on metadata [as of 01/09/2025 for Wave 2] from Digital Science's Dimensions platform, available at <https://ukri.dimensions.ai/>. Access was granted under licence agreement with UKRI.

⁸ Survey response totals vary across questions because some beneficiaries did not complete every item. Throughout the report, the base number of responses is shown for each question to aid interpretation.

Methodological considerations

1.17 The key methodological limitations observed across the LMT portfolio are as follows, which should be considered against the findings within this report:

- **Many technologies are still at the early stages of development**, meaning long-term impacts have not yet occurred. Many impacts are unlikely to emerge until several years after projects have completed. This is particularly the case for innovation funding, where numerous steps occur between initial project funding and measurable market outcomes. The findings gathered at this early stage (even if project have closed) should therefore be considered indicative of a longer-term trajectory rather than conclusive.
- **Dependency on self-reporting**: although multiple sources of evidence have been examined, including consultation with wider stakeholders and industry experts, there is nonetheless an emphasis on understanding impacts via discussion with – or reporting by – project beneficiaries. Beneficiaries may sometimes emphasise positive outcomes or focus less on challenges, thus resulting in findings which could overstate the true impact of the portfolio. Wherever possible, the views of wider stakeholders and industry experts have been considered alongside beneficiary viewpoints to mitigate this risk.
- **Heterogeneity of the portfolio**: The programmes within the portfolio vary significantly in terms of scale, technology, and commercial readiness. Applying a consistent methodology across the seven programmes is therefore challenging. To address this, Steer and Technopolis sought to achieve a balance between providing consistent research tools across the portfolio, while also allowing for some tailoring to reflect the differences between programmes.
- **Survey fatigue among respondents**: Repeated surveys of beneficiaries can lead to fatigue, causing lower response rates or incomplete responses and reduced data quality. This risk has been managed via briefing sessions with beneficiaries and proactive management of communications to ensure stakeholders understand the purpose of the research and benefits of participating. Across the portfolio, the beneficiary survey achieved a project response rate of 66%, which is still considered good representation.

Structure of the report

1.18 The remainder of this report is structured as follows:

- **Section 2: Overview of ZEHID delivery** outlines the current status of ZEHID and presents the progress made.
- **Section 3: Building and strengthening partnerships through programme delivery** focuses on how ZEHID has fostered partnerships across industry, academia, and government.
- **Section 4: Development, commercialisation and deployment of new technologies** explores the progress made by ZEHID in developing new technologies and progressing on the pathway to commercialisation.
- **Section 5: Growing skills and organisational maturity through programme delivery** assesses the impact of ZEHID on enhancing skills and growing business and organisational capacity and capability.

- **Section 6: Impacts on wider framework conditions and long-term outcomes** discusses the potential long-term impacts of the ZEHID on broader industry and regulation.
- **Section 7: Conclusions & next steps** conclude the report.

2 Overview of ZEHID delivery

Key Messages

- The ZEHID programme is the UK's largest effort to decarbonise heavy goods vehicles, a sector responsible for around 16% of domestic transport-related CO₂ emissions.
- The ZEHID programme, backed by up to £200 million in DfT and IUK grant funding, comprises four projects with 41 unique partners.
- The projects are completing the first phase, procuring zero emission HGVs and building refuelling and charging infrastructure. The second phase will see large-scale, on-road demonstrations of vehicles and the infrastructure, as well as data collection.
- All four seven-year ZEHID projects have experienced delays of at least three months, primarily due to external factors such as infrastructure challenges and vehicle importation issues. As of September 2025, three of the four projects have begun early deployment of vehicles, and all remain committed to delivering their original objectives within extended timelines. However, one project (HyHaul) has since closed due to lack of progress against key milestones, including securing customer demand for hydrogen fuel vehicles.
- In terms of project delivery, beneficiaries have found IUK extremely supportive; however, the grant management system/portal and the long timelines on change request decisions have historically posed challenges to the smooth delivery of projects. These issues have been resolved over the past 12-18 months.

Introduction

- 2.1 This chapter provides a detailed overview of the ZEHID programme, outlining the objectives, timelines and key features of the programme, drawing on an analysis of monitoring data plus insights from the beneficiary survey. It goes on to characterise the delivery progress across the projects and offer insights from project delivery drawn from beneficiary interviews.

Introducing the programme

- 2.2 The ZEHID programme is the UK's largest effort to decarbonise heavy goods vehicles, a sector responsible for around 16% of domestic transport-related CO₂ emissions. Backed by up to £200 million from the DfT and delivered with IUK, the programme will enable around 300 zero-emission HGVs, powered by either advanced battery-electric or

hydrogen fuel cell technology, deployed on UK roads, supported by more than 70 depot-based and public refuelling and charging sites, with most in place by March 2026. Case study projects (Appendices B-E) illustrate the breadth of scope:

- Electric Freightway (Appendices B and C) plans to demonstrate 140 eHGVs, deploy over 200 high-powered chargers across 33 locations (including motorway service areas and commercial depots) and gather TCO data over a 5-year test period for analysis.
- eFREIGHT2030 (Appendices D and E) aims to introduce 82 electric HGV 4×2 units, and up to 35 new charging locations, most of which will have megawatt-charging capacity.

2.3 Across the programme, each of the four projects was awarded a grant, collectively bringing together 41 unique partners (Table 2-1). These grants have resulted in 37 individual funding contributions to project partners. Typically, consortia comprised OEMs (Original Equipment Manufacturer) fleet operators and hauliers, with an average consortium size of 13.5 partners. Individual partner grants ranged from £6k to £33 million with a programme-wide average partner grant value of £3.5 million.

2.4 ZEHID is structured in two phases:

- Phase One: Currently drawing to a close, focused on procurement vehicles and building essential refuelling and charging infrastructure (2023–2026).
- Phase Two: The second will see large-scale on-road demonstrations (2026–2031), where vehicles will be tested across a range of duty cycles and commercial operations to validate their performance in real-world conditions.

Table 2-1: Overview of ZEHID projects

Project	ZENFreight	eFREIGHT 2030	Electric Freightway	HyHaul
Lead	Dynamon	Voltempo	Gridserve	HyHaul
Start Date	1 February 2024	1 January 2024	1 July 2023	1 February 2024
Description	Demonstrating both battery-electric and hydrogen fuel cell HGVs in parallel	Focused on demonstrating how zero-emission freight can scale commercially	Aiming to establish the world's largest and most advanced electric HGV charging network	Plans to develop a robust hydrogen supply chain and refuelling infrastructure along the M4 corridor
Grant Funding	£33.7M	£49.2M	£62.2M	£31.8M
Number of partners	9	20	19	5
Current status and timings	Deployment phase Full implementation by March 2026	Deployment phase	Deployment phase	The project was unable to secure sufficient customer commitments for fuel cell heavy goods vehicles and

				is coming to an end
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2.5

As the projects transition into Phase Two, activity remains ongoing, though its nature is evolving. While Phase One primarily focused on vehicle procurement and infrastructure deployment, Phase 2 will centre on demonstration. Infrastructure construction and installation commenced during Phase 1 and, in specific cases, is expected to continue into Phase 2. However, this is not anticipated to be the norm across the entire programme. Although some tools have been developed and preliminary data collected, the majority of telematic data gathering will take place in the upcoming phase as vehicles are rolled out. A summary is provided below:

- **Infrastructure construction and installation (Phase One and Two):** As Figure 2-1 shows, this involves the installation of charging infrastructure across multiple public and private sites and depots throughout the UK. Engagement with Distribution Network Operators (DNOs) to secure grid connections is essential to enable the rollout of electrification across these locations. These efforts also include upgrading depot capabilities from single chargers to multi-bay configurations to accommodate growing operational needs.

Figure 2-1: ZEHID planned infrastructure locations



Source: IUK (February 2026)

- **Vehicle procurement and early deployment (Phase One):** The projects have each procured zero emission HGVs from a number of manufacturers, UK (DAF) and international. For example, Electric Freightway (Appendices B and C) has ordered 161 vehicles.
- **Data collection and modelling (mostly Phase Two):** collection of telematic data, user attitude surveys to understand behavioural impacts, and the development of tools such as a Total Cost of Ownership (TCO) and Carbon Impact Calculator.

Insights from project delivery

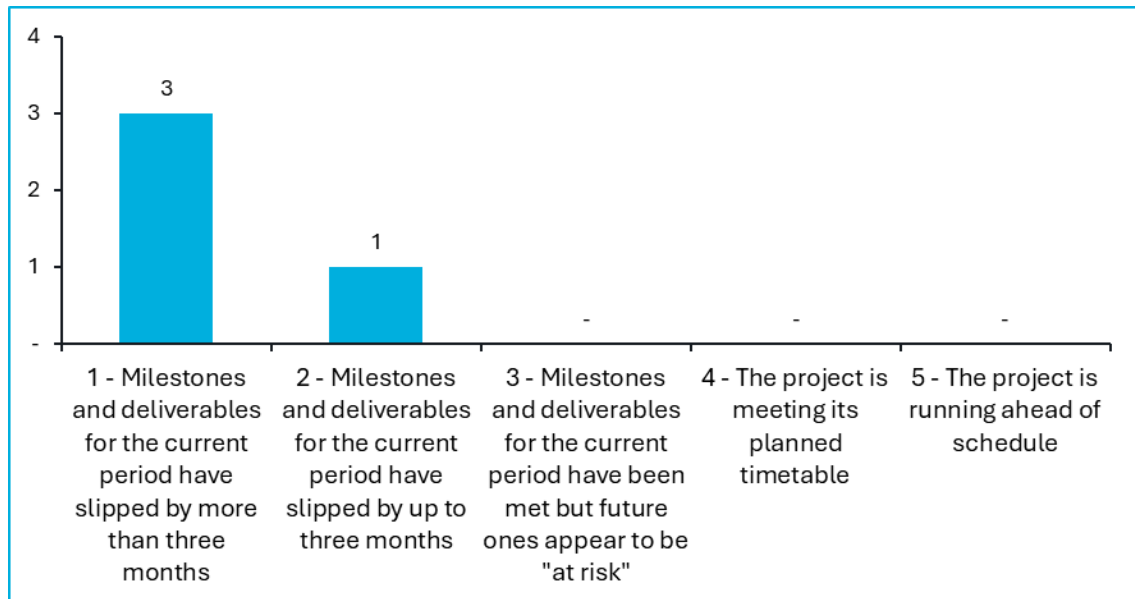
- 2.6 The extent to which milestones and deliverables for ZEHID projects have been achieved according to the planned timeline was explored using QMS data in Waves 2 (Figure 2-1) and 3.
- 2.7 Electric Freightway was assessed as having its milestones and deliverables slip by more than three months. While truck orders were assessed to be largely on schedule, infrastructure elements (MSA public charging and several depot chargers) have been delayed over three months. Grid connection costs associated with building public charging sites were noted as a key challenge. In the latest QMS data from Wave 3 (January 2026), this assessment remained unchanged, again noting substantial delays to infrastructure delivery, with truck orders progressing as planned but constrained by charging infrastructure timelines.

“You can’t drive a cable over a bridge; you need an extra £60k and a three-month feasibility assessment.” – Wave 2 ZEHID beneficiary

- 2.8 The milestones for eFREIGHT2030 were judged to have slipped by up to three months. The QMS assessment describes a material risk of delay to depot charging. From interview insights, this could also be attributed to the changes in project manager (PM) and the time required for each new PM to get up-to-speed on the project, requirements and systems. Wave 3 monitoring data indicates that milestones have now slipped by over three months, with delays specifically affecting depot chargers and Berkeley trailers.
- 2.9 In Wave 2, ZENFreight was assessed as having slipped by more than three months. While initial delays were caused by difficulties importing Hydrogen Fuel Cell Electric Vehicles (HFCEVs), the more significant disruption stemmed from changes in project leadership, particularly BP’s departure in April 2024, and the subsequent need to rescope the project through multiple change requests. Operator reluctance also contributed to the decision to descope most HFCEVs from the programme, with only the already secured Scania vehicles retained. By Wave 3, this outlook had improved, with the project now assessed as having deliverables slipping by up to three months. Both eHGVs and charging infrastructure are expected to largely remain on schedule, though a small number of depots are still at risk of delay.
- 2.10 HyHaul milestones and deliverables were assessed as having slipped by more than three months. While initial delays were due to the time taken to finalise the grant, resulting in a grant offer letter in May 2024 following a start-at-risk in February, the more significant disruption arose from the withdrawal of the original project leasing partner, Riverside, in March 2024. This required the onboarding of a new partner, Novuna, and led to a rescoping of the project. Towards the end of 2024, further delays emerged due to difficulties in securing customer orders, coinciding with a period when most potential HFCEV OEMs (UK and international) either entered insolvency or lacked viable offerings. These challenges culminated in a suspension period from March to May 2025, during which suspension milestones were completed.
- 2.11 Since the completion of Wave 2 fieldwork, the HyHaul project has closed in December 2025. Although progress was delivered across four of the programme’s five work

packages, the project was unable to secure sufficient customer commitments for fuel cell heavy goods vehicles and thus did not meet the milestones for this work package.

Figure 2-2: Most recent QMS score for the timing of ZEHID projects (n=4)



Source: QMS data (IUK), Steer-ED analysis (August 2025) (Answer options: Time Scoring Matrix, Scores 1-5)

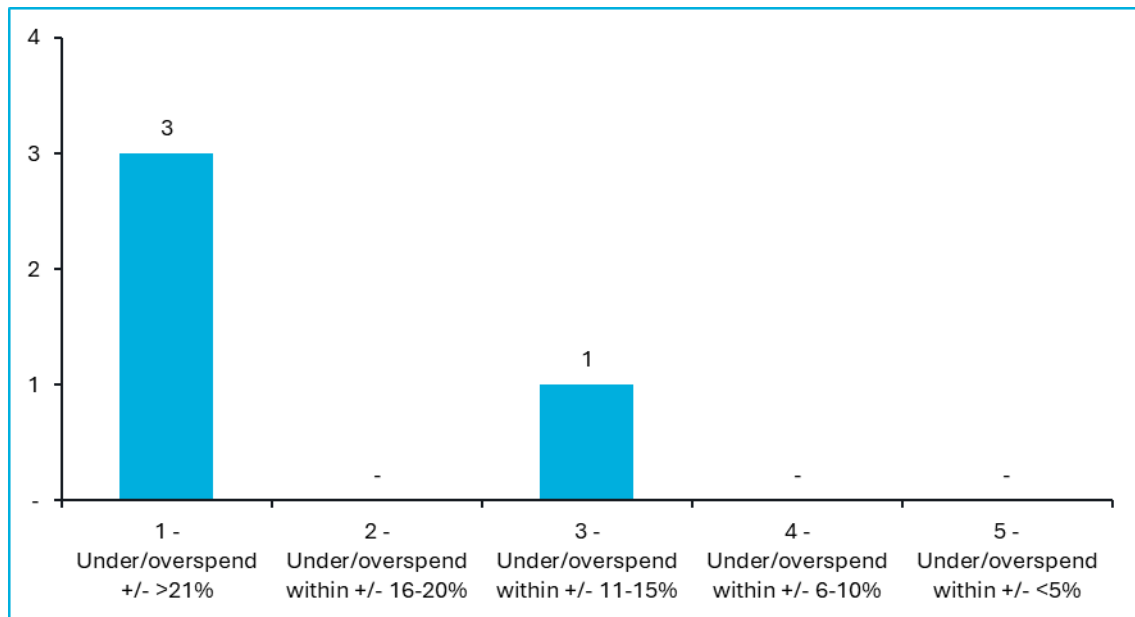
- 2.12 In Wave 2, the latest QMS data for the four projects was reported between February-June 2025. By mid-September, when beneficiaries were interviewed, all acknowledged initial delays but confirmed that early vehicle deployment had since commenced. While delays were evident across all four projects, they were largely attributed to external factors, specifically infrastructure challenges (e.g. grid connection costs and feasibility assessments) and complications with importing vehicles. Despite these setbacks, beneficiaries report that progress is now visible across all projects.
- 2.13 Wave 3 interviews reinforced that infrastructure was the primary barrier to delivery progress. This includes permitting processes, contractual requirements, and securing agreements such as EPC (Engineering, Procurement & Construction) contracts, charger maintenance arrangements, and grid connections. Beneficiaries noted that additional complexity arises because many of these agreements must be tailored to individual sites.
- 2.14 A theme that emerged more strongly in Wave 3, likely due to the projects progressing more fully into deployment, was the misalignment between infrastructure timelines and vehicle readiness. This mismatch led to deferred vehicle orders, which in some cases resulted in built but undeliverable trucks. However, beneficiaries also noted that progress has since improved. In one project, delays stemmed from the Lead Partner attempting to manage all infrastructure delivery activities in-house; after revising their approach, both progress and confidence have increased.

"It was a bit of a juggling act to make sure that the chargers and the trucks were deployed at the same time because you didn't want trucks turning up with no chargers." – Wave 3 ZEHID beneficiary

“Our biggest challenge has been aligning vehicles being built with infrastructure being ready.” – Wave 3 ZEHID beneficiary

- 2.15 The latest QMS data also provides an assessment of how well ZEHID projects were delivering against their budget. As shown below in Figure 2-2, one project was assessed as having an over or under spend of 11%-15% and three having an over or under spend of over 21%. Of the active projects in Wave 3 this outlooked had improved, with two assessed as having an over or under spend of 16-20% and one as having an over or under spend of 11-15%.

Figure 2-3: ZEHID project delivery against budget (n=4)



Source: QMS data (IUK), Steer-ED analysis (August 2025). Question: How well has the project been able to deliver against budget? (Answer options: Cost Scoring Matrix, Scores 1-5)

- 2.16 Finally, QMS data was used to investigate the extent to which ZEHID projects were successfully achieving their objectives in Wave 2 (Figure 2-3). Three projects, Electric Freightway, eFreight2030 and ZENFreight, were assessed as being highly likely to fail to deliver one or more key objectives. One project, HyHaul, was assessed as certain to fail to deliver on one or more key objectives. In Wave 3, two active projects (Electric Freightway and ZENFreight) were assessed as having a possibility of failing to deliver their objectives, while one project (eFreight2030) was assessed as highly likely to fail to deliver.
- 2.17 For Electric Freightway, Wave 2 reporting indicated strong progress on vehicle orders, with 161 trucks procured, exceeding the initial target of 140. However, it was assessed almost certain that the number of public charging sites would fall short of the original target of 33, with fewer than 25 expected. Despite these challenges, the Wave 2 QMS assessment concluded that the project remained likely to deploy sufficient infrastructure to meet most of its R&D objectives.
- 2.18 The most recent Wave 3 assessment has upgraded the project scope score, indicating only a possibility that the project will fail to deliver on its objectives. This largely reflects changes since Wave 2, as a recent decision from DfT and Gridserve has enabled further MSAs to be built, seven hubs are currently in progress and another four have been

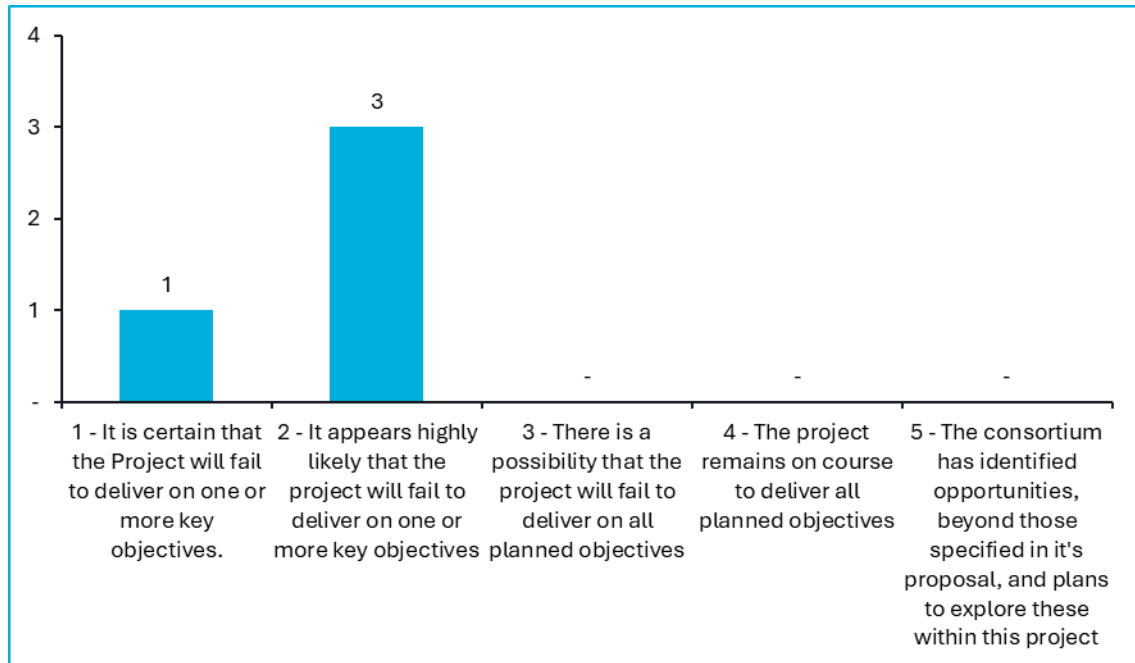
commissioned, suggesting the project is still likely to deploy enough infrastructure to meet most R&D objectives. In terms of vehicle deployment, 161 vehicles have now been ordered. Qualitative evidence from Wave 3 interviews indicates that Electric Freightway beneficiaries remain confident the project will achieve its intended outcomes.

- 2.19 Regarding eFreight2030, the project is generally on track. Nonetheless, some elements of the original scope have been dropped in previous quarters, including one partner withdrawing trucks and chargers, and another failing to procure chargers. In Wave 3, the primary risk identified relates to the Berkeley trailers. While the first trailer is scheduled for delivery in March 2026, limited visibility on delivery dates is available for the remaining eleven units. The overall assessment in both Wave 2 and 3 found that the project remains broadly aligned with its original objectives, namely, demonstrating MW charging, streamlining grid connection times, and developing MW-capable charging locations.
- 2.20 Although it appears unlikely that all intended locations will achieve MW capability (more likely around 30%), recent progress suggests this outlook may continue to evolve. In January 2025, the consortium officially opened its first megawatt-scale charging site at Kuehne+Nagel's East Midlands Gateway hub, and Wave 3 beneficiaries intending to open further sites have already reported receiving important operational learnings from this installation.
- 2.21 For ZENFreight, the revised scope, reducing from 16 fcHGVs to three vehicles with only depot based refuelling, has now been accepted. The project is expected to deliver the intended number of BEVs and charge points. However, one partner is unlikely to order the BEVs allocated to them. Wave 3 monitoring data has upgraded the scope assessment, indicating only a possibility that the project will fail to meet its objectives. However, there remains a risk that the fcHGVs may not be utilised as extensively as intended due to the high cost of hydrogen.
- 2.22 In the case of HyHaul, the scope had been scaled back to approximately 25 fcHGVs and two to three fixed HRS. The most recent QMS assessment, conducted in June, noted some evolution in key project challenges over the preceding three to four months, particularly around demand for hydrogen trucks, availability, and procurement risks. During this period, project partners were preparing orders for around six trucks and 15 tractor units. Since then, the project has closed, and while progress had been made toward addressing these core challenges, they ultimately persisted through to its conclusion.
- 2.23 For all four projects, qualitative assessments in Wave 2 indicated that despite early delays, each remained committed to delivering planned vehicle procurement and infrastructure within an extended timeline aligned with original objectives. Three projects have now begun early deployment of vehicles, suggesting progress reported through the beneficiary interviews (September 2025) was not captured in the earlier QMS reporting (February-June 2025). Wave 3 beneficiary interviews similarly highlighted positive progress, with many beneficiaries now shifting their focus toward the data-capture phase and expressing optimism about the insights this stage will generate.

“So just in that alone [electrifying a number of vehicles] I think it’s [Project Electric Freightway] been really successful. The learnings from the operational experience are obviously still yet to come.” – Wave 3 beneficiary

“I mean, we’ve already learned a lot so far and I know once we start to see the data, we’ll be able to build in a nice robust total cost of ownership.” – Wave 3 beneficiary

Figure 2-4: Most recent QMS score for the scope of ZEHID projects (n=4)



Source: QMS data (IUK), Steer-ED analysis (August 2025). Question: How well has the project delivered against its objectives? (Answer: Cost Scoring Matrix, Scores 1-5)

Beneficiaries' delivery experience

- 2.24 Beneficiaries reported a mixed experience regarding delivery, with key enablers and barriers to delivery consistent across the projects.
- 2.25 The application process was generally viewed as well structured. However, concerns were raised about the clarity and consistency of the questions and scoring criteria. One example involved a beneficiary who ranked last in the written application stage but first in the interview, suggesting a potential mismatch in how requirements were interpreted or weighted.
- 2.26 Interactions with IUK were consistently described as supportive, responsive and approachable. Many appreciated that IUK were enthusiastic and demonstrated a strong understanding of the project fundamentals. This praise was also a consistent theme across Wave 3 interviews.

“I really want to stress how hugely impressed I have been with the Innovate UK team... Their commitment and dedication has been amazing and they have done themselves, and Innovate UK, credit.” – Wave 2 ZEHID beneficiary

“[Of IUK] On a scale of 1 to 5, 5 for professionalism.” – Wave 3 ZEHID beneficiary

2.27 While ZEHID beneficiaries spoke positively about their experience working with IUK, there were procedural challenges identified by interviewees:

- **The portal system:** The portal was described by many beneficiaries as having a difficult-to-navigate user interface and was considered ill-suited for managing a project of this scale. However, many interviewees also reported that the IT issues have now largely been resolved. Both the early challenges and the subsequent improvements were consistently reflected in Wave 3 interviews.
- **Delayed project change requests:** Most beneficiaries reported experiencing delays when submitting project change requests, which had knock-on implications for project partners receiving claims in a timely manner. It is important to note that many of these negative experiences relate to the earlier stages of programme delivery. Significant operational improvements have since been implemented, and over the past 12 months all project change requests have progressed to approval well within Innovate UK's standard 30-day Service Level Agreement (SLA).
- **Administrative burden:** Smaller-scale beneficiaries, in particular, reported lacking the skills or capacity to manage the administrative burden, which diverted time and focus from their core responsibilities. One beneficiary noted that having a key or worked example would have significantly aided their understanding of procedural requirements. Wave 3 insights also highlighted that larger organisations are not exempt from these pressures, with one beneficiary reporting challenges with extensive legal reviews and corporate processes.

"The first person you employ is an engineer, not an accountant." – Wave 2 ZEHID beneficiary

"Now, before we say yes to a grant, if we get offered the grant, we do now look in and go cool. We do have the resources to administer this grant. And that is not innovation. That is not entrepreneurship. That is not small business. That is just the antithesis of all those things. I understand the reasons why, I get it, but we've got another grant that we work with, where they're like, cool, fill in the spreadsheet. If the numbers change, the numbers change. You're learning as you go." – Wave 2 ZEHID beneficiary

"I didn't envisage the amount of separate legal agreements that were needed, I've never spent as much time with our legal team." – Wave 3 ZEHID beneficiary

2.28 In terms of grant management, greater flexibility in funding arrangements, including the possibility of dialogue around accessing additional funds and clearer guidance on the availability of different funding pots, was expressed. A dedicated pot for overspend or unforeseen costs was also suggested. Wave 3 interviewees added an important nuance: the timing of grant agreements created challenges for some organisations, as later contract signing clashed with internal business cycles. As corporate planning and financing approvals typically operate on annual cycles, multi-year government projects can fall out of sync with these processes. As one beneficiary noted, this misalignment meant they had to re-secure approvals for their co-investment.

- 2.29 Feedback on project monitoring was mixed, with some beneficiaries finding the reporting requirements ambiguous or overly complex. Suggestions were made to streamline processes, particularly at the consortium level where reporting could be duplicative. The most significant burden was associated with data sharing, which involved navigating numerous agreements and inconsistent expectations. Wave 3 interviews brought this into sharper focus, with one beneficiary noting that the telemetry data requirement in particular was unclear and evolved unexpectedly.
- 2.30 Despite these challenges, IUK was commended for its flexibility, particularly in adjusting report timelines to accommodate real-world constraints, such as the need for vehicles to be operational before data could be collected.

“I would just say [of IUK] supportive and realistic and when needed, brought a bit of informality.” – Wave 2 ZEHID beneficiary

- 2.31 There were several key barriers to delivery that were mentioned across beneficiaries:
- **Procedural delays** due to submitting project change requests and issues with navigating the portal.
 - **Limited support on commercial aspects**, which led some beneficiaries to delay decisions due to perceived financial risks.
 - **The bureaucratic structure and long chain of command** also posed challenges in terms of grant management, with significant lobbying required to reallocate funding across financial years.
- 2.32 Enablers to successful delivery reported by beneficiaries included:
- **Targeted support for publicity and dissemination**, such as coaching on event participation.
 - **IUK flexibility**, for example, a partner faced supply constraints due to grid connection issues, posing a major business risk and required additional funding to resolve. IUK’s responsiveness and willingness to explore funding for new technologies to address such challenges was seen as a strong enabler.

Conclusion

- 2.33 The ZEHID programme was established to accelerate the decarbonisation of the UK’s HGV sector by deploying and demonstrating zero-emission HGVs. It funded four projects focused on delivering this goal through the development of charging infrastructure, the deployment of both electric and hydrogen vehicles, and the collection of telematics data. Although initial progress across all four projects was slower than anticipated, three have now advanced into the deployment phase. One project (HyHaul) has since closed after being unable to secure sufficient customer demand for fuel cell HGVs. Across the remaining consortia, vehicle roll-out is now underway, and beneficiaries are increasingly shifting their focus toward data capture and operational learning.
- 2.34 Delivery experience has been mixed but constructive. Beneficiaries consistently valued the IUK’s support, responsiveness and flexibility but pointed to procedural challenges around the portal system and submitting project change requests. However, in terms of

overall delivery, participants have found their experience of the programme from application through to today, to be a positive one.

- 2.35 Overall, ZEHID has achieved strong initial progress. Given the programme's scale and duration, the administrative challenges encountered to date not only highlight the need to streamline processes but also present an opportunity to improve delivery experience as Phase Two begins. Encouragingly, Wave 3 insights indicate that many of these early administrative issues have already been resolved, suggesting a more stable foundation for the next phase of delivery.

3 Building and strengthening partnerships through programme delivery

Key Messages

- The ZEHID programme has enabled the formation of new partnerships (83% of beneficiaries are working with at least one new partner), as well as strengthening existing relationships (70% report a further developing of relationships).
- In an industry where collaboration has been described as challenging, ZEHID has brought together a wide variety of partnerships. It has given beneficiaries, notably SME operators, access to customers and suppliers and as the programme develops, will likely allow partners to share complementary capabilities.
- The quality of relationships has remained consistently high across Waves 2 and 3, with interviewees reporting relationships that are constructive, useful, and well-aligned with project goals.
- One benefit emerging from these partnerships has been the development of British supply chains. By engaging domestic suppliers identified through phase 1, organisations have been able to contribute to regional economic development.
- Wave 3 has highlighted a new, tangible form of partnership value: operational learnings. Shared insights from early megawatt-charging deployments, such as Menzies learning from Kuehne+Nagel's site, are accelerating readiness, reducing risk, and strengthening collaboration as projects move into Phase Two.

Introduction

- 3.1 A key objective of the LMT portfolio is to encourage a more collaborative approach to research through fostering new academic and commercial partnerships. As a result, ZEHID programme applicants were required to deliver their project in partnership with at least one other organisation. Participating organisations could include businesses, charities, academic institutions, public sector organisations and research and technology organisations.

- 3.2 This chapter sets out the role that project delivery has played in building and strengthening partnerships between industry, academia and regulators. It explores the mechanisms through which new partnerships were formed, and the ZEHID programme's contribution to strengthening these relationships. It goes on to describe beneficiaries' accounts of the types of partnerships formed and their anticipated (or realised) benefits.

Exploring the role of programmes in partnership development

- 3.3 Within the wider haulage sector, stakeholders and beneficiaries acknowledged that collaboration can be challenging, with some characterising the industry as traditional and mistrusting. Although collaboration in logistics has gained prominence in recent years and is widely recognised as a means to enhance supply chain performance, real-world examples remain limited.⁹ Barriers such as lack of trust, leadership conflicts, and cultural differences often hinder progress. Against this backdrop, evidence from the ZEHID programme suggests it has successfully fostered meaningful collaboration across projects.

"Having collaborations and partnerships is notoriously difficult." – Wave 2 ZEHID beneficiary

- 3.4 Across waves, nearly all beneficiaries reported that partnership and collaboration formed a key part of the ZEHID programme. Interviewees reflected that their involvement in ZEHID played a pivotal role in enabling and shaping both new and existing partnerships.

"Collaboration is a really popular word in this project." – Wave 2 ZEHID beneficiary

"We talk with other ZEHID projects all the time." – Wave 2 ZEHID beneficiary

"It [ZEHID] tied us tighter and I think it demanded even more trust and openness in terms of contracts and pricing." – Wave 3 ZEHID beneficiary

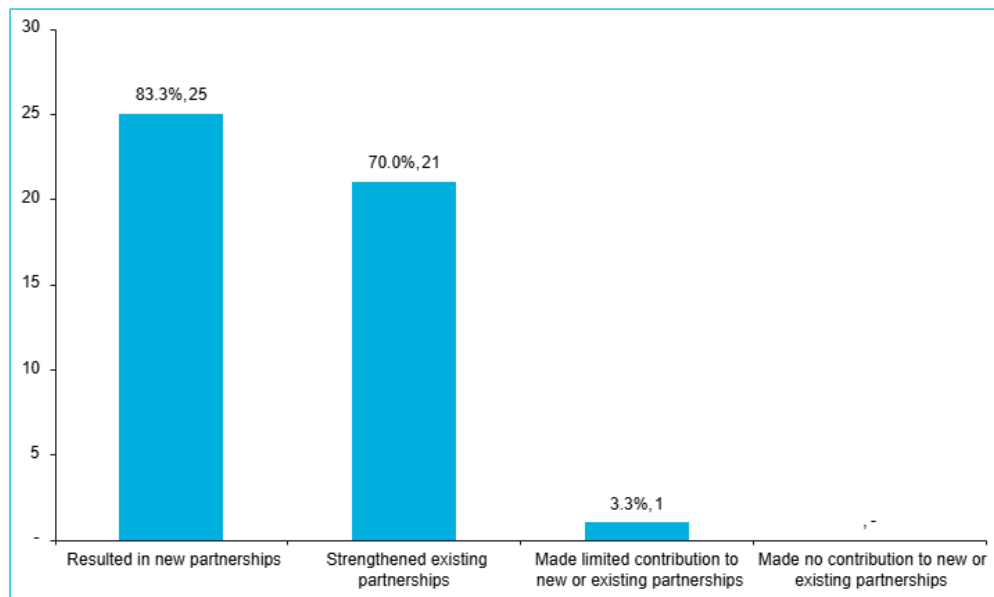
- 3.5 This is also echoed by the beneficiary survey, which indicated that these mechanisms facilitated both the formation of new relationships and the strengthening of existing ones, reported by 83% and 70% of beneficiaries respectively (Figure 3-1). Wave 3 survey data reinforces the impact on new relationship-building, with 93% of beneficiaries¹⁰ stating that ZEHID has led to new partnerships. A slightly lower proportion, 60%, reported that it had strengthened their existing partnerships. This may reflect the fact that many

⁹ Basso, F., D'Amours, S., Rönqvist, M. and Weintraub, A. (2019). *A survey on obstacles and difficulties of practical implementation of horizontal collaboration in logistics*. Intl. Trans. in Op. Res., 26: 775-793. <https://doi.org/10.1111/itor.12577>

¹⁰ From a sample size of 27 beneficiaries.

partnerships have mostly progressed through the operational deployment phase and are now focused on data-sharing, leaving limited scope for further strengthening.

Figure 3-1: Extent to which the project has contributed to new relationships/partnerships or strengthening existing ones (n=30)



Source: Beneficiary Survey, Steer-ED analysis (September 2025). Question: 'To what extent has the project contributed to creating new relationships/partnerships or strengthen existing ones?' (Answer options: Yes, No for each category)

3.6 These partnerships were formed through a variety of mechanisms:

- **Procurement driven partnerships:** Some partnerships were initiated through specific project needs, such as identifying a new subcontractor via the ZEHID procurement process for civil works or securing a charging partner to meet infrastructure requirements.
- **Interest generated through project visibility:** Marketing and outreach efforts sparked interest from external stakeholders, including international fleet operators who engaged with the programme following promotional activities.
- **Consortium and governance structures:** Regular consortium meetings and quarterly review sessions provided structured opportunities for collaboration, relationship-building, and sharing of learnings.
- **Individual-led:** In several cases, partnerships were attributed to the proactive efforts of key individuals within the consortium who drove engagement.
- **IUK led:** One beneficiary reported that IUK was responsible for facilitating a new partnership with the EU Horizon Fund. Wave 3 interviewees also highlighted additional contexts where IUK has helped to build relationships, for example, one beneficiary noted that IUK enabled their engagement with the start-up ecosystem.

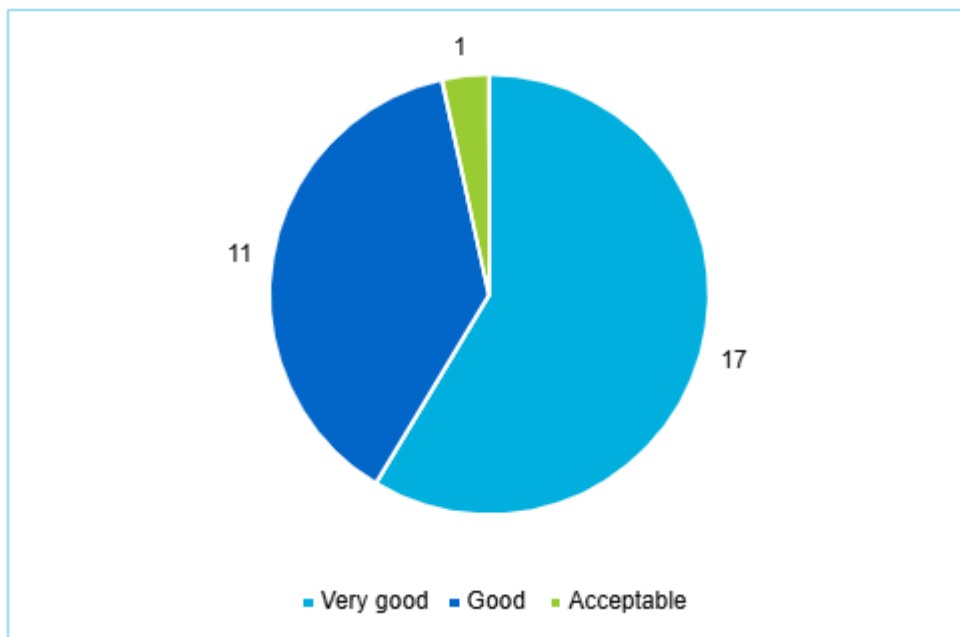
Types of partnerships formed, and how they have been used

3.7 The types of partnerships formed have largely been dictated by the mechanism through which they formed. Those that formed through procurement needs typically involve a sub-contractor partnership. Likewise, those formed through the Quarterly Review Meetings

(QRMs) are between partners within the consortium. As the programme moves out of the deployment phase, these types of intra-consortium partnerships have begun to look towards the sharing of charging infrastructure. Less common types of partnerships formed have been with academic organisations, for example, to facilitate PhD student placement.

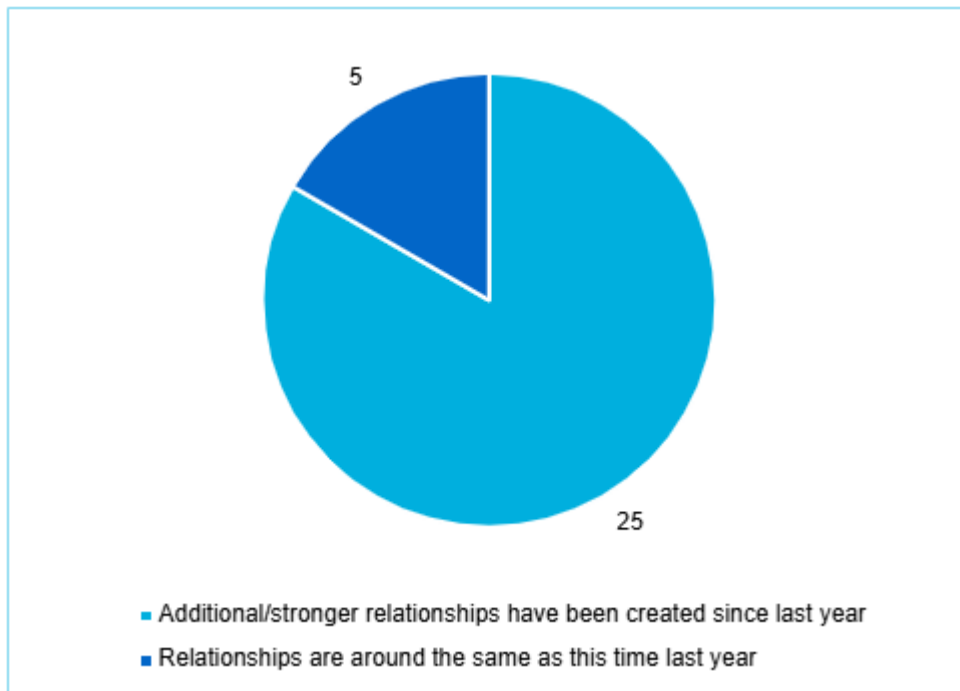
- 3.8 In terms of the quality of the relationships formed, feedback across the board was mostly very positive, with many beneficiaries reporting that the collaborations were constructive, useful, and well-aligned with project goals. These partnerships often enabled smoother delivery and shared learning. As shown in Figure 3-2, 17 out of 29 responses to the beneficiary survey reported the quality of relationships between project partners to be 'very good', 11 reported that the relationship quality was 'good' and one reported it to be 'acceptable'. No respondents reported relationships between partners to be poor or very poor. Similar sentiment was reflected in Wave 3, in which 15 out of 27 survey respondents reported that relationships were 'very good', while 12 reported the quality to be 'good'. This demonstrates that across the duration of ZEHID, the quality of relationships has remained consistently strong, a finding reinforced by both survey data and interview feedback.

Figure 3-2: Beneficiary perspectives on the quality of relationships between project partners (n=29)



Source: Beneficiary Survey, Steer-ED analysis (September 2025). Question: 'How would you rate the quality of relationships between project partners?' (Answer options: Very good, Good, Acceptable, Poor, Very poor, Don't know, N/A)

- 3.9 Throughout the programme, the nature and scope of relationships have evolved significantly, as shown by Figure 3-3. Survey data indicates that 25 of 30 beneficiaries reported the establishment of new or stronger relationships compared to last year. Similarly, the types of external collaborations have diversified. One beneficiary noted that companies specialising in technology to locate charging points, previously outside the scope of Phase One, are now being considered as potential partners.

Figure 3-3: Beneficiary perspectives on how relationships have changed since last year (n=30)

Source: Beneficiary Survey, Steer-ED analysis (September 2025), Question: 'How does this compare to the situation this time last year?' (Answer options: Additional/stronger relationships have been created since last year, Relationships are around the same as this time last year, Relationships are weaker/fewer compared to this time last year, Don't know)

- 3.10 Despite this, a small number of beneficiaries indicated that their collaborations may not continue beyond ZEHID. This was typically due to differences in commercial outlook or because the partnership was specific to the programme's requirements and not necessary in future contexts.
- 3.11 This issue, where collaborative relationships can sometimes sit in tension with commercial interests, was explored further in Wave 3. Some beneficiaries reported that they were now committed to longer-term contracts that, in a competitive environment, they would ordinarily avoid. While this was viewed as a trade-off, it was ultimately considered the worthwhile for programme involvement.

"Weakness for us is we've got long contracts that we don't normally have because we'd like to keep the pressure on [operators] for the whole time, so that's the trade-off. But in terms of doing the right thing at the right moment in time, I think everybody would look at that project as an absolutely peak bit of work for them personally and maybe for the company as well." – Wave 3 ZEHID beneficiary

Beneficiary perspectives on the benefits of partnerships

- 3.12 Beneficiaries were asked to further explain any benefits realised because of new or strengthened partnerships through ZEHID involvement. One key benefit already emerging

from these partnerships has been the development of a more local, British supply chain. By engaging domestic subcontractors and suppliers, identified through procurement processes in Phase One, organisations have been able to contribute to regional economic development.

- 3.13 For SME operators and start-ups (around 18 in the consortia), partnerships also served as a valuable stepping stone to gaining industry credibility, enabling access to major players within the fleet operator sector.

“Our first clients were the biggest fleets in the world.” – Wave 2 ZEHID beneficiary

- 3.14 What begins as micro-level change, switching to UK suppliers or SMEs earning credibility, signals momentum towards a broader strengthening of domestic supply chains driven by ZEHID. Even within a small segment of the market, these early shifts demonstrate how the programme could, and has already started to, enhance UK resilience and reduce reliance on international suppliers. This represents an important policy outcome that extends beyond the immediate objectives of ZEHID.

“Fully British innovation built here, made here, employing people here from the ground up, which is something that we should be really encouraging right now.” – Wave 2 ZEHID beneficiary

Case study vignette showcasing partnership development and the benefits to the project/organisation

eFreight 2030 is a ZEHID project led by Voltempo a chargepoint developer, manufacturer and installer (full case study in Appendix D).

Through the ZEHID programme Voltempo has been able to identify and move to using UK-based manufacturers within its supply chain. Examples include:

- The switching system, previously sourced from Germany, new provider located in Wales, and,
- The cooling system was Chinese now from Glasgow – a more efficient product with no moving parts.

The quantities of these products ordered by the ZEHID project help their businesses to advance enhancing domestic supply chains and regional economic development.

- 3.15 As the programme transitions into its demonstration phase, perceptions of the future benefits of partnerships are now more operational and resource based. For example, hauliers within the consortium are now considering collaborating by sharing charging infrastructure. In Wave 3, this theme continued to emerge strongly in qualitative accounts, with clearer evidence of progress, as illustrated in the case study excerpt below. This example highlights tangible operational learning being transferred between project partners. Thinking around depot sharing has also advanced, with one beneficiary noting that relationships are likely to remain strong beyond the project because shared charging needs will persist. Another beneficiary suggested that IUK could play a future

role in facilitating connections and knowledge exchange with the bus sector, which underwent a similar transition approximately five years ago.

Case study vignette showcasing partnership development and the benefits to the project/organisation

Menzies is a member of the eFreight 2030 consortium (full case study provided in Appendix E). Following the launch of Kuehne & Nagel's megawatt charging site in January 2026, Menzies visited the facility to observe early operations and gather practical insights. This visit enabled rapid knowledge transfer, allowing Menzies to incorporate software updates and commissioning fixes ahead of its own infrastructure going live.

The collaboration demonstrated the tangible value of shared learning within the consortium. Issues identified at the Kuehne & Nagel site were quickly communicated and resolved, meaning Menzies will begin operations from a more advanced starting point. This example highlights how proactive partnership working has accelerated improvements, reduced risk, and strengthened operational readiness across the project.

Conclusion

- 3.16 Fostering new partnerships and championing a more collaborative approach to research is a key objective of the LMT portfolio.
- 3.17 Evidence across Waves 2 and 3 shows that ZEHID has been highly effective in both forming new partnerships and strengthening existing ones. Through a number of different mechanisms, the programme has had a strong impact with regards to creating and developing cross-industry partnerships, including and in particular with regards to the development of local supply chains. This reality is recognised and reflected in the beneficiary survey responses, interviews and case studies.
- 3.18 The quality of these relationships has remained consistently strong throughout delivery. Consultees described that the collaborations were constructive, useful, and well-aligned with project goals. These partnerships often enabled smoother delivery and shared learning.
- 3.19 In a sector often characterised by traditional practices and a lack of trust, ZEHID has enabled ideas to be shared, trust to be built, and relationships to be strengthened. Looking ahead to the demonstration phase, beneficiaries are already exploring opportunities for deeper collaboration, most notably around shared use of charging infrastructure and co-learning on megawatt-scale charging deployments. These discussions suggest that the partnerships established through ZEHID are likely to deliver lasting value beyond the programme itself.

4 Development, commercialisation and deployment of new technologies

Key Messages

- The technologies are at advanced stages of development, relative to other programmes across LMT, with over half of respondents reporting TRL levels of between 7-9. The limited development seen since Wave 1 is down to the projects still being in the deployment phase.
- There has been wide and varied dissemination of lessons learned however some wider stakeholders want more.
- As projects move into the demonstration phase, partners expect real-world data to drive the next wave of innovation: supporting the development of planning tools, optimisation software and strengthening market confidence in the novel technologies being trialled, including the 1 MW Hypercharger and the Bulldog e-Trailer, helping convert early interest into commercial opportunities.
- Project beneficiaries note that the absence of regulatory or legislative drivers for zero emission HGV adoption is a barrier to uptake and hence commercial development of the industry. Additional challenges raised in Wave 3 include power-supply constraints and high electricity costs.

Introduction

- 4.1 This chapter explores the extent to which ZEHID projects have been successful in developing and deploying technologies, as well as progressing towards commercialisation.

Reported TRL progression across projects, and mechanisms driving this

4.2 Technological maturity is reported using Technical Readiness Levels (TRL), a scale from 1-9. Definitions of the TRL scale are as follows:¹¹

- TRL 1: basic principles observed and reported
- TRL 2: technology concept or application formulated
- TRL 3: analytical and experimental critical function or characteristic proof-of-concept
- TRL 4: technology basic validation in a laboratory environment
- TRL 5: technology basic validation in a relevant environment
- TRL 6: technology model or prototype demonstration in a relevant environment
- TRL 7: technology prototype demonstration in an operational environment
- TRL 8: actual technology completed and qualified through test and demonstration
- TRL 9: actual technology qualified through successful mission operations.

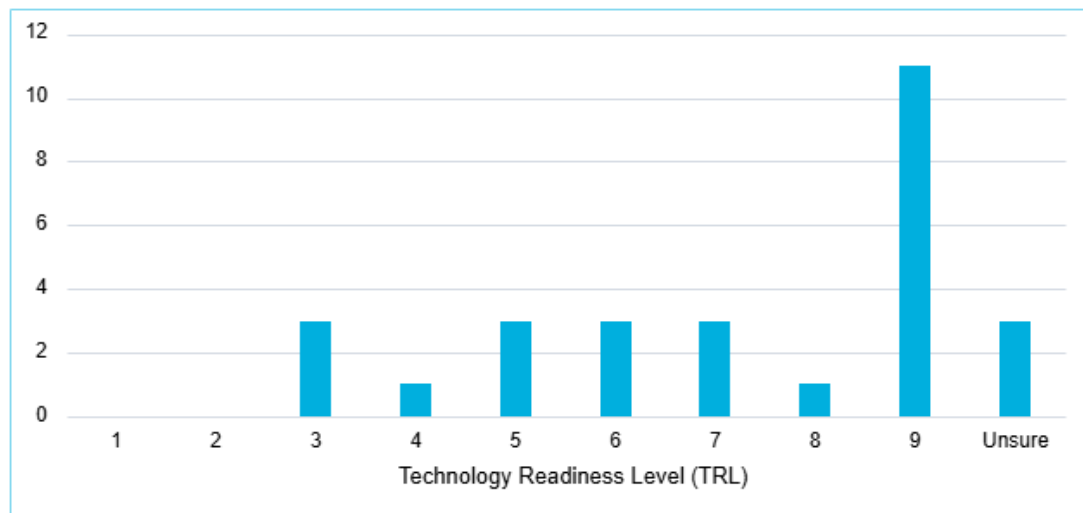
4.3 Given the demonstrator nature of the ZEHID programme, the technologies are at advanced stages of development, relative to other programmes across LMT, with over half (54%) of respondents reporting TRL levels of between 7-9. Wave 3 results reinforced this trend, with 59% (16 respondents) indicating their technology is currently at TRL 7–9. This represents an increase from the Wave 1 survey in 2024, where 42% reported TRLs in this range. The observed difference in responses is likely to be down to changes in partners and respondents; hence the real-world difference is deemed to be minimal and in line with the expectations given that the projects are still in the deployment phase.

“Stage of development: deep in deployment. When MW charger are installed there will be more [development] ground to cover on the software side – optimisation and energy management” – Wave 2 ZEHID beneficiary

“The ZEHID projects have supported improvements to our pre-existing software products. Transport management systems and routing information, adding that into the software.” – Wave 2 ZEHID beneficiary

4.4 While technological progress within ZEHID is already advanced, Wave 3 interviews indicate that further development is occurring more laterally than technically. Rather than advancing the core technologies themselves, which are already in place, beneficiaries are progressing through their involvement in parallel initiatives, such as Transport Scotland’s eHGV Business Readiness Fund.

¹¹ IUK (2025) *Eligibility of Eligibility of technology readiness levels (TRL)*. Available at: [Eligibility of technology readiness levels \(TRL\) – UKRI](#) (Accessed 24th October 2025)

Figure 4-1: Reported current TRL of ZEHID projects (n=28)

Source: Beneficiary Survey, Steer-ED analysis (September 2025). Question: 'With reference to the TRL scale, what is the TRL of the technology now?' (Answer options: Numeric (1-9), Unsure)

- 4.5 As the ZEHID programme progresses into its demonstration and data-gathering phase, one wider stakeholder has cautioned that it may risk overlooking emerging innovations within the broader sector. To mitigate this, it has been suggested that the programme actively monitor privately funded initiatives, such as those currently being undertaken by Milence, to stay informed of relevant technological developments.

“As projects progress from deployment to operation and data gathering, it’s worth keeping in mind that innovation will still be happening outside the programme. So, there is a risk that the programme misses out on opportunities to bring in innovations later on in the project.” – Wave 2 ZEHID wider stakeholder

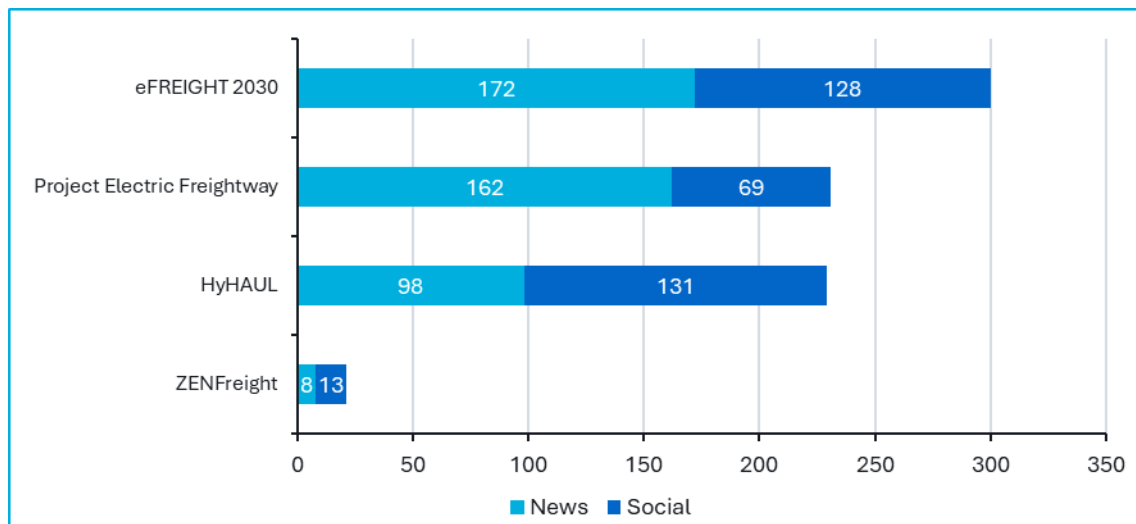
Intellectual property and information dissemination

- 4.6 The Dimensions analysis did not reveal any patents or publications linked with IUK awards on ZEHID projects. This reflects our findings from the interviews and is to be expected as the funding focuses on application of existing technologies.
- 4.7 There were two innovative technologies mentioned during interviews both of which were reported to be developed outside of ZEHID but which will be deployed and tested for the first time and in earnest through the programme, these are: Voltempo’s Hypercharger, a 1 MW capable charger and, the Berkeley Coachworks Bulldog e-Trailer, a trailer with 200 kWh of battery that can increase the range of an HGV by 150 miles without impacting payload. Berkeley Coachworks stated that there were 12 areas of trailer innovations that will be pushing for intellectual property (IP) on, and they expect to hold 20 more patents in 3 years’ time as a result of completing the ZEHID project.
- 4.8 To assess the public dissemination of LMT projects, a structured search of media output using Meltwater, a media monitoring and analytics platform, has been undertaken. The data collection for each project covered the past year (period from 12 August 2024 to 12 August 2025), capturing news coverage of these projects in the form of online news and

print, as well as social media activity on platforms, blogs, and forums (see Appendix A) for further details about the methodology).

- 4.9 Figure 4-2 shows the breakdown of 740 media pieces found related to the four ZEHID projects. Across all media outputs the engagement was either positive or neutral with the split in sentiment slightly in favour of positive (by 4%).
- 4.10 eFREIGHT 2030 was found to have the most coverage with 300 news and social media items found through the analysis.
- 4.11 Although HyHAUL has experienced a 12-month delay, it still has many media mentions (229), likely because the project shares its name with the lead company, making it challenging to distinguish between coverage of the project and the company activities. Electric Freightway was also found to have 230 media items.
- 4.12 ZENFreight appears to have had the smallest amount of media output at just 21 items. The beneficiary highlighted that their quarterly newsletter and LinkedIn page had proven effective tools for national and international industry engagement generating new relationships and opportunities which had been successfully converted into new business.

Figure 4-2: Media output by ZEHID projects August 2024-2025



Source: Meltwater Analysis (September 2025). The data collection for Meltwater media analysis took place from 12 August 2024 to 12 August 2025.

- 4.13 The types of information dissemination:
- Formal reports:** Energy Systems Catapult (ESC) have published several documents. They report their eHGV Charger Connections Guide having extensive industry engagement and their eHGV Purchasing Options and Considerations having less engagement but being a more detailed document. Hitachi Zero Carbon (H2C) have published three documents, a 'Project introduction and approach' building a view of the project ambitions, what and how planning to achieve; 'Demonstration design and implementation' detailing the challenges encountered around for example building depot charging infrastructure; and an 'Interim Findings' report detailing early insights from site commissioning and eHGV operations. These reports include editorials from

Haulier experience. There have also been White Papers on helping companies switch to electric vehicles.

- **Integration into company sustainability strategy:** Two Wave 3 beneficiaries reported that insights from their ZEHID participation had informed and been incorporated into their corporate sustainability strategies.
- **Digital materials:** the online presence of the projects is evident and reflected by the high number of social media posts identified through the Meltwater analysis (Figure 4-2), 341 over the past 12 months. Other digital materials shared by a project Gridserve have shared drone footage, layouts and designs of sites. Beneficiaries have also taken part in podcasts.
- **Meetings:** all projects host Quarterly Review Meetings to share lessons learned, select industry stakeholders are invited to these in-person meetings to ensure the lessons are shared beyond the project partners. For the larger projects these meetings host around and sometimes over 100 people, in-person. One beneficiary mentioned their participation in debates on hydrogen (presenting the industry perspective) and their presence at a DfT roundtable.
- **Webinars and conferences:** partners also host or co-host webinars with other organisations across the industry including think tanks. These webinars tend to be open to anyone to register.
- **Informal knowledge sharing:** one Wave 3 beneficiary reported that adjacent businesses and customers had approached them to share learnings from their involvement in the project.

“We have quite a loud voice in our part of the industry for the size of a company that we are. We do an awful lot of webinars, conference panels. We're on a lot of the list for decarbonisation, power players and Green Fleet Top 100 etc. But need to do more to reach people that aren't convinced yet, because there's a huge amount of the industry that don't think it's going to happen.” – Wave 2 ZEHID beneficiary

“We've presented 35 times in 18 months – our audience is growing, we're getting more questions and wider interest (including from fuel card providers, OEMs, payment providers, ancillary software systems).” – Wave 2 ZEHID beneficiary

- 4.14 Some wider stakeholders reported a desire for more frequent updates and greater sharing of lessons learned. Some felt that the communications should be simpler to effectively convey key messages to a broader audience.

Commercial progress made by organisations

- 4.15 Commercialisation typically lags until demonstration evidence is available and ZEHID projects are not expected to complete the deployment phase until March 2026. However, across the interviews there were a few themes that pointed to the likelihood of increased commercial progress over the coming phase of the project.
- **Improved market positioning:** a common theme was the improvement of market positioning. Several organisations noted that project participation enabled them to expand their service offerings in the electric vehicle sector, making them more

responsive to evolving customer needs. This, in turn, strengthened their presence and competitiveness in the market. One beneficiary noted that they have begun to leverage their UK-based project experience as a blueprint for international contexts, applying lessons learned to initiatives in countries such as France and Germany. Wave 3 findings also supported this, with one beneficiary reporting that project involvement had enabled them to enter new market segments, including asphalt, bulk cement, flatbed and crane vehicles. However, one wider stakeholder advised that caution should be exercised regarding the potential for larger companies to gain a commercial advantage:

“Operators are going to take it as a commercial advantage; the operator has a first mover advantage. [We] need to be weary of using tax-payer money to subsidise operations of larger companies.” – Wave 2 ZEHID wider stakeholder

- **Increased and broadened industry engagement:** the projects also facilitated broader industry engagement. One organisation highlighted that, as a result of their involvement, they had grown their network significantly, now maintaining relationships with 104 companies in their CRM (Customer Relationship Management) system. Adjacent to this, increased visibility and credibility were also cited as key outcomes. Beneficiaries described how their profile within the sector had improved, with positive PR (Public Relations) and a more solidified reputation through association with the project.
- **Anticipating building consumer confidence:** once the demonstration phase gets underway partners and stakeholders anticipate that the real-world data gathered will pave the way to new software products and planning tools for other fleets looking to decarbonise and transition to zero emission. In addition, once the HyperCharger megawatt charging system and the electric trailer have been demonstrated this will give consumer confidence in the novel technologies which will hopefully translate to further contracts and work winning.

“We’ve seen more visibility and increased inbound leads” – Wave 2 ZEHID beneficiary

“Sustainability is gaining more weight in tenders, and customers value knowing the company is already prepared for rollout. This has led to increased trial work and specific projects, showing that commercial pieces are beginning to come together.” – Wave 2 ZEHID beneficiary

Barriers and enablers to technological and commercial development

- 4.16 Project beneficiaries note that the absence of regulatory or legislative drivers for zero emission HGV adoption is a barrier to uptake and hence commercial development of the industry. The lack of information on any possible R&D funding or policy incentives for consortium members post-ZEHID is another barrier that is tempering the appetite of operators to plan transitions in the short-term.

- 4.17 Given that margins in the logistics and haulage sectors are typically around 1-2%, the effect of the additional weight of eHGVs (compared to diesel HGVs) on payload capacity can have a notable impact on some specific operational duty cycles and hence profitability. Wave 3 beneficiaries echo this payload penalty. Operators and other stakeholders reflect that the regulations around the weights and lengths of HGVs would ideally be updated to accommodate longer and heavier vehicles to remove this barrier. National Highways are cautious of the impact these changes may have on the roads and bridges across the major and strategic road networks as well as on the potential safety implications in the event of collisions. Some stakeholders comment that they expect that as eHGV designs evolve and battery technology develops there is likely to be some decrease in the overall weight of eHGVs.
- 4.18 Qualitative insights from Wave 3 interviews highlighted a barrier that was less prominent in Wave 2: constraints around power supply and the cost of electricity. One beneficiary reported that limited power capacity at their charging hub requires the use of dynamic load management (DLM) to ensure that core business operations are prioritised over EV charging. They also raised safety concerns should DLM systems fail; while a technical solution has been identified, it has not yet been implemented or tested. Beneficiaries emphasised that these challenges stem partly from the lack of mass-scale deployment, which reduces commercial incentive for investment. They also stressed the need for future-proofing, although this can leave some operators paying high standing charges for unused capacity reserved for anticipated future demand.

Case study vignette showcasing a project which has made notable commercial progress, plus commentary on the barriers and enablers experienced

Electric Freightway project (case study in Appendix B) has developed a new feature within existing software systems - charging slot bookability. This was to overcome a key barrier to operations reported by freights and logistics companies for who minimising downtime (including associated with charging) is crucial to their bottom line and thin margins. This new feature gives customers confidence that they will be able to align their charging time with their breaks and also helps the CPOs to have a view of their near-term charger utilisation a key component of commercial success.

Conclusion

- 4.19 Commercialisation typically lags until demonstration evidence is available and ZEHID projects are not expected to complete the deployment phase until March 2026. However, across the beneficiary interviews there were a few themes that pointed to the likelihood of increased commercial progress over the coming phase of the project including improved market positioning and increased and broadened market engagement. Several noted that project participation has already enabled entry into new market segments, while others emphasised that the demonstration phase will be critical in building customer confidence, converting early leads, and validating novel technologies such as megawatt charging and electric trailers.
- 4.20 The Dimensions analysis did not reveal any patents or publications linked with IUK awards on ZEHID projects. However, the projects are just concluding the deployment and entering the demonstration phase so this is as expected. One beneficiary stated that there were 12 areas of innovations that will be pushing for intellectual property (IP) on,

and they expect to hold 20 more patents in 3 years' time as a result of completing the demonstration phase of the ZEHID project.

- 4.21 The information dissemination across the projects has been good, 740 media pieces were found related to the four ZEHID projects through the Meltwater analysis. Beneficiaries noticed an increase in leads and opportunities.
- 4.22 A key barrier to HGV adoption and hence commercial development of the industry as reported by both project beneficiaries and wider stakeholders is the absence of regulatory or legislative drivers for zero emission vehicle deployment. Operators also stressed ongoing barriers around payload penalties, power-supply constraints and electricity costs. Government action and stronger policy signals in this regard would be a key enabler to unlock the benefits of the lessons being learnt and data being gathered through the project.

5 Growing skills and organisational maturity through programme delivery

Key Messages

- A significant proportion of beneficiaries reported substantial improvements in skill levels, with many gaining new technical, regulatory, and contextual expertise as a direct result of their involvement in the projects.
- Beneficiaries also widely acknowledged that their involvement in the projects led to meaningful growth in organisational maturity. Smaller organisations particularly benefited from enhanced operational capabilities, including access to advanced equipment and infrastructure that would otherwise be beyond their reach.
- Larger organisations also demonstrated maturity gains, including improved cross-functional collaboration and more agile, flexible ways of working shaped by the programme's demands.
- Beyond technical and operational outcomes, the programme fostered a strong sense of pride among participants, who felt their organisations were contributing meaningfully to sector progress and societal benefit.
- While job creation was not universal, the programme did lead to the establishment of new roles in several organisations, particularly in underserved regions, and helped safeguard existing jobs through upskilling and role evolution.

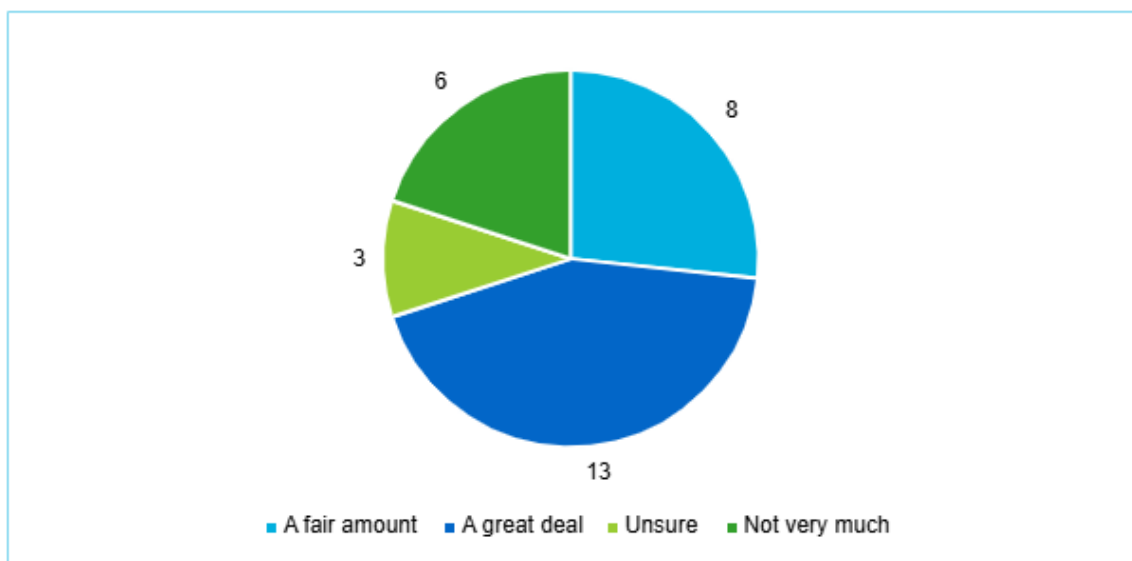
Introduction

- 5.1 Delivery of ZEHID projects is expected to stimulate growth in the capability, capacity, resilience, workforce and skills of beneficiary organisations, ultimately leading to growth in the maturity and scale of the zero emission HGV sector, with corresponding economic benefits. This chapter sets out the mechanisms by which activities have impacted organisational skills and maturity, and the role of the programmes in creating and safeguarding jobs.

How projects have contributed to skills development amongst partner organisations

- 5.2 When asked about the extent to which the project positively influenced skill levels within their organisation, 13 out of 30 respondents indicated it had done so ‘a great deal’ (Figure 5-1). However, it should be noted that a small number of beneficiaries (6) also expressed that minimal skill development occurred in their organisation as a result of project involvement. This was typically due to existing capabilities being sufficient. Wave 3 survey findings were similar: 9 out of 27 respondents (33%) indicated that the project had positively impacted skills by ‘a great deal’, while only 4 (15%) indicated it had a little effect.

Figure 5-1: Extent to which the project has had a positive impact on skill levels within beneficiary organisations (n=30)



Source: Beneficiary Survey, Steer-ED analysis (September 2025). Question: ‘To what extent has the project had a positive impact on skill levels within your organisation? This could include for example commercial, technical, or regulatory knowledge/skills.’ (Answer options: A great deal, A fair amount, Not very much, Not at all, Unsure)

- 5.3 These survey findings were further supported by interviews, where beneficiaries shared specific examples of personal skill enhancement and emphasised the degree of learning experienced through the project.

“[My job has changed] from glorified IT guy, to driving innovation.” – Wave 2 ZEHID beneficiary

“The value of grant is much greater than funding because of what we’ve learnt along the way.” – Wave 2 ZEHID beneficiary

- 5.4 During interviews, beneficiaries also collectively identified several mechanisms through which ZEHID projects have supported organisational skill development:

- **Enhancing technical understanding and skills:** One beneficiary mentioned that through the deployment phase they and their partners have gained new knowledge about interoperability challenges between vehicle and charging technologies from different OEMs. These insights have informed both design and implementation processes. Other beneficiaries reported developments in their national level modelling capabilities, and improvements to their TCO models/modelling capabilities. In terms of more day-day skills, a beneficiary also reported that first aid and forklift training had been established due to project activities. Wave 3 findings reinforced that project involvement contributed to technical skill development, particularly in relation to understanding vehicle technologies from the driver's perspective as the end user.

“The engineering team have certainly been engaged and learned a lot through this process. It's really key that they understand the technical aspects of the vehicle, how we manage the battery technology, how we get the best out of it, how we cascade that information correctly to the to the drivers as the end users.” – Wave 3 ZEHID beneficiary

- **Enhancing sector context understanding:** The most direct effect, and most cited, many organisations reported that through their experience of the project, they had increased their knowledge of ZEHID technologies and increased their understanding of the associated challenges and solutions. For Gridserve, an established provider of public charging infrastructure, the HGV sector represented a new area of engagement and they reported gaining new technical and regulatory knowledge through the project that has helped them to develop their offering.
- **Enhancing regulatory understanding:** Beneficiaries explained that their project had helped their understanding of the regulatory environment and the regulatory requirements that they would need to work within for their zero emission HGV solutions to be successful. One beneficiary commented on how participation in the ZEHID programme enabled the organisation to build knowledge around HGV operating rules and regulations and the barriers these create for their customers. These insights have informed both design and implementation processes

5.5 Skills shortages have long affected the logistics sector, with persistent challenges such as an ageing workforce and limited new entrants among HGV drivers.¹² Alongside this, there are acute shortages in specific technical occupations, notably fitters, mechanics and vehicle technicians, which are critical for maintaining fleet reliability and regulatory compliance.¹³ At the same time, the sector faces evolving capability gaps linked to technological change: the transition to zero-emission vehicles requires new electrical and battery maintenance expertise, while increasing automation, AI-enabled logistics

¹² Logistics UK (2025) *Skills shortages ease, but risks to the logistic workforce remain says Logistics UK*. Available at: [Skills shortages ease, but risks to the logistics workforce remain says Logistics UK | Logistics UK](#) (Accessed: 30th September 2025)

¹³ Dudley College of Technology (2024) *Skills West Midlands and Warwickshire Employer Skills Report*. Available at <https://dudleycol.ac.uk/wp-content/uploads/2024/03/skillswm-report.pdf> (Accessed: 23rd February 2026)

systems and data-driven operations demand stronger digital, analytical and systems management skills.¹⁴

- 5.6 The skills developed through ZEHID are crucial for addressing these gaps, particularly in light of the transition to zero-emission vehicles, which will demand a whole new set of capabilities across the sector. Skills gaps were again highlighted in Wave 3, with beneficiaries emphasising the importance of long-term workforce development. One beneficiary noted that staff exposure to EV technology is part of a wider, ongoing transition that will shape the sector's future skills needs.

"We're deep in telematics field and yet need skills. From vehicles to energy to executives." – Wave 2 ZEHID beneficiary

"As they [colleagues in other parts of the business] become advocates, they go, oh actually it works and then they'll think about it next time the customer asks them if they can do it." – Wave 3 ZEHID beneficiary

- 5.7 Although the programme is still in its early stages, evidence suggests that ZEHID has begun to make meaningful progress in plugging these sector-wide skill gaps.

How projects have contributed to growth in organisational maturity amongst partner organisations

- 5.8 Beneficiaries widely acknowledged that their involvement in the projects led to meaningful growth in organisational maturity.
- **Enhanced capabilities for both smaller and larger organisations:** Smaller beneficiaries reported significant gains in operational capacity. For example, one organisation was able to install large-scale charging hubs and access advanced equipment that would typically be beyond the reach of a small operator. This acceleration not only improved their own operations but also enabled collaboration with other SMEs by offering shared charging capacity. Larger organisations also demonstrated that capability development remains possible even within already mature operational environments; for instance, one beneficiary in Wave 3 noted that, whereas they had previously outsourced their truck training, they are now able to deliver this in-house.
 - **Ways of working:** One Wave 3 beneficiary highlighted that ZEHID involvement has been one of the most cross-functional projects the large scale company has ever delivered (spanning over 15 different business functions), breaking down traditional organisational silos and building new capacity for operating in non-linear, fast-paced environments. Importantly, this has created a lasting behavioural shift, with those

¹⁴ Logistics UK (2025) *Logistics experts debate the challenges of AI and reskilling*. Available at: <https://logistics.org.uk/media/press-releases/2025/november/logistics-experts-debate-the-challenges-of-ai-and> (Accessed: 23rd February 2026)

involved continuing to apply more flexible and collaborative ways of working beyond the project.

“Those people that took part in the project, there was over 80, have all taken that away, I think, which is you can do things differently.” – Wave 3 ZEHID beneficiary

- **Improved understanding of government-funded schemes:** Many beneficiaries commented that their understanding of the processes and procedures involved in participating in government-funded initiatives had improved. Several expressed enthusiasm about engaging in future schemes, having gained confidence and insight through their current involvement.
- **Sense of pride:** While not operational or technical in nature, beneficiaries reported that those involved in the projects felt a strong sense of pride in their organisation’s role and direction.

“I think everyone's proud. Everyone's proud that we're trying to do the right thing and it gives you a bit more pride in the company that you're representing.” – Wave 2 ZEHID beneficiary

“Legacy that I’m proud to be a part of.” – Wave 2 ZEHID beneficiary

Case study vignette showcasing how a project has resulted in the maturing and skills development of the organisation(s) involved

Gridserve are the lead partner for Electric Freightway (full case study in Appendix B). Gridserve are an established provider of public charging infrastructure however the HGV sector represented a new area of engagement. Participation in the ZEHID programme enabled the organisation to build knowledge around HGV operating rules and regulations, as well as interoperability challenges between vehicle and charging technologies from different OEMs and dissemination of these lessons learned to OEMs to resolve the challenges. These insights have informed both site layout design, and implementation processes helping them to develop layouts that are more ergonomic and safer for HGV drivers accessing the sites and charging infrastructure.

Amazon, one of the world’s largest and most influential technology and e-commerce companies (full case study in Appendix C), also played a pivotal role within the Electric Freightway consortium. While Amazon generated new insights through their own participation, they also acted as a major source of expertise and learning for other partners, including Gridserve. Their operational maturity and large-scale fleet experience helped drive skills development across the consortium. Amazon contributed extensively to programme learning structures, including active participation in Quarterly Review Meetings where risks, delays, and operational updates were discussed and bi-annual reporting cycles capturing insights on telematics, data compliance, operational risk, and infrastructure needs. They also provided practical feedback on charging-hub design, covering requirements for booking systems, access considerations for vehicles with trailers attached, and

expectations around charger reliability. These contributions enabled more informed design decisions and strengthened the consortium's collective capability.

The role of programmes in creating and safeguarding jobs

- 5.9 Beneficiaries shared varied perspectives on how the programmes contributed to job creation and retention within their organisations. Of the 26 survey respondents in Wave 2, 35% reported that new roles had been created as a direct result of project involvement. Wave 3 findings showed a similar pattern, with 30% of respondents (8 out of 26) indicating that new roles had been established, suggesting that job creation remained a consistent, though slightly reduced, outcome as projects progressed.
- 5.10 For instance, Voltempo noted that its headcount had nearly doubled over the past year, reaching 53 employees, including 48 permanent staff, four contractors, and one fixed-term placement from a university programme. Another beneficiary reported the creation of 12 new roles linked to project activities, while a further organisation highlighted the establishment of 14 new jobs in a remote region that previously lacked such employment opportunities.

"eFreight 2030 has contributed to the growth of Voltempo from start-up to scale up." – Wave 2 ZEHID beneficiary

"This is not a place that has jobs outside of tourism and farming and we've created 14 jobs. That's 14 people that don't have to leave the county to find work. And I'm really, really proud of that." – Wave 2 ZEHID beneficiary

- 5.11 However, 65% of the beneficiaries in Wave 2 reported that no new jobs were created. Several beneficiaries explained that while new divisions or functions had been established, these were often staffed by reallocating existing personnel. In many cases, employees had taken on dual roles or expanded responsibilities rather than being replaced or supplemented by new hires. This was reinforced in Wave 3, where 70% of beneficiaries similarly reported no new job creation. One beneficiary did note, however, that they anticipated further role creation once vehicles become fully operational and more staff begin to champion the EV transition.
- 5.12 More broadly, one organisation suggested that the transition to electric technologies may not necessarily lead to net job creation within their specific context. Instead, they anticipated a shift in roles, with existing positions evolving to meet new technical and operational demands rather than expanding the workforce. This is positive news for safeguarding jobs through upskilling in new areas.
- 5.13 Whether through the creation of entirely new roles or the transformation of existing ones, the longer-term effects on employment will become clearer as zero emission fleets scale up and operational needs become fully fledged.

Conclusion

- 5.14 The ZEHID programme has played a pivotal role in strengthening the organisational foundations of partner organisations across the zero emission HGV sector. Evidence from both survey responses and interviews across Wave 2 and 3 demonstrates that the projects have significantly contributed to the development of technical, regulatory, and contextual skills within beneficiary organisations. These enhancements have not only improved day-to-day operational capabilities but also enabled organisations to engage more confidently with emerging technologies and sector-specific challenges.
- 5.15 Importantly, the programme has supported growth in organisational maturity, particularly among smaller operators. Access to advanced equipment, improved understanding of government-funded schemes, and a strengthened sense of purpose have collectively empowered these organisations to scale their operations and collaborate more effectively within the sector. For larger organisations, participation in ZEHID has helped break down traditional silos, foster more flexible ways of working, and strengthen organisational readiness for fast-paced innovation.
- 5.16 While job creation was not universal, the programme has nonetheless facilitated meaningful employment opportunities, especially in regions with limited economic activity, and safeguarded existing roles through upskilling and role evolution. The sense of pride expressed by beneficiaries further underscores the broader impact of the programme on organisational culture.
- 5.17 Taken together, these outcomes reflect the programme's success in laying the groundwork for a more capable, resilient, and mature zero emission HGV sector, with long-term benefits for both individual organisations and the wider industry.

6 Impacts on wider framework conditions and long-term outcomes

Key Messages

- The programme has been crucial in driving adoption of new technologies among the partners and participants. Through the interviews many beneficiaries made the point that they would not have procured any zero emission HGVs had the (ZEHID) funding not been available.
- Through over 600 interviews Hitachi Zero Carbon have seen improvements in attitudes and sentiment towards eHGVs but uptake is limited by barriers around the TCO and legislations.
- The most urgent legislative barriers are around HGV weight/length rules and insufficient vehicle grants to support wider early adoption beyond ZEHID. Without action here, the lessons of ZEHID risk limited uptake.
- ZEHID learnings have contributed to three recently published BSI standards related to publicly accessible charging sites for eHGVs, workshops for zero emission HGVs and guidance on the design and implementation of hydrogen refuelling sites.
- The portfolio is generating industry wide value, from accelerating the case for national charging infrastructure to laying groundwork for future connected, autonomous, and energy-integrated freight systems. The opening of the UK's first MCS-enabled charging hub illustrates that these long-term impacts are already beginning to materialise.

Introduction

- 6.1 This chapter discusses the role that projects have played in affecting trust in, and adoption of, new technologies, plus contributions to the regulatory environment. It then goes on to discuss evidence about potential longer-term outcomes that may be delivered by the portfolio.

The role of projects in driving adoption of new technologies

“This technology [zero emission HGVs] disrupts a century-old system, making demonstrator projects vital to proving its viability and overcoming resistance.” – Wave 2 ZEHID beneficiary

6.2 Through consultations exploring the projects’ role in driving adoption of zero emission HGVs a number of common themes emerged:

- **Programme funding:** the programme has been crucial in driving adoption of new technologies among the partners and participants. Through the interviews many beneficiaries made the point that they would not have procured any eHGVs had the (ZEHID) funding not been available. Wave 3 feedback reinforced this, highlighting that the “use it or lose it” nature of the funding acted as a strong incentive. Even where cost parity and operational uncertainties remained barriers, the funding deadlines prompted operators to commit, accelerating uptake earlier than they otherwise would have.
- **Changing attitudes:** Hitachi (HZC) have done 600 interviews to date tracking feelings, thoughts, attitudes and they are already seeing a positive change in attitudes and sentiment towards zero emission HGVs. Willingness to adopt eHGVs is slowly growing, as more operators test the vehicles, though progress and adoption is still at an early, small-scale stage. This emerging change in mindset was echoed in Wave 3 interviews, where beneficiaries confirmed that operator attitudes continue to move in a more favourable direction.

“ZEHID has helped move the dial on the realistic opportunity for electric for zero emission HGVs. In that space, it’s also opened up more discussion around the range of options and the use of decarbonised fuels and it’s kept the decarbonisation agenda on the table.” – Wave 2 ZEHID wider stakeholder

“It has been the catalyst; without the programme there wouldn’t have been such an awareness and willingness in the industry to do this [adoption of zero emission HGVs in the UK].” – Wave 2 ZEHID wider stakeholder

“I think for those that those operators that are involved in ZEHID in particular, there is definitely a shift in mindset more to like a test and learn.” – Wave 3 ZEHID beneficiary

- **Existing barriers:** Customers who use eHGVs are enthusiastic, but high costs compared to diesel remain the biggest barrier. Wider adoption will depend on improving commercial viability - through lower truck/energy costs or stronger carbon reporting obligations to improve TCO. Dissemination of learnings from ZEHID is helpful but lack of funding and regulatory support limits adoption outside the project and especially among SME fleets or non-early movers. Although it should be

acknowledged that the zero-emission HGVs within ZEHID, some of the heaviest battery-electric and hydrogen fuel cell vehicles on UK roads, are typically the most expensive and challenging to decarbonise.

“When operators look at TCO it doesn’t stack up, there’s a slight arrogance emerging from the ZEHID echo chamber.” – Wave 2 ZEHID wider stakeholder

- **First mover reluctance:** In Wave 3, one beneficiary highlighted that adoption is likely to evolve naturally as battery technology improves, becoming cheaper and offering longer ranges. Each new generation of eHGVs is perceived as an improvement on the last, similar to the trajectory seen in the electric car market. This ongoing pace of advancement contributes to hesitation among some operators, who question whether it is worth being an early adopter when the next iteration of vehicles may soon be better and more cost-effective.

“I think it will naturally completely evolve, and I think that’s part of the reluctance by some operators about whether you want to be an early adopter or not, because well actually the next generation[will] be better, cheaper.” – Wave 3 ZEHID beneficiary

- **Peripheral factors:** Beneficiaries and stakeholders also highlighted other factors outside the programme that are influencing the willingness to adopt eHGVs including DAF’s promotion of electric vehicles, the growth in the electric car market, and organisations’ initiatives around driver training.

The role of projects in shaping the regulatory and standards environment

- 6.3 One of the key outcomes and successes related to the application of the learnings from ZEHID have been the three BSI standards have been developed with the support of learnings from ZEHID (more in the case study vignette below).

Case study vignette showcasing how a project has helped to contribute to changes in the national standards

Electric Freightway (Appendix B) reported their collaboration with BSI who have published three new, freely accessible standards related to zero emission HGVs and the associated infrastructure in April/May 2025.

During the deployment phase Gridserve gained significant knowledge of: HGV bay design, signage, and safe movements around charging infrastructure. They were able to share the lessons learnt along with other materials (such as site layouts and designs) with the BSI.

“ZEHID has been the catalyst, without the programme there wouldn’t have been such an awareness and willingness in the industry to do this. Not just the ones that got the funding but everyone, contributing to various initiatives like the standards programme.” – Wave 2 ZEHID wider stakeholder

The key findings and themes related to the projects role in shaping the regulatory environment were as follows:

- **Influence to date:** the influence of the programme is demonstrated through Voltempo's engagement with the DVSA, who issued clarification that drivers can leave their HGVs plugged in for charging during statutory rest breaks. This clarification is crucial to the operational duty cycles of eHGVs and therefore their viability. Voltempo are continuing to work with the DVSA on the official announcement on this clarification.

"Industry is definitely using ZEHID to get the message across about what needs to change." – Wave 2 ZEHID wider stakeholder

- **Barriers in the regulatory framework:** beneficiaries and stakeholders interviewed wanted more regulatory support for the transition to zero emission HGVs in the form of post ZEHID-funding or ZEHID policies and strategies and changes to the legislation around HGV lengths and weight. The projects and partners are trying to influence a change by lobbying action and by working with relevant organisations to build further evidence base (for example one beneficiary said they are liaising with National Highways to model impacts on road surfaces). These regulatory constraints around vehicle weights and dimensions remained a recurring barrier in Wave 3 interviews, with participants reinforcing the same sentiment: the issue persists, and continued lobbying will be essential.

"Current legislation offers no clear pathway for change, making acquisition of certain trucks a high financial risk." – Wave 2 ZEHID beneficiary

"So, there are a lot of challenges that we're still juggling with every day related to weights and dimensions." – Wave 3 ZEHID beneficiary

- **IUK role:** Beneficiaries also suggested that IUK could play a more active role in this space, potentially by synthesising policy-relevant insights and experiences from across all ZEHID projects to develop a consolidated and robust set of policy recommendations.

"Policy and regulatory challenge [are] a clear cross-sector limitation that is well known but not being addressed." – Wave 2 ZEHID beneficiary

- **Future prospects:** Over the next few years real-world data from ZEHID demonstrations will provide the necessary support to make evidence-based decision on regulations. The programme is driving cross-industry collaboration to support the consideration and development of holistic assessments on regulations, one such example is with regards to the work on the weights and lengths of HGVs. Wave 3 beneficiaries further reinforced the expectation that robust operational data from ZEHID will be a key driver of future policy development, noting that the insights

produced will strengthen the case for national infrastructure planning and wider regulatory change.

“Proof of the pudding will be in the eating. If ZEHID provides the proof, there will be more eating.” – Wave 2 ZEHID wider stakeholder

“There'll be lots of numbers, lots of data captured in a really, really structured way, which I think will definitely help influence people's decisions in the future.” – Wave 3 ZEHID beneficiary

Long-term outcomes

6.4

It is too early to tell the impacts beyond the programme, however a number of emerging long-term outcomes have been identified through consultations with partners and wider stakeholders:

- **Environmental benefits:** the number of diesel HGVs displaced by zero emission HGVs within the programme, and the miles driven can directly be correlated with commensurate emissions savings. For example, eFREIGHT 2030 reports on their website that their 11 eHGVS on the road have travelled approximately 470,000 km and saved 370 tonnes of CO₂. Where the charging infrastructure built has been utilised by vehicles outside of those that are part of the project the energy transferred to the vehicles can be said to offset fossil fuel miles. These emissions reductions also translate to improvements in air quality along the routes the vehicles take. Wave 3 findings highlighted some unexpected environmental impacts beyond emissions. One beneficiary described how habitat loss during charging site preparation required mitigation, leading to the creation of a butterfly bank to deliver biodiversity net gain. This illustrates that, going forward, depot and charging sites may offer opportunities to generate wider environmental value.
- **Economic benefits** are yet unknown, and beneficiaries and stakeholder report a mixed response on this topic. Some believe that the current payload limitation and increased charging time compared to diesel refuelling time could reduce productivity and profits, while others report an increase in demand and revenue for ‘green’ deliveries.
- **Operational benefits:** drivers of zero emission vehicles are complementary of the driving experience stating that vehicles are smoother, easier to driver, more pleasant and less tiring. This could support retention and perhaps encourage recruitment.
- **Wider industry benefits:** one of the realised long-term benefits related to learnings from the ZEHID programme is the development of three BSI standards related to zero emission HGVs and infrastructure¹⁶. These will help other stakeholders not involved

¹⁵ eFREIGHT 2030 (2025) *Accelerating the uptake of zero emission HGVs*. Available at: <https://efreight2030.com/> (Accessed: 26 September 2025)

¹⁶ BSI (2025) *Zero Emission HGVs and Infrastructure Standards Programme*. Available at: <https://www.bsigroup.com/en-GB/products-and-services/standards-services/zero-emission-hgvs-and-infrastructure-standards-programme/> (Accessed: 26 September 2025)

in the programme to benefit from the learning and ensure the industry is aligned and following best practices. The BSI representative also mentioned that they are conducting further stakeholder engagement to see how these standards may be adapted and applicable to other vehicle classes such as buses and coaches. Wave 3 feedback further underscored the wider industry value of ZEHID. Beneficiaries highlighted that the transport sector is highly fragmented, with smaller operators often lacking access to technology, data, and capital. By openly sharing learnings, resources, and evidence, the programme is helping to reduce these barriers and support broader industry-wide progress.

“The project has created an international ripple and has shown UK has leapt ahead and so other OEMs now thinking UK is a really viable market, call from TESLA and Windrose truck.” – Wave 2 ZEHID beneficiary

“We’re invited to talk about learnings from the UK (through ZEHID) at international tables where we have a good reputation.” – Wave 2 ZEHID wider stakeholder

- **Cross-industry benefits:** In the longer term eHGVs enable and pave the way to a shift to *connected and autonomous vehicles* which could offer further advantages for safety and costs of operating freight services. Switching to electric fuel (which can be and is generated domestically) instead of diesel supports *energy independence*. Use cases for vehicle-to-grid energy services from eHGVs are yet to be tested and developed but in the longer-term this could provide substantial support to the national electricity grid and to *national energy security*.

Case study vignette showcasing the long-term impacts of one of the technologies being demonstrated

The Megawatt Charging System (MCS) being trialled and demonstrated through eFREIGHT2030 will enable HGVs without regular access to depot charging to recharge during their breaks without extending their operational duty cycles. As downtime is expensive for businesses this technology will be crucial in removing a blocker for the transition to electric for a wider segment of the eHGV population. This technology will also support long-distance coaches and buses make the transition to electric reducing emissions and improving air quality.

In Wave 3, steps toward these long-term impacts are already being realised, with the opening of the UK’s first MCS-enabled eHGV charging site at Kuehne+Nagel. The site features six DC charging bays, with a dynamic power-distribution system that allocates capacity across bays as needed. The charging hub supports Kuehne+Nagel’s expanding electric fleet and will initially serve twelve eHGVs operating on regional, national, and international routes. These vehicles will generate valuable real-world data on energy use, charging cycles, range, and total cost of operation. This evidence will help shape the future of electric freight in the UK and inform wider system planning.

Conclusion

- 6.5 Demonstrators are seen as vital to disrupting the existing systems/technologies in place and the ZEHID programme is seen as a key catalyst in raising awareness and interest in the ZEHID technologies. Willingness to adopt the technology is increasing but uptake outside the programme is limited by the ongoing TCO barrier and the lack of regulatory frameworks to support and guide uptake of zero emission HGVs.
- 6.6 Over the next few years real-world data will provide the necessary support to make evidence-based decision on regulations. The programme is driving cross-industry collaborations to support the consideration and development of holistic assessments on potential and proposed changes to regulations. The most urgent legislative barriers are around HGV weight/length rules and insufficient post-ZEHID funding to provide continued support in the early phases of the transition towards zero-emission HGVs. Without action here, the lessons of ZEHID risk limited uptake.
- 6.7 ZEHID learnings have contributed to three recently published BSI standards related to publicly accessible charging sites for eHGVs, workshops for zero emission HGVs and guidance on the design and implementation of hydrogen refuelling sites. These will help wider stakeholders to benefit from the learning and ensure the industry is aligned and following best practices. The BSI is conducting further stakeholder engagement to see how these standards may be adapted and applicable to other vehicle classes such as buses and coaches and also sharing learnings including from ZEHID internationally.
- 6.8 The long-term outcomes have yet to be measured or calculated but through the programme tens of thousands of tonnes of CO₂ will be saved from the displacement of diesel HGVs with zero emission ones. Unexpected environmental value, such as biodiversity net gain at charging sites, is also beginning to emerge. Importantly, the programme is helping to reduce fragmentation within the freight industry by sharing learning openly, widening access to insights and evidence, and supporting smaller operators who have traditionally had limited exposure to new technologies. This growing collective knowledge base, alongside the demonstration of new technologies, can also support the transition toward future innovations such as connected and autonomous vehicles.

7 Conclusion & Next Steps

Key Messages

- The ZEHID programme was established to accelerate the decarbonisation of the UK's HGV sector by deploying and demonstrating zero-emission HGVs in the heaviest weight category. Four projects have received up to £200 million in funding.
- In Phase One of the programme (deployment, expected to be concluded in March 2026), all four projects experienced delays. However, beneficiaries now report that deployment is underway across three of the projects and that all remain on track to deliver the majority of the programme's objectives. One project has since closed after being unable to secure sufficient customer commitments for fuel-cell HGVs.
- Beneficiaries consistently praised IUK's support throughout project delivery, particularly day-to-day communication, though technical issues with IT systems were a recurring frustration.
- The programme has enabled new partnerships and strengthened existing ones across the consortia, with many beneficiaries reporting strengthened collaboration and dialogues on sharing charging infrastructure.
- Skills development has been a clear outcome, with beneficiaries reporting gains in technical, regulatory, and sector-specific knowledge, particularly among smaller organisations entering the zero-emission space.
- In terms of commercial progress, ZEHID has helped organisations improve market positioning and visibility, but broader adoption of zero-emission HGVs and further commercialisation remains constrained by regulation, high costs, operational limitations, and challenges such as grid connections and electricity pricing.
- Beneficiaries recommend improvements to IT systems, funding flexibility, and stronger links between programme delivery and policy development to maximise future impact.
- ZEHID has generated strong engagement across the sector. While broader industry and societal impacts are still emerging and expected through the demonstration phase, there is already evidence of a strengthening domestic supply chain.

Summary of monitoring findings

- 7.1 This report is structured around the LMT portfolio logic model, which is divided into five themes: programme delivery; partnerships and collaboration; technology development,

deployment and commercialisation; skills development; and wider framework conditions. The key findings from the monitoring commission in each of these areas are set out below.

Delivery

- 7.2 The ZEHID programme has allocated up to £200 million across four projects, encompassing 37 grants and involving 41 partners. It is structured in two distinct phases. Phase One focuses on procurement and the development of essential refuelling and charging infrastructure. Phase Two centres on demonstration, where vehicles will be tested across a variety of duty cycles and commercial operations to validate their performance under real-world conditions. Three of the four funded projects are reaching the end of phase one and have made good early progress in vehicle deployment and demonstration. One project, however, has now closed after being unable to secure sufficient customer demand for fuel-cell HGVs, meaning its planned demonstration activity will not proceed into Phase Two.
- 7.3 At the latest quarterly assessment, all four projects were found to have experienced delays, with key milestones slipping by three months or more. The most recent QMS data, reported between February and June 2025, highlighted these issues. By mid-September, when beneficiaries were interviewed, all acknowledged the initial setbacks but confirmed that early vehicle deployment had since begun. The delays were largely attributed to external factors and complications with vehicle imports. Beneficiaries also noted that mismatches between infrastructure readiness and vehicle delivery created operational challenges. Despite these hurdles, beneficiaries reported visible progress across all projects.
- 7.4 Beneficiaries were generally positive about their experience working with IUK throughout both the application process and project delivery. Day-to-day communication and support from IUK were consistently highlighted as strong points. However, frequent issues were reported with the online portal, with IT-related frustrations, rather than interpersonal or procedural concerns, being the main source of difficulty. Beneficiaries of a smaller scale also expressed frustration over the administrative load. Several beneficiaries have since indicated that many early administrative issues have eased as the programme has matured.

Partnerships

- 7.5 Despite initial concerns about collaboration in the traditionally cautious haulage sector, ZEHID has fostered meaningful partnerships across its projects. Beneficiaries consistently reported that collaboration was a core feature of their experience, with many noting that ZEHID enabled both new and existing partnerships to flourish. These partnerships emerged through various channels, including procurement needs, project visibility, structured consortium meetings, individual initiative, and facilitation by IUK.
- 7.6 Feedback on the quality of these relationships was largely positive, with beneficiaries describing them as constructive and well-aligned with project goals, although a small number of beneficiaries conceded that collaborations may not continue beyond ZEHID due to commercial differences.
- 7.7 As the programme progresses into its demonstration phase, the nature of these partnerships is also likely to change. Beneficiaries reported that partnerships are

beginning to evolve to support operational needs, such as plans for consortium members to share charging infrastructure and to exchange practical learning from early megawatt-charging deployments.

Development, deployment and commercialisation

- 7.8 Most projects are working with advanced technologies, with over half of beneficiaries reporting TRL levels between 7 and 9. While intellectual property generation has been limited due to the programme's focus on applying existing technologies, some innovations, such as the Bulldog e-Trailer, show potential for future patents.
- 7.9 Information dissemination has been strong, and projects have used a mix of formal reports, digital content, webinars, and industry events to share lessons learned and raise awareness. Engagement has been largely positive, and targeted communications, particularly from smaller projects, have helped attract new business and build sector credibility.
- 7.10 Although commercialisation is still in its early stages, ZEHID has helped participating organisations strengthen their market position, expand networks, and raise their visibility both domestically and internationally. There is optimism that the upcoming demonstration phase will unlock further opportunities, including new planning tools and increased demand for innovative technologies. However, key barriers remain. The absence of clear regulatory drivers and funding incentives for zero-emission HGVs continues to dampen commercial appetite. Operational challenges, such as payload limitations due to battery weight and power-supply constraints at charging hubs, also persist.

Skills

- 7.11 The programme has had a clear and positive impact on skills development, particularly in enhancing technical, regulatory, and sector-specific capabilities. Many beneficiaries described ZEHID as a catalyst for personal growth and improved operational understanding, helping organisations better navigate interoperability challenges, regulatory frameworks, and the practicalities of deploying new technologies. Where skills gains were not reported, this was typically because organisations already possessed the necessary expertise for their level of involvement.
- 7.12 In addition to skills development, the programme has contributed to increased organisational maturity, particularly among smaller organisations. This included access to advanced equipment, improved confidence in engaging with government-funded schemes, and a strengthened sense of purpose. Larger organisations also reflected that ZEHID helped break down rigid organisational structures and encourage more flexible, cross-functional ways of working.
- 7.13 While job creation was not universal, ZEHID has supported meaningful employment opportunities, particularly in regions with limited economic activity. It has also helped safeguard existing roles through upskilling and evolving responsibilities, ensuring that organisations are better prepared for the transition to zero-emission technologies. In the longer term, these small shifts also signal progress towards addressing the wider skills gap in the logistics sector.

Wider outcomes and impacts

- 7.14 In terms of the wider industry, the programme has played a critical role in building trust and encouraging early adoption of new technologies, with funding cited as a key enabler. Beneficiaries also noted that industry attitudes are slowly shifting towards a more test-and-learn mindset. While uptake remains limited outside the programme due to cost and regulatory barriers, changing attitudes and increased interest signal positive momentum.
- 7.15 ZEHID has also influenced the regulatory landscape, contributing to the development of three new BSI standards and prompting clarifications from DVSA that improve operational viability. Ongoing cross-industry collaboration and data collection in phase two are expected to play a part in policy and regulatory consideration, particularly around HGV weights and lengths.
- 7.16 Though long-term impacts are still emerging, early signs point to environmental benefits through emissions reductions, operational improvements for drivers, and wider stakeholder gains from shared learning. Additional early value, such as biodiversity enhancements at charging sites and greater support for smaller operators through shared learning, also indicate that benefits are beginning to extend beyond decarbonisation alone.

Next steps for the programme

- 7.17 The projects have started to enter the demonstration phase of the programme.
- Electric Freightway (Appendices B and C) are planning the roll-out of eleven Motorway Service Areas (MSA) sites, seven of which are now in construction. With 161 vehicles ordered and roughly 120 now in operation, next steps will include further vehicle deployment.
 - eFREIGHT2030 (Appendices D and E) are committing to installing around 35 depot charging hubs, with a total of 180 charging bays. One site has been installed, which provides six high-power DC bays supported by dynamic load distribution and is already generating early operational learning for the consortium. Vehicle deliveries expected from Scania in autumn 2025/early 2026 and most Volvo vehicles expected to go live at the end of 2025. Voltempo are also planning to recruit four new people this quarter.
 - HyHaul has now closed. While the project delivered progress across several work packages and consortium members invested significant effort, it ultimately did not meet the necessary milestones for securing sufficient customer commitments for fuel-cell HGVs. Importantly, this shortfall was influenced by the fixed timelines attached to the grant rather than by a wider market reluctance toward zero-emission technologies.
 - ZENFreight 54 BEVs vehicles are being delivered, electrifying around 18 depots, with full implementation to March 2026. Fleets will operate across the UK, from Devon to Shetland Isles, three Hydrogen Fuel Cell vehicles in Scotland.
- 7.18 Beneficiaries shared a range of suggestions to improve future programme delivery. These can be summarised as:
- **Improving the interface and reliability** of the programme portal.

- **Increase funding flexibility** e.g. milestone-based payments, carry-over allowances to ease SME cash-flow pressures and improve resilience to external delays.
- **Increase engagement between programme and policy makers** ensuring demonstrator evidence is systematically channelled into government strategy and policy and regulation drafting and development.
- **Broader knowledge sharing.**
- **Further support for charging infrastructure, grid connections and energy pricing.**

- 7.19 Several beneficiaries highlighted challenges with the programme portal, suggesting that the user interface and IT system be improved and training be offered to help users navigate the portal more effectively. One smaller organisation noted that having a key or worked example would have significantly aided their understanding of procedural and reporting requirements in general. Additionally, the process for submitting change requests could be streamlined to reduce administrative burden.
- 7.20 There was a call for greater flexibility in funding arrangements, including the possibility of dialogue around accessing additional funds and clearer guidance on the availability and use of different funding pots. Beneficiaries also expressed a need for more transparency regarding asset usage particularly in cases where assets are deployed outside the immediate scope of the project but for related purposes (e.g. using a refuelling vehicle to deliver hydrogen directly to a client). A dedicated pot for overspend or unforeseen costs was also suggested. Larger organisations additionally noted that fixed grant timelines can clash with internal business-cycle approvals, requiring partners to re-secure investment sign-off and creating delays beyond their control.
- 7.21 Beneficiaries felt that more could be done to capture nuanced learnings, especially where commercial sensitivity is a concern. Suggestions included anonymising and aggregating insights to enable broader sharing. Some participants observed that Quarterly Review Meetings, while valuable, do not always facilitate the sharing of real-time operational insights, leading to calls for more agile or informal mechanisms. Several beneficiaries suggested that a cross-industry roundtable could help address this by bringing together operators, OEMs, SMEs and policymakers.
- 7.22 Areas for further IUK support included more guidance on charging infrastructure, grid connections and energy pricing. One beneficiary suggested that IUK could help facilitate connections and knowledge sharing with the bus sector, which underwent a similar transition approximately five years ago. There was also interest in IUK's ability to support forecasting around commercial viability. More broadly, beneficiaries felt that IUK could play a more visible role in shaping regulatory positions by synthesising insights across programmes and engaging a wider range of stakeholders, such as SME hauliers, to diversify perspectives and dissemination.

Recommendations for future evaluation

- 7.23 Many of the impacts of the ZEHID programme will only become fully evident during the demonstration and data collection phase and beyond. It is therefore essential that evaluation continues throughout the demonstration period to capture these impacts.
- 7.24 A key priority is the follow-up tracking of projects at approximately 12-month intervals. 12 months is seen as a realistic timeframe in which projects should make significant and tangible progress while allowing time for the monitoring and evaluation process. This will

help assess the programme's impact on zero-emission HGV uptake outside of its immediate scope, as well as its contribution to regulatory and policy development progress towards commercialisation.

- 7.25 Future evaluation should also place greater emphasis on environmental outcomes as projects scale. While early demonstrations have shown technical feasibility, the full value lies in verified reductions in carbon emissions, improvements in air quality, and operational efficiencies in live deployments. These benefits will only be measurable after some time and should be tracked.
- 7.26 There is also scope to better capture social and workforce-related impacts. Early qualitative evidence suggests that drivers may experience health and wellbeing benefits from operating electric vehicles, including reduced noise, vibration, fatigue and stress. Over time, these factors could contribute to lower sickness absence, improved retention, and wider occupational-health benefits, with potential implications for NHS resource use. The programme presents a unique opportunity to collect such evidence systematically, and future evaluation should consider incorporating these indicators.
- 7.27 Additionally, there is a need for stronger economic impact analysis. Initial job creation during the programme was modest, but over the medium term, benefits may include safeguarded roles, SME and further local supply chain development, new investment, and export contracts. Beyond monitoring job creation and business growth, future evaluation should explicitly track supply chain localisation to understand how programme participation influences procurement decisions, particularly shifts from overseas to UK-based suppliers. This would capture impacts already visible in ZEHID, such as, beneficiary-led supply chain substitutions, and provide evidence of the programme's contribution to UK industrial resilience and regional economic development.
- 7.28 Finally, a broader assessment of logistics operators' businesses pre and post fleet decarbonisation, complementing the TCO analysis being undertaken by project partners, would also support progress in the transport decarbonisation agenda. Capturing all these indicators will be critical for assessing the programme's contribution to green growth, wider industrial strategy and regional economic development.

Appendices

A Sources of evidence utilised

Monitoring data analysis

- A.1 Three forms of programme monitoring data are captured by IUK and were provided to Steer-ED for analysis, as described below.

1) Applicant information data

- A.2 Basic ‘demographic’ data covering organisations awarded funding. The data includes the beneficiary’s name, project name, project description, competition programme, the total amount of funding, which was initially bid for, the grant funding amount provided, project start and end date.

2) Quarterly Monitoring Scores (QMS) monitoring reports

- A.3 Quarterly assessments undertaken by external MSPs; typically, industry professionals who are knowledgeable about the technology in question and are contracted to provide an independent assessment of project progress on a quarterly basis. Their assessment covers the project’s scope, time, cost, exploitation, risk, and project management. Officers score each of these project aspects as well as providing commentary as to the reasoning behind their scores.
- A.4 For Wave 3, QMS data was only provided for five programmes; CCAM, FOAK (2025 specifically), TVH, Maritime and ZEHID.

3) IUK’s impact management system (IMS)

- A.5 IMS is a data collection system which, at the time of writing, is being rolled out across all IUK programmes. It captures data upon project commencement, during project delivery, and following project completion, and is provided in the form of short-answer multiple choice, quantitative, or character-limited free-text responses. It covers subjects including patents, technology progression and partnerships (amongst others).
- A.6 For wave 3, IMS data was provided for only three programmes: CCAM, FOAK (2025 specifically); CCAM; and Maritime.
- A.7 These programmes had additional data available in wave 3 and this information was therefore included within this Monitoring Report (as text updates rather than generation of new graphs).
- A.8 It should also be noted that the data available varied across these four programmes, with fewer questions being asked of FOAK beneficiaries compared to CCAM beneficiaries. We anticipate additional data from IMS will be available for subsequent monitoring activities.

Analysis of secondary data sources

- A.9 Three sources of secondary data were explored for inclusion within this document:

Crunchbase

- A.10 To further explore whether businesses participating in LMT programmes are attracting external investment, and whether LMT participation aligns with investment-raising events, Technopolis have made use of Crunchbase – a platform that provides information on businesses and funding events.
- A.11 Of the ~430 unique organisations participating in LMT projects (at the time of undertaking Wave 2 analysis), Technopolis were able to identify 215 (50%) in Crunchbase (the remainder were mainly public orgs and universities). Of these, 88 have one or more instances of securing external funding (251 deals in total, 2010- July 2025). Crunchbase provides details on the type of funding, the date and the financial amount.
- A.12 Findings evidenced that investment/ funding activity was relatively low pre-project participation, and increased gradually, peaking during IUK LMT project period — with the highest number of investment/funding rounds in 2023 (63). This suggests a clear increase in funding and investment round announcements following the start of IUK LMT project participation.
- A.13 Table A-1 shows the different types of funding / investment round that are captured.

Table A-1: Funding / investment round

Investment Type	Number	Investment Type	Number
Grant	131*	Non-equity assistance	4
Seed	28	Post-IPO debt	5
Pre-seed	7	Private equity	3
Series-A	16	Series-B	6
Equity crowdfunding	5	Corporate Round	2
Convertible Note	2	Series-C	2
Debt Financing	7	Undisclosed / Unknown	28
		Grand Total	251*

Source: Technopolis Crunchbase data 2025 *Note that 13 LMT grants are included, which have then been removed from the subsequent analysis

- A.14 For the 88 companies with funding data, Technopolis have tracked deals (both volume and value) over time at the company level. Technopolis have analysed the total number and value of deals for each company since the start of their LMT project, and then also compared this with the number and value of deals achieved in an equivalent period prior to the project start date (i.e. if the LMT project started two years ago, Technopolis has compared the two years, pre- and post- this start date).
- A.15 At the overall portfolio level, this reveals:
1. LMT participants have achieved 110 deals since their project started. This is 43% higher than the 77 deals they achieved in the same length of time before project start.
 2. LMT participants have achieved deals worth \$4.7bn since their project started. This is more than five times higher than the \$0.8bn achieved in the same length of time before project start.
 3. On average (per company, amongst these 88), organisations have secured 1.3 deals worth \$52.9m since project start, and 1.0 deals worth \$9.7m in the same period before.

- A.16 An additional, updated analysis was also undertaken in Wave 3 for the Maritime and FOAK programmes, covering the period 2018 to the end of 2025. This update also included the additional 26 FOAK projects awarded in 2025.

Meltwater Analysis

- A.17 To assess the public dissemination of LMT projects, a structured search of media output was conducted using Meltwater, a media monitoring and analytics platform. The data collection for each project covered the one year period from 12 August 2024 to 12 August 2025, capturing online news and print, as well as social media activity on platforms, blogs, and forums. An additional, updated analysis was also undertaken in Wave 3 for the Maritime and FOAK programmes, covering the period from 30 January 2025 to 29 January 2026. This updated analysis also includes 26 FOAK projects awarded in 2025.
- A.18 For accuracy, search queries were tailored for each project by combining project titles or acronyms with lead organisation names, and articles were manually screened to remove irrelevant results. The search process also involved an iterative refinement of keywords to ensure that retrieved content was directly attributable to the projects.

Meltwater's metrics enabled assessment of both the quantity and quality of media coverage. Estimated views gauged the average exposure of articles, reach measured the potential audience size, and engagement captured interactions across platforms including Facebook and Twitter. These data points were collected for each project and aggregated at the programme level, providing a comprehensive overview of LMT projects' media performance.

Dimensions

- A.19 Dimensions is a comprehensive research database that provides patent and publication data. The LMT projects were identified within the Dimensions dataset. However, only FOAK of the seven programmes were associated with patents and only FOAK and CCAM were associated with publications within the dataset.
- A.20 As not all the programmes were associated with patents and publications from the dataset, there is some discrepancy to self-reported information from project beneficiaries which will be further explored with the Dimensions team. Dimension data has therefore only been included for programmes where patents and publications have been linked.
- A.21 It should be highlighted that for wave 3 specifically¹⁷ :
- A dimensions search was done for FOAK 2025, however there was no data regarding linked patents or publications for these. This is likely due to Rail awards are quite recent compared to the Maritime awards and are subsequently yet to be added to Gateway to Research.
 - A dimensions data search was also undertaken for Maritime.

Beneficiary survey

- A.22 An online survey of beneficiaries was developed and distributed to all project beneficiaries during each of the research waves across the full portfolio, amounting to 582 recipients. Both project leads and partners were invited to complete the survey,

¹⁷ This data was based on metadata [as of 01/09/2025 for wave 2 and 10/02/2026 for wave 3] from Digital Science's Dimensions platform, available at <https://ukri.dimensions.ai/>. Access was granted under licence agreement with UKRI.

meaning that multiple responses could be captured from each project. The survey included a range of multiple choice and free text questions and allowed for the gathering of valuable additional data beyond the core data collected by IUK via IMS, QMS monitoring reports and applicant information data.

- A.23 Unique surveys were created for each programme and whether a beneficiary had responded in the previous wave. The number of questions therefore varied slightly between programmes and whether a beneficiary had responded in the previous wave. However, the core survey questions remained consistent between programmes and whether a beneficiary had responded in the previous wave.
- **For Wave 1:** The survey was open for a period of approximately three weeks from 15 July 2024 to 3 August 2024 (for six programmes) and for approximately four weeks between 16 September 2024 to 11 October 2024 for the TDD programme. Overall, the survey was issued to 464 recipients across the portfolio (236 responded).
 - **For Wave 2:** The survey was open for a period of approximately six weeks from July to September 2025, issued to 220 recipients across the portfolio (145 responded).
 - **For Wave 3:** The survey was open for approximately four weeks between January and February 2026, issued to 347 recipients across the portfolio (201 responded).

- A.24 Table A-2 shows the beneficiary survey response rates and number of responses from unique organisations within each of the seven programmes.

Table A-2: Beneficiary survey response rates and overall number of responses (all waves)

Programme	Number of Responses	Number of beneficiaries sent the survey	Response Rate
ZEHD	85	125	68%
CCAM	146	179	82%
Hydrogen	26	29	90%
FOAK	74	102	73%
Maritime	196	481	41%
Net Zero propulsion	28	76	37%
TDD	27	39	69%
Total	582	1,031	56%

Source: Steer-ED survey response analysis, 2026

- A.25 Across the LMT portfolio, the beneficiary survey achieved the following project response rates per wave:
- Wave 1 = 51%, which is still considered good representation.
 - Wave 2 = 66%, which is still considered good representation.
 - Wave 3 = 58%, which is still considered good representation.

Depth interviews with beneficiaries and wider stakeholders

Interview methodology

- A.26 The qualitative research component comprised one-hour depth interviews conducted with programme beneficiaries and a selection of wider stakeholders. The interviews were held using MS Teams and were guided by a topic guide.

Beneficiary Interviews

- A.27 As Table A-3 shows, a total of 183 interviews were undertaken with project beneficiaries (project leads, and in some cases project partners) during the three-year LMT research period, split per wave as follows:
- Wave 1 – 70 interviews.
 - Wave 2 – 61 interviews.
 - Wave 3 – 52 interviews.

- A.28 The number of interviews undertaken varied by programme, in accordance with the number of stakeholders involved in the programme. The ZEHID and CCAM programmes were a key focus for beneficiary interviews due to the substantial number of beneficiaries participating in these initiatives.

Wider Stakeholder Interviews

- A.29 Interviews with wider stakeholders took the same format and were conducted with a selection of knowledgeable industry stakeholders (from both commercial and academic institutions), based on recommendation by IUK and programme sponsors. These interviews were conducted over the three-year research period under the LMT portfolio. As Table A-3 shows, a total of 118 interviews with wider stakeholders were completed across all three research waves combined.
- Wave 1 – 53 interviews.
 - Wave 2 – 50 interviews.
 - Wave 3 – 15 interviews.
- A.30 Priority was given to programmes with the largest funding allocation, and therefore ZEHID and CCAM were a key focus for wider stakeholder interviews.

Summary

Table A-3: Beneficiary wider stakeholder interviews (all waves)

Programme	Number of Beneficiary Interviews	Number of Wider Stakeholder Interviews
ZEHID	24	27
CCAM	52	18
Hydrogen	11	16
FOAK	29	16
Maritime	38	22
Net Zero Propulsion	18	9
TDD	11	10

Total	183	118
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Source: Steer-ED interview analysis, 2025

Interview notes and analysis

- A.31 All interviews were recorded and transcribed using the automatic transcription facility on Microsoft Teams. A note-taker also attended each interview and took detailed notes of the conversation between the interviewer and the interviewee.
- A.32 Following the interview, the notes taken by the note-taker and any notes taken by the interviewer were either manually coded or analysed using qualitative analysis software, Atlas.ti. Both forms of analysis were guided by a coding frame aligned with the study's research questions and topic guide to ensure consistency. Coding was conducted by the programme leads and project team support to ensure consistency and reduce bias, with openness to emerging themes.
- A.33 Learnings from these interviews, supported by quotations, have been provided throughout this report.

Case studies

- A.34 A total of 21 case studies have been developed for the monitoring commission (two, three or four case studies for each programme). These are presented as vignettes within the report and as separate full write-ups within remaining parts of the appendices. The case studies were developed through interviews with project leads and supporting desk research. All case studies have been reviewed by the programme's independent panel of subject-matter experts, selected for their expertise in relation to the programme or technology in question. This provides a valuable external perspective on the importance and potential long-term impact of the technology in question.

B Case study: Electric Freightway

Introduction	
Value	£62.2M
Duration	July 2023- July 2030
Start date	01/07/2023
End date	31/07/2030
Context & Objectives	
Project summary	Project Electric Freightway is a £100 million+ initiative led by GRIDSERVE to establish the world's most advanced electric Heavy Goods Vehicle (eHGV) charging network, aiming to replace diesel fleets and address environmental and efficiency challenges in freight transport. Running until 2030, it plans to deploy over 200 high-powered chargers across motorway service areas and commercial depots, support a fleet of around 161 eHGVs, and collect operational data to inform future policy and infrastructure development.
Context	GRIDSERVE is a chargepoint operator. The project is trying to address the wider challenge of decarbonising the heavy goods transport sector. In 2023, the heavy goods sector accounted for 16% of the UK's transport CO2 emissions (18.2 million tonnes) despite doing 16.9 billion vehicle miles. Therefore, if the 500,000 HGVs on UK roads today were switched to electric, the potential saving is 18.2 Mt CO2e – the same as powering roughly two million homes for a year. However, there are key barriers to eHGV adoption: limited availability of vehicles, chargers and higher cost of new vehicle purchase or lease.
Objectives	1. Installation of eHGV Charging Infrastructure Over a two-year procurement phase, eHGV charging hubs will be installed at motorway service areas to support long-distance travel and opportunistic charging across major UK trunk roads. 12 commercial depot charging locations will be established, some offering shared access for multiple fleets. - Approximately 200 chargers (350kW capacity) will be deployed, all powered by 100% net zero carbon energy. 2. Deployment of eHGVs At least 161 electric HGVs will be integrated into UK-based fleets, with collaboration between multinational corporations and SMEs.

	3. Catalyst for change A five-year data collection programme, led by Ricardo, will generate insights into eHGV operations and electrification to support sector-wide transition. 4. Future-proofing features (<i>non-mandatory but valuable</i>) • Bookability and reservation systems to support commercial operations will be developed.
Project Activities	Key challenges • Shifts in funding timelines due to government treasury changes. • Delays across activities; large companies faced pressure to accelerate decisions beyond internal governance allowances. • Budget constraints due to inflation, extended timelines and complexity of the project (original budgets set two years prior). • High complexity from the number of consortium partners. • Grid connection costs: Significant unexpected expenses have emerged during site development—e.g. one location requires an additional £60,000 and a three-month feasibility study due to restrictions on running cables over a bridge. • Project Change Requests: Multiple change requests have been necessary. The first was particularly time-consuming, taking several months to complete. A fourth request has now completed to increase the project scope to include an additional number of publicly funded sites at no additional cost. • Infrastructure deployment delays: Progress on public charging sites has been slower than anticipated, with only seven confirmed and efforts ongoing to reach eight or nine. Key successes • 161 vehicles ordered, exceeding the original target of 140, demonstrating strong market appetite. • 12 depots and 7 Motorway Service Area (MSA) sites at various levels of construction • £62.2 million in funding secured, the second-largest grant ever awarded by IUK. Experience of LMT Delays caused by DfT led to uncertainty around project announcements and timelines. Although the team was allowed to start early, they faced a more challenging funding profile. However, once underway, support from IUK was highly valued. Formal quarterly review meetings were effective, and informal coaching made the team feel supported and able to ask questions freely. Support for outreach is increasing. Hitachi has led much of the publicity, and Innovate UK Business Connect has provided guidance on suitable events for speaking engagements.

Outcomes & Impacts	
Outcomes	• Strong market demand: Evidenced by high order volumes from hauliers and logistics firms, confirming appetite for eHGV deployment. • Knowledge sharing: Delivered 35 presentations in just over 18 months, helping others navigate the transition to electrified HGVs. • Public visibility: Infrastructure and vehicles are now operational and visible, reinforcing the project's credibility. • Sector transformation: Acted as a catalyst for change in a previously unelectrified segment of transport, enabling more informed decisions by hauliers, OEMs, and standards bodies. • Growing industry engagement: Increasing interest from adjacent sectors such as fuel card providers, payment platforms, and software vendors. • Shared charging potential: the project's identifying opportunities for infrastructure sharing between trucks and buses. • Proof of concept: Large-scale deployment has helped reduce uncertainty around feasibility, backed by substantial knowledge outputs.
Impacts	Achieved Impacts • Exceeded vehicle deployment targets and secured substantial funding. • Raised public and industry awareness of eHGV viability. • Strengthened organisational technical capacity in design methodology, software systems (e.g. bookability), and MW charging readiness. • Positive influence on upstream supply chains by opening markets for infrastructure and hardware suppliers. • Collaboration with BSI on three new, freely accessible standards published May/April 2025 on bay design, signage, and movement safety around charging infrastructure; maintenance of zero emission HGVs and design and implementation of hydrogen refuelling sites. Anticipated Impacts • Environmental: Significant decarbonisation by replacing diesel HGVs with zero-emission alternatives powered by renewable energy. • Operational: While operational benefits are currently limited, commercial advantages exist through CSR and Scope 3 emissions targets. Wider sector impacts • Accelerated electrification in a previously underserved transport segment. • Informed decision-making across hauliers, OEMs, CPOs and standards bodies.

	• Growing interest and engagement from adjacent sectors. • Demonstrated feasibility through infrastructure and vehicle deployment. • Design collaboration: Site layouts, drone footage and other technical information have been shared with OEMs to support product development and infrastructure alignment (e.g. location of charging ports on vehicles). This data sharing has led to technical insights e.g. DAF discovered limitations in their vehicle software's compatibility with chargers, highlighting the need for more universal communication protocols. These learnings are valuable not only for OEMs but also for charger manufacturers, helping improve interoperability and future product design. • There is a noticeable early shift in user and operator willingness to trust new technologies. Hitachi has conducted around 600 interviews to date, tracking user sentiments, attitudes, and perceptions - already revealing a positive change in mindset.
Additionality	• Project funding enabled cost parity for vehicles (based on TCO) and covered infrastructure, labour, and time. Without funding, progress would have been significantly (years) slower, and infrastructure expansion may not have occurred due to lack of demand. Alternative funding sources would likely have been more risk-averse and delayed. • Cross-project collaboration: Engagement with Voltempo from another ZEHID project, with plans to deploy their hardware in additional locations. • Supply chain expansion: Enable Renewables, initially a subcontractor for civil works on the Nissan site, was sourced through ZEHID procurement and is now likely to join the Gridserve's framework for public site development. • Emerging customer relationships: Potential new partnerships are forming, including with Transport Scotland. • While not currently within the project's scope, the infrastructure developed has potential to support other large vehicles such as buses and coaches. However, practical limitations exist e.g. coaches typically park in different areas of motorway service stations compared to trucks, making shared use of facilities challenging. Some shared use may be possible, but in many cases, dedicated infrastructure will be required. Despite these constraints, expanding to include coaches is recognised as a wider priority for decarbonisation.
Successes and lessons learnt	
Key lessons	Lessons learnt: Our interviewee who was involved from the inception phase of the project said <i>'I never realised how difficult it would be. Funding was essential because of difficulties and extra resources needed for</i>

	<i>delivery but the value of grant is much greater than funding because of what we've learnt along the way.'</i> Success factors: • Strong collaboration across stakeholders, including quarterly review meetings and cross-project learning (e.g. ZEHID projects). • Effective engagement with government bodies such as IUK, DfT, BSI, and industry associations. Barriers: • Delays and cost escalations due to project complexity and unknowns, extended timelines and inflation. • Decision-making constraints within large organisations. Improvements: Greater flexibility in funding timelines and mechanisms would help streamline project delivery and reduce administrative burden.
Next Steps	New MSA sites: Gridserve have seven MSA sites planned, two of which are in construction. Aim to establish more public sites by end of year, then next phase of work is data gathering and analysis.

C Case study: Electric Freightway – Amazon

Introduction	
Name of case study project	Project Electric Freightway – Amazon as a project beneficiary
Project Value	£62.7M
Project Duration	July 2023 - July 2030
Start date	01/07/2023
End date	31/07/2030
Context & Objectives	
Project summary	Project Electric Freightway, a £100+ million initiative led by GRIDSERVE, aims to create the world’s most advanced eHGV charging network. Running to 2030, it will deploy 200+ high-power chargers, support around 155 electric HGVs, and collect real-world data to guide future infrastructure and policy decisions, helping shift freight transport away from diesel. Amazon is a key partner in the 19-member consortium. Its contribution includes deployment of 30 electric HGVs, sharing learnings from its private charging network and global EV operations, and supporting smaller operators, particularly Amazon Freight Partners, through practical guidance and technical insight.
Context	HGVs produce roughly 20% of the UK’s transport emissions, making decarbonisation vital for 2050 net zero targets. With new diesel HGVs banned from 2040 and electric adoption still in its early stages, the UK lacks suitable charging infrastructure. Electric Freightway aims to fast-track this shift by building a national eHGV charging network and providing operators with the tools to transition successfully. Amazon, one of the world’s largest and most influential technology and e-commerce companies, plays a critical role in the decarbonisation of freight. With an extensive delivery network and high-volume logistics operations across the UK, transitioning its HGV fleet to electric has a meaningful impact on reducing transport emissions at scale. As part of its commitment to achieving net zero emissions by 2040, Amazon is investing in sustainable technologies and electric freight solutions, helping to demonstrate the feasibility of large-scale eHGV adoption and setting a benchmark for the broader logistics industry.
Objectives	For Amazon, involvement in Electric Freightway centred on four objectives: • Deploy eHGVs at meaningful scale within its UK operations.

	• Build a consortium-wide community of practice to exchange knowledge and practical learning. • Share operational insights, particularly those beneficial to SMEs that lack access to data, technology, and fleet-transition expertise. • Send a long-term market signal about the viability and direction of freight electrification.
Project Activities	Amazon's core activity was the procurement and deployment of 30 electric HGVs across London and the Midlands. These vehicles were partially funded through the programme, forming part of Amazon's broader 150-truck national electrification effort. The trucks are operated primarily by Amazon Freight Partners, who trained their drivers specifically in eHGV operation, range management, and charging behaviours. Amazon contributed extensively to knowledge-sharing structures. This included active participation in Quarterly Review Meetings (QRM), where risks, delays, and operational updates were discussed; interviews led by Hitachi and Ricardo with senior managers, operators and drivers; and bi-annual reporting cycles that captured insights on telematics, data compliance, operational risk, and infrastructure requirements. Amazon also provided hands-on feedback on charging-hub design, including requirements for booking systems, accessibility for vehicles with trailers attached, and charger reliability. Amazon did not apply for charging-infrastructure funding owing to requirements for public access that conflicted with operational site security and load-integrity considerations. However, it worked closely with GRIDSERVE, Hitachi, Ricardo, and Daimler on telematics integration, data transmission (including API compatibility), and operational trials. Independently, it plans to install additional fast charging infrastructure across key UK sites to support its wider fleet order. Key challenges The consortium's size and diversity made the application process complex, requiring significant coordination to produce a unified proposal. Another challenge was timing: funding was announced in May 2022, proposals finalised later that year, but contracts were not signed until July 2023. This misalignment created difficulties for Amazon, whose financial approvals run on annual cycles, requiring the company to re-secure co-investment authorisations. Sector-wide barriers also affected progress. Many partners experienced delays related to permitting, grid-capacity upgrades, and contractual negotiations for charging-site installation. Although these were outside Amazon's direct scope, Amazon actively shared best practice from its own operations to support smaller partners facing delays. High vehicle costs and the continued need for robust charging infrastructure also remain structural constraints.

	Key Successes The project achieved several important successes. Consortium-wide HGV deployment exceeded initial expectations, with some partners successfully increasing their planned vehicle numbers due to better pricing achieved through collective negotiation. Amazon's 30-truck deployment, combined with Daimler's supportive training and the integration of advanced safety and comfort features in the vehicles, produced a substantial body of operational insight. Collaboration was repeatedly highlighted as a defining strength. Amazon described an open, problem-solving culture in which members supported one another. This ranged from sharing technical knowledge to helping partners resolve administrative issues such as identifying suitable accountants for reporting. Annual in-person consortium events strengthened these connections and helped build a more integrated national network, including opportunities to use private depot chargers as part of a broader charging ecosystem. Experience of the LMT programme Amazon's experience of the LMT programme was consistently positive. Although the application phase was complex due to consortium size, Innovate UK's programme team was described as responsive and proactive, offering direct, rapid support that exceeded Amazon's prior experience in working with government agencies. Participation in the project also expanded Amazon's connections with the UK's innovation ecosystem, universities, and start-ups. Innovate UK regularly shared opportunities for technology pilots and academic collaboration, helping Amazon stay informed about emerging decarbonisation technologies. The consortium structures, including in-depth interviews and structured reporting, were viewed as highly effective mechanisms for knowledge exchange.
Outcomes & Impacts	
Outcomes	Amazon deployed all 30 eHGVs, contributing to the consortium's wider roll-out of roughly 161 vehicles. The project created a structured framework for learning, reflected in QRMs, interviews, and biannual reporting. The trucks generated valuable operational data on range, charging behaviour, driver experience, telematics, and cost considerations. The project also strengthened collaboration across operators of varying sizes, offering SMEs access to insights they would otherwise not have.
Impacts	Early impacts include emissions reductions from deployed vehicles, improved driver experience (quieter operation, smoother acceleration, enhanced safety features), and greater organisational capability in managing eHGVs. Longer-term impacts are expected to be more significant. The dataset being collected through 2030 will provide one of the strongest evidence bases yet for eHGV operations in the UK. The project has also influenced infrastructure planning, particularly

	the importance of booking systems and designs suitable for trucks with trailers. At a sector level, Electric Freightway has demonstrated the feasibility of eHGV deployment at scale and has strengthened public-private collaboration. The consortium's work is expected to support broader market adoption, potentially enabling 30-50% electrification of middle-mile fleets as infrastructure matures.
Additionality	While Amazon was already committed to electrifying its fleet, with a 150-truck order in progress, the project accelerated deployment, reduced commercial risk, and provided operational data and shared learning that would not have been available through unilateral action. Participation also amplified Amazon's ability to support SMEs in their supply chain and engage in infrastructure design discussions, ensuring impacts significantly greater than Amazon's independent efforts.
Successes and lessons learnt	
Key lessons	Lessons learnt Amazon emphasised the importance of close collaboration, strong communication, and structured learning mechanisms. The three learning channels, QRM, in-depth interviews, and biannual reports, were seen as complementary and highly effective. The project also highlighted the need for better alignment between government funding timelines and corporate investment cycles, and reinforced the importance of early driver training, behavioural adaptation, and operational planning for eHGVs. Barriers and enablers to delivery and impact Key enablers included strong project management from GRIDSERVE, responsive Innovate UK support, and the collaborative ethos across the consortium. Structural barriers included the complexity of coordinating a large consortium, misaligned timelines, high vehicle costs, the need for grid upgrades, and the greater operational demands of electric HGV training and route planning.
Next Steps	With all Amazon vehicles now deployed, the wider project's immediate priorities include the activation of motorway charging hubs, supported by a booking system that Amazon has strongly advocated for, and the finalisation of the next bi-annual report. Looking ahead, Amazon and consortium partners will continue sharing operational data until 2030. This multi-year dataset will form a substantial evidence base to identify best-use cases, remaining barriers, and pathways to scaling electrification across 30–50% of UK HGV fleets.

D Case study: eFREIGHT2030

Introduction	
Value	£49.2M
Duration	January 2024- January 2031
Start date	01/01/2024
End date	31/01/2031
Context & Objectives	
Project summary	eFREIGHT 2030 brings together a diverse group of stakeholders, including fleet operators, vehicle and charge point manufacturers, software developers, charging hub owners and operators, and data and research experts, to explore scalable approaches for electrifying heavy goods transport. The initiative is conducting a comprehensive real-world assessment of both the technical and commercial feasibility of electric HGVs. Its goal is to validate the business case for deploying electric trucks and establishing a nationwide network of megawatt capable public charging hubs powered by British innovation.
Context	The UK's freight sector is heavily reliant on trucks and heavy goods vehicles (HGVs), which in 2022 were responsible for transporting around 80% of the country's 200 billion tonne-kilometres of goods. This reliance has come at a significant environmental cost, with HGVs contributing 16% of all domestic transport greenhouse gas emissions in 2023. In response to this challenge, the UK government announced in November 2021 its intention to phase out the sale of new non-zero emission HGVs weighing 26 tonnes or less by 2035, and to ensure that all new HGVs sold from 2040 onwards are fully zero emission at the exhaust. This policy shift has created an urgent need for infrastructure capable of supporting the transition to electric freight. The project is led by Voltempo, developers of the HyperCharger, a British designed, manufactured and patented Megawatt Charging System (MCS) solution for electric HGVs. The HyperCharger MCS, delivers over 1 MW of power and enables multiple vehicles to charge simultaneously at optimal speeds.
Objectives	At its core, the eFREIGHT 2030 project aims to introduce 82 electric HGV 4x2 units, and up to 37 new charging locations, most of which will have megawatt-charging capacity.
Project Activities	

The eFreight2030 project is being delivered in two phases. The first, a deployment phase running from early 2024 to 2026, focuses on preparing the groundwork: identifying suitable charging locations, securing grid connections, and purchasing electric HGVs (eHGVs). This phase is essential to ensure infrastructure is in place ahead of live operations.

The second phase, a demonstration running from January 2026 to January 2031, will see 82 eHGV tractor units operating in real-world conditions, supported by up to 37 new megawatt charging hubs and the Berkeley Bulldog e-trailers. The first eHGV hit the road with Welch's Transport in November 2024, while M&S have completed six months of successful operation with five Renault Trucks E-Tech T 4x2 HGVs.

Key challenges

The project has grown significantly in scale, but this expansion has brought new challenges. While the team is no longer focused solely on deploying a few trucks and chargers, the ambition to scale electric HGVs across the industry over the next decade has introduced complex questions around infrastructure, market readiness, and policy. The team is now grappling with how to reach a tipping point where electric HGVs become the default choice over diesel, and this requires a clear understanding of the blockers, risks, and opportunities that lie ahead. These strategic challenges are compounded by the political sensitivity of penalising diesel use, which makes it difficult to push for change through taxation and regulation alone. Instead, the team is exploring alternative approaches that could incentivise adoption without triggering resistance.

Key successes

Despite the challenges, the project has made notable progress. Voltempo's team has expanded with around 50 additional members of staff including assembly line staff.

Experience of LMT programme

The experience of the LMT programme has been marked by strong support from IUK, as well as excellent contributions from the MSP, who has been described as a real asset to both IUK and the project team. Quarterly Review Meetings have also been highlighted as a valuable forum for face-to-face networking and fostering meaningful engagement across consortium partners.

However, several challenges have been noted, including significant delays in processing change requests by the Department for Transport, one early instance took five months instead of the expected one month, although more recent requests have been resolved more promptly, well within the one month SLA. Tarmac has

	faced ongoing issues with submitting a capital claim for £3.5 million, which is now resolved. Additionally, the portal used to manage the programme has been criticised poorly optimised for a project of this scale, and reporting requirements during the early funding stage have been described as ambiguous, leaving partners uncertain about expected deliverables in some areas. More recently, the IT issues have been largely resolved and a better system is being used going forward.
Outcomes & Impacts	
Outcomes	Participation in eFreight2030 has delivered several tangible outcomes for Voltempo. The organisation, for example, has grown from a team of 20 in March 2024 to over 50 employees, across roles including project managers, manufacturing engineers, and assemblers. The majority of these additional staff (48) are permanent members of staff. Through ZEHID, Voltempo has also been able to identify and move to UK-based manufacturers, such as, • The switching system, previously sourced from Germany, new provider located in Wales, and, • The cooling system, was Chinese now from Glasgow – a more efficient product with no moving parts. The amount the project is ordering helps their businesses go forward enhancing domestic supply chains. Other consortium members such as Berkeley Coachworks, Dynamon, and various fleet operators have also contributed to employment growth, e.g. Berkeley Coachworks the designer and manufacturer of the innovative lightweight e-trailer Berkeley Bulldog has been able to take on 12 people and expand into a bigger manufacturing facility in South Wales. Through the project, an Associate Membership Programme has been developed. This has facilitated meaningful collaboration enabling companies like Renault to independently run trials with support from the consortium, and engaging retailers such as Tesco, Waitrose, and John Lewis, as well as micro-businesses with operating small fleets of 4-5 trucks, who typically face barriers to participating in IUK projects due to administrative burdens. Additionally, a number of reports have been published via Energy Systems Catapult, reflecting strong engagement across the consortium and contributing to the programme’s knowledge-sharing objectives. A Total Cost of Ownership (TCO) toolkit will be completed soon.

Impacts	While many of the broader impacts of eFreight2030 are still to be fully realised, anticipated impacts have significant potential. The data generated through the programme is expected to drive down costs for both trucks and infrastructure by providing greater certainty around the pipeline of demand. This data will also help to identify geographic and operational clusters, which in turn encourages further investment. For Voltempo, the project has already had an organisation level impact: progressing the business from a start-up to a scale-up. Renault Trucks have reportedly said that they are ‘winning new business because of eFREIGHT’. Berkeley Coachworks have had interest from DAF and Renault so there may be opportunity to export their products from Wales internationally.
Additionality	The eFreight2030 project has played a pivotal role in enabling the outcomes and impacts outlined above. While some of the achievements, such as organisational growth and sector-wide engagement, may have occurred over time, the structure, funding, and collaborative environment provided by the project have clearly accelerated progress. For Voltempo, participation in the programme has supported its transition from start-up to scale-up. The consortium model has also facilitated partnerships with SMEs and retailers that typically face barriers to entry in government-backed initiatives, demonstrating that the project has added value beyond what individual organisations might have achieved independently. In this way, eFreight2030 has acted as a catalyst by bringing together stakeholders, resources, and ideas in a way that has amplified both the pace and scope of impact. Project collaborations facilitate the exploration of innovative ideas, such as monetising carbon savings through blockchain technology. By accurately recording the carbon footprint of EV charging, the team believes it may be possible to generate carbon credits that could be traded or even used to underpin a cryptocurrency. If scaled across 100,000 HGVs, this system could represent over £1.6 billion in value by 2040. This approach not only offers a financial incentive for switching to electric HGVs but also reframes the conversation: moving away from penalising diesel users and towards rewarding carbon savings. If successful, this could deliver up to £10,000 in annual savings per truck, significantly improving the total cost of ownership and strengthening the case for industry-wide adoption.

Successes and lessons learnt	
Key lessons	As aforementioned, the project has benefited from strong support from IUK. IUK guidance has been instrumental throughout the programme, as noted in earlier reflections on both positive experiences and outcomes. However, barriers around IT systems and administrative processes persist. As previously mentioned, early delays in change request approvals, such as one instance taking five months instead of the expected month, previously caused significant disruption (though these issues have not persisted into the latter part of the project). For future, it is suggested that in addition to further improvements to the IT systems, tailored training on portal use and project processes would be especially beneficial for smaller businesses, helping them navigate complex systems more effectively and contribute with greater confidence.
Next Steps	The project is committing to 30 sites installed in the next few months, with a total of 180 charging bays. This will rise to a final state of up to 37 sites and 220 bays by summer 2026. Looking ahead, the next steps for eFreight2030, and indeed Voltempo, focus on reaching a point of independence, where the initiative can operate sustainably without reliance on grant funding. A key milestone on the pathway to commercialisation will be identifying the point at which TCO for zero-emission freight reaches parity with diesel. Understanding this tipping point will be critical for scaling adoption and attracting further investment, enabling the programme to provide the evidence base to Government to develop relevant policies and strategies to further support the transition to zero emission HGVs.

E Case study: eFREIGHT2030 – Menzies

Introduction	
Name of case study project	eFREIGHT2030 – Menzies as a project beneficiary
Project Value	£49.2M
Project Duration	January 2024- January 2031
Start date	1/01/2024
End date	31/01/2031
Context & Objectives	
Project summary	eFREIGHT 2030 brings together a broad consortium of stakeholders to develop scalable solutions for electrifying heavy goods transport. Led by Voltempo, the project is undertaking a real-world evaluation of the technical and commercial viability of electric HGVs, with the aim of proving the business case for zero-emission freight. Central to this ambition is the development of a nationwide network of megawatt-capable public charging hubs, underpinned by British innovation. As part of eFREIGHT 2030, Menzies is deploying ten 42-tonne electric tractor units into live operations and installing three 1-megawatt charging platforms, each capable of charging up to six vehicles simultaneously. This operational deployment will generate critical evidence to support the future scaling of electric HGVs across the UK freight sector.
Context	The UK freight sector faces major barriers to adopting zero-emission HGVs. Although HGVs account for a significant share of transport emissions, the infrastructure needed to support large-scale electrification is limited, with a lack of high-power, HGV-specific charging and public networks designed primarily for cars. Alongside uncertainty around vehicle performance, charging times, operational impact, and cost, these constraints have slowed the uptake of electric HGVs across the industry. Currently, less than 1% of HGVs are eHGVs. Menzies is one of the UK's largest supply chain and logistics providers, operating complex, high-volume freight networks that are critical to the movement of goods across the country. As a

	major HGV operator, Menzies has the potential to have a large-scale environmental impact and help lead the transition to cleaner, more sustainable freight transport.
Objectives	Menzies entered the project with several clear objectives: • Generate operational data on BEV HGV performance across different payloads, routes, temperatures and duty cycles. • Understand where BEV HGVs can integrate into a 44-tonne logistics operation, including operational windows, back-to-base feasibility, and interaction with customer requirements. • Develop megawatt charging capability at three core depots, establishing the technical and commercial foundations for future fleet electrification. • Build internal capability across engineering, driver training, planning and estates teams. • Support customer decarbonisation goals and offer evidence-based low-carbon logistics propositions.
Project Activities	Project activities have combined infrastructure deployment, vehicle readiness and organisational capability development. Menzies has progressed the installation of three 1 MW chargers across its leased depot sites, each requiring separate landlord agreements and extensive coordination with distribution and independent network operators. In parallel, the company has procured ten electric HGVs from three OEMs, timed deliberately to arrive once charging infrastructure is energised. Alongside engineering and estates work, Menzies has undertaken route modelling using Dynamon's tools and engaged with customers to identify appropriate early phase use cases. The driver training team has begun preparing training modules that will be expanded once the vehicles arrive. Menzies has also actively participated in the consortium's operational structures, including Quarterly Review Meetings and operator-only workshops, and has benefited from visiting Kuehne & Nagel's first MW charging site to incorporate commissioning learnings into its own deployment plans. Key challenges The most significant challenge has been the timeline for delivering megawatt-scale charging. Menzies experienced longer than anticipated waits for grid connections, legal approvals and landlord agreements, with each of the three private landlords requiring slightly different terms. Coordination across DNOs and IDNOs, combined with software commissioning and hardware

manufacturing lead times, contributed to a slower rollout than initially envisaged. The company also had to navigate financial packaging complexities within the consortium, where some partners purchased assets outright while others, like Menzies, leased them. This required flexibility from Innovate UK but was ultimately resolved collaboratively. While vehicles are not yet operational because commissioning is sequenced behind infrastructure energisation, the delays are viewed as an inherent part of deploying first-of-its-kind charging infrastructure rather than the result of programme shortcomings.

Key successes

Despite early stage challenges, the project is progressing effectively. The near completion of the Droitwich site, which will become one of the UK's first megawatt HGV charging locations, represents a significant milestone. Collaboration has been a defining success, with Menzies describing the consortium as open, constructive and noncompetitive. Knowledge sharing has been strong throughout, aided by well-structured QRM and the establishment of an operator only workshop to deepen alignment on practical and strategic issues. -stage challenges, the project is progressing effectively. The near-completion of the Droitwich site, which will become one of the UK's first megawatt HGV charging locations, represents a significant milestone. Collaboration has been a defining success, with Menzies describing the consortium as open, constructive and non-competitive.

Menzies has enhanced its internal capability, with engineering and driver training teams gaining valuable insights through OEM engagement and modelling exercises. The project has also driven innovation in software and back office systems, prompting the adoption of an off the shelf billing and booking solution that will support shared charging access across operators.

Experience of the LMT programme

Menzies reports a highly positive experience with the LMT programme. As this is its first time accessing grant funding at this scale, the organisation found Innovate UK's processes to be clear, structured and well supported. Innovate UK staff have been consistently present at QRMs and responsive to questions, contributing to a sense of shared ownership and momentum. The online claims and reporting systems were described as detailed and logical, and Voltempo's guidance helped the company navigate requirements efficiently. -training teams gaining valuable insights through OEM engagement and modelling exercises. The project has also driven innovation in software and back-office systems, prompting the -the-shelf billing and booking

	solution that will support shared charging access across operators.
Outcomes & Impacts	
Outcomes	Although vehicles have not yet been deployed, the project has already delivered important outcomes. The Droitwich charging site is close to energisation, demonstrating the feasibility of megawatt-scale depot charging in a leased-estate context. Menzies has significantly deepened its technical understanding of BEV HGV operation, with engineering teams working closely with manufacturers to understand safety, battery management and vehicle capability. Driver-training teams are preparing operational guidance tailored to electric HGV characteristics. Route-modelling capacity has also matured, enabling Menzies to identify realistic early-phase use cases. The project has opened new conversations with customers regarding future low-carbon logistics offerings and has strengthened relationships with operators that Menzies had not previously engaged with. These outcomes provide a solid foundation for the operational phase to follow.
Impacts	Early impacts include the acceleration of knowledge transfer from Kuehne & Nagel's MW site, which allowed Menzies to incorporate software updates and commissioning fixes before its own infrastructure goes live. The consortium's aggregated engagement has improved dialogue with ministers and government bodies, particularly around weight and dimension regulations and the need for HGV-suitable charging infrastructure. The project has already generated industry interest, with customers and peers engaging more actively in discussions about BEV freight. Future impacts are expected to be more substantial, including quantifiable emissions reductions, improved local air quality, lower noise levels around depots and detailed datasets on energy use, range, utilisation and operational windows. The presence of more BEV HGVs on the road over the coming months is also expected to shift industry perceptions and encourage wider adoption.
Additionality	The funding has been essential in enabling Menzies to undertake early-stage BEV HGV trials. Customers remain engaged but reluctant to pay a premium for electric transport, meaning the company would not have deployed vehicles or infrastructure at this scale without public support. The project has created a financially safe environment for Menzies to test vehicles at close

	parity to diesel, understand operational cost implications and build internal readiness. The collaborative nature of the consortium has accelerated learning and reduced risk, particularly through shared commissioning insights and the rapid dissemination of software updates. These additional benefits would not have materialised through unilateral action.
Successes and lessons learnt	
	Lessons learned The project has reinforced that early-stage infrastructure deployment is inherently complex and requires patience, flexibility and iterative problem-solving. Menzies emphasised the value of consistent personnel across participating organisations, noting that stable teams have helped maintain progress and trust. The company has learned that effective electrification requires preparation across multiple functions, including engineering, training, planning and customer engagement. It also found that collaboration accelerates improvement: issues encountered at the Kuehne & Nagel site were quickly communicated and corrected, meaning Menzies will begin operations from a more advanced starting point. Barriers and enablers to delivery and impact Enablers of progress included a strong consortium culture, consistent and responsive support from Innovate UK, and Voltempo's adaptability in scaling its project management capacity and integrating lessons into future templates. The operator-only workshop also emerged as a valuable forum for addressing practical challenges and aligning approaches. management capacity and integrating lessons into future templates. Barriers included long grid connection timelines, differing requirements across three private landlords, limited public HGV charging, regulatory weight constraints and customer reluctance to pay a green premium. Despite these barriers, none became prohibitive due to collaboration and flexibility within the consortium. Suggested improvements Menzies noted that future initiatives could benefit from streamlined landlord and grid coordination processes, clearer national guidance on megawatt charging deployment and continued government engagement on the regulatory reforms needed to support heavy freight electrification.-connection timelines, differing requirements across three private landlords, limited public HGV charging, regulatory weight constraints and

	customer reluctance to pay a green premium. Despite these barriers, none became prohibitive due to collaboration and flexibility within the consortium.-freight electrification.
Next Steps	The immediate priority for Menzies is to energise the Droitwich site, followed by commissioning the East Kilbride and Wakefield infrastructure. Once charging systems are live, the company will take delivery of its ten BEV HGVs and begin structured data collection to build an evidence base for future fleet transition decisions. Menzies plans to engage customers, share learnings widely, and host site visits once the infrastructure is operational.-transition decisions. In the medium term, the company intends to apply early insights to develop a scalable electrification roadmap, with future uptake shaped by regulatory developments, infrastructure growth and the operational data generated through the project

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