ScotZED: Supporting Careers and Opportunities in Transport - for Zero Emission Diversity in the ZE HDV Sector

Final Report and Roadmap

June 2026

Citation

This document was produced by the SCOT-ZED team, which was led led by the Centre for Transport and Society at the University of the West of England (UWE, Bristol), in collaboration with the University of Glasgow and Southeast Scotland Transport Partnership (SEStran).

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Executive Summary

Why this project matters

The transition to zero-emission heavy-duty vehicles (ZE HDVs) is not only a vehicle and infrastructure challenge. It is also a workforce transition. Scotland will need a skilled, diverse and resilient workforce to support the adoption, operation and maintenance of zero-emission buses, coaches, lorries and related systems. Without early action on skills, recruitment, retention and workforce diversity, workforce constraints may become a barrier to decarbonisation. This risk is particularly important for small and medium-sized enterprises (SMEs), regions with weaker access to training and employment opportunities, and groups currently under-represented in the HDV workforce.

What the ScotZED project did

The ScotZED project examined how workforce diversity can be supported in the ZE HDV transition, with a focus on South-East Scotland. The project was led by the Centre for Transport and Society at the University of the West of England, in collaboration with the University of Glasgow and South East Scotland Transport Partnership (SEStran). It used a mixed-methods approach, combining documentary analysis, semi-structured interviews, co-design workshops and systems mapping.

The project engaged stakeholders from across the freight, bus, coach, skills, recruitment, training, policy and regional transport systems. Its aim was to identify barriers to workforce diversity, understand how these barriers interact, and co-design practical actions that can support a fair and effective transition.

The findings should be read through three linked messages: workforce is a transition risk; diversity strengthens resilience; and practical pilots are now needed to move from evidence to implementation.

Key finding: diversity is part of workforce resilience

The findings show that workforce diversity should not be treated as a separate equality issue or as an add-on to decarbonisation policy. It is central to workforce supply, transition readiness and just transition outcomes. A sector that draws from a narrow demographic base will struggle to replace an ageing workforce, address skills gaps and sustain the pace of technological change. Widening participation is therefore necessary both to improve fairness and to strengthen the labour pool available for the transition. This means diversity needs to be built into workforce planning, training provision, recruitment, retention and progression from systematically.

Main barriers identified

The project identified five main barriers affecting workforce diversity in the ZE HDV transition.

The first barrier is the **availability, access and cost of training**. Participants emphasised that training is essential for both new entrants and existing workers, but access can be limited by

course availability, location, cost, employer capacity and uncertainty about future skills needs. These constraints are especially significant for SMEs.

The second barrier is the **image and visibility of the sector**. Many potential recruits are unaware of the range of roles available beyond driving, including maintenance, engineering, operations, planning, digital systems and management. This limits who sees the sector as a realistic or attractive career option.

The third barrier is **workplace patterns and conditions**. Long hours, irregular shifts, limited flexibility and challenging working environments can discourage new entrants and contribute to retention problems.

The fourth barrier **is pay and progression**. Participants linked pay to career visibility, mobility, long-term retention and the perceived value of new skills.

The fifth barrier is the **retention of older and experienced workers**. These workers hold practical knowledge, diagnostic skills, workplace memory and mentoring capacity that cannot be quickly replaced through formal training alone.

Why these barriers matter for decarbonisation

These barriers are interconnected. Limited training access, limited sector visibility, weak entry routes, difficult working conditions and loss of experienced workers do not operate in isolation. They reinforce one another and can create negative feedback loops. For example, poor image reduces recruitment; recruitment shortages increase pressure on existing workers; pressure worsens retention; and poor retention reinforces the perception that the sector is unattractive.

The risk is that vehicles and infrastructure may become available, but the sector may not have enough trained, confident and supported workers to operate and maintain them at scale. Workforce diversity and skills planning should therefore be treated as a core part of transition planning.

Priority solutions

Participants identified six priority solutions:

1. a **clear national policy framework** for training and recruitment;
2. **sustained funding** for training, upskilling and reskilling;
3. better **workplace-ready education**;
4. clearer and more accessible **routes into employment**;
5. non-mandatory shared industry **good-practice guidance**;
6. **recruitment and engagement campaigns** to improve sector image and visibility.

These solutions should be understood as a connected package. National policy direction and funding provide the foundations. Education and entry pathways build the future workforce pipeline. Shared guidance, progression routes and improved working practices support retention and mobility. Recruitment and image campaigns reinforce all other actions by widening awareness and expanding the future talent pool.

Additional actions needed

The six participant-led solutions provide a strong foundation, but they do not fully address workplace conditions, pay and progression, or the retention of older and experienced workers. These issues matter because recruitment and training gains will not be sustained if people continue to leave the sector.

The roadmap therefore includes three complementary actions: flexible rostering pilots and improved working practices; clearer progression pathways across roles and employers; and targeted retraining and knowledge-transfer roles for experienced staff. These actions would help protect workforce capacity, support retention and reduce the risk of losing critical knowledge during the transition.

Roadmap and future action

The roadmap sets out how these actions can be sequenced over time. In the short term, the priority is to establish policy and funding foundations, begin education reform, create visible entry routes and strengthen sector image work. In the medium term, successful pilots should be scaled, education-to-employment pathways should be embedded, and good-practice guidance should be introduced once the workforce pipeline is more established. In the longer term, funding, progression, knowledge transfer and fair access should become normal parts of workforce planning.

Future action should move from identifying barriers to testing practical intervention models. Priority opportunities include regional ZE HDV workforce transition pilots, SME transition readiness support, inclusive entry pathway demonstrators for under-represented groups, knowledge-transfer and experienced worker retention pilots, and a cross-project practitioner toolkit.

Overall conclusion

The central message of this report is that workforce transition must be planned with the same seriousness as vehicle and infrastructure transition. If workforce issues are addressed too late, they may constrain both the pace and fairness of decarbonisation. If they are addressed early and collaboratively, they can accelerate the ZE HDV transition while making the sector more inclusive, resilient and attractive.

ScotZED provides practical evidence for Transport Scotland's just transition work by showing how workforce diversity, skills access, SME capacity and place-based training provision need to be embedded into ZE HDV transition planning from the outset. The project offers both an evidence base and a practical roadmap to support a fairer, more resilient workforce future for Scotland.

Introduction

The transition to zero-emission heavy-duty vehicles is central to Scotland's wider transport decarbonisation agenda. However, the success of this transition will depend not only on the availability of vehicles and charging or refuelling infrastructure, but also on the workforce required to operate, maintain and support these systems. Skills, training, recruitment and retention therefore need to be treated as part of the transition infrastructure.

This report presents findings from the ScotZED project, which examined how workforce diversity can be supported in the zero-emission HDV transition. The project focused on the workforce conditions that shape who enters the sector, who remains in it, who has access to training and progression, and whether the opportunities created by the transition are fairly distributed across different groups and places.

The project responds to concerns that the HDV sector already faces significant workforce challenges, including an ageing workforce, limited gender diversity, recruitment difficulties, uneven access to training and pressure on SMEs. These existing challenges may become more significant during the transition if new skills requirements, technology uncertainty and infrastructure changes are not supported by appropriate workforce planning.

This report is intended to support policy makers, industry bodies, employers, training providers and regional partners by identifying practical actions that can strengthen workforce diversity and resilience. Rather than treating diversity as a separate equality issue, the report positions it as a core part of workforce supply, transition readiness and just transition planning.

The purpose of this report is to provide a practical roadmap for supporting workforce diversity in the ZE HDV transition. It is designed to do three things.

First, it summarises the key workforce barriers identified through the project, including training access and cost, sector visibility, workplace conditions, pay and progression, and the retention of experienced workers.

Second, it presents a set of participant-informed potential solutions that can inform the action taken by government, industry, education and training providers, and regional partners.

Third, it sets out how these solutions could be sequenced over time, showing which actions are needed in the short term to build confidence, which actions need to develop over the medium term, and which actions should become embedded as part of normal workforce planning.

The report is intended to support both immediate action and future intervention design. It can be used as a standalone practitioner-facing output, as evidence to inform Transport Scotland's and SEStran's wider work on skills and just transition, and as a basis for future funded pilots or demonstrator projects.

Project overview and methods

What the project was about

SCOT-ZED looked at how Scotland can build a skilled and more diverse workforce to support the move to zero-emission heavy-duty vehicles (ZE HDVs), such as electric and hydrogen buses and lorries. The project focused on who currently works in this sector, who is missing from it, and what needs to change so that more people (especially women, younger people, ethnic minorities, and other under-represented groups) can access and progress into these jobs. Whilst the South East of Scotland was the primary focus, stakeholders from across Scotland were engaged in the research as most of the matters discussed are applicable nationally. The overall aim was to support a just transition to net zero, where new green jobs are fair, inclusive and accessible.

The project's three core objectives were to:

1. Understand the barriers to entry, retention, and progression in ZE HDV roles for underrepresented groups.
2. Co-design practical, inclusive workforce development strategies with regional and sector stakeholders.
3. Produce actionable outputs to guide employers, training providers, and policymakers in embedding equity into workforce planning.

The project was led by the Centre for Transport and Society at the University of the West of England (UWE, Bristol), in collaboration with the University of Glasgow and South East Scotland Transport Partnership (SEStran).

This collaborative project brought together expertise across freight, bus and coach sectors, stakeholder engagement, and policy. The strong involvement of SEStran as a regional partner made the project delivery and results highly practice-oriented, in particular working closely with stakeholders across the sector.

Methods used and who was involved

We used a **mixed-methods approach**, combining documentary analysis, workshops, interviews and mapping. The documentary analysis helped us understand what the state of play on workforce diversity is in policy and practice. The semi-structured interviews explored lived experiences of recruitment, training and progression. Co-design workshops used systems thinking and future planning tools to develop practical, realistic solutions, which informed an inclusive workforce roadmap.

The project involved a wide range of people from across the ZE HDV system. We engaged around forty participants through semi-structured interviews and co-design workshops, including employers, drivers, trainees, colleges, job centres, recruiters and policy stakeholders. This included:

- **twenty-two semi-structured interviews** between December 2025 and March 2026 with stakeholders across the transport and skills ecosystem. The aim of the interviews

was to understand workforce challenges, diversity, skills and the implications of the transition to zero-emission heavy-duty vehicle (HDVs) within the Scottish context.

- **three co-design workshops** that were delivered online in March 2026 with seventeen key stakeholders, including HDV business operators, industry representatives (e.g., CILT, RHA, Logistics UK), policy makers, recruitment agencies and training providers, using: (i) systems thinking to analyse unintended consequences of diversity focused issues; and (ii) foresight and road mapping techniques to co-design future solutions and explore governance roles and responsibilities.

In addition, we conducted a **documentary analysis** focusing on a set of key policy and industry documents produced by government bodies, industry associations, and research organisations across the UK and Scotland. These documents address a range of interconnected themes, including workforce trends in the logistics sector, green skills development, transport decarbonisation strategies, and just transition frameworks.

A total of sixteen documents were analysed. The review was guided by five analytical questions concerning: (1) how workforce diversity and inclusion are framed; (2) barriers and opportunities for entry, progression and retention in the sector; (3) skills needs and training pathways; (4) the roles and responsibilities attributed to employers, training providers and public bodies; and (5) the extent to which place-based variation is recognised in workforce planning.

These questions provide a structured lens through which to examine how workforce challenges are understood and addressed, particularly in the context of the transition to zero-emission HDVs.

In this project, **diversity** refers to the presence and meaningful participation of people from different backgrounds, identities, experiences and life circumstances within the ZE HDV workforce. This includes, but is not limited to, gender, age, ethnicity, disability, socio-economic background, caring responsibilities and previous work experience. Diversity is understood not only as who enters the sector, but also who is able to stay, progress and access good-quality opportunities as the transition to zero-emission heavy-duty vehicles creates new roles and skills needs.

Additional information on the interviews, workshops and documentary analysis underpinning this study is available in the Appendices.

A focus on South-East Scotland

The South East of Scotland was chosen as the real-world context for the study. It combines large urban centres and rural communities, hosts major freight and bus operators, and has strong regional partners, including SEStran (South East of Scotland Transport Partnership), who was a partner in SCOT-ZED. The South East of Scotland region was defined as the eight Local Authority regions in the South East: City of Edinburgh, Midlothian, West Lothian, East Lothian, Clackmannanshire, Falkirk, Fife, and Scottish Borders. The region contains a lot of opportunity: Falkirk and Grangemouth Growth Deal, the development of the Forth Green Freeport, high economic growth in the capital city, and rapid growth with Midlothian's population is projected to grow by 13.8% between 2023 and 2028. Ensuring transport is supporting this, both through every journeys and employment opportunities, is key to ensuring a just transition. This made it

practical to deliver the project while ensuring that findings can be transferred to other parts of Scotland.

Our findings

Barriers to Workforce diversity

Key barriers

The project identified five main barriers affecting workforce diversity in the ZE HDV transition.

The first barrier is the ***availability, access and cost of training***. Participants emphasised that training is essential for both new entrants and existing workers, but access can be limited by course availability, location, cost, employer capacity and uncertainty about future skills needs. These barriers are particularly significant for SMEs, which may have less capacity to release staff for training, develop training in-house, or absorb the cost of upskilling.

The second barrier is the ***image and visibility of the sector***. In terms of image, the sectors were reported to be perceived as traditional, male dominated and even 'dirty'. Many potential recruits have limited awareness of the range of roles available in HDV, logistics, bus, coach and related technical occupations. Participants noted that the sector is often associated with a narrow set of visible roles, particularly driving, which the public are more likely to have direct contact with, such as seeing in their everyday lives. Wider opportunities in maintenance, engineering, operations, planning, digital systems and management are less visible. This limits the pool of people who see the sector as a realistic or attractive career option.

The third barrier is ***workplace patterns and conditions***. Long hours, irregular shifts, poor work-life balance, limited flexibility and challenging working environments can discourage new entrants and contribute to retention problems. In the freight industry particularly, these conditions are a consequence of Just In Time inventory control systems, pressures on the speed of deliveries, pressures on the cost of deliveries, and the need for long distance transportation. These issues are particularly important for people with caring responsibilities, older workers, and groups who may already feel less represented or supported within the sector.

The fourth barrier is ***pay and progression***. Participants did not frame pay as the only issue, but they linked it to career visibility, mobility, long-term retention and the perceived value of new skills. The lack of clear career paths for progression within many role types make the sector less attractive as a long-term choice and therefore can result in employees looking beyond the HGV, bus and coach sectors for opportunities for advancement. If workers cannot see how training leads to progression, recognition or better opportunities, the sector may struggle to retain both new entrants and experienced staff.

The fifth barrier is the ***retention of older and experienced workers*** during the transition. Key reasons for the loss of experienced workers were reported to be a lack of interest or ability to retrain and adapt working practices, challenges of handling a wider range of vehicle types during the transition itself, and a lack of interest in or connection with the newer vehicle technologies. Experienced workers hold practical knowledge, diagnostic skills, workplace memory and

mentoring capacity that cannot be replaced quickly through formal training alone. If these workers leave without structured knowledge transfer, the sector risks losing critical capability at the same time as it needs to adopt new technologies.

Across these barriers, diversity is not simply an outcome to be improved. It is part of the workforce resilience challenge. A sector that draws from a narrow demographic base will struggle to replace an ageing workforce, respond to new skills demands, and deliver a just transition.

Why these barriers matter for the ZE HDV transition

These workforce barriers matter because they can affect the pace, fairness and resilience of the ZE HDV transition. If training is inaccessible or unaffordable, fewer workers will be able to develop the skills needed to support zero-emission technologies. If career routes are unclear, potential recruits may not enter the sector. If working conditions remain unattractive, recruitment gains may be lost through poor retention. If experienced workers leave without passing on knowledge, organisations may lose practical capability just as new technologies are introduced.

The risk is that workforce challenges become a constraint on decarbonisation.

In this scenario, vehicles and infrastructure may be available, but the sector may not have enough trained, confident and supported workers to operate and maintain them at scale. This risk is particularly important for SMEs, which may face higher relative costs, limited time to engage with training, and greater exposure to uncertainty.

For this reason, **workforce diversity** and **skills planning** should be treated as part of the **core transition architecture**, not as a separate or secondary issue. A fair transition requires attention to be paid to who can access new opportunities, which firms and regions are able to participate, and whether the workforce system is strong enough to support long-term change.

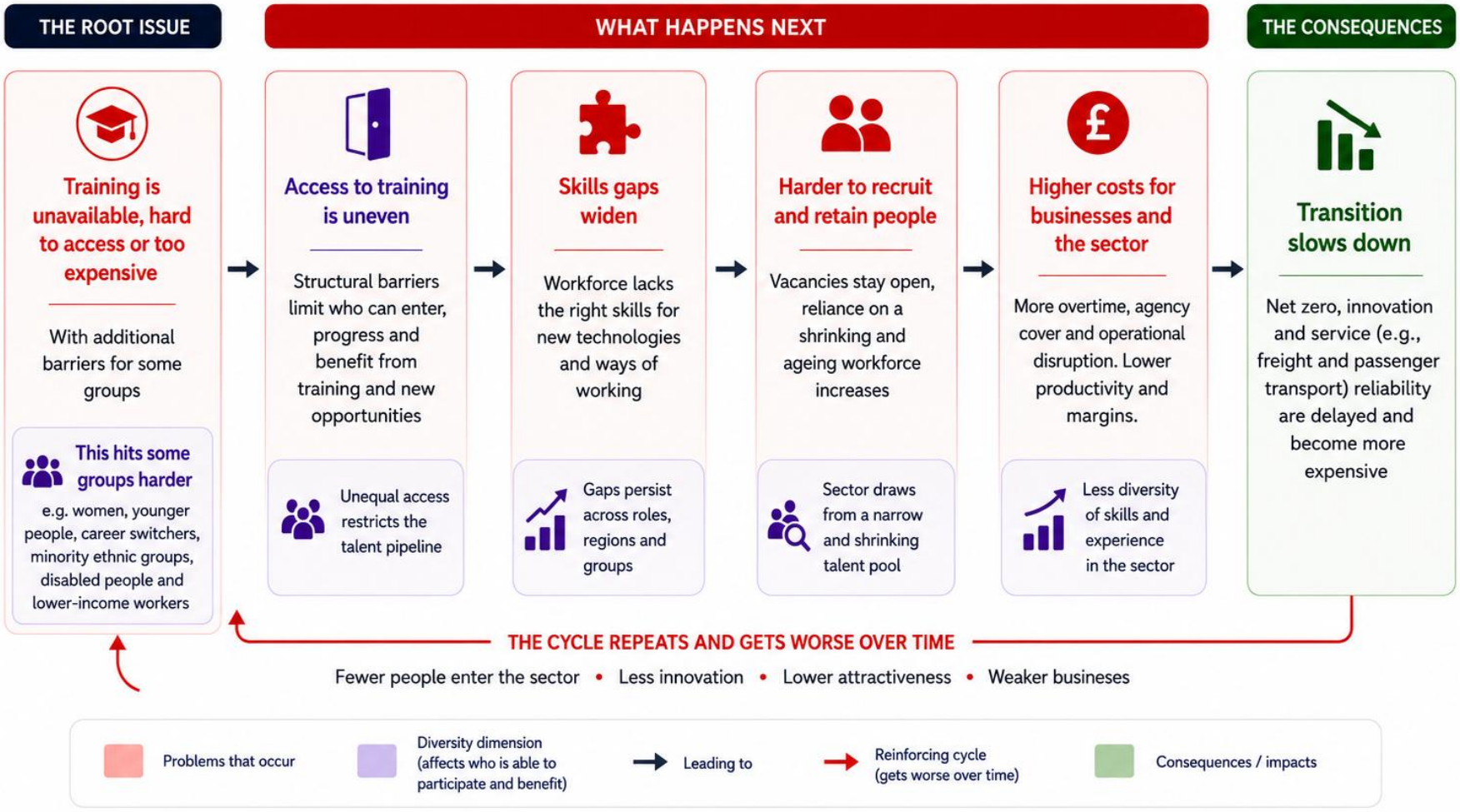
What happens if these barriers persist or worsen?

The following infographics illustrate the **knock-on and cascading effects** identified through interviews and workshops for each of the five key barriers above. Participants consistently emphasised that workforce challenges do not operate in isolation: early decisions on policy, funding and education shape downstream outcomes for recruitment, retention, progression and long-term capacity.

These infographics are intended to support a **systems-level understanding** of workforce change, highlighting why timing, sequencing and sustained support matter as much as individual interventions.

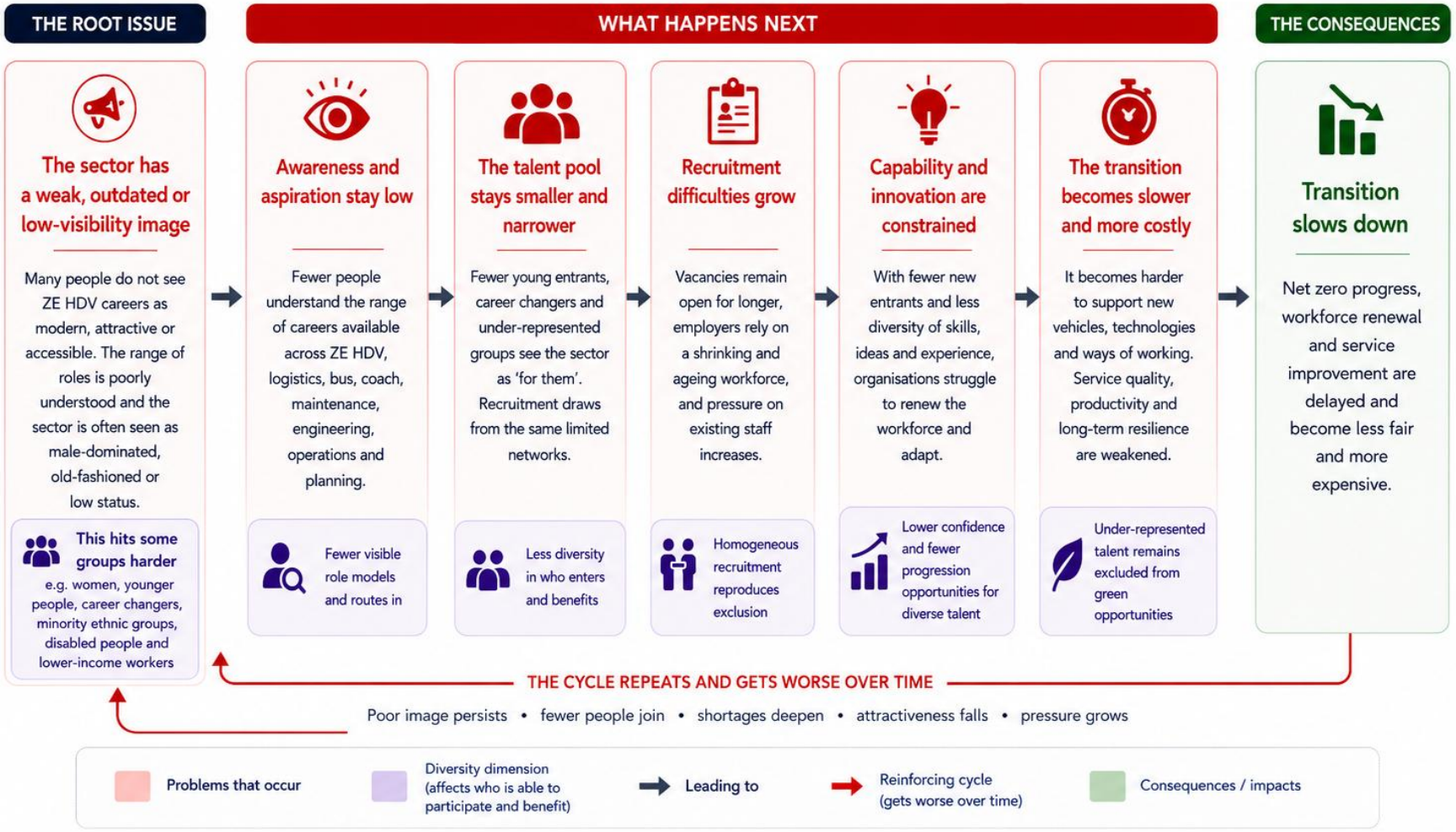
What happens when we fail to solve the problem of availability, access and cost of training during the transition?

A downward spiral that slows the transition and increases costs



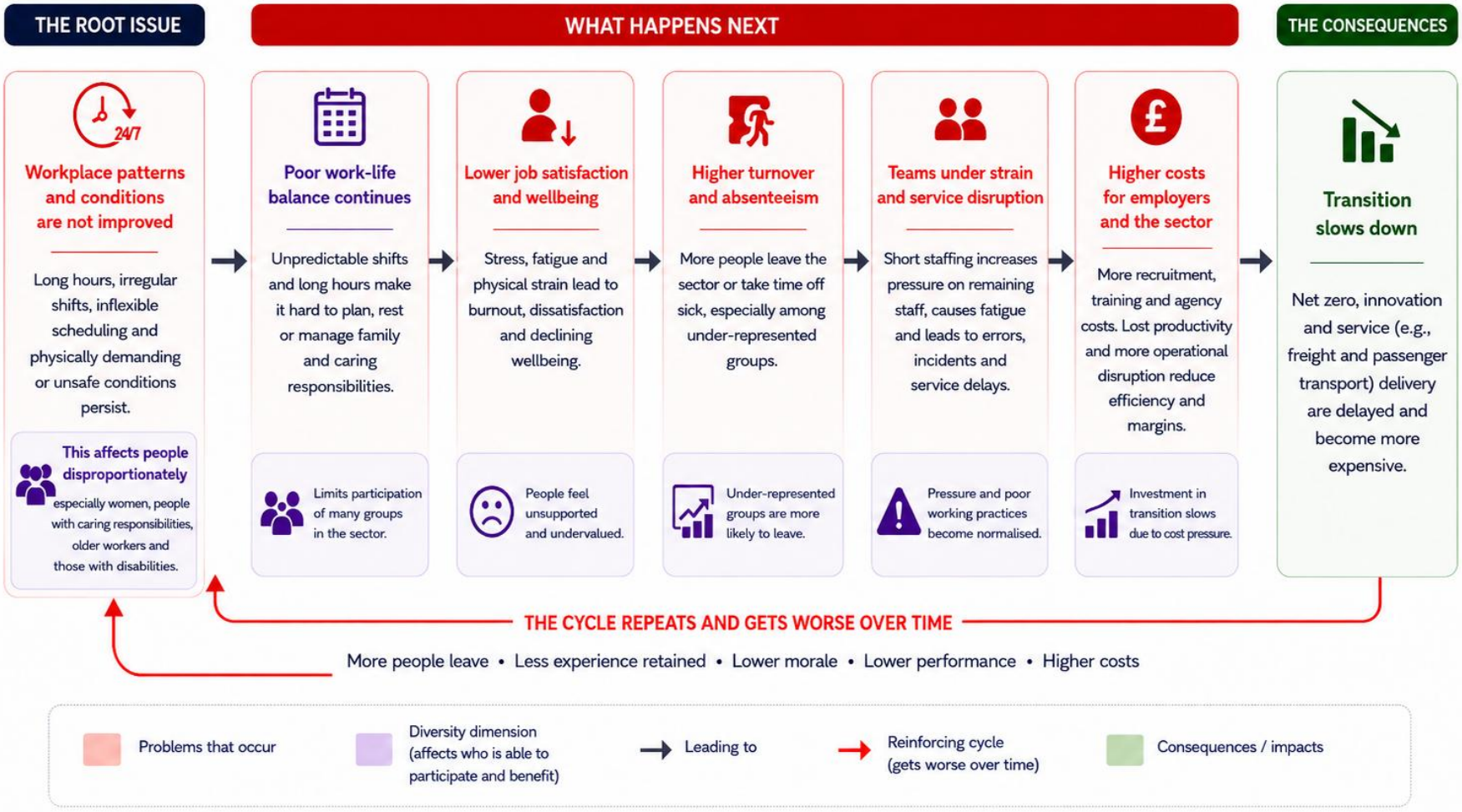
What happens when we fail to solve the problem of image and visibility of the sector during the transition?

A downward spiral that reduces attractiveness, shrinks the talent pool and slows the transition



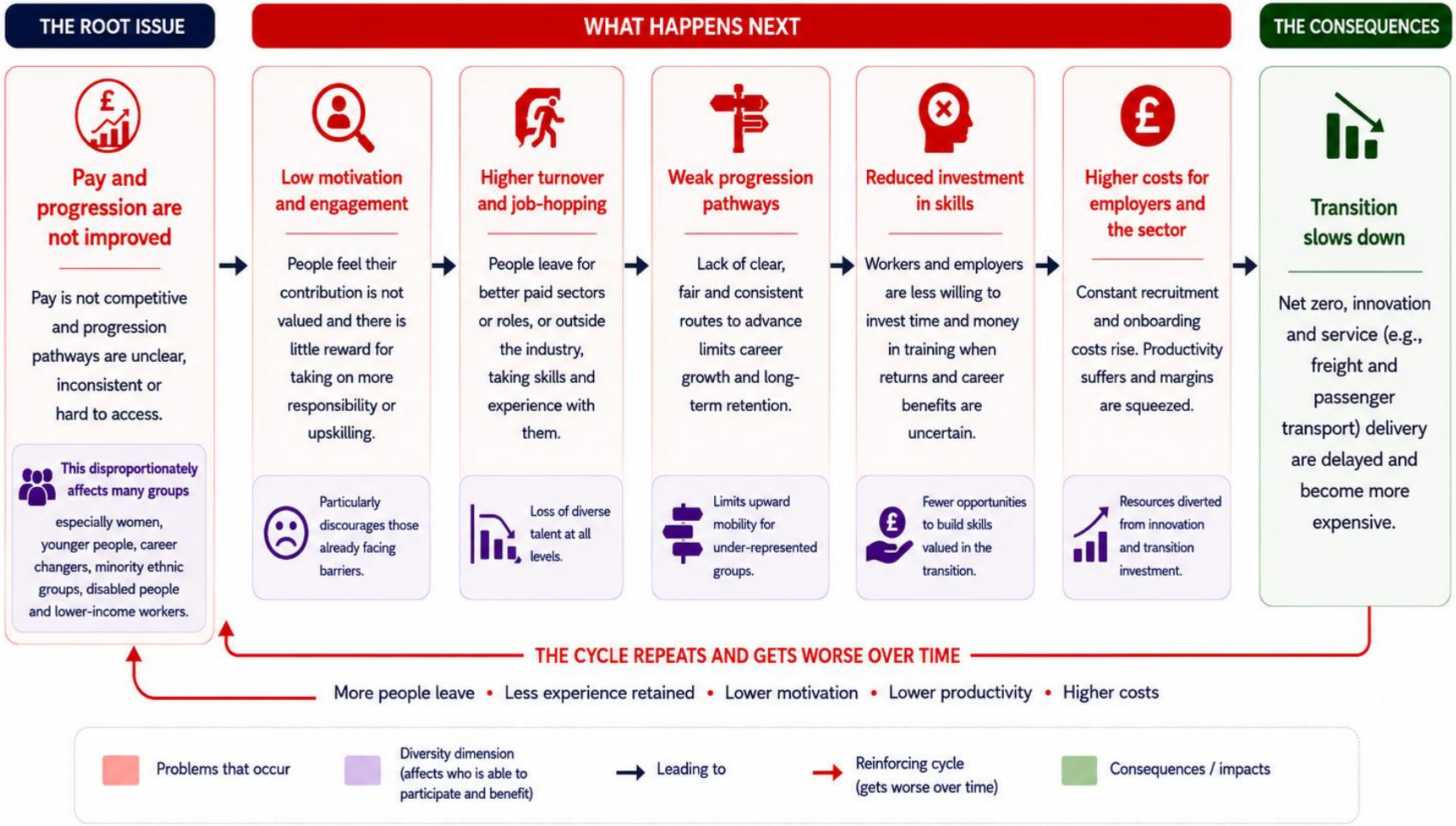
What happens when we fail to solve the problem of workplace patterns and conditions during the transition?

A downward spiral that drives people out, weakens performance and undermines the transition



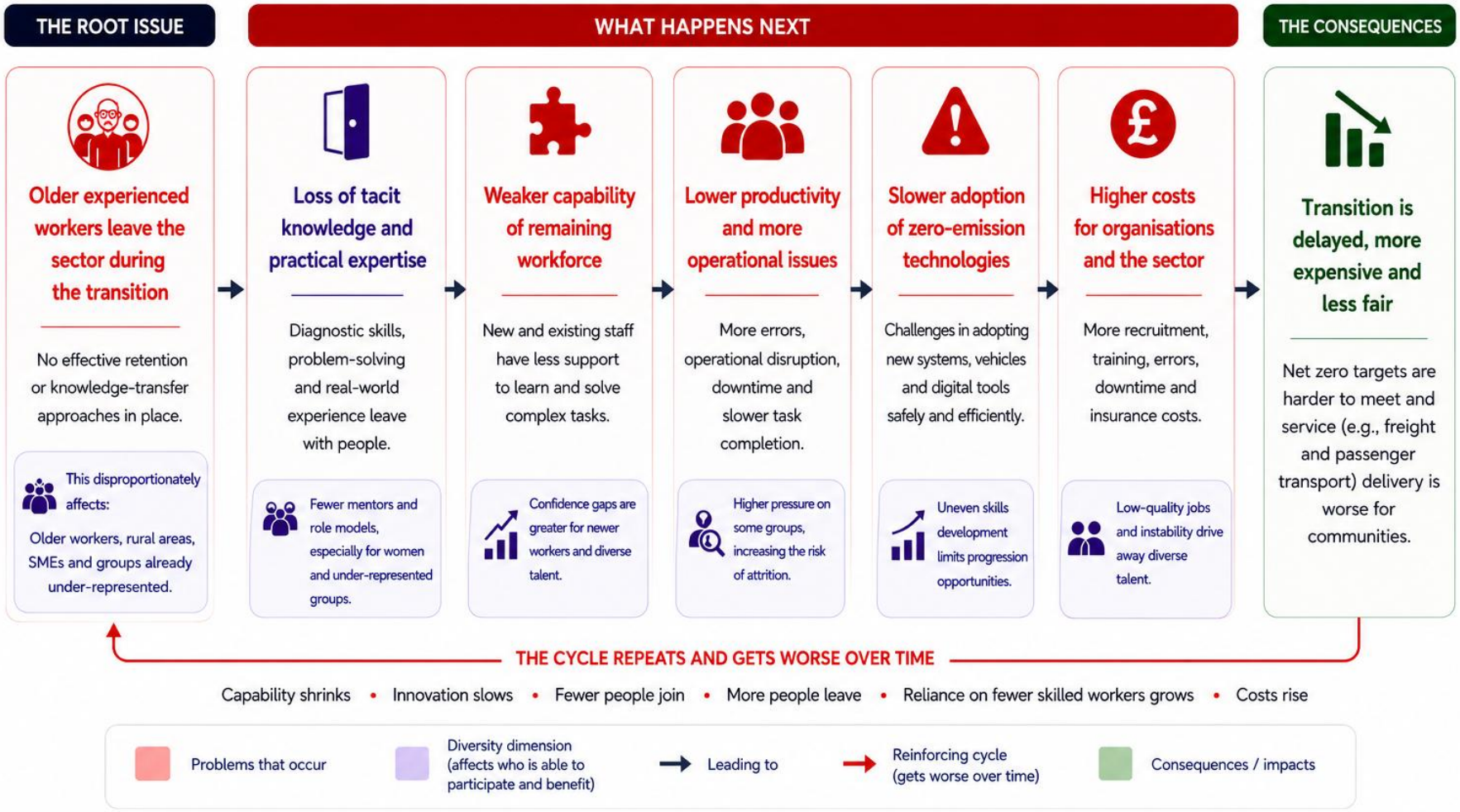
What happens when we fail to solve the problem of pay and progression during transition?

A downward spiral that undermines motivation, drives people out and weakens the transition



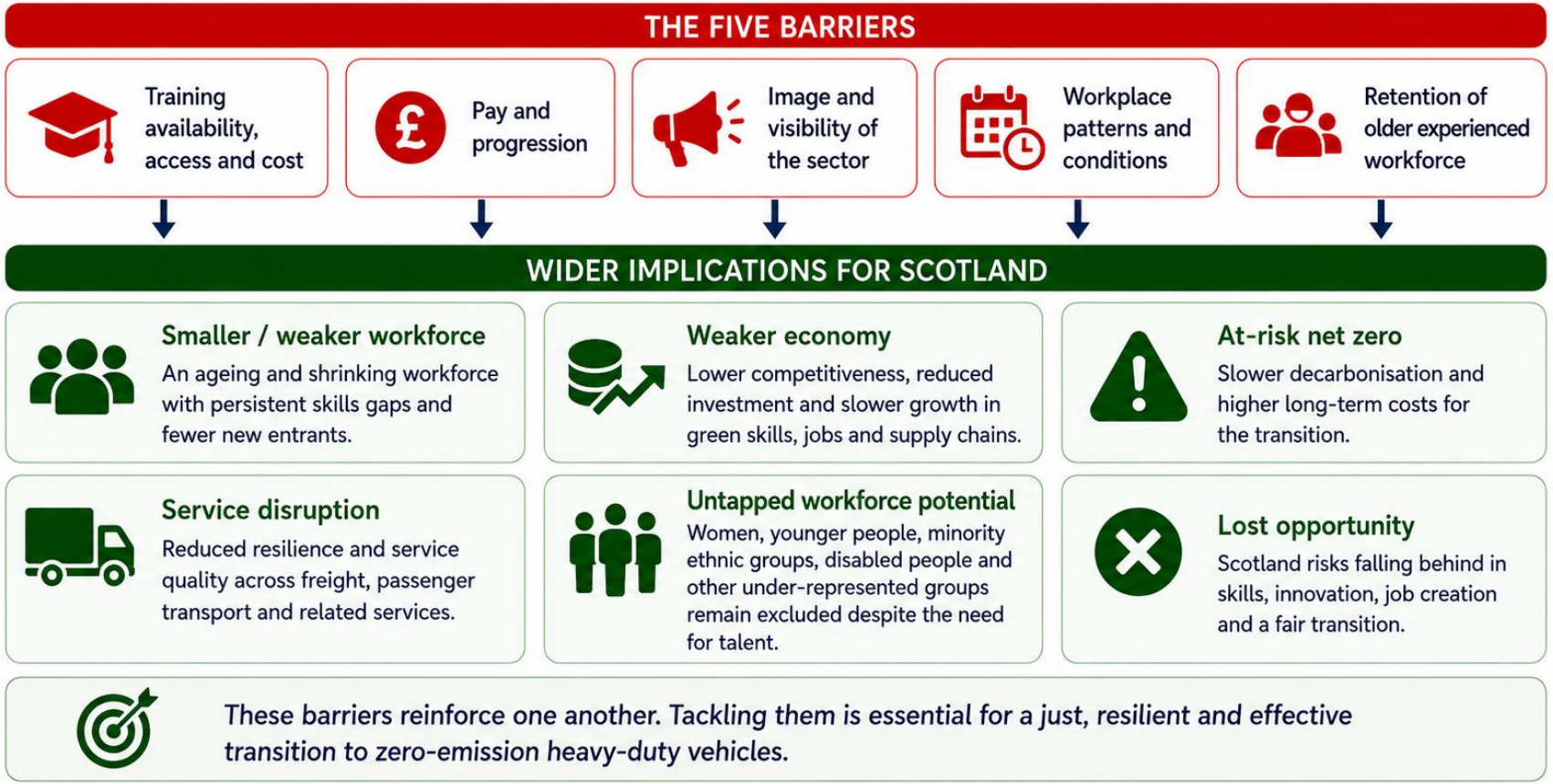
What happens when we fail to solve the problem of retention of older experienced workforce during the transition?

A downward spiral that weakens capability, slows the transition and increases risks



Wider implications for Scotland

How the five workforce barriers can collectively weaken the zero-emission HDV transition



What does this mean for Scotland?

The five workforce barriers identified in this project do not operate in isolation. Problems around training availability and cost, pay and progression, the image and visibility of the sector, workplace conditions, and retention of older experienced workers can reinforce one another over time. If left unaddressed, they risk creating a downward spiral in which fewer people enter the sector, existing workers leave, skills gaps widen, and employers face higher costs and reduced capacity.

For Scotland, this has implications beyond individual businesses. A smaller and less diverse workforce could weaken the resilience of freight, bus, coach and related transport services. It could also slow the adoption of zero-emission heavy-duty vehicles if employers cannot access the skills, confidence and capacity needed to introduce, operate and maintain new technologies.

These barriers also risk undermining Scotland's wider net-zero and just transition ambitions. If women, younger people, ethnic minority groups, disabled people, lower-income workers and other under-represented groups remain excluded from emerging opportunities, the transition may reproduce existing inequalities rather than address them. At the same time, persistent workforce shortages could reduce competitiveness, limit innovation and increase long-term costs for businesses, public bodies and communities.

Addressing these barriers is therefore not only a workforce issue. It is central to building a fair, resilient and effective transition to zero-emission heavy-duty vehicles in Scotland.

From barriers to solutions

The solutions presented below were identified through participant discussions and are intended to respond to the barriers outlined above. They are not designed as isolated interventions. Instead, they form a connected package of actions that work together across different parts of the workforce system.

Some solutions provide the foundations for action, such as national policy direction and funding. Others strengthen the workforce pipeline, such as workplace-ready education and clearer routes into employment. Others support retention and mobility, such as shared good-practice guidance, improved working practices and progression pathways. Recruitment and image campaigns play a reinforcing role by improving awareness and widening the future talent pool.

When considering the potential solutions below, it is important to consider additional risks and barriers to implementation associated with these actions that workshop participants may not have been aware of. These might include financial and regulatory constraints, alongside political barriers (e.g., changing policy priorities, leadership turnover, or limited political will), as well as institutional, technical, and societal challenges that could hinder implementation.

The documentary analysis, interviews and workshops also highlighted the substantial amount of work which is already being done across the bus and HGV sectors. The solutions discussed below are not intended to undermine the work that has already been done (or is ongoing) – in

many cases they are informed by good practice from individual organisations or industry bodies and they aim to ensure a more consistent, sector-wide approach.

The key message is that no single actor can deliver this roadmap alone. The Scottish Government has an important role in setting direction, funding transition support and coordinating the system. Industry has a central role in improving job quality, opening routes into work and demonstrating what good practice looks like. Colleges, schools and training providers are essential to building the skills pipeline. Regional and local partners can help ensure that interventions are place-based and accessible across different geographies.

Potential Solutions

S1 - Clear national policy for training and recruitment

A clear, long-term national framework that sets direction for skills, training and recruitment linked to the transition to zero-emission transport, with continuity beyond political cycles.

What problem does this fix?
It fixes uncertainty and fragmentation that prevent employers, colleges and workers from planning. Participants highlighted constant policy change as a major barrier to skills investment.

Who leads this?
National government (Scottish Government / Transport Scotland).

Who supports?
Industry bodies, employers, colleges, skills agencies and unions.

Who benefits?
Employers (especially SMEs), training providers, and workers who gain clarity on career pathways.

What are the risks?
Early adopters may feel penalised if funding arrives later; over-centralisation could misalign policy with industry reality; delays risk prolonging workforce shortages.

How does this make the system stronger?
Creates certainty, coordination and confidence to invest, enabling industry-led delivery within a stable policy framework.

When can this be implemented?
Policy design: in the next 24 months; phased implementation thereafter.

Other comments:

- Early access needed for awarding bodies and training providers to standards, requirements, and equipment.
- Additional funding likely required for colleges/training organisations to invest in materials and infrastructure.
- Importance of ***clear career pathways*** and ***consistent employer quality standards***.

- Sector diversity makes a "one-size-fits-all" approach challenging.
- Existing training standards may not address wider issues such as workforce diversity.
- Opportunity to align with initiatives like ***Skills Passports*** and ***established competency frameworks*** (e.g. CILT).
- Need for ***clear, long-term national policy*** on skills, training, and recruitment.
- Policy instability and frequent changes create uncertainty and hinder investment.
- Risk of ***misalignment*** with industry needs, delays in implementation, and ongoing workforce shortages.

Participant quote:

"If there was a clear and consistent policy... everybody could see there's a roadmap here. It's not going to change in four years' time" (Industry representative)

S2 - Funding to assist training, upskilling and reskilling

Public (and co-funded) financial support for apprenticeships, internships, reskilling from adjacent sectors, and zero-emission technology training.

What problem does this fix?
Cost barriers for SMEs, skills shortages, and risks of an unjust transition.

Who leads this?
Scottish Government / Transport Scotland.

Who supports?
Training providers, large firms, local authorities, skills agencies.

Who benefits?
Workers, SMEs, and the wider economy through faster transition.

What are the risks?
Stop-start funding; mis-targeting technologies; displacement of funding from other priorities.

How does this make the system stronger?
Builds workforce capacity, accelerates transition, and improves resilience to technological and fuel shocks.

When can this be implemented?
Some schemes within 12 months; medium-term rollout.

Other comments:

- Bus and coach operators were seen as early adopters of new technologies, suggesting they could act as ***testbeds for initial investment***, provided robust data on costs, performance and efficiency is captured.
- Evidence generated through early bus and coach deployment could help ***de-risk later investment*** in HGV technologies.
- Participants cautioned that ***overall funding is likely to be constrained***, reinforcing the need for prioritisation.

- There was strong support for ***long-term, stable funding settlements***, rather than short-term or competitive funding schemes.
- Concerns were raised about the ***feasibility of tightly linking skills funding to specific technologies***, given that training systems are typically structured around frameworks and learner groups. Flexibility is required to enable the funding to be used for a diverse range of training types across different roles and different technologies.
- Several participants highlighted the wider ***fiscal context and limited public resources*** as a key constraint on delivery.

Participant quote:

"If we focus the money on the education side, the training side, that will add far more value." (Freight operator)

S3 - Better education and preparation of new entrants for the workplace

Embedding workplace readiness, practical experience and sector awareness into schools, colleges, apprenticeships and universities.

What problem does this fix?
New entrants are often unprepared for workplace realities, leading to poor retention and lost investment.

Who leads this?
Schools, colleges and training providers.

Who supports?
Employers, local authorities, government and skills agencies.

Who benefits?
Young people and new entrants; employers who get job-ready recruits.

What are the risks?
Schools and colleges are already under pressure; smaller firms may struggle to engage; short-term time and cost burdens.

How does this make the system stronger?
Improves retention, reduces churn, and builds a sustainable workforce pipeline.

When can this be implemented?
Some measures immediately; full impact over the medium term (3–5 years).

Other comments:

- Participants called for a ***joined-up, high-profile marketing approach***, similar to large national campaigns, to improve awareness of careers in transport.
- Stronger promotion of ***routes into the sector*** at schools, colleges, job fairs and recruitment centres was seen as essential.
- There was a clear need to ***shift perceptions of the industry***, highlighting the diversity of roles and people working in transport through visible role models, speakers and inclusive imagery.

- ***Case studies*** were identified as a 'quick win', particularly when shared through employer channels and careers-focused social media (for example building on the work of the Workforce Mobility Project in South East Scotland).
- Direct engagement with ***potential entrants*** was seen as important to shape credible and attractive entry routes.
- Participants emphasised that ***diversity*** should be ***embedded as standard practice***, building on existing initiatives such as ***Generation Logistics***, rather than delivered as a standalone activity.

Participant quote:

"People leaving education are not necessarily prepared for the workplace… if we want more apprenticeships, we need to be preparing them while they're still in education." (Industry representative)

S4 - Clearer and more accessible routes into employment

Visible, structured routes into a wide range of roles (drivers, engineers, technicians, professional roles), including targeted pathways for under-represented groups.

What problem does this fix?
Labour shortages, lack of awareness of roles, and constant recruitment churn.

Who leads this?
Joint leadership: government sets the framework; industry delivers.

Who supports?
Colleges, employability agencies, local authorities, industry bodies.

Who benefits?
Potential workers, SMEs, and service users through improved stability.

What are the risks?
Mismatch between training and available jobs; poor coordination across regions; raised expectations without guaranteed employment.

How does this make the system stronger?
Improves workforce flow, stability and service reliability.

When can this be implemented?
Pilots immediately; scaling over 1–3 years.

Other comments:

- The college network is well placed to respond flexibly to changing industry demand.
- Existing initiatives, such as ***Generation Logistics***, provide established models that could be shared or scaled with limited additional effort.
- Stronger ***coordination between road and rail freight*** would support growth around regional hubs and reduce unhelpful competition.

- A ***full-time commercial vehicle course*** (bus and truck), developed ***with local employers and supported by workplace trials***, could strengthen employer links and apprenticeship recruitment.
- Participants noted that this type of activity should be ***ongoing***, with no fixed end point or defined timescales.

Participant quote:

"People don't know it's a job. People don't know it's an option… that comes up time and time again." (Local authority)

S5 - Shared or standardised industry policies and practices (as guidance)

Non-mandatory, shared good-practice guidance on skills, progression and workforce standards to improve transferability across organisations.

What problem does this fix?
Inconsistent practices and barriers to workforce mobility.

Who leads this?
Industry bodies and trade organisations.

Who supports?
Government (enabling role), employers, insurers, unions.

Who benefits?
Workers gain mobility; larger and mid-sized firms benefit from consistency.

What are the risks?
Disproportionate burden on SMEs; standards becoming de-facto mandatory; insurance requirements undermining access for new entrants.

How does this make the system stronger?
Improves retention, mobility and resilience without forcing uniformity.

When can this be implemented?
Medium to long term (around 3 years).

Other comments:

- Risk that ***large operators*** (e.g. national bus and HGV fleet companies) dominate uptake and influence standards.
- ***Smaller companies*** may struggle to adopt or comply without targeted support.
- Potential need to ***ring-fence funding to ensure SMEs can participate*** in training and implementation.
- Guidance will need to account for ***variation across sub-sectors***, as skills and workforce needs differ significantly.

Participant quote:

"If it becomes a standardised thing rather than good practice, then it becomes a barrier." (Local Authority)

S6 - Recruitment campaigns to improve image and visibility

Sector-wide recruitment and engagement activities: school visits, site visits, case studies, and promoting progression and net-zero roles.

What problem does this fix?
Poor visibility of the sector and narrow perceptions focused only on driving roles.

Who leads this?
Industry and individual employers.

Who supports?
Local authorities, schools, colleges, skills agencies.

Who benefits?
Employers, potential recruits, and the sector's long-term reputation.

What are the risks?
Time and resource burden on SMEs; uneven representation by large organisations; reputational risk if messaging over-promises.

How does this make the system stronger?
Expands the future talent pool and builds positive feedback loops through role models.

When can this be implemented?
Immediately; ongoing activity.

Other comments:

- Participants noted that ***existing national campaigns and DWP engagement with the sector*** provide a strong foundation that should be built upon rather than duplicated.
- It was emphasised that effective engagement with schools and communities ***cannot be industry-led alone***, and requires leadership from ***local and/or national government*** to carry weight and legitimacy.
- ***Community and third-sector organisations*** were seen as having a key role in delivering trusted, locally grounded "social marketing" approaches.
- The involvement of ***credible local public figures***, not necessarily from the freight sector, was highlighted as a way to build trust and reach under-represented groups.
- ***Careful selection*** of organisations and individuals leading engagement was viewed as critical to maximising impact.
- Participants suggested that training in new technologies could help ***reframe the sector's image***, making roles appear more technical, modern and attractive to new entrants.

Participant quote:

"People only see the bus driver, but they don't see the 40 or 50 other jobs behind that." (Bus operator)

How do these solutions address workforce-related barriers in the transition?

Table 1 shows how the six solutions identified by participants address five key workforce problems. Some solutions respond directly to a specific issue, while others contribute indirectly by improving coordination, visibility, or longer-term stability. No single solution resolves all problems if implemented in isolation. Participants emphasised that these challenges are interconnected and require coordinated action across policy, funding, education, and industry practice. In particular, issues around training access and cost are strongly addressed through funding and policy frameworks, while image and visibility are primarily tackled through recruitment and engagement activity. Workplace conditions, pay, progression, and retention of experienced workers are addressed more indirectly, highlighting areas where further targeted action may be required alongside the identified solutions.

How the six solutions work together

The six solutions identified by participants address different parts of the workforce system (see Table 1). The national training and recruitment framework provides strategic direction and reduces uncertainty. Funding enables employers, workers and training providers to act on that direction. Workplace-ready education helps prepare future entrants before they reach the labour market. Clearer routes into employment make opportunities more visible and accessible. Shared good-practice guidance supports consistency, mobility and retention. Recruitment and image campaigns challenge outdated perceptions and widen the pool of potential entrants.

The solutions are mutually reinforcing. For example, recruitment campaigns are more likely to succeed if clear pathways and funded training are available. Training investment is more likely to be effective if employers can see a stable policy direction. Shared good practice is more likely to support retention if workers also have visible progression routes. This means the solutions should be implemented as a coordinated package rather than as disconnected initiatives.

Table 1. How the solutions address the barriers identified by ScotZED participants (☑ = directly addresses the problem; ◐ = indirectly or partially addresses the problem; — = not a primary focus)

Problem	S1 National training & recruitment framework	S2 Funding for training & reskilling	S3 Workplace-ready education	S4 Clear routes into employment	S5 Shared good-practice standards	S6 Recruitment & image campaigns
1. Availability, access, and cost of training	◐ Provides direction and coordination but not funding itself	✅ Directly reduces cost and access barriers, especially for SMEs	◐ Improves availability over time but does not address cost	◐ Links people to training pathways but does not fund them	— Not focused on training availability or cost	— Not focused on training
2. Image & visibility of the sector	◐ Improves clarity of the sector's future direction	—	—	◐ Makes opportunities more visible to jobseekers	—	✅ Primary focus: improves awareness and perception
3. Workplace patterns and conditions	—	—	◐ Prepares entrants for reality of work, but does not change conditions	—	◐ Can influence norms and practices indirectly	—
4. Pay and progression	◐ Enables longer-term alignment but does not set pay	◐ Can support progression via skills, not pay; limited by funding	—	◐ Makes progression pathways clearer	◐ Supports clearer progression and mobility	◐ Can highlight progression but does not change pay
5. Retention of older, experienced workforce during transition	◐ Provides stability and reduces uncertainty	◐ Can support retraining and adaptation	—	—	✅ Supports retention through recognition, mobility, and progression	◐ Reinforces value of experience through visibility

Implications of the gap analysis

The gap analysis shows that the six solutions provide a strong foundation, but they do not fully address all workforce risks. In particular, workplace conditions, pay and progression, and the retention of experienced workers require further targeted attention. These areas are important because they influence whether the benefits of training, recruitment and education reform are sustained over time.

This has two implications for future action. First, future interventions should not focus only on increasing the number of new entrants. They should also address why people leave, why some groups do not feel the sector is for them, and how existing workers can be supported through technological change. Second, future funding should support practical pilots that test improvements to working practices, progression pathways and knowledge transfer, particularly in SMEs and regions where workforce capacity is already constrained.

Participants recognised that challenges relating to workplace patterns and conditions, pay and progression, and the retention of experienced workers during the transition influence whether improvements in training, education and recruitment can be sustained over time. As a result, a small number of additional, complementary actions are included alongside the participant-identified solutions. These actions do not replace the original solutions, but are intended to strengthen their effectiveness by addressing residual risks and supporting long-term workforce stability. These additional/complementary solutions are presented below.

Flexible rostering pilots and improved working practices

This action involves trialling more flexible, predictable, or alternative ways of organising working hours and shifts, where operationally feasible. Participants highlighted that even with improved recruitment and training, poor working patterns and conditions can continue to drive people out of the sector. Flexible rostering pilots help address these unresolved issues by making roles more compatible with caring responsibilities, ageing workers, and work-life balance. By improving day-to-day working conditions, this action supports retention and ensures that gains made through recruitment and training are not lost.

Progression pathways clarified across roles and employers

This action focuses on making progression pathways clearer and more visible across different roles, organisations, and parts of the sector. Participants discussed pay and progression less as a single lever and more in relation to long-term careers, mobility, and job satisfaction. Clarifying progression pathways helps address unresolved issues around retention by showing employees how skills and experience can lead to advancement, even where immediate pay increases are limited. This improves motivation, supports mobility within the sector, and reduces the likelihood that people leave simply because they cannot see a future career path.

Targeted retraining and knowledge-transfer roles for experienced staff

This action involves offering tailored retraining opportunities and creating roles that allow experienced staff to pass on skills and knowledge as technologies and operations change. Participants emphasised the risk of losing experienced workers during the transition,

particularly if they feel unsupported or displaced by new technologies. Targeted retraining and knowledge-transfer roles help address this unresolved problem by retaining institutional knowledge, supporting experienced staff to adapt, and enabling skills to be transferred to newer entrants. This strengthens continuity and reduces the risk of skills loss at a critical point in the transition.

Roadmap

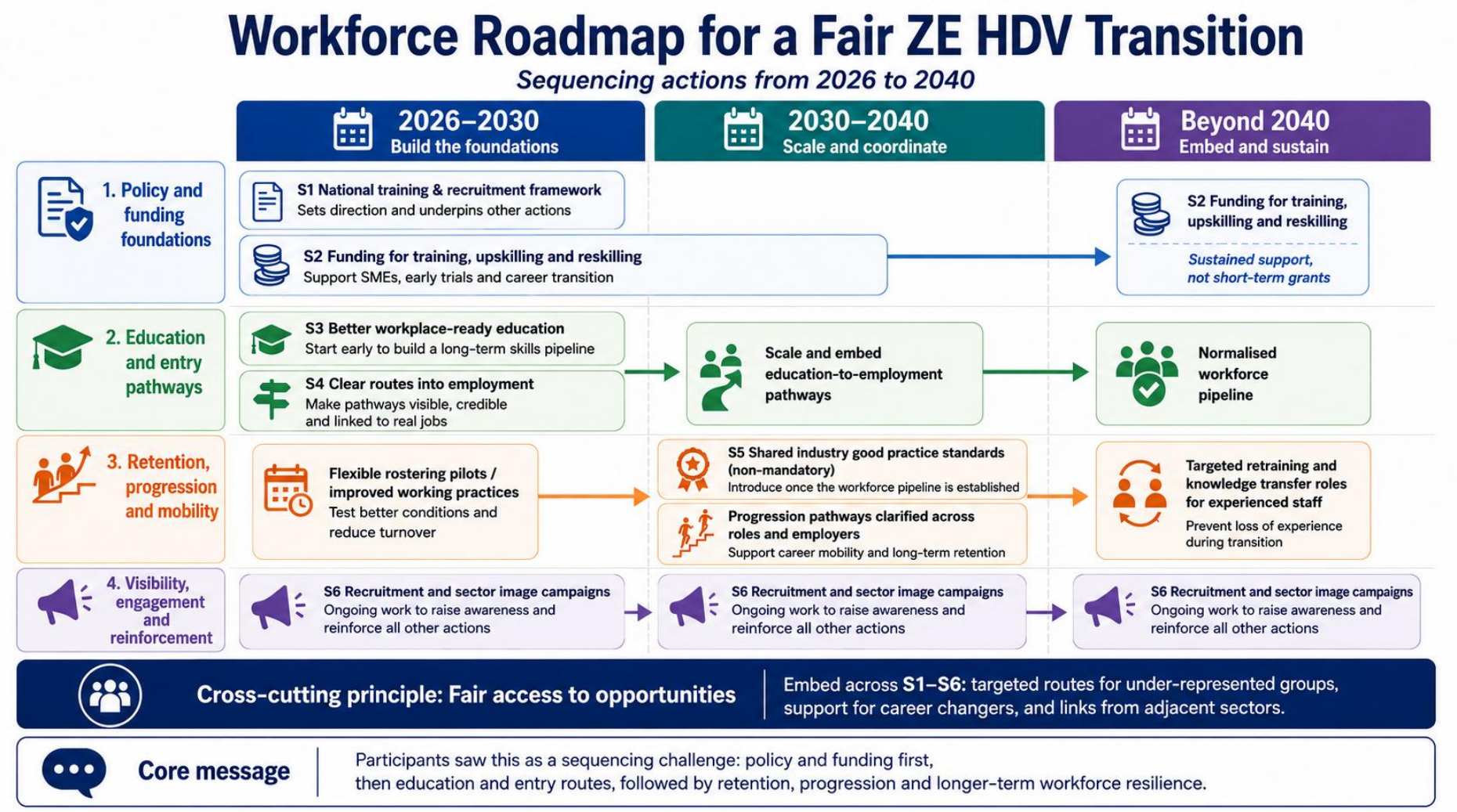
This roadmap in page 26 sets out how the six workforce solutions identified by participants are expected to develop over time, from the short term to the long term. It shows which actions need to be in place early to provide direction and support, which actions build the skills pipeline, and which actions help retain and sustain the workforce as the transition progresses. The roadmap also highlights where some actions are ongoing and where others are intentionally introduced later to avoid unintended consequences. Overall, it illustrates how the solutions work together as a system to support a fair, coordinated, and effective workforce transition.

How to read the roadmap

The roadmap should be read as a sequencing tool rather than a fixed implementation plan. It shows the order in which different types of action need to develop so that the workforce system becomes more resilient over time.

The first phase focuses on creating the conditions for action. This includes national policy direction, initial funding, early education reform, visible employment routes and sector image work. The second phase focuses on scaling and coordination. This includes expanding successful pilots, strengthening education-to-employment pathways, and introducing shared good-practice guidance once the workforce pipeline is more established. The third phase focuses on embedding and sustaining change. This includes maintaining funding where needed, normalising career pathways, retaining experienced workers and ensuring fair access remains built into the system.

The roadmap also shows that some actions should begin immediately but continue over time. Recruitment and image work, for example, should not be treated as a one-off campaign. Funding should not be limited to short-term grants. Fair access should not be a separate programme, but a principle embedded across all actions.


Workforce Roadmap for a Fair ZE HDV Transition
Sequencing actions from 2026 to 2040
2026–2030
Build the foundations
2030–2040
Scale and coordinate
Beyond 2040
Embed and sustain
1. Policy and funding foundations
S1 National training & recruitment framework
Sets direction and underpins other actions
S2 Funding for training, upskilling and reskilling
Support SMEs, early trials and career transition
S2 Funding for training, upskilling and reskilling
Sustained support, not short-term grants
2. Education and entry pathways
S3 Better workplace-ready education
Start early to build a long-term skills pipeline
S4 Clear routes into employment
Make pathways visible, credible and linked to real jobs
Scale and embed education-to-employment pathways
Normalised workforce pipeline
3. Retention, progression and mobility
Flexible rostering pilots / improved working practices
Test better conditions and reduce turnover
S5 Shared industry good practice standards (non-mandatory)
Introduce once the workforce pipeline is established
Progression pathways clarified across roles and employers
Support career mobility and long-term retention
Targeted retraining and knowledge transfer roles for experienced staff
Prevent loss of experience during transition
4. Visibility, engagement and reinforcement
S6 Recruitment and sector image campaigns
Ongoing work to raise awareness and reinforce all other actions
S6 Recruitment and sector image campaigns
Ongoing work to raise awareness and reinforce all other actions
S6 Recruitment and sector image campaigns
Ongoing work to raise awareness and reinforce all other actions
Cross-cutting principle: Fair access to opportunities
Embed across S1–S6: targeted routes for under-represented groups, support for career changers, and links from adjacent sectors.
Core message
Participants saw this as a sequencing challenge: policy and funding first, then education and entry routes, followed by retention, progression and longer-term workforce resilience.

Suggested priorities for different stakeholders

The roadmap requires action from multiple stakeholders. The following priorities identify where different actors can contribute.

For Scottish Government and Transport Scotland:

- develop a long-term national framework for ZE HDV workforce skills, training and recruitment;
- align workforce planning with vehicle and infrastructure transition planning;
- provide sustained funding for training, upskilling and reskilling, with specific attention to SMEs;
- support place-based pilots that test how training, recruitment and retention interventions work in different regional contexts;
- use findings from this project to inform future just transition and decarbonisation interventions.

For industry bodies and employers:

- improve the visibility of ZE HDV careers beyond driving roles by engaging with schools, colleges and employability organisations;
- develop non-mandatory good-practice guidance on progression, skills and workforce standards;
- pilot flexible or improved working practices where operationally feasible;
- create knowledge-transfer roles for experienced staff during the transition.

For schools, colleges and training providers:

- embed workplace readiness and practical experience into relevant education and training pathways;
- work with employers to ensure training reflects real operational needs;
- support routes into employment for under-represented groups, career changers and workers from adjacent sectors;
- identify gaps in equipment, staffing and accreditation that may limit ZE HDV training capacity.

For regional and local partners:

- identify regional gaps in access to training and employment opportunities;
- support coordination between employers, training providers and local economic development actors;
- ensure rural, island and peri-urban areas are not disadvantaged by the concentration of training and employment opportunities in larger urban centres;
- use regional transport and economic development strategies to embed ZE HDV workforce planning.

Future funding and pilot opportunities

The findings suggest that future funding should move from identifying barriers towards testing practical intervention models. Five follow-on opportunities are particularly important, and are presented below.

Regional ZE HDV workforce transition pilots

Place-based pilots could test how training, recruitment, retention and diversity interventions work in different regional contexts. This would be particularly useful in areas where access to employment, training provision or infrastructure may be uneven.

SME transition readiness support

A targeted SME programme could help smaller operators assess their workforce risks, training needs, funding requirements and readiness for ZE HDV adoption. This would reduce the risk of a two-tier transition in which larger firms progress while smaller firms fall behind.

Gender diversity and inclusive entry pathway demonstrators

Pilot programmes could test targeted routes for women and other under-represented groups, including school engagement, site visits, mentoring, taster sessions, role model campaigns and supported entry into training.

Knowledge-transfer and experienced worker retention pilots

Future funding could support roles that allow experienced workers to act as mentors, trainers, workplace assessors or transition champions. Such roles could include two-way mentoring, where newly trained workers also share their experiences of the latest technologies with the more experienced workers. This would help prevent the loss of tacit knowledge during technological change, introduce new progression opportunities for more experienced workers, and ensure that older workers feel valued during the transition.

Cross-project synthesis and practitioner toolkit

A future phase could bring together learning from related Transport Scotland-funded projects to create a practical ZE HDV workforce transition toolkit for employers, policy makers, regional partners and training providers. This would support shared understanding and make the evidence easier to apply across the sector.

Conclusion

The ScotZED roadmap shows that workforce diversity in the ZE HDV transition is not a standalone issue. It is closely connected to skills, training access, job quality, sector visibility, SME capacity, regional opportunity and just transition outcomes. A more diverse workforce is not only desirable from an equality perspective; it is necessary for widening the labour market expansion, strengthening workforce resilience and supporting the pace of decarbonisation.

The six solutions identified by participants provide a practical starting point for action. However,

their impact will depend on how they are sequenced, funded and implemented. National policy direction and sustained funding are needed to create confidence. Education and employment pathways are needed to build the future workforce. Recruitment and image campaigns are needed to widen awareness of the range of roles within the sector and progress which has already been made in terms of workplace conditions. Shared guidance, improved working practices, progression routes and knowledge-transfer mechanisms are needed to retain skills and experience over time.

The central message is that workforce transition must be planned with the same seriousness as vehicle and infrastructure transition. If workforce issues are addressed too late, they may become a constraint on decarbonisation. If they are addressed early and collaboratively, they can accelerate the transition while also making the sector more inclusive, resilient and attractive.

Future action should therefore focus on practical, place-based and sector-led interventions that can be tested, evaluated and scaled. This would allow Transport Scotland, industry and regional partners to move from evidence to implementation, ensuring that the ZE HDV transition supports both climate goals and a fairer workforce future for Scotland.

Annex 1 – Documentary Analysis

The documentary analysis focused on a set of key policy and industry documents, including industry reports, government strategies, workforce assessments, and policy papers produced by organisations such as Logistics UK, the Road Haulage Association, the Scottish Government, and UK government departments. These documents were selected for their relevance to workforce planning, skills development, and sectoral transformation within the HDV and transport sectors, particularly in the context of the transition to zero-emission mobility.

A total of **sixteen documents** were analysed. The review was guided by five analytical questions concerning: (1) how workforce diversity and inclusion are framed; (2) barriers and opportunities for entry, progression and retention in the sector; (3) skills needs and training pathways; (4) the roles and responsibilities attributed to employers, training providers and public bodies; and (5) the extent to which place-based variation is recognised in workforce planning.

These questions provide a structured lens through which to examine how workforce challenges are understood and addressed, particularly in the context of the transition to zero-emission HDVs.

Methodology

Documentary analysis was used as the primary method to examine how workforce issues and policy responses are represented across relevant reports and policy documents. Documentary analysis is a qualitative research method that involves the systematic review and interpretation of existing documents to identify patterns, themes, and underlying assumptions shaping policy discourse and sectoral strategies (Bowen, 2009).

The analysis followed a thematic coding approach. First, each document was reviewed to identify references to workforce characteristics, skills need, training pathways, diversity and inclusion and policy responsibilities. Second, a coding framework was developed based on the guiding research questions, including themes such as workforce diversity, barriers to workforce participation, skills requirements, institutional roles, and regional variation. Third, documents were systematically coded according to these categories to identify recurring narratives and policy priorities across sources.

This process enabled the identification of key themes shaping workforce planning in the HDV sector and how these themes intersect with broader discussions surrounding decarbonisation and just transition policies. By analysing multiple sources across policy, industry and research context, the documentary analysis provides a structured overview of how workforce challenges and opportunities are currently framed within the sector.

Table 2. Summary of documents reviewed

Reference	Geographic scope	Sector focus	Reference to zero-emission transition	Reference to just transition	Framing of workforce challenge
Logistics UK (2024). Skills and Employment Update Q3 2024	UK	HGV / logistics	No explicit	No	Labour supply constraints; ageing workforce; retention challenges
Logistics UK (2024). Skills and Employment Update Q4 2024	UK	HGV / logistics	No explicit	No	Skills shortages; workforce sustainability risks
Logistics UK (2025). Skills and Employment Update Q1 2025	UK	Logistics / freight	No explicit	No	Workforce sustainability; training system dependency
Logistics UK (2025). Skills. Insight Report 2025. Building the future logistics workforce.	UK	Logistics / freight	Indirect (skills for decarbonisation and automation)	No	Skills transformation; job quality; talent attraction
Logistics UK (2025). The Logistics Report Summary 2025	UK	Logistics	Indirect	No	Productivity pressures; structural workforce constraints
RHA (2025). Autumn Budget Submission to HM Treasury	UK	Road haulage (HGV, vans, coach)	Yes (explicit; linked to viability)	Yes (implicit; economic fairness)	Systemic transition constraints; commercial viability; skills system misalignment
Transport Scotland. (2022). IAG Report 2022: Report on the work of the Zero Emission Mobility Industry Advisory Group.	Scotland	Automotive / ZE vehicles / HDV	Yes	Yes (explicit)	Innovation-driven skills transition; supply chain development

Reference	Geographic scope	Sector focus	Reference to zero-emission transition	Reference to just transition	Framing of workforce challenge
Department for Energy security & Net Zero (2025). Assessment of the Clean Energy Skills Challenge	UK	Cross-sector (energy, transport)	Yes	Indirect	System-wide skills transformation, supply chain capacity
Green Aliance (2022). Closing the UK's Green Skills Gap	UK	Cross-sector	Yes	Indirect	Workforce transition, retraining imperative
Just Transition Commission (2024). Conditions for Success. Annual Report 2024	Scotland	Cross-sector	Yes	Yes	Regional inequality; just transition governance
NSAR (2024). Future Skills Assessment for the Transport Sector	UK	Transport (freight, rail, bus)	Yes	No explicit	Skills shortages; demographic imbalance; workforce diversity
Scottish Government (2025). Just transition. A Draft Just Transition Plan for Transport in Scotland	Scotland	Transport	Yes	Yes	Workforce transition; policy coordination
Rubio et al. (2022). Green Jobs in Scotland: an inclusive approach to definition, measurement and analysis	Scotland	Cross-sector	Yes	Yes	Occupational transformation; job creation
Green Jobs Taskforce Report (2021) Report to government, industry and the skills sector	UK	Cross-sector	Yes	Indirect	Workforce reskilling; green job creation

Reference	Geographic scope	Sector focus	Reference to zero-emission transition	Reference to just transition	Framing of workforce challenge
RHA (2024) Mission Driven: A Blueprint for Delivery	UK	Road haulage / logistics	Yes (indirect; skills + decarbonisation readiness)	No explicit	Skills system misalignment; training inefficiencies; workforce pipeline constraints
RHA (2025) The Future of Fleets: informing the net zero transition for commercial vehicles	UK	Road haulage / HGV	Yes (explicit; central focus)	Yes (implicit; viability and fairness)	Commercial viability constraints; uneven transition readiness; SME disadvantage

Annex 2 - Stakeholder interviews

This research employed a qualitative approach based on semi-structured interviews with stakeholders across the transport ecosystem. The study focused on understanding workforce challenges, diversity, skills and the implications of the transition to zero-emission heavy-duty vehicle (HDVs) within the context of South-East Scotland.

A total of twenty-two interviews were conducted between December 2025 and March 2026. Participants were purposively selected to capture a range of perspectives across the sector, including freight operators, public transport companies, technology providers, training and skills organisations and industry bodies. Interviews included business owners, recruitment managers, training leads, policy stakeholders and technical specialists with direct experience in workforce development, operational management and sectoral change.

The semi-structured interview format enabled consistency across key topics while allowing participants to elaborate on issues most relevant to their roles and organisations. Interviews explored a set of core themes, including workforce demographics and recruitment challenges, entry pathways and barriers, working conditions and job quality, diversity and inclusion, skills and training systems and perceptions of technological and policy change associated with the transition to zero-emission vehicles.

All interviews were transcribed and analysed using thematic analysis. An initial coding framework was developed deductively from the research questions and interview guide and then refined inductively through iterative engagement with the data. This process involved identifying recurring patterns, comparing perspectives across stakeholder groups and progressively grouping codes into higher-level analytical categories.

The final coding framework was structured around six themes: 1. Workforce profile and labour market pressures; 2. Entry pathways and barriers to participation; 3. Job quality, working conditions and occupational identity; 4. Diversity and inclusion; 5. Skills, training and workforce readiness and 6. Zero-emission transition and transition justice. These themes reflect not only the topics explored in the interviews but also the interconnected nature of workforce, technological and policy dynamics shaping the sector.

While policy and system level factors emerged strongly in the analysis, they were not treated as a standalone theme. Instead, they were integrated within the zero-emission transition and transition justice theme, reflecting their role as cross-cutting drivers influencing workforce development, technology adoption and sectoral change.

This analytical approach enabled the research to move beyond descriptive accounts of workforce challenges and towards a more systemic understanding of how labour market dynamics, organisational practices and policy conditions interact to shape the transition to a more diverse and skilled workforce in the HDV sector.

Table 3. Characteristics of participants in semi-structured interviews - counts by sector type

Sector Type	Count
Operator	4
Skills / training	4
Recruitment agency	1
Trade association	3
Academic	5
Public sector / policy	3
Technology supplier	3

Table 4. Characteristics of participants in semi-structured interviews - counts by job role

Broad Role Category	Count
Senior leadership / strategy	9
Project / operations management	4
Academic & research roles	6
Training & vocational education	3
Recruitment roles	1

Table 5. Characteristics of participants in semi-structured interviews - counts by HDV focus

HDV Focus	Count
HGV	14
Bus / Coach	4
Both	5

Annex 3 - Co-design workshops

Introduction

As part of the SCOT-ZED project, three co-design workshops were delivered to explore workforce diversity, skills, and retention issues linked to the transition to zero-emission heavy-duty vehicles (ZE HDVs). The workshops were designed to complement the documentary analysis and semi-structured interviews by creating a space for shared reflection, discussion, and co-development of solutions. We engaged 17 key stakeholders.

All stakeholder role information was anonymised prior to analysis. No individual job titles, organisations, or role descriptions are reported, as several could be disclosive within the transport sector. Instead, participants were grouped into broad categories based on their organisational type (e.g., **industry representatives**, **local or regional authorities**, **operators**, **recruitment/workforce bodies**). Job roles were similarly aggregated into high-level functional groups such as **senior leadership/strategy**, **programme or operations management**, **policy/public affairs**, and **skills/workforce development**. HDV focus was summarised only at the level of **HGV**, **Bus & Coach**, or **both**. No cross-tabulations were produced, and no information is presented that could reasonably enable identification of individual participants or organisations.

The overall purpose of the workshops was threefold: first, to identify key barriers to building a skilled and diverse ZE HDV workforce; second, to examine the wider knock-on effects of these barriers for the transport system; and third, to collaboratively develop practical actions and pathways to support a just transition. The workshops were explicitly focused on people, skills and organisational change, rather than technical infrastructure. Diversity was used as a cross-cutting lens to analyse problems and find solutions, to finally co-design a roadmap.

Workshop structure

Each workshop ran for approximately two hours and followed a consistent structure. Sessions were facilitated by members of the research team and delivered online, using a collaborative digital whiteboard (Miro.com) to support participation and capture inputs in real time. Participants could contribute verbally, through digital “post-it” notes, or via the chat function to ensure accessibility.

The workshop began with a short introduction outlining the aims of the project and the focus of the session. This was followed by an ice-breaker activity in which participants were asked to briefly introduce themselves and reflect on a current decarbonisation initiative they were involved in. Participants positioned their responses along a simple scale indicating whether workforce issues sat at the centre of, at the margins of, or were not yet part of their decarbonisation agendas. This exercise helped surface differences in organisational priorities and provided an entry point for discussion.

Key activities and questions

The main body of the workshop was structured around a series of facilitated tasks:

1. **Identifying barriers**
   Participants were asked: *What are the biggest barriers to developing a skilled and diverse ZE HDV workforce?* Suggested themes included access to training, working conditions, pay and progression, inclusion and culture, recruitment pathways, and retention of experienced staff. Participants added missing barriers and then prioritised what they saw as the most critical issues.
2. **Exploring knock-on effects**
   Building on the highest-ranked barriers, participants examined wider system impacts. They were asked: *If this barrier persists or worsens, what happens next?* This activity encouraged participants to think beyond their own organisations, considering consequences for service reliability, costs, workforce stability, safety, and the delivery of essential goods and services.
3. **Responsibility and action**
   Participants discussed who currently deals with these issues and who *should* take responsibility in future. This included reflection on the roles of industry, training providers, local authorities, national government, and trade bodies.
4. **Co-designing future pathways**
   Finally, participants worked in groups to identify concrete actions across short-, medium- and long-term timeframes, contributing to the development of a future workforce roadmap aligned with Scotland's 2045 net-zero target.

Together, these workshops generated rich qualitative insights and practical recommendations, grounded in lived experience and collective system knowledge.

After the workshops, a survey was circulated to attendees and individuals who were invited but could not attend. The survey offered an opportunity to provide feedback on key findings from across the three workshops and the roadmap which was subsequently developed. Inputs from the surveys are included as 'other comments' in the description of each solution (see the section title: "**Priority solutions**").