Traction discount policy options to support lower-carbon traction under GBR

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Prepared for Network Rail

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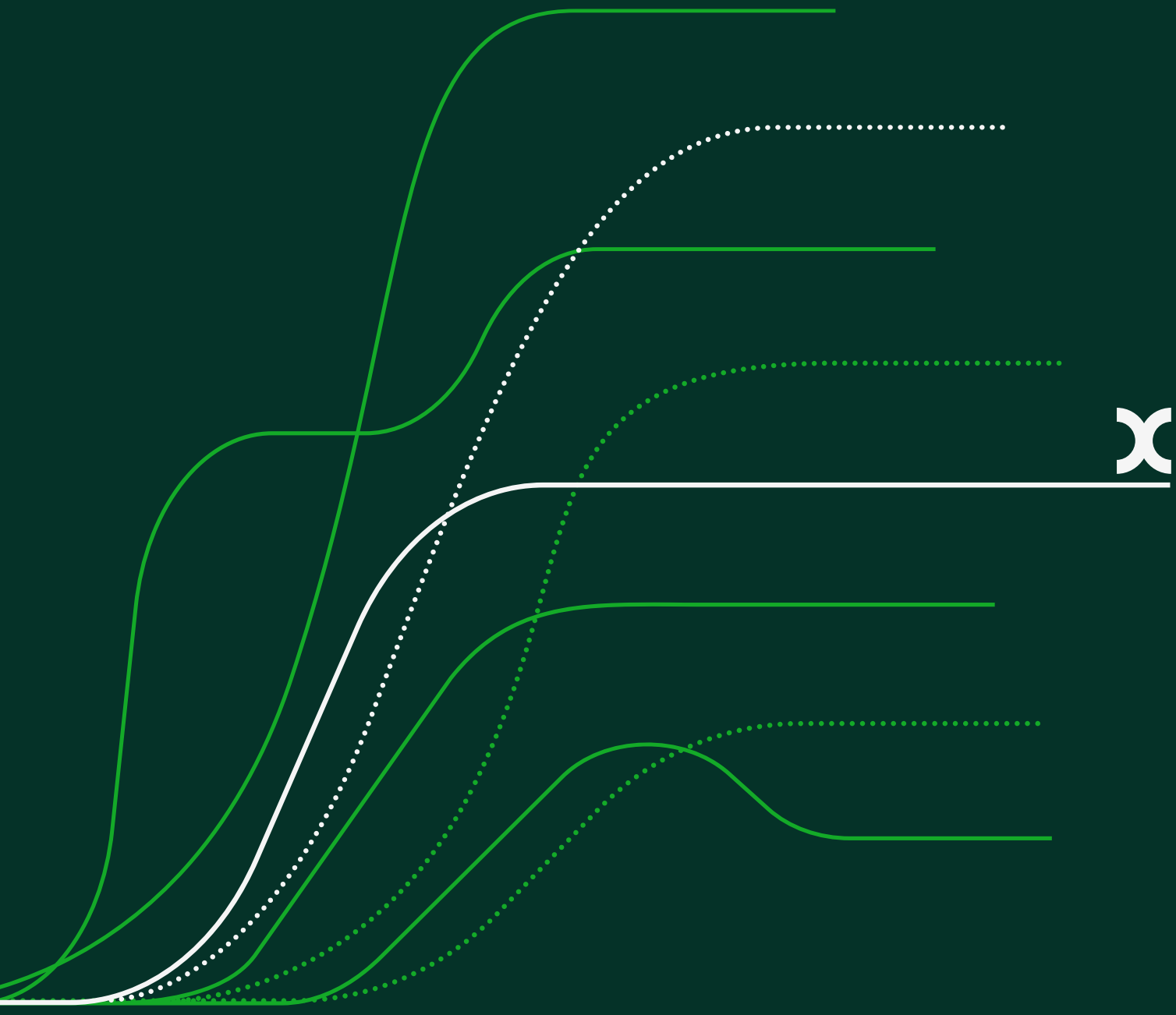

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Executive summary

To support the development of Great British Railway's (GBR) track access charges scheme, Network Rail has commissioned Oxera to develop and assess options for a track access charges (TAC) discount policy for Funding Period 1 (FP1, 2029–34) to support lower-carbon traction choices by operators. The options target the operating cost differential between diesel and lower-carbon alternatives (including electric and hydrotreated vegetable oil, HVO), rather than providing support to capital expenditure for the purchase or procurement of locomotives.

Network Rail's current approach to track access discounts

Within the TAC framework, operators face three usage-based variable costs: the Variable Usage Charge (VUC) for operating, maintenance and renewal costs; the Electrification Asset Usage Charge (EAUC) for maintaining and renewing electrification assets; and the Traction Electricity Charge (EC4T) for electricity supplied by Network Rail.

Network Rail's current policy allows temporary discounts on the VUC and, for electrified services, the EAUC, to support new rail services. The Mode Shift Revenue Support (MSRS) grant also provides support to encourage modal shift, by targeting the operating cost differential from road to rail or inland waterway, with no differentiation based on rail traction type. The options in this report focus on a different market failure and cost differential: the higher operating cost of lower-carbon traction relative to diesel.

EU precedents for setting traction discounts to support lower-carbon traction choices

Our review identifies no examples of a rail infrastructure manager applying a TAC discount to address the diesel–electric operating cost differential, but we discuss several precedents offering lessons for GBR's policy design. This includes a Spanish ex-post subsidy to support modal shift and electric traction adoption, calibrated by traction type, load factor and traffic growth; a TAC discount applied in Germany to support modal shift; and EU airport charges which are calibrated to the environmental performance of aircraft. Together, these precedents demonstrate the opportunity to implement discounts effectively within an existing charges regime.

Principles and design considerations for a TAC discount policy

We set out below six principles and two legal requirements that have informed the design and assessment of the three policy options in this report.

Box 1.1 Principles for assessing GBR traction discount policy options

1. **Targeted and evidence-based—**target market failures or policy objectives, underpinned by evidence of the issue and how the discount will address it.
2. **Incentive-compatible—**discounts should provide incentives for operators to adopt low-carbon traction, and support behavioural change consistent with the policy objective, while mitigating potential unintended incentive effects and considering any impact on the existing incentives provided by the charging regime.
3. **Proportionate and time-limited—**discounts should be proportionate to the outcome sought, public funding affordability, and the time needed to deliver change.
4. **Not unduly discriminatory—**discounts should be available on equivalent terms to operators undertaking comparable activities.
5. **Transparent and well-governed**—eligibility criteria should be published, and decisions should be based on clear governance arrangements.
6. **Minimum distortion—**discounts should minimise distortions to competition, investment and efficient pricing signals.

Two overarching legal requirements, which any traction discount policy would need to comply with:

- **Aligned with GBR's statutory duties** and charging objectives, and with wider rail and decarbonisation strategy.[1]
- Compliance with the **Subsidy Control Act** 2022.[2]

Source: Oxera.

We also discuss overarching design considerations that GBR can use to refine the design and implementation of any of the three options as its priorities develop. This includes defining the eligibility of alternative, non-electric, lower-carbon traction types, and the eligibility of existing lower-carbon vehicles; establishing the appropriate level, structure and duration of the discount; and choosing whether to include a mechanism for revising the discount level to meet the budget available.

Three policy options for a GBR discount to encourage lower-carbon traction

This report sets out **three policy options**, each of which reflects different approaches, choices and trade-offs available to GBR, and vary in their degree of alignment with the principles set out above.

- **Option 1: Uniform discount on the VUC**—this option provides a uniform, fixed-percentage (i.e. up to 100%) discount on the VUC for new and existing services using lower-carbon traction throughout FP1. The approach is simple and transparent, but does not reflect differences in carbon benefit or financial need across traction types. The impact on operator behaviour (additionality) may be limited, as a uniform discount funds operators that would have continued running services in the same way.

[1] See Clause 18(2) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June; and Department for Transport (2026), 'Railways Bill factsheet: the Long-Term Rail Strategy'. While the Long Term Rail Strategy has not yet been issued, one of its five strategic objectives will be 'supporting government's environmental sustainability objectives', for example, by 'delivering rail net zero (traction and infrastructure)'.
[2] It is beyond the scope of this work to undertake a subsidy control assessment.

- **Option 2: EC4T discount—**this option introduces a fixed percentage discount on the cost per unit of electricity, calibrated to the diesel–electric operating cost differential. It is administratively simple and reduces the cost of electric traction, but excludes alternative traction (e.g. HVO). With only 39% of the network fully electrified, the impact on the day-to-day choices of operators will be limited.[3]

- **Option 3: Calibrated discount based on carbon benefit and financial need—**this option calibrates the discount based on the environmental benefit and financial need for each lower-carbon traction type, setting the maximum support at the lower of the operating cost differential and carbon benefit, with thresholds for value for money. It is inspired by the MSRS, but uses standardised discount rates per traction type—e.g. using a £/thousand gross tonne miles (kgtm) basis for freight, rather than a flow-by-flow assessment.

Across all three options, a key challenge will be demonstrating additionality, particularly for Option 2. We discuss mechanisms that could be introduced within any policy to strengthen operators' incentives to make greater use of low-carbon traction at the margin.

The discussion set out in this report should not be taken as a conclusion that any of the policy options would comply with the subsidy control principles. Reaching such a conclusion would require further detailed analysis once the preferred policy design, level of support, eligibility criteria and implementation arrangements have been developed.

This report does not recommend a specific policy option, as we understand that Network Rail intends to explore the relative merits of each approach further with industry stakeholders in autumn 2026, with a formal GBR consultation on access charging policy scheduled for April 2027.

[3] Department for Transport and the Office of Rail and Road (2025), 'Rail Trends 2025', 9 December.

1 Introduction

The Railways Bill will create Great British Railways (GBR), bringing together responsibility for infrastructure and passenger services under a new single public body.[4] In line with its duties and functions, GBR will be required to develop a track access charges (TAC) scheme for non-GBR operators, including freight and open access operators (OAO), and non-GBR publicly owned or contracted operators.[5]

The Railways Bill provides GBR with broad authority to apply discounts to infrastructure charges where it considers this to be appropriate—for example, in order to:[6]

- encourage the use of GBR infrastructure where there is spare capacity;
- promote new services for the carriage of passengers or goods by rail;
- give effect to wider strategic objectives or government guidance;
- or for any other reason.

In preparation for the introduction of GBR, Network Rail commissioned Oxera to develop and assess three distinct options for a future discounts policy to be introduced through TAC for Funding Period 1 (FP1, 2029–34), to provide incentives for operators to adopt lower-carbon traction in line with the lower-carbon objectives.[7] In particular, the policy options target the operating cost differential between diesel and lower-carbon alternatives (including electric and Hydrotreated Vegetable Oil, HVO), rather than providing support to capital

[4] The Railways Bill is being debated in the Houses of Parliament and may be subject to change. The version used for this report is House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June; see also Department for Transport (2025), 'A Railway Fit for Britain's Future: Government Response', November, p. 14.
[5] GBR will not be required to levy TAC on its own operators, but will be required to have a transparent cost-allocation process and publish 'indicative charges' for the purposes of transparency. See Clause 64(5) of House of Commons (2026), 'Railways Bill', Bill 373 2024-26 (as amended in Committee), 10 February; Department for Transport (2025), 'A Railway Fit for Britain's Future: Government Response', November, p. 71.
[6] See Clause 64(4) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June.
[7] Lower-carbon traction types, such as electricity, may provide additional benefits to the network operator through improved performance relative to diesel. For example, electric traction may support faster acceleration and deceleration, which could in principle increase capacity on the network. While these additional benefits may be relevant to consider as part of GBR's policy more broadly, the policy options discussed in this report focus on achieving environmental benefits only.

expenditure for the purchase or procurement of low-carbon locomotives.

While similar policy objectives may also be supported using other incentive mechanisms, including grants and support with financing costs associated with lower-carbon traction, this work considers only discounts that could be introduced through TAC. Furthermore, the policy options are not designed to provide capital expenditure support for the purchase or procurement of new traction, nor to directly support modal shift from road and waterways to rail.

As part of this work, we have undertaken engagement sessions with a small number of freight operators to discuss emerging versions of the policy options, which informed their design. While any discount policy is expected to apply to both freight operators and OAO, freight operators were engaged as they expressed a particular interest in contributing to this topic during previous workshops with Network Rail.

This report is intended to inform further stakeholder engagement to be undertaken in autumn 2026, and to inform GBR's formal consultation on access charging policy scheduled for April 2027.

The report is structured as follows.[8]

- Section 2 sets out the current approach to TAC and discounts in Great Britain during Control Period 7 (2024–29).
- Section 3 explores lessons from European policies to support environmental objectives.
- In section 4 we develop the principles and overarching design considerations to inform the structure and implementation of a GBR traction discounts policy to support lower-carbon choices.
- Section 5 sets out three distinct options for a traction discounts policy that are then assessed against the principles defined in section 4. The three policy options and their relative merits are summarised in section 5.5.
- Section 6 concludes.

[8] Recommending a preferred option is outside the scope of this report. While we discuss the high-level principles of subsidy control that are relevant for the design and implementation of any discounts policy, it is beyond the scope of the report to undertake a formal subsidy control assessment.

2 The current approach to track access charge discounts in Great Britain

2.1 The current track access charges framework in Great Britain

In Great Britain, the Office of Rail and Road (ORR) is currently responsible for setting Network Rail's TAC every five years through its periodic review (PR) process. In PR23, the ORR established the current charging framework, which runs until March 2029.[9]

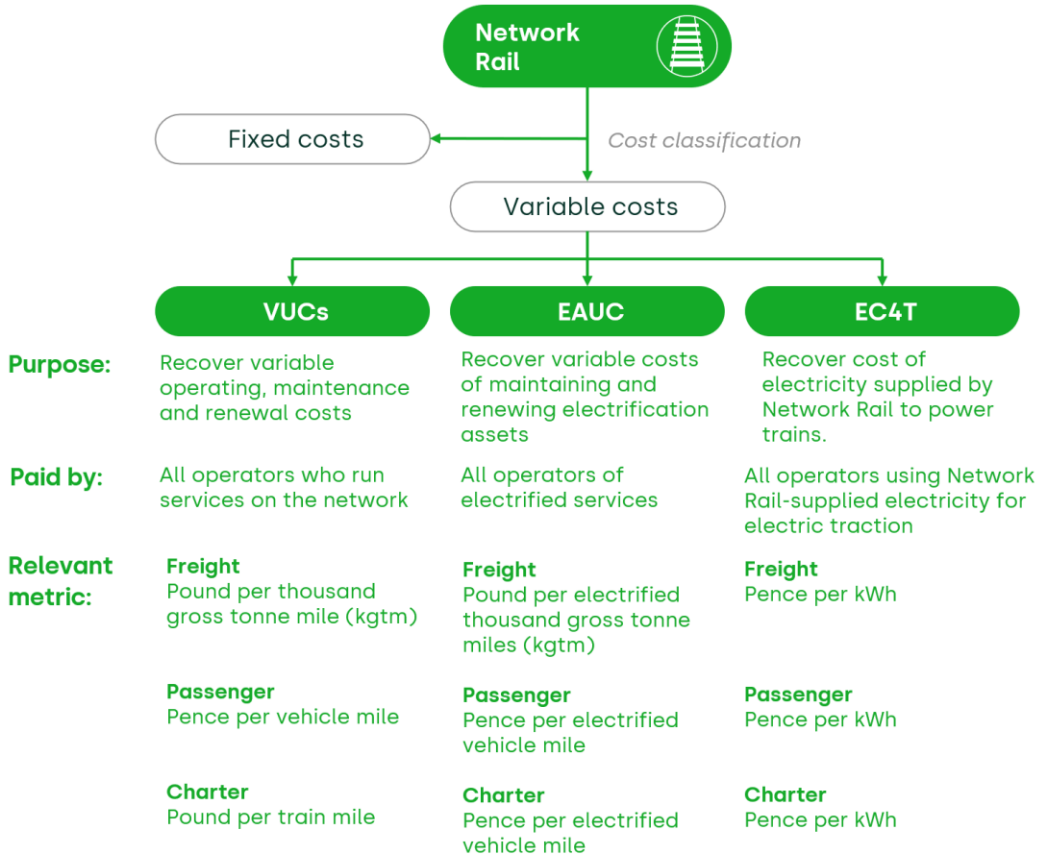
As an input to this process, Network Rail's costs are allocated across different categories, which determines how costs are attributed and which elements are recovered through each type of charge. An initial step in this process is to classify expenditure into variable and fixed components. Variable costs are those that change with train usage, such as those relating to track wear and energy consumption. Fixed costs are those that do not vary with the use of the network in the short term, such as the costs associated with the signalling system.

Within the TAC framework, train operators face three variable charges: Variable Usage Charge (VUC), Electrification Asset Usage Charge (EAUC), and Traction Electricity Charge (EC4T). VUC and EAUC rates are set for the five-year control period, with annual inflation uplifts, whereas the EC4T varies with the cost of electricity procured by Network Rail and is subject to an annual cost reconciliation (a 'cost wash-up').

Figure 2.1 below illustrates the current framework for setting charges, focusing on variable costs.

[9] Office of Rail and Road (2024), 'Access charging framework for use of Network Rail infrastructure: user guide', October.

Figure 2.1 Existing framework for setting charges



Note: kgtm, thousand gross tonne miles. Fixed costs are recovered through infrastructure Cost Charges (ICCs) levied on freight and open-access operators, Fixed Track Access Charges (FTAC), and direct network grant payments from funders. FTAC are set to recover Network Rail's residual fixed costs after taking into account income from other sources, ensuring that the 'net revenue requirement' for operating, maintaining and renewing the network is satisfied. See Office of Rail and Road (2025), 'Access charging framework for use of Network Rail infrastructure: user guide', accessed 17 August 2026.
Source: Oxera.

2.1.1 Variable usage charge

The VUC is designed to recover the **operating, maintenance and renewal costs that vary** with levels of traffic. To achieve this, the charge recovers costs relating to track, civil engineering and signalling. It does not reflect the costs of investments that provide or change the capability or capacity of the network.

The VUC is paid by all operators who run services on the network, on a pence per vehicle-mile (p/vm) basis for passenger services, and £/kgtm basis for freight. The charge is calculated using a combination of maintenance and renewal expenditure forecasts as a function of changes in traffic, forecast expenditure for maintenance and renewals over the next control period, and engineering models used to calculate

relative levels of damage to infrastructure caused by different vehicle types.[10] An invoice specifying the VUC amount payable is issued by Network Rail following each charging period (spanning 28 days).[11]

The design of the scheme incentivises operators to run services only where the marginal benefit outweighs the additional costs imposed on the infrastructure, and to use more track-friendly vehicles that impose less wear and tear on the network. The VUC is disaggregated by vehicle class, and for freight services by commodity, with heavier and faster vehicles typically incurring a higher VUC. This reflects the greater levels of expected marginal damage to track caused by these vehicles. The track usage price lists for the VUC differentiate between locomotive and wagon types, with different rates applicable depending on the commodity carried and whether the vehicle is laden or empty ('tare').[12]

2.1.2 Electrification Asset Usage Charge

The EAUC is used to recover the costs of maintaining and renewing electrification assets that vary with levels of traffic. All operators of services powered by electric traction receive an invoice issued by Network Rail following each charging period (spanning 28 days).[13]

Rates vary across both type of operator and type of electrical current. Passenger, freight and charter operators are subject to different rates for both DC and AC, leading to six EAUC rates in total. The charge is levied on a pence per electrified vehicle-mile basis for passenger and charter traffic, and a pound per electrified thousand gross tonne miles (£/kgtm) basis for freight traffic.

Network Rail calculates EAUC rates by estimating the annual maintenance and renewal costs of electrification assets, identifying the share that varies with traffic, and allocating those variable costs across operator types using historical network usage. It then uses forecast AC and DC electrified traffic to set rates per vehicle-mile for passenger and

[10] Total annual wear and tear costs, used in the VUC methodology, are estimated using a 35-year average cost. See Office of Rail and Road (2024), 'Access charging framework for use of Network Rail infrastructure: user guide', October, accessed 21 August 2026, section 'Variable Usage Charge (VUC)'.
[11] Office of Rail and Road (2026), 'Track Access Contract (Freight Services)', 2.1.1.
[12] Network Rail (n.d.), 'CP7 Track Usage Price Lists', accessed 21 August 2026, section 'CP7 access charges - Network Rail'.
[13] Office of Rail and Road (2026), 'Track Access Contract (Freight Services)', 2.1.1.

charter operators, and per kgtm for freight operators, such that the variable costs are recovered on average.[14]

2.1.3 Traction Electricity Charge

To recover the cost of electricity supplied by Network Rail to power trains, the Traction Electricity Charge (also known as electric current for traction, or EC4T) is levied on all operators who use Network Rail-supplied electricity. The EC4T charge is based on either metered or modelled electricity consumption, invoiced by Network Rail following each charging period (spanning 28 days).[15]

- **Under the modelled approach**, estimated consumption rates are multiplied by electrified mileage, and then by Network Rail's electricity cost per kWh. At year end, a volume reconciliation compares modelled consumption with actual consumption, including transmission losses, within each electricity supply tariff area, resulting in balancing payments between Network Rail and operators.
- **Under the metered approach**, the charge is based on electricity recorded by on-train meters, less regenerated braking energy. A mark-up is added for estimated transmission losses, and the resulting consumption is multiplied by Network Rail's electricity cost per kWh. A separate annual cost reconciliation compares the tariff charged to operators with the tariff Network Rail actually paid to electricity suppliers, again resulting in balancing payments where necessary.[16]

2.2 The current approach to discounting track access charges in Great Britain

2.2.1 Existing discounts on the VUC and the EAUC to support new traffic flows

To support new rail services, Network Rail's CP7 policy allows temporary discounts on the VUC and, for electrified services, the EAUC, with discounts applied to specific flows. These discounts are available to freight, passenger, open-access and charter operators, although publicly contracted passenger operators do not in general qualify. The

[14] Office of Rail and Road (2024), 'Access charging framework for use of Network Rail infrastructure: user guide', October, section 'Electrification Asset Usage Charge (EAUC)', accessed 21 August 2026.
[15] Office of Rail and Road (2026), 'Track Access Contract (Freight Services)', 2.1.1.
[16] Office of Rail and Road (2024), 'Access charging framework for use of Network Rail infrastructure: user guide', October, section 'Electrification Asset Usage Charge (EAUC)', accessed 21 August 2026.

standard discount applies for seven railway periods, which may be extended by up to six further periods where support can be justified.[17]

For freight, the service must involve traffic that is new to rail or a new origin-to-destination (O/D) axis, while passenger and charter applications must similarly involve a new established service.[18] Applicants must demonstrate a commercial need for support through quantified financial evidence, showing that the business case is limited without the discount. The service must be expected to remain viable once the support ends.

The policy demonstrates the opportunity for GBR to introduce a complementary discount scheme within the TAC regime to support operators' lower-carbon choices by operators.

2.2.2 Insights from the administration of the existing discount scheme

Since the introduction of the scheme two years ago, Network Rail has received approximately one discount application per rail period, with most of those that progress to the panel being approved. Applications follow a standardised template requiring information on the proposed service, and the expected value of the VUC and (where relevant) EAUC that would be waived.

We understand that a more calibrated approach that would align the level and duration of the discount to the financial need associated with each service, withdrawing support at the point where that service reaches profitability, was rejected in favour of a more standardised approach, to reflect the trade-off between the degree of calibration and targeting, and the administrative complexity and evidential requirements for both Network Rail and operators.

Any traction discount scheme to encourage lower-carbon vehicles will therefore need to consider similar trade-offs between alignment with operators' incentives and the associated evidential and administrative requirements.

[17] Network Rail (2026), 'CP7 Access Charge Discount Policy', June.
[18] To qualify as a new rail freight axis, while the O and/or D in question may previously/currently receive rail freight traffic, the O/D axis must not have served as an established traffic flow (meaning 'at least one train per week has been running for a period of greater than at least six months'). For passenger or charter services, the O/D axis must serve as a new established traffic flow, irrespective of routing. See Network Rail (2026), 'CP7 Access Charge Discount Policy', June, p. 9.

2.2.3 Mode Shift Revenue Support (MSRS) grant

This report focuses on discounts that could be introduced to address the operating cost differential between diesel and alternative traction types (such as electric and HVO), to encourage lower-carbon traction choices. In contrast, the Mode Shift Revenue Support (MSRS) grant, administered by the Department for Transport in England and the devolved governments in Scotland and Wales, addresses a different market failure and cost differential: the additional cost of moving freight by rail or inland waterway, with the aim of encouraging modal shift, with no differentiation in support based on rail traction type.

The MSRS provides a useful precedent to inform how any discount policy to support lower-carbon traction could be introduced, and any additional scheme would need to contribute towards a coherent set of incentives for all stakeholders.

The aim is to generate environmental and wider social benefits by reducing lorry journeys. There is no automatic entitlement to the MSRS and all applications must achieve a minimum benefit–cost ratio (BCR) of 2:1.[19] The current scheme operates until 31 March 2027.[20]

The scheme has two parts:

- **MSRS (Intermodal)** supports standard intermodal units (containers, swapbodies and piggyback trailers) moved by rail, excluding Channel Tunnel traffic and certain bulk or trainload commodities. Great Britain is divided into 18 zones, with maximum grant rates applying per container moved between each O/D zone. Separate rates apply to port flows, involving one road leg, and domestic flows, involving road legs at both ends;
- **MSRS (Bulk and Waterways)** covers non-containerised rail freight and eligible inland-waterway freight that would otherwise move by road. Unlike the Intermodal scheme, there are no standard maximum grant rates. Applications are assessed individually, with support limited by the identified

[19] An example of how to calculate the BCR for a given application, using the approach required under the Bulk and Waterways part of the scheme, is given in Department for Transport (2026), 'Guide to the Mode Shift Revenue Support (MSRS) Scheme', January, Annex E, p. 29. The BCR is calculated by dividing the environmental benefit associated with the request by the amount of grant requested. .

[20] In England, a joint provisional budget of up to £20m has been allocated to the MSRS and the Waterborne Freight Grant for 2026/27, while in Scotland, the January 2026 Budget did not contain any support for the MSRS due to ongoing financial pressures. See UK Parliament (2026), 'Question for Department for Transport: UIN 105758'; The Scottish Parliament (2026), 'Question reference: S6W-43211'; and Department for Transport (2026), 'Guide to the Mode Shift Revenue Support (MSRS) Scheme', January.

environmental benefits and the financial need. Support is not provided where the service can be commercially justified without MSRS support (or would proceed in any event without it), or where the best alternative mode of transport is not road.[21]

Under both parts, support is based on the principle that rail or inland waterway is more expensive than the road alternative and that the environmental benefits justify grant support. Financial need is defined as the difference between the door-to-door cost of road and the cost of rail or water transport. For intermodal flows, published zone-pair rates set the maximum grant available, although support cannot exceed the financial need of the individual flow.

For Bulk and Waterways applications, financial need is established through a detailed appraisal comparing the costs of the road and rail or waterway options, supported by evidence of the underlying costs and forecast volumes.

The grant rate awarded is the lowest of the following values:

- the amount requested;
- assessed financial need;
- available environmental benefits;
- any minimum value-for-money criterion applied by the administrative body.

Moreover, the grant must not exceed:

- 30% of the total rail or inland-waterway costs,
- 50% of the environmental benefits.

The grant is provided only where the Administrative Body is satisfied that it is in the public interest and that, in the absence of support, the freight would be moved by road. For Bulk and Waterways applications, this must be supported by an evidence-based forecast of the type and quantity of goods that would be conveyed by rail or water.

Applications are prioritised based on value for money, where proposals that generate a higher BCR are more likely to receive support. While the guidance specifies the maximum grant rates that may be permitted for

[21] In addition, the MSRS (Bulk and Waterways) will not be provided if the 'use of rail or inland waterways is a planning or other legal requirement on the site from where the freight is to be carried', or the traffic is eligible for the MSRS (Intermodal). See Department for Transport (2026), 'Guide to the Mode Shift Revenue Support (MSRS) Scheme', January, p. 12.

a given flow, applicants can choose to request a lower amount, increasing the BCR and the probability that the proposed application will be approved.

The grant is made in arrears according to the agreed rate and the number of eligible units moved, subject to the contracted volume cap and supporting evidence. Traffic volumes are closely monitored through the claims submitted. Where traffic levels are at least 5% lower than forecast at the time of the agreement, the Administrative Body may reduce the awarded volumes for a given flow to reflect the projected shortfall and reallocate budget.

Lessons for a GBR traction discount policy

Any new discount scheme would need to contribute towards a coherent set of incentives for all stakeholders provided by the wider TAC regime. Furthermore, the design and implementation of the MSRS grant provides several lessons for a future GBR traction discount policy. First, the framework's consideration of **financial need** and **environmental benefits**, in principle, could be translated into a discounting approach specifically targeting lower-carbon traction.

Second, where appropriate, future discount schemes could draw on the **monitoring and clawback mechanisms** established under the MSRS, whereby support is conditional on traffic volumes meeting agreed forecasts and subject to formal review at defined intervals.

Third, understanding how stakeholders perceive and use the MSRS provides insights into the administrative burden of any discount policy. Of the respondents to the UK government's 'Mode shift grants review call for evidence', 26% cited difficulties during the application process, describing it as 'complex' and 'resource intensive'.[22] It will be important to ensure that any discount policy does not create a disproportionate administrative burden for operators or GBR.

Finally, **a process to support value-for-money** criteria, such as a minimum BCR, could also be embedded within any future discount policy to support lower-carbon traction.

[22] Department for Transport (2025), 'Mode shift grants review – outcome', February.

3 Lessons from policies in the EU to support the adoption of lower-carbon traction

3.1 Introduction

To inform the development of GBR traction discount policy options to incentivise lower-carbon choices by operators, this section summarises a small number of European policies.[23]

While our review has not identified an example of a rail infrastructure manager introducing a TAC discount specifically to address the operating cost differential between diesel and lower-carbon alternatives, the following examples provide useful lessons:

- subsidies introduced by an infrastructure manager to support modal shift and the adoption of electric traction, focused on a case study in Spain (section 3.2).
- a TAC discount to support modal shift from road to rail, focused on Germany (section 3.3).
- a temporary discount applied to the cost of rail electricity in Germany (section 3.4).
- the application of discounts and penalties to airport charges to support environmental objectives (section 3.5).

For each example, we set out the scope of the support, its level and how it is calibrated; its funding and administration; and lessons for GBR's policy design.

3.2 Subsidies provided by an infrastructure manager to support modal shift and the adoption of electric traction

Infrastructure managers in several European countries have introduced subsidies to encourage modal shift from road to rail, while also supporting the adoption of electric traction. A brief case study on the approach followed in Spain is set out below.

[23] This section presents a small sample of policies for lower-carbon traction, rather than a full survey of discount schemes in the EU.

Box 3.1 A subsidy scheme to promote modal shift and electric traction in Spain

In 2022, rail freight represented only 5% of national freight transport in Spain. To encourage rail adoption, Spain introduced a subsidy scheme with the primary objective of encouraging modal shift from road to rail, and a secondary objective of promoting electric traction. The scheme was structured to run until 30 June 2026, or until the available budget was exhausted.

Scope and form of support—a subsidy was provided to qualifying rail operators to address the external cost differential between road and rail, and between diesel and electric. Operators apply for the subsidy, which is paid in arrears at the end of each calendar year. Operators that are unable to increase their annual traffic volumes in the respective year are not eligible, while those achieving traffic growth of 8% or above received the maximum available subsidy. Eligibility for the subsidy is therefore also assessed ex post.

Level of support and calibration—the level of subsidy is calibrated according to the European Commission's Handbook on the External Costs of Transport,[24] with the exact amount depending on: traction type (electric or diesel); load factor; and the degree to which the operator increased its annual traffic volumes. Electric traction attracted a higher subsidy than diesel, reflecting its lower external costs. The total budget was set at €120m, with an estimated annual maximum of €40m.

Funding and administration—initially funded through EU funds and administered via Spain's national recovery, transformation and resilience plan, the scheme was amended in 2024 following an 8.8% fall in freight rail traffic in 2023 (attributed in part to the impact of the war in Ukraine on global trade),

[24] The Handbook assesses these cost differences for external costs due to accidents, air pollution, noise, congestion and the impact on the environment/climate directly. Other cost categories include habitat damage and well-to-tank damage, but these are not considered by the Spanish precedent. European Commission (2019), 'Handbook on the external costs of transport', January, Table 66.

which increased the maximum level of subsidy. The scheme has now been extended until the end of 2027, funded by Spanish national public funds, with a smaller budget and a revised focus on addressing temporary capacity restrictions on the Spanish network.

Source: Oxera, European Commission (2022), 'State Aid SA.100486 (2022/N) – RRF Spain – TRTEL', March; European Commission (2024), 'State Aid SA.106980 (2024/N) – Spain', July; European Commission (2024), 'State Aid SA.115332 (2024/N) – Spain – RRF', October; Ministerio de Transportes, Movilidad y Agenda Urbana (2022), 'Orden TMA/371/2022', April; Ministerio de Transportes, Movilidad y Agenda Urbana (2022), 'Orden TMA/1234/2022', December.

A similar scheme, the Ferrobonus, has been running in Italy in various forms since 2010. Similar to Spain, operators receive an ex-post subsidy to encourage modal shift, funded by public sources and with operators submitting applications.[25] However, one key difference is that the scheme applies to electric traction operators only.[26] All eligible operators receive the same subsidy rate per train-km until the annual budget is exhausted.

Lessons for developing a GBR traction discount policy

The Spanish and Italian schemes illustrate how a subsidy can be applied to encourage lower-carbon traction choices and modal shift simultaneously. Furthermore, the Spanish scheme demonstrates that a subsidy that varies based on traction type, load factor and traffic volumes is feasible. In this context, the European Commission's Handbook on the External Costs of Transport provides a useful reference point for calibrating the discount level. In Spain, the subsidy is paid in arrears, with operators receiving their subsidy to cover the 2024 period in December 2025, which may affect cash flow.

3.3 Track access charge discounts to incentivise modal shift

Several European countries have introduced a TAC discount to encourage modal shift from road to rail. While the schemes may not directly support electric traction, there are useful lessons for the design

[25] European Commission (2022), 'State Aid SA.103856 (2022/N) – Italy', December.
[26] Minestero delle infrastrutture e dei trasporti (2023), 'DECRETO 30 agosto 2023, n. 13', December; RAM S.p.a. (n.d.), 'Incentivi', accessed 20 August 2026; Ministero delle infrastrutture e dei trasporti (2025), 'Decreto direttoriale 184 del 10/10/2025', October.

of any TAC discount scheme. We summarise below a scheme introduced in Germany, and briefly discuss a similar one in Austria.[27]

Box 3.2 TAC discount for all traction types to support modal shift in Germany

In 2018, Germany introduced a TAC discount on rail freight to address the cost differential between road and rail freight, to support Germany's national and European climate commitments, including specific targets for increasing the share of rail freight. The scheme has been revised and extended several times, and currently operates until at least 2028.

Scope and form of support—the scheme is available to all traction types (including diesel) and all railway operators within the scope of the network of the German infrastructure manager (IM) DB InfraGO, including German operators and organisations from other EU member states. All traction types, including diesel, are part of the scheme to support the shift from road to rail. The subsidy is applied as a discount on the TAC, calculated per train-km. DB InfraGO administers the scheme, while monthly funding is provided by the Federal Network Agency (Bundesnetzagentur).

Level of support and calibration—the subsidy rate is set by DB InfraGO on behalf of the German government for each timetable period, taking into account the available budget, approved TAC, and forecast freight traffic volumes. Essentially, the federal government sets an annual budget for the IM, from which the IM calculates the subsidy rate as the total budget of the subsidy divided by the total TAC paid by all qualifying operators. DB InfraGO monitors traffic continuously. Where traffic is lower than forecast, the subsidy rate may be increased to exhaust the budget. Similarly, where realised traffic exceeds the forecast levels, the budget is reduced. This means that operators may receive lower funding where aggregate performance outperforms forecasts.

[27] European Commission (2022), 'State aid SA.104264 (2022/N) – Austria', December.

The IM ensures that the subsidy level remains within defined estimates for the external cost differential between road and rail. An independent study by INFRAS, commissioned by DB InfraGO in 2019, concluded that the external costs of heavy goods vehicles exceed those of freight trains by approximately 2.5 eurocents per tonne-km, consistent with the Handbook on the External Costs of Transport.[28] Essentially, DB InfraGO ensures that the amount provided is not above the EU thresholds.

Funding and administration—the scheme is funded by the German federal government, with a total budget of approximately €1.75bn between 2024 and 2028. DB InfraGO assesses operators' applications and passes through approved subsidies to them as a reduction in TAC invoices. An independent mid-term evaluation, covering 2018 to 2020, found that the scheme contributed to an increase in rail freight's modal share in Germany from 18.7% in 2018 to 19.8% in 2022.

Source: Oxera, European Commission (2023), 'State Aid SA.109540 (2023/N) – Germany', December; DB InfraGO (n.d.), 'Trassenpreisförderung im Schienengüterverkehr', accessed 20 August 2026; European Commission (2018), 'State Aid SA.51956 (2018/N) – Germany', December; European Commission (2023), 'State Aid SA. 105221 (2022/N) – Germany', June; INFRAS (2019), 'Externe Kosten des Verkehrs in Deutschland Straßen-, Schienen-, Luft- und Binnenschiffverkehr 2017', August; DB InfraGO (2024), 'TraFöG', January.

Since 2013, Austria has operated a broadly similar TAC reduction scheme, which was extended in 2023, targeting accompanied combined transport, unaccompanied combined transport, and single wagonload traffic. The principal difference from the German approach is that Austria permits infrastructure charge reductions of up to 100% of eligible

[28] The estimated subsidy of 0.25 eurocents per tonne-km for 2024 remains significantly below the 50% of eligible costs threshold (equivalent to 1.25 eurocents per tonne-km) permitted under the state aid framework. Germany also monitors cumulation across multiple concurrent schemes to ensure that the total aid received by any operator does not exceed 30% of total rail freight costs or 50% of avoided external costs. See European Commission (2023), 'State Aid SA.109540 (2023/N) – Germany', December. External costs considered in the study by INFRAS include accidents, noise, congestion, air pollution, direct climate impacts and impacts on the local environment. See INFRAS (2019), 'Externe Kosten des Verkehrs in Deutschland Straßen-, Schienen-, Luft- und Binnenschiffverkehr 2017', August, p. 7.

costs (a higher ceiling than Germany's scheme) and calibrates the level of support separately for each freight segment using an independent external cost study, rather than applying a uniform flat rate across all eligible operators.[29]

Lessons for developing a GBR traction discount policy

While the subsidy scheme implemented in Germany is intended to support modal shift, it provides a useful example of a discount that applies to all traction types (including diesel) to encourage decarbonisation. The evidential requirements are relatively light and operators receive an upfront TAC discount. Calibrating the discount to the Commission's Handbook provides a transparent basis for the subsidy. Introducing a mechanism for adjusting the discount level in line with the available budget and realised traffic volumes provides certainty that total funding will meet approved applications, but creates uncertainty for operators regarding the level of support.

3.4 Discounts applied to the cost of electricity for rail operators

We summarise below a temporary electricity price cap scheme introduced in Germany. This provides useful lessons for any potential policy that targets the operating cost of electric traction, while illustrating the opportunity for multiple policies to run concurrently as the scheme runs alongside the subsidy programme set out in section 3.3.

Box 3.3 A temporary price cap in Germany in 2023 following a price shock

During the energy crisis in 2023, Germany introduced a temporary cap on the price of electricity to preserve the competitiveness of electric rail relative to diesel rail, and to prevent modal shift towards road freight.

Scope and form of support—all rail operators (including both passenger and freight) with annual electricity consumption exceeding 30MWh were eligible for a monthly reduction in their electricity bills throughout 2023. The measure was introduced

[29] European Commission (2022), 'State aid SA.104264 (2022/N) – Austria', December; Bundesministerium Innovation, Mobilität und Infrastruktur (2023), 'Aufruf zum Förderungsprogramm"SGVPlus" (Schienengüterverkehr 2023–2027 sowie Wegeentgeltförderung) für das Jahr 2026'.

as a temporary response to the energy price shock rather than as a permanent structural change to electricity costs.

Level of support and calibration—the commodity portion of the electricity price was capped at €0.13/kWh, applied to up to 70% of each operator's prior-year consumption. The discount level reflected a policy decision, rather than an external cost methodology. While the total cost would be determined by the divergence between the price cap and the market price for electricity, a budget of around €1.125bn was provided.

Funding and administration—the scheme was funded through the national government, and was subject to the EU state aid framework. Support was delivered through monthly reductions in electricity bills, lessening the administrative burden on operators compared with an ex-post application process. Rail freight revenue increased by 8% in 2023, and the market share of rail freight declined by only 1.1 percentage points. The scheme is broadly considered to have been successful in stabilising the market.

Source: Oxera, European Commission (2023), 'State Aid SA. 105120 (2022/N) – Germany', February; Bundesministerium der Justiz und für Verbraucherschutz (2022), 'Gesetz zur Einführung einer Strompreisbremse* (Strompreisbremsegesetz - StromPBG)', December; Bundesnetzagentur (2024), 'Market Analysis Germany', November.

Lessons for developing a GBR traction discount policy

The case study illustrates the potential merits of a time-limited policy that reduces the cost per unit of electricity for operators, while transferring risk associated with energy price volatility to the public authority.

3.5 Insights from the use of discounts and penalties applied to airport charges to support environmental objectives

While the case studies described above focus on policies to support environmental objectives in rail, airports apply similar schemes across

the Europe through take-off and landing charges to encourage airlines to use low-carbon aircraft.[30] [31]

Airport charges recover costs related to the provision of aircraft-/airline-related services (including runway, taxiways and lighting) and passenger services (including terminal infrastructure and cargo handling).[32] European airports incorporate environmental discounts and penalties into their existing take-off and landing charges.[33] The total level of airport charges is set to recover the airport's costs and is distributed among operators, with a penalty or discount adjustment applied to reflect the environmental performance of each aircraft.

The approach is revenue-neutral for the airport manager, with higher charges for poorer-performing aircraft offsetting discounts for better-performing aircraft. While some airports, including Heathrow, recover charges at the end of each period, other airports, including Berlin, require the charge to be paid in advance.[34] Any discount or penalty is automatically applied to charges based on the aircraft type, with an ex-post adjustment mechanism where charges are paid in advance to reflect any revisions to aircraft type.

The level of discount/penalty is calibrated to the environmental performance of the aircraft, based primarily on local environmental impacts, rather than global impacts such as CO_2.[35] This can include nitrogen oxide emissions and noise, assessed over the landing and take-off cycle. The policy incentivises airlines to operate less polluting aircraft more frequently, while introducing a degree of competition between airports for the least polluting aircraft from an operator's fleet to be allocated to their route.

Lessons for developing a GBR traction discount policy

The integration of discounts and penalties into existing aviation charges demonstrates that environmental objectives can be supported through the access charging regime while minimising risk of discrimination, rather than requiring a separate grant or support mechanism. As the

[30] Airports Council International (2020), 'Information on the use of modulations of airport charges for environmental reasons', June, p. 3.
[31] Ibid., p. 7.
[32] Ibid., p. 2.
[33] Ibid., p. 7.
[34] Heathrow Airport Limited (2025), 'Heathrow Airport Limited Conditions of Use including Airport Charges from 1 January 2026, October, section 4; Berlin Brandenburg Airport (2025), 'Charges Regulation', January.
[35] Airports Council International (2020), 'Information on the use of modulations of airport charges for environmental reasons', June, p. 6.

adjustment is automatically applied based on the aircraft type, the scheme is relatively straightforward to administer, offering a useful precedent for how a comparable traction-based discount could be embedded within GBR's charging framework.

The aviation scheme also demonstrates the opportunity to include wider environmental benefits within the assessment beyond carbon emissions, such as noise. It may be appropriate for GBR to consider calibrating the value of any environmental benefits on a geographical basis—for example, applying larger discounts to encourage lower-emissions traction in residential, urban areas.

4 Principles and design considerations for a discount policy to support lower-carbon traction choices under GBR

4.1 Introduction

This section sets out two distinct elements that inform our approach to developing and assessing a GBR traction discount policy to support lower-carbon traction choices:

- **principles**, to inform the design of each policy option (section 4.2), which are used to assess the relative merits of each approach in section 5;
- **design considerations** (section 4.3), which reflect overarching choices and trade-offs for GBR to refine and calibrate the design and implementation of any policy option in line with its own priorities, rather than providing a basis for comparing the merits of each option.

We also provide a high-level overview of the subsidy control considerations that will be relevant for the appraisal of any traction discount policy (section 4.4).

4.2 Principles for assessing GBR traction discount policy options

Before starting this work, Network Rail undertook initial stakeholder engagement to explore approaches to discounts that might encourage lower-carbon traction choices by operators. A key theme that emerged is that any future discount framework must be based on a transparent set of design principles.

We set out below **six principles** that have informed the design and assessment of each of the three policy options set out in this report.

1 **Targeted and evidence-based—**target market failures or policy objectives, underpinned by evidence of the issue and how the discount will address it.

2 **Incentive-compatible—**discounts should provide incentives for operators to adopt low-carbon traction, and support behavioural change consistent with the policy objective, while mitigating potential unintended incentive effects and considering any impact on the existing incentives provided by the charging regime.

3 **Proportionate and time-limited—**discounts should be proportionate to the outcome sought, taxpayer affordability, and the time needed to deliver change.
4 **Not unduly discriminatory—**discounts should be available on equivalent terms to operators undertaking comparable activities.
5 **Transparent and well-governed—**eligibility criteria should be published, and decisions should be based on clear governance arrangements.
6 **Minimum distortion—**discounts should minimise distortions to competition, investment and efficient pricing signals.

The design and assessment of the policy options has also been informed by the following **two overarching legal requirements,** which any traction discount policy would need to comply with.

- **Aligned with GBR's statutory duties** and charging objectives, and with wider rail and decarbonisation strategy.[36]
- Compliant with the **Subsidy Control Act** 2022 (SCA, see section 4.4).[37]

Within principle 2, an important consideration is **additionality:** to what extent will the policy change operators' behaviour, rather than providing funding where the same services would have operated anyway, using the same traction type, in the absence of the scheme? Indeed, when assessing the options in section 5, it is useful to consider the realistic no-subsidy counterfactual, which also forms a core part of a subsidy control assessment (see section 4.4).

While these principles provide a framework for assessing the relative merits of each policy option, stronger performance against one principle may mean weaker performance against another, necessitating trade-offs. For example, targeting support precisely to the carbon benefit and financial need (principle 1) generally requires more granular evidence, which can increase administrative complexity and reduce transparency (principle 5).

[36] See Clause 18(2) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June; and Department for Transport (2026), 'Railways Bill factsheet: the Long-Term Rail Strategy'. While the Long Term Rail Strategy has not yet been issued, one of its five strategic objectives will be 'supporting government's environmental sustainability objectives'—for example, by 'delivering rail net zero (traction and infrastructure)'.
[37] It is beyond the scope of this work to undertake a subsidy control assessment.

As we discuss further below, introducing a discount that applies to both existing and new lower-carbon traction may minimise discrimination (principle 4) and market distortions (principle 6), but risks providing a discount even where operators do not change their behaviour (i.e. limited additionality), challenging the proportionality of the approach (principle 3). Therefore, these principles must be applied holistically when assessing each option.

4.3 Design considerations for any TAC discount policy

While this report sets out three distinct policy options for introducing a TAC discount to support environmental objectives, the overall incentives that will be provided to operators, and the outcomes that will be achieved, will vary according to the specific design and implementation of the scheme. Indeed, each policy option can be revised and refined to reflect the wider set of choices available to GBR as priorities develop, and in consultation with stakeholders.

We set out below six overarching choices that are relevant to consider within any policy option.

Eligibility of alternative, non-electric, lower-carbon traction types—GBR faces a choice regarding which lower-carbon traction types should be supported within a future discount scheme. Where the policy provides support for electric traction only, the application to hybrid-electric vehicles would need to be considered. This is particularly important where current infrastructure constraints mean that operators do not have access to fully electrified routes, and alternatives including hybrid and HVO-fuelled locomotives are needed. Furthermore, it will require time for operators to shift from diesel to electric alternatives, given the lifespan of existing vehicles and the capital costs of fleet replacement.

Level and structure of the discount—any discount option must consider whether to provide the same level of discount to all eligible lower-carbon traction types and vehicles, and whether the discount should be provided up-front, as a rebate or in another form. While applying a uniform discount to all approved vehicles reduces the administration and evidential requirements for both GBR and operators, a more calibrated approach based on carbon benefits may provide better-targeted incentives. However, varying the discount based on the carbon benefits of different electric traction vehicles could be seen as unfair by operators who invested before better-performing models became available. For any upfront or rebate discount, providing transparency and certainty to operators will be critical to support investment incentives.

Eligibility of existing vehicles—a key design choice for GBR is whether the discount should apply to lower-carbon traction currently in operation, or only to new vehicles. Concentrating any discount on new vehicles would be consistent with incentivising additional services to adopt lower-carbon traction. However, where operators with existing access to diesel and lower-carbon traction face a continuous choice regarding which type to operate based on their relative costs, providing support to existing fleets can encourage operators to increase the use of lower-carbon traction. Furthermore, excluding existing fleets may distort competition, where operators who have previously invested in decarbonisation face a cost disadvantage, and may risk future uncertainty for operators regarding ongoing support for investments.

Duration of the discount—for any discount policy, there is also a choice regarding the duration of the discount, and whether the duration should vary across applicants. In principle, any discount should be limited to only the duration necessary to achieve the desired behavioural change from operators. However, where the policy is designed to address a permanent operating cost differential, there is an economic rationale for providing continued support throughout FP1. GBR should also consider any signals it can provide regarding the charging scheme beyond FP1 to support long-term incentives to invest.

Funding—any discount policy to support electric traction will require funding, with transparency for operators regarding any rationing of support that may be required to meet financial constraints. For example, will applications be assessed on a first-come, first-served basis until the budget is exhausted? Will the subsidy level be adjusted in-period (i.e. annually) to ensure sufficient funding throughout FP1? To support investment incentives, the scheme should provide operators with certainty where possible.

Evidential requirements—the choices made regarding the design and calibration of the policy will shape the evidential and administration requirements for both GBR and operators. A more tailored approach, with discounts varying by traction type, route, or operators' financial need, could improve targeting towards achieving decarbonisation. However, this would require more detailed evidence (e.g. on costs and environmental performance), increasing the complexity of the scheme, which may reduce the policy's effectiveness.

While this report focuses primarily on discounts to support lower-carbon traction choices by operators, any discount policy would need to contribute towards a coherent TAC scheme, which provides consistent incentives and transparency for all stakeholders.

4.4 Compatibility with subsidy control requirements

Any discount policy will also need to consider subsidy control requirements. While a formal assessment is beyond the scope of this report, we summarise the relevant considerations below.

A traction discount may constitute a subsidy under the SCA 2022. This is because it would provide an economic advantage to eligible railway undertakings by reducing the charges they would otherwise pay for access to the rail network. The fact that support would be provided through a reduction in TAC, rather than via a direct grant, would not necessarily alter this assessment.

The SCA requires the public authority responsible for the measure to assess whether the subsidy or subsidy scheme is consistent with the subsidy control principles. As the proposed discount is intended to support decarbonisation, the relevant energy and environment principles would also need to be considered. The assessment should be proportionate to the value of the support and its potential effects on competition and investment. See Box 4.1.

Box 4.1 Subsidy control principles

- **Principle A**: the subsidy pursues a specific policy objective to remedy a market failure or address an equity rationale.
- **Principle B**: the subsidy is proportionate to the policy objective and limited to what is necessary to achieve it.
- **Principle C**: the subsidy is designed to bring about a change in the economic behaviour of the beneficiary that would otherwise not occur.
- **Principle D**: the subsidy does not normally compensate for costs that the beneficiary would have funded in the absence of support.
- **Principle E**: the subsidy is an appropriate policy instrument and the objective cannot be achieved through less distortive means.

- **Principle F**: the subsidy minimises negative effects on competition and investment.
- **Principle G**: the expected benefits of the subsidy outweigh its negative effects, including any effects on competition, investment and international trade.

Sources: UK Government (2022), 'Subsidy Control Act 2022', April, Schedule 1.

The assessment would need to consider additionality carefully. This is particularly relevant if the discount applies to existing lower-carbon fleets as well as to new investments during FP1. Support for existing fleets may be justified where operators retain a choice between lower-carbon and diesel traction, and the discount is expected to increase the use of lower-carbon traction. However, the case for support would be weaker where the relevant activity would take place in any event or where the operator has no realistic ability to change its traction choice.

The duration of the discount is also relevant to the assessment of proportionality and additionality. The SCA does not impose a general maximum duration for a measure of this type. However, the period of support should be no longer than necessary to achieve the policy objective and should be considered alongside the level and structure of the discount. A discount operating throughout FP1, from 2029 to 2034, could be justified where:

- the operating cost differential between diesel and lower-carbon traction is expected to persist throughout the period;
- operators require certainty when making fleet procurement, leasing and deployment decisions; and
- a shorter period would be insufficient to influence investment or operating decisions.

The design of the discount should also seek to minimise distortions by:[38]

- applying objective and transparent eligibility criteria;
- making support available on equivalent terms to operators undertaking comparable activities;

[38] While these considerations are similar to the principles set out in section 4.2, our assessment in this report does not provide a formal subsidy control assessment.

- calibrating the discount, where possible, to the relevant operating cost differential and environmental benefit;
- considering whether operators unable to use electric traction because of infrastructure constraints should have access to comparable support for other lower-carbon traction types; and
- taking account of other public support measures to avoid over-compensation.

5 Options for setting a traction discount policy to support lower-carbon traction choices under GBR

5.1 Introduction

In this section we develop three distinct options for the design and implementation of a GBR traction discount policy to support lower-carbon traction choices by operators.

As discussed in section 4, the outcomes and incentives provided by any discount policy will be shaped by the precise implementation of the policy and the overarching design considerations. The options are intended to reflect distinct approaches, which can be refined further in consultation with stakeholders.

For each option, we provide the following.

- **High-level operational details—**including the main design features, eligibility criteria, and how each option could be operationalised in practice, taking into account insights from the policy precedents discussed in section 3.
- **Feasibility and implementation considerations—**including the approach for implementing and administering the scheme in practice and evidential requirements.
- **Assessment against the six principles and two overarching legal requirements**, as defined in section 4.2.

In summary, Option 1 provides a fixed discount on the VUC for all operators that use lower-carbon traction (including electric, diesel-battery hybrid and HVO); Option 2 introduces a discounted rate for electricity for operators through EC4T; and Option 3 sets out a more calibrated approach where the level of support varies across traction types depending on the carbon reduction and financial need, which could be implemented through the VUC.

We have not considered a discount policy that would be administered through the EAUC as this charge represents a relatively small proportion of TACs.

5.1.1 Assumptions

To develop the options outlined in this report, we have needed to make specific assumptions about the future policy framework in which GBR will be setting charges and the objectives that any discount policy

would be expected to achieve. These assumptions—developed in consultation with Network Rail—are set out below.

- **Duration—**the proposed policy would operate throughout FP1 (2029–34), with no assumption that the policy would necessarily continue beyond FP1.
- **Operating costs—**the discount policy is intended to incentivise lower-carbon traction choices by addressing operating cost differentials between diesel and lower-carbon alternatives. It is not intended to support direct procurement of new rolling stock or broader capital investment.
- **Policy objective—**the objective of the policy is to encourage lower-carbon traction choices. While lower-carbon traction may provide additional benefits to the infrastructure manager, these are not included within the assessment.[39] The policy options also do not consider wider environmental objectives, such as air quality effects and noise, which may involve regional considerations (e.g. to deliver targeted improvements in urban, residential areas).
- **Modal shift—**while the policy options should not discourage modal shift from road to rail, supporting modal shift is not the objective of this policy.
- **Funding—**for any policy, the level of support would be calibrated to align with the total available funding. Where the total volume of discounts may exceed the available funding, a transparent process (e.g. first-come, first-served, or rationing the subsidy level) would need to be applied.

5.2 Policy Option 1: Uniform discount on the VUC

5.2.1 High-level operational details

Policy Option 1 applies a uniform, fixed-percentage discount (i.e. up to 100%) to the VUC for all freight and open access operators using lower-carbon traction, for the full duration of FP1 (2029 to 2034). The discount is available to all eligible operators on equivalent terms for all approved lower-carbon traction types, including electric and HVO. The discount would apply to both existing services using lower-carbon rolling stock and new vehicles, including on new routes.

Where the introduction of a new traffic flow would attract a 100% VUC discount under the existing policy (see section 2.2.1), any lower-carbon

[39] For example, electric traction may provide improved acceleration and deceleration, which could support an increase in network capacity.

discount under this policy would begin only after the existing discount had expired.

While we have assumed that eligible operators would receive a discount throughout FP1, the discount level would need to be aligned with the available funding. Indeed, there will be trade-offs between the scope and duration of the support, and the level of the discount, which would need to be considered in the round, including through consultation with stakeholders. In principle, GBR could calculate the minimum expected level of funding required based on existing eligible flows, in addition to a forecast of the number of additional flows that would adopt lower-carbon traction following the introduction of the policy.

A numerical example, shown in Table 5.1, illustrates the approach that GBR could follow to calibrate the level of discount based on the available budget.

Table 5.1 Illustrative numerical example for Policy Option 1

	VUC discount level	20%	40%	60%
	Forecast annual VUC payable by existing lower-carbon traction traffic (annual)	£10m	£10m	£10m
1	Expected cost of discount based on existing traffic and traction types (annual)	£2.0m	£4.0m	£6.0m
2	Expected cost of discount due to existing services shifting from diesel to lower-carbon traction (annual)	£0.2m	£1.0m	£2.4m
3	Expected cost of discount applied to new traffic flows (annual)	£0.1m	£0.2m	£0.3m
	Total expected annual cost	**£2.3m**	**£5.2m**	**£8.7m**

Notes: All numerical values are provided for illustrative purposes only. The expected cost of the discount due to existing services shifting from diesel to lower-carbon traction increases with the discount rate due to: i) an increase in the cost of the discount for a given degree of switching behaviour by operators, as the discount rate increases; ii) an increase in the expected degree of switching by operators as the discount rate increases.

Calculating the total (annual) cost of the policy comprises three components. First, based on existing traffic levels and traction types, the cost of applying any VUC discount can be calculated. In this example, a 20% discount level generates an expected annual cost of £2m. Second, the policy is designed to encourage operators to switch from diesel to lower-carbon traction, and these traffic flows would receive the discount. Assuming that the discount rate is 20%, this generates an additional annual cost of £0.2m in this example. Third, while the policy does not focus on supporting modal shift, the discount would apply to new services that adopt lower-carbon traction, which would represent an additional cost.

GBR could adopt a similar approach to the numerical example set out above to forecast the expected cost under varying discount levels, enabling GBR to calibrate the discount level with the available funding. While the example illustrates how the cost of the policy associated with the additionality (i.e. the behavioural change of operators in response to the discount) could be calculated, further work would be required to assess the expected degree of switching to lower-carbon traction, and the extent to which operators expect to introduce new services during FP1. This could be informed through consultation with stakeholders.

Overall, this approach resembles the existing VUC discount applied in Great Britain for new traffic flows, and the TAC discount schemes in Germany where all qualifying operators receive the same level of subsidy.

5.2.2 Feasibility and implementation

The administrative requirements for both operators and GBR are relatively low. Operators of approved traction types automatically qualify without requiring a bespoke application or panel assessment based on financial need or carbon impact. The discount could be embedded within the existing VUC charging infrastructure, similar to the existing discount for new traffic flows, with a rebate mechanism for administering the discount following each period. This process can be refined further through consultation with operators, including to define the timing for the payment of any rebate that is due.

For some traffic flows, the information that operators already submit to inform the calculation of the VUC may be sufficient to enable the appropriate calculation and application of a discount under this policy. For example, operators are expected to confirm the locomotive class for each traffic flow. Where the evidence currently provided by operators is insufficient for calculating the appropriate discount, the process would need to be refined to ensure that the required additional

evidence is submitted. For example, where a hybrid locomotive can operate using both electric and diesel, a process would need to be established to confirm the proportion of the route powered by each traction type, while minimising manual reporting by operators. To maintain simplicity and reduce administrative burden, GBR may explore ways to aggregate these calculations for each operator within a given period, rather than requiring the O/D of each train.

5.2.3 Strategic assessment—alignment with principles

We assess below the alignment of the policy with the principles set out in section 4.2.

Table 5.2 Alignment of Option 1 against the principles

Principle	Assessment
Targeted and evidence-based—target market failures or policy objectives, underpinned by evidence of the issue and how the discount will address it	**The policy provides support towards addressing the operating cost differential** between diesel and lower-carbon traction types, to encourage operators to adopt lower-carbon traction. Therefore, the policy is broadly targeted towards an established market failure: the presence of positive externalities associated with low-carbon traction, which generate benefits that would otherwise not be reflected in the decisions that operators face. However, a uniform discount across all low-carbon traction types (including all variants of electric traction and alternative low-carbon traction, such as HVO) does not target the specific benefits associated with each traction type. Providing support to existing traffic flows using electric or HVO risks providing a discount on flows that would have operated using the same traction type anyway in the absence of the support, potentially limiting additionality.
Incentive-compatible—discounts should provide incentives for operators to adopt low-carbon traction, and support behavioural change consistent with the policy objective, while mitigating potential unintended incentive effects and considering any impact on the existing incentives provided by the charging regime.	Applying a uniform discount to all low-carbon traction types **provides a financial incentive for operators to run lower-carbon traction types.** Operators with limited access to lower-carbon fleet will have stronger incentives to procure eligible locomotives, while those with existing access to lower-carbon traction—who select on a continuous basis whether to run electric or diesel locomotives—could be incentivised to increase their use where feasible (i.e. taking into account infrastructure constraints). As discussed above, providing support to existing services operating with lower-carbon traction types introduces a risk that discounts will be provided to operators that do not change their behaviour (i.e. limiting additionality). However, including existing services provides a signal of reassurance to operators that investments made during FP1 are more likely to fall within the scope of any discount policy beyond FP1. The level of the discount will also inform the extent to which the policy is effective in incentivising behavioural change by operators efficiently. While a higher discount level reduces the risk that there will be limited behavioural change, such that the policy only provides a discount to services that would have always used lower-carbon traction, a higher discount level increases the risk that the value of the discount exceeds the level required to incentivise behavioural change, reducing the efficiency of the policy. A discount applied throughout FP1 may not be a sufficient time horizon to encourage operators to replace diesel traction at scale. They may choose to lease in order to

Principle	Assessment
	benefit from the scheme, rather than procuring rolling stock. Therefore, it will be important to assess their access to lower-carbon traction. Any discount applied through the VUC will weaken the incentives that are currently provided by the existing charging regime. As discussed in section 2.1.1, vehicles that impose less wear and tear on the network incur lower charges, which encourages operators to use more track-friendly vehicles. Therefore, the impact of a fixed-percentage VUC discount on the wider incentives provided by the charging regime would need to be considered.
Proportionate and time-limited—discounts should be proportionate to the outcome sought (public funding affordability), and the time needed to deliver change	**Providing a discount throughout FP1 may be proportionate where operators face a persistent operating cost** differential between diesel and low-carbon traction (see section 4.3). Providing a discount to existing operators will also support the continued and increased use of lower-carbon traction. However, where operators would have operated lower-carbon traction anyway in the absence of financial support, the policy would not be proportionate. As discussed above, and in section 4.3, the eligibility criteria are key to ensuring that the scheme is proportionate and enables operators to move towards lower-carbon traction types, rather than providing discounts for services that would have operated anyway using lower-carbon traction. Providing support to non-electric, lower-carbon traction types, such as HVO, may be proportionate where operators cannot replace diesel rolling stock with electric, and HVO can contribute towards the transition to decarbonisation. The level of the discount will also inform the extent to which it is proportionate. A 100% VUC discount applied in the absence of quantifying the financial need or carbon benefit, even at an aggregate level across all regions and traction types, may not deliver value for money.
Not unduly discriminatory— discounts should be available on equivalent terms to operators undertaking comparable activities	**The discount is available on equal terms to all operators undertaking comparable activities using low-carbon traction**, thereby minimising discrimination. However, where the operating cost differential varies between eligible traction types (such as electric and HVO), and where only some operators have access to certain traction types due to factors beyond their control (such as infrastructure constraints), this may lead to some operators benefitting to a larger extent than others.
Transparent and well-governed—eligibility criteria should be published, and decisions should be based on clear governance arrangements	**Eligibility criteria to define which lower-carbon traction types will receive support can be established transparently in a way that is easy for operators to understand**, while minimising the administrative costs for operators and stakeholders. Eligibility may be defined as all non-diesel traction, though a process would need to be specified for the treatment of traffic flows that are powered by multiple traction types (i.e. diesel and HVO), while minimising the administrative burden for operators and GBR. The discount would be applied automatically to all eligible traction types, following confirmation of actual traffic flows and traction types. A clear application process and governance framework could be established using existing charging infrastructure. Information may be required from operators to determine the extent to which different traction types have been used. A proportionate and efficient approach for the provision of information required from operators could be determined through consultation with stakeholders.
Minimum distortion— discounts should minimise distortions to competition,	As discussed above**, a uniform discount across all eligible traction types and operators minimises discrimination.** Furthermore, ensuring that both existing and new investments receive support removes any potential competitive distortions whereby operators who

Principle	Assessment
investment and efficient pricing signals	have previously invested in lower-carbon traction face a cost disadvantage relative to operators that undertake a future investment following the introduction of the policy. However, where the financial need varies across alternative traction types or traffic flows, **a uniform discount may benefit some operators to a greater extent than others.** For example, if the additional cost associated with operating electric traction is substantially lower than the additional operating cost associated with HVO, operators that are able to adopt electric traction may benefit disproportionately. This may distort incentives to invest in electric, HVO and other lower-carbon traction types.

Source: Oxera.

5.2.4 Aligned with GBR's duties

Option 1 is aligned with GBR's duty to **'promote the use of the railway network […] for the carriage of goods'** by reducing operating costs across services that adopt lower-carbon traction and would provide a simple and predictable form of support consistent with operators having a **'reasonable degree of assurance'**.[40] However, a uniform discount would be relatively weakly targeted against the **'need to make efficient use' of public funds**, as the same support would be provided irrespective of financial need, traction type or carbon benefit. The policy would have a weaker link to decarbonisation objectives than a more calibrated approach.[41]

5.2.5 Initial considerations for compliance with the SCA 2022

Option 1 appears capable of being structured to address an identified market failure: the positive environmental externalities associated with lower-carbon traction and the resulting operating cost differential relative to diesel. However, the option is not calibrated to differences in the operating cost differentials or carbon benefits associated with electric traction, HVO and other eligible traction types. This weakens the case that the support is proportionate and limited to what is necessary to achieve the policy objective, and could result in distortions between traction types, operators and competing modes of transport.

A key consideration is that applying a uniform discount to all lower-carbon traction services introduces a risk that funding is provided without generating a substantial change in operators' behaviour, limiting additionality. Further analysis would be required to assess the no-subsidy counterfactual to inform this assessment. The assessment

[40] See Clause 18(2) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June.
[41] Department for Transport (2026), 'Railways Bill factsheet: rail freight'.

would also need to consider whether a five-year discount is necessary to influence investment and operating decisions, and potential effects on competition and investment, including whether operators unable to use electric traction because of infrastructure constraints would be placed at a disadvantage.

At this stage, these points represent initial considerations only and do not constitute a final conclusion on the compatibility of Option 1 with the subsidy control principles.

5.3 Policy Option 2: EC4T discount

5.3.1 High-level operational details

Option 2 applies a fixed-percentage discount on the EC4T charge (the cost per unit of electricity) for all operators using electric traction throughout FP1 (2029–34). The percentage discount rate could be calibrated to the estimated operating cost differential between electric and diesel traction, and the discount would apply to both existing and new vehicles. Introducing the discount as a percentage on the EC4T rate means that any risk associated with electricity price volatility is shared between GBR and operators, to encourage operators to use, and invest in, lower-carbon traction.

A uniform discount rate would apply across all regions within Great Britain. Where there are substantial variations in EC4T on a regional basis within Great Britain, different discount rates could be considered.

This approach most closely resembles the precedents explored in section 3.4, which introduced a temporary discount on the cost of operating electric services.

By definition, the policy applies only to vehicles drawing power from overhead lines and third rail, omitting HVO- and battery-based traction. However, as well as supporting the use of pure electric traction, it may at the margin drive decisions between diesel and electric where hybrid (e.g. battery) power is available for short distances and electric current is not provided.

GBR could consider introducing a separate scheme in parallel to option 2 to provide support for the adoption of HVO. For example, a discount could be applied through the VUC to support HVO traction, as outlined in Option 1, while a discount to support electric traction could be administered under EC4T, as set out under Option 2.

5.3.2 Feasibility and implementation

EC4T sits outside the standard TAC framework and would therefore need to be discounted through a separate mechanism from the VUC. The discount would be applied as a percentage reduction on the unit rate of electricity billed within each period.

Where consumption is metered, the discount would be applied to recorded usage; where it is modelled, it would be applied to estimated consumption. Operators of electric traction would automatically qualify based on electricity purchased. Where rolling stock uses a combination of electricity and another source, it is not generally necessary to disaggregate the relative share of electricity, as the charge is based on electricity consumption. However, in its current form, the policy would discount only the cost of electricity purchased through a Network Rail-managed power source.

5.3.3 Strategic assessment—alignment with principles

We assess below the alignment of the policy with the principles set out in section 4.2. We note that the extent to which the introduction of additional electric traction will generate carbon benefits relative to diesel will depend, in part, on the source of the electricity.

Table 5.3 Alignment of Option 2 against the principles

Principle	Assessment
Targeted and evidence-based— target market failures or policy objectives, underpinned by evidence of the issue and how the discount will address it	**The discount directly targets the operating cost differential between diesel and electric traction by reducing the cost of electricity.** This addresses an established market failure: the positive environmental externalities associated with electric traction that are not otherwise reflected in operators' cost structures. However, the policy does not extend support to alternative lower-carbon traction, including HVO. This may limit the effectiveness of the policy, especially where operators are unable to adopt electric traction due to factors beyond their control (such as infrastructure constraints). Where more recently purchased electric traction provides greater carbon benefits, this is not explicitly reflected in the policy. However, such discrimination may penalise operators that invested to decarbonise at an earlier stage, which may introduce market distortions and dampen investment incentives.
Incentive-compatible— discounts should provide incentives for operators to adopt low-carbon traction, and support behavioural change consistent with the policy objective, while mitigating potential unintended incentive effects and considering any	**An EC4T rate discount provides a financial incentive to operate electric traction,** and applying the discount to existing and new vehicles incentivises operators to introduce additional electric traction and, where possible, make greater use of existing electric vehicles. A key limitation is that for operators to switch from diesel to electric traction will require sufficient infrastructure with fully electrified routes, or for operators to be able to continue a journey using alternative traction (such as diesel) where electrification is not available, which may create operational inefficiencies or

Principle	Assessment
impact on the existing incentives provided by the charging regime.	require hybrid traction. The scheme provides no incentives to invest in HVO or alternative lower-carbon fuels, except for electricity. Structuring the discount as a percentage of the EC4T introduces risk-sharing between operators and GBR on future electricity price volatility, providing greater predictability for operators and supporting investment incentives.
Proportionate and time-limited— discounts should be proportionate to the outcome sought, public funding affordability, and the time needed to deliver change	**The discount could encourage operators to make greater use of electric traction at the margin but only in a small proportion of cases** where operators have access to fully electrified lines, or where they are able to continue running using battery power or an alternative non-electric source of traction when the lines end. Supporting the discount throughout FP1 may be proportionate for incentivising more intensive use of already-procured electric traction, where the operating cost differential is expected to persist. The extent to which the policy is proportionate will depend on robustly estimating the operating cost differential relative to diesel, and ensuring that any discount does not exceed the value of the carbon reduction. Applying a discount only during FP1 may not be sufficient to incentivise decisions regarding new fleet procurement.
Not unduly discriminatory— discounts should be available on equivalent terms to operators undertaking comparable activities	**In principle, the discount is available to all operators that use electric traction.** However, restricting support to electric traction **concentrates the benefits to operators with existing electric fleet**, or to operators who are able to access additional electric fleet, while excluding those who unable to consider electric traction due to factors beyond their control, such as the absence of a fully electrified route. The policy also **discriminates against operators that have previously invested in, or may plan to invest in, HVO or other traction types.**
Transparent and well-governed— eligibility criteria should be published, and decisions should be based on clear governance arrangements	**Eligibility is transparent, with all operators benefitting from the same percentage discount on the EC4T.** The discount is relatively simple for operators to understand. Governance arrangements could be relatively straightforward, with the discount applied automatically through the existing EC4T billing process without requiring a panel to assess financial need or carbon benefits for each application. However, during the initial stakeholder engagement exercise, some operators noted that the EC4T may be excessively complex and generate uncertainty for operators. Any discount would need to be implemented in a way that simplifies EC4T charges more broadly, rather than creating further complexity.
Minimum distortion—discounts should minimise distortions to competition, investment and efficient pricing signals	**By definition, the policy provides support for electric traction only, with less support provided to hybrid-electric traction**. This may be inconsistent with the flexibility that operators require since only 39% of the network is electrified.[42] Battery-powered services which do not purchase electricity through the EC4T would also not be supported. **The policy distorts the incentive to invest in alternative lower-carbon traction** such as HVO, which is not supported and would become more expensive compared to electric. Indeed, operators who run on HVO and compete against rivals with existing/future access to electric traction may face a cost disadvantage. There may also be wider distortions to the market for manufacturers of rolling stock.

[42] Department for Transport and the Office of Rail and Road (2025), 'Rail Trends 2025', 9 December.

Source: Oxera.

5.3.4 Aligned with GBR's duties

A fixed percentage EC4T discount would broadly support GBR's duty to **'promote the use of the railway network […] for the carriage of goods'** by reducing the cost of electric freight. However, as a fixed EC4T discount would support electric traction only, this may constrain the policy's ability to **'promote the use of the railway network…for the carriage of goods'** and fully capture environmental aspects of the **'public interest'** where electrification is infeasible, where HVO and battery/hybrid could contribute to reducing emissions.[43]As the discount would not be calibrated explicitly to financial need or environmental benefits, its alignment with the '**need to make efficient use' of public funds** is weakened. However, the use of a fixed rate would provide operators with greater simplicity and a **'reasonable degree of assurance'**.

The option provides some support towards wider rail decarbonisation objectives by strengthening the incentives to use and invest in electric freight, but **only at the margin in a small number of cases due to infrastructure constraints**, primarily where operators have access to a fully electrified line. No support is provided for alternative lower-carbon traction types.[44]

5.3.5 Initial considerations for compliance with the SCA 2022

Option 2 appears capable of being structured to address an identified market failure: the positive environmental externalities associated with electric traction and the operating cost differential between electric and diesel power. Applying the discount through the EC4T would provide a direct incentive to use electric traction, while linking support to electricity consumption and using a fixed percentage rate could provide a relatively simple and predictable mechanism. However, the option would provide no equivalent support for HVO or other lower-carbon traction types. This may limit its effectiveness where electrification is not feasible, and could create distortions between operators, traction types and competing suppliers.

A key challenge for Option 2 is that the case for additionality (i.e. for operators to change their behaviour) appears limited. As set out above,

[43] See Clause 18(2) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June.
[44] Department for Transport (2026), 'Railways Bill factsheet: rail freight', June.

the discount is likely to affect operators' decisions only at the margin where fully electrified lines are available, and would provide the same level of support to existing electric fleets regardless of whether it changes their behaviour. Further analysis would therefore be required to assess whether the level and duration of the discount are proportionate to the policy objective, including whether the discount exceeds the operating cost differential or the carbon benefits associated with electric traction.

Potential effects on competition and investment would require particular consideration, including the impact on operators that cannot access electrification and on investment in HVO or other lower-carbon alternatives. At this stage, these points represent initial considerations only, and do not constitute a final conclusion on the compatibility of Option 2 with the subsidy control principles.

5.4 Policy Option 3: Calibrated discount based on cost and carbon differentials

5.4.1 High-level operational details

This third policy option reflects a more bespoke approach, calibrated to the carbon reduction and financial need associated with lower-carbon traction (including electric and HVO), while balancing the need for a scheme that is tractable for GBR and operators to administer.

The policy option is designed to complement the MSRS (see section 2.2.3). While the MSRS encourages a shift from road to rail, this policy encourages a shift from diesel to lower-carbon rail traction by addressing the operating cost differential relative to diesel.

The economic principle of the MSRS is to calculate both the financial need and the carbon reduction associated with shifting a flow from road to rail, and to apply a discount (grant) based on the lowest of the two values (with additional restrictions applied to the overall level of the grant based on the total operating costs and carbon benefits delivered). The grant is calculated for each O/D pair, requiring bespoke applications for support as both the environmental benefits and financial need vary across traffic flows and regions.

Policy Option 3 draws on these principles, calculating the carbon-reduction benefit and financial need associated with the shift from diesel to lower-carbon traction, and setting the maximum level of support at the lowest of the two values. This ensures that schemes generating a large carbon reduction relative to the financial need are prioritised.

However, in contrast to the MSRS, the carbon reduction and financial need for each lower-carbon traction type (e.g. electric, HVO) would be calculated on an average basis, rather than for each flow. GBR would establish these values on a £/kgtm basis for freight, and as a p/vm, aligning with freight and passenger VUCs, respectively.

The discount would be applied through the existing VUC charging infrastructure at the end of each charging period. However, in principle, the discount could also be administered through EC4T for electric traction, while applying a discount through the VUC for non-electric lower-carbon traction, such as HVO.

The discount would be determined by:

- the rate applicable for a given traction type per kgtm/vm;
- the level of activity (kgtm for freight traffic and vm for passenger traffic) undertaken using this traction type.

Similar to Policy Option 2 (where a flow involves multiple traction types), a process would be required to confirm the relative share of each type to calculate the discount. To maintain simplicity and reduce administrative burden, GBR may explore ways to aggregate these calculations for each operator within a given period, rather than requiring the distance of each flow individually.

The standardised support rates could be fixed for the five-year period of FP1 to provide certainty to stakeholders, but remain subject to periodic review in response to defined extraordinary cost movements.

The overall level of the discount could be further calibrated based on the available budget, as described in the numerical example set out in Option 1 (section 5.2.1). Similar to the MSRS, additional thresholds could also be applied to the discount level to support the efficient use of public funds. For example:

- the maximum discount could be limited to a percentage of the carbon reduction (i.e. 50% under the MSRS), which ensures a minimum BCR;
- the maximum discount could be limited to a maximum percentage of the total operating cost of the traffic flow, where an average value could be applied per kgtm (freight) or per vm (passenger) to mitigate the need for bespoke applications for each flow;
- the maximum discount could be limited as a percentage of the VUC.

A numerical example for freight traffic, shown in Table 5.4, illustrates the standardised approach that GBR could establish.

Table 5.4 Illustrative numerical example for Policy Option 3

Traction option	Operating cost differential relative to diesel (£/kgtm)	Carbon-reduction benefit relative to diesel (£/kgtm)	Maximum support (£/kgtm), subject to any additional conditions
Diesel (baseline)	-	-	-
HVO	15	5	**5**
Electric	10	15	**10**

Note: All numerical values are provided for illustrative purposes only. The operating cost differential and carbon-reduction benefits are illustrative and not intended to reflect actual estimates. Establishing these figures would require an empirical exercise that is outside of the scope of this report. While this numerical example relates to freight traffic, the approach for passenger traffic could be equivalent in principle but would use p/vm as its underlying metric to align with the passenger VUC.
Source: Oxera.

Diesel provides the **baseline** for both traction costs and monetised costs of carbon emissions. For each alternative traction type, the incremental cost and carbon-reduction benefits relative to diesel are published in £/kgtm, with the maximum support set at the lower of the two: £5/kgtm for HVO and £10/kgtm for electric.

Applying an additional threshold, such as limiting the maximum support to 50% of the carbon-reduction benefits, would reduce support to £2.5/kgtm for HVO, and £7.5/kgtm for electric traction, guaranteeing a minimum BCR of 2:1. The level of support could be further calibrated based on the available budget. For example, the discount level could be adjusted by a fixed-percentage across all traction types prior to the introduction of the policy to reflect the available budget. However, the level of support would not be revised during FP1, to provide certainty to operators and support incentives to invest in lower-carbon traction.

Extending the calibration of policy Option 3

The standardised approach discussed above uses average operating cost differentials and carbon reduction between traction types on the basis of the distance and, for freight, the weight of the traffic. Where GBR considers that there is significant variation in operating cost differentials and carbon reduction *within* a traction type, the approach

could be further calibrated (e.g. newer versus older electric rolling stock).

While this report considers environmental benefits associated with lower-carbon traction only, which are measured on a global scale, the policy could be extended to address wider environmental impacts which vary on a regional basis, such as noise in residential areas. In this case, the standardised table could be extended to provide different discounts in different regions, or to apply a multiplier (larger than one) for priority traffic flows.

While additional calibration to the financial need and carbon-reduction benefits improves the targeting of the policy, the evidential and administrative costs for operators and GBR would also increase. The most bespoke variation of Policy Option 3 could move away from a standardised table that abstracts from the specific flow, and require all operators to submit individual applications evidencing both the financial need and the carbon reduction to calculate the discount. However, this introduces additional complexity; for example, to establish how the financial need should be calculated for existing operators of electric traction.

5.4.2 Feasibility and implementation

Implementing this policy requires an assessment of the average operating cost differential and carbon reduction associated with lower-carbon traction types, relative to diesel, on any traffic flow. In many cases, manufacturers provide this information to operators—and GBR could introduce this as a requirement—enabling operators to share the data with GBR in advance of FP1. Existing sources, such as those developed by the European Commission and the UK's Department for Transport, could also provide complementary estimates to inform GBR's analysis.[45]

GBR could estimate a lower bound of the funding requirement to provide the discounts under Policy Option 3 based on the current usage levels of each traction type, combined with a forecast for the expected increase in lower-carbon traction (similar to the numerical example outlined under Option 1).

[45] For example, see European Commission (2019), 'Handbook on the external costs of transport', January. In addition, GBR could leverage approaches and estimates contained within Department for Transport (2025), 'TAG Unit A5.3', Rail Appraisal, November, and Department for Transport (2026), 'TAG Unit A3', Environmental Impact Appraisal, May.

From an operator perspective, the evidential requirements during the period are relatively light, as operators are not required to provide evidence of financial need or carbon reduction directly to GBR for each flow. Rather, operators must provide information and evidence at the end of each period to demonstrate that eligible services and traction have been used, to determine the value of the discount.

For freight, this would require operators to evidence the traction type used and the weight of goods transported, where support is applied on a per **kgtm** basis. For passenger services the relevant metric would be per **vm**. Similar to Policy Option 1, the information already prepared and supplied to GBR for the calculation of the VUC may be sufficient.

As described above, where a flow is powered by multiple traction types, a process would be required to confirm the relative share of each type to calculate the discount. For example, where diesel is used for 25% of a flow, and electric traction is used for the remaining 75%, the discount would only apply to the VUC that reflects the electric mileage. Similarly, where an operator uses both HVO and diesel, a process would be needed for operators to confirm the relative share of each fuel type. This could, for example, require operators to submit their intended traction type at the beginning of the rail period, and confirm any revisions at the end of each rail period to inform the discount that will be applied. The most appropriate approach should be developed in consultation with stakeholders and seek to minimise the administrative burden for both operators and GBR.

5.4.3 Strategic assessment—alignment with principles

We assess below the alignment of the policy with the principles set out in section 4.2.

Table 5.5 Alignment of Option 3 against the principles

Principle	Assessment
Targeted and evidence-based— target market failures or policy objectives, underpinned by evidence of the issue and how the discount will address it	**Option 3 directly targets the market failure** by linking support to both the incremental financial need to support lower-carbon traction and the monetised carbon reduction associated with each traction type relative to diesel. By setting the maximum support based on the lower of the two, the framework helps ensure that public funding targets the operating cost differential and the carbon-reduction benefits inherent in traction choices, while supporting value for money. However, where multiple traction types are used for a flow (e.g. hybrid), this would require a process for operators to provide additional evidence regarding the relative share of each traction type that has been used.

Principle	Assessment
	Establishing a mechanism for revising the discount in response to substantive changes in operating costs could improve targeting but may create uncertainty and administration. However, providing a discount to operators currently using lower-carbon traction may not deliver a highly targeted approach and reduces additionality.
Incentive compatible—discounts should provide incentives for operators to adopt low-carbon traction, and support behavioural change consistent with the policy objective, while mitigating potential unintended incentive effects and considering any impact on the existing incentives provided by the charging regime.	**The option provides a direct incentive to adopt lower-carbon traction** by addressing the operating cost differential relative to diesel, with differentiated support for each traction type to encourage operators to select options with greater carbon-reduction benefits, aligning incentives more closely than a uniform discount (Option 1). However, because support rates would be standardised on an average basis rather than assessed per flow, and the discount would be applied to existing services, **the scheme could still provide support to operators who would have adopted the same traction choice in the absence of a discount**—reducing the additionality, similar to Options 1 and 2. We discuss the challenge of quantifying additionality due to any policy option in further detail in section 5.5. As discussed, the degree of alignment between incentives and outcomes would depend on the level of calibration (e.g. differentiation between vehicle types) implemented within the framework. Similar to option 1, any discount applied through the VUC will weaken the incentives provided by the existing charging regime, including the incentive for operators to adopt more track-friendly vehicles in exchange for a lower charge.
Proportionate and time-limited— discounts should be proportionate to the outcome sought, public funding affordability, and the time needed to deliver change	**The methodology for Option 3 is underpinned by the financial need and carbon-reduction benefits associated with lower-carbon traction choices. This contributes to the overall proportionality of the approach,** and, as discussed, further criteria could be introduced to the discount level to support value for money. However, under the fully standardised approach, averages may conceal variation across vehicle types and specific flows, reducing the proportionality of support in some contexts. Support could become disproportionate if it continues after the relevant cost differential has declined, or for longer than necessary to change behaviour. A mechanism for monitoring the price of diesel, electric and other fuels, and adjusting the discount during FP1 in response to extraordinary price movements, may be needed to support value for money. However, this may increase complexity and reduce certainty for operators, weakening incentives.
Not unduly discriminatory— discounts should be available on equivalent terms to operators undertaking comparable activities	**The policy provides equivalent support to operators undertaking comparable activities** and supports all lower-carbon traction types. Applying the discount to existing investments minimises discrimination between operators who have already invested in lower-carbon traction.
Transparent and well-governed— eligibility criteria should be published, and decisions should be based on clear governance arrangements	The eligibility criteria and rates of support can be published online, and the principles of the scheme are **relatively straightforward** for operators to understand. The standardised approach (rather than flow-by-flow) reduces the administrative burden. To support the scheme's legitimacy, any discount rates

Principle	Assessment
	would need to be established using robust evidence, with a transparent mechanism for applying the discount to support stakeholder confidence.
Minimum distortion—discounts should minimise distortions to competition, investment and efficient pricing signals	Providing support to all lower-carbon traction types, and to both new and existing vehicles, minimises distortions to competition and provides the greatest opportunity to deliver efficient price signals to support investment. Calibrating the discount to carbon reduction and financial need can reduce distortions relative to a flat discount (Option 1). However, the extent to which these price signals are effective would depend on the level of accuracy of the calibration exercise, and on operators having confidence that the discount rates would remain stable. As discussed above, introducing a mechanism to adjust rates during FP1 in response to changes in relative costs (e.g. diesel and electricity prices) could improve accuracy for targeting the policy, but the resulting uncertainty could act as a disincentive for operators to invest in lower-carbon traction.

Source: Oxera.

5.4.4 Aligned with GBR's duties

Option 3 aligns closely with GBR's duty **to 'promote the use of the railway network […] for the carriage of goods'**, its consideration of the 'public interest' and the **'need to make efficient use'** of public funds. Published benchmark rates could also support the provision of a 'reasonable degree of assurance' to operators.[46]

Option 3 aligns strongly with **wider rail decarbonisation objectives** by improving the attractiveness of lower-carbon traction and targeting support according to the carbon benefit generated. This is consistent with the government's intention that GBR should have flexibility to offer targeted discounts to stimulate freight growth, alongside its wider objective of supporting investment in technologies that improve efficiency and decarbonisation.[47]

5.4.5 Initial considerations for compliance with the SCA 2022

Option 3 appears well placed to address an identified market failure by linking support to both the incremental operating cost of lower-carbon traction and its monetised carbon benefit relative to diesel. Setting maximum support by reference to the lower of these two amounts could help ensure that the discount is targeted at the relevant cost differential and carbon reduction. The inclusion of different rates for

[46] See Clause 18(2) of House of Lords (2026), 'Railways Bill', HL Bill 25 (as brought from the Commons), 11 June.
[47] Department for Transport (2026), 'Railways Bill factsheet: rail freight', June.

different traction types could also provide incentives that are more closely aligned with carbon benefits than a uniform discount, while published eligibility criteria, assumptions and benchmark rates would support transparency.

Further analysis would nevertheless be required to establish whether the underlying operating cost and carbon estimates are robust and whether a standardised rate provides an appropriate basis for comparable activities.

Similar to Options 1 and 2, **the treatment of existing services remains a key consideration for assessing the additionality associated with the policy,** to ensure that a substantive change in behaviour is generated.

Option 3 may provide a stronger basis than Options 1 and 2 for demonstrating proportionality and minimising distortions, particularly if support is capped by reference to carbon benefits or total rail costs and is subject to defined review arrangements. However, further analysis would be needed to determine whether the proposed level and duration of support are limited to what is necessary, and whether the methodology would generate a material change in operators' behaviour. The potential effects on competition and investment would also need to be assessed, including the effects of differentiated support rates on operators, traction technologies and rolling-stock investment. At this stage, these points represent initial considerations only and do not constitute a final conclusion on the compatibility of Option 3 with the subsidy control principles.

5.5 Summary of the three options identified

The three policy options illustrate the choices available to GBR regarding how any discount policy to support electric traction could be designed and implemented. Each option reflects a different balance between the scope of support, administrative complexity, precision in targeting the operating cost differential, and broader alignment with the principles set out in section 4.2. As discussed in section 4.3, the overarching design considerations mean that each option could be adjusted as GBR's priorities develop and in consultation with stakeholders.

Option 1 applies a fixed-percentage discount to the VUC for the operators of all lower-carbon traction types (including both electric and HVO), and is the simplest option for both GBR and operators to administer. The scheme could operate in a similar way to the existing discount scheme for new traffic flows, but would be available to all OAOs and freight operators throughout FP1.

Where a new service using electric traction is introduced, the lower-carbon traction discount would be applied following the expiry of any new-flow discount. However, the policy is not calibrated to variations in carbon benefits across traction types, or the financial need for the discount. This means that the level of support is only loosely targeted to the underlying market failure it is intended to address. Moreover, this option raises important design questions in relation to being able to demonstrate additionality—i.e. that the discount would lead to a change in operators' behaviour, which we discuss further below.

Option 2 discounts the EC4T cost per unit of electricity, incentivising the use of electric traction by addressing the operating cost differential and introducing risk-sharing between GBR and operators on energy price volatility. However, in the absence of an additional scheme, Option 2 would not support HVO or other lower-carbon traction types. The policy is only likely to support operators' decisions to invest in electric traction, rather than incentivising the choice between electric and lower-carbon at the margin for existing vehicles, as only 39%[48] of the network is fully electrified. Indeed, making greater use of existing electric fleet may be feasible in only a small number of cases, where operators have access to fully electrified lines, or where they are able to continue running using battery or an alternative traction type (e.g. diesel), which may create operational inefficiencies. Given that infrastructure constraints may prevent some operators from adopting electric traction, this option may be considered unduly discriminatory.

Option 3 sets out the most calibrated approach, which could be implemented as a discount to the VUC (though for electric traction, the discount could in principle be administered through the EC4T). It aligns the maximum support with both the operating cost differential and the environmental benefits of lower-carbon traction, addressing a key limitation of Options 1 and 2.

Establishing standardised benchmark discounts for each lower-carbon traction type would provide a pragmatic balance between targeting support and ease of implementation, avoiding the greater administrative burden of assessing individual flows while retaining a stronger link to financial need and carbon reduction. The evidential requirements for operators would remain relatively light, and in many

[48] Department for Transport and the Office of Rail and Road (2025), 'Rail Trends 2025', 9 December.

cases the information already submitted to inform the VUC may be sufficient to support the application of the discount.

Under Option 3, GBR could introduce a process for reviewing the discount rate during FP1 at set intervals, or in response to extraordinary circumstances where there are substantial changes in relative operating costs (e.g. electric and diesel prices). While this could improve targeting and support value for money, any adjustment mechanism would need to consider the administrative complexity for GBR and uncertainty created for operators, which could limit incentives to invest.

There are additional choices for GBR under Option 3 regarding the degree of calibration across traction types (including different classes/models of the same traction type). Increasing the degree of calibration could better target the carbon benefit, but increases the evidential requirements for operators and the operational burden for GBR, and would require careful design to mitigate any negative unintended consequences.

Overall, Options 1 and 2 would be relatively simple and transparent, but their uniform structure could result in support that is not closely related to the carbon benefit or financial need associated with each traction type. Option 3 may provide a stronger basis for demonstrating proportionality and minimising distortions, although it would require robust and transparent assumptions. Any discount that is administered through the VUC would also need to consider the interaction with the design of the existing charging regime, including the incentives for operators to adopt more track-friendly vehicles to benefit from a lower VUC rate.

Taken together, the three options sit along a spectrum between administrative simplicity and targeting precision, with additional choices regarding the precise design and implementation reflected in the overarching design considerations discussed in section 4.3. While this report focuses on supporting lower-carbon traction choices only, the underlying approaches could be developed further to take into account wider environmental benefits, such as noise and air pollution, which may introduce a stronger case for regional or flow-specific discounts to be applied.

Under any of the three policy options, a key challenge is demonstrating additionality: to what extent will the policy change the behaviour of operators, rather than providing funding to operators who would have operated the same services anyway in the absence of the scheme? This

will be particularly important from a subsidy control perspective, where the realistic no-subsidy counterfactual would need to be considered.

While providing support for existing services may minimise discrimination across operators and competitive market distortions, there is a risk that a large proportion of the subsidy may not be associated with an increase in lower-carbon traction.

To address this, drawing on insights from the case studies discussed in section 3, an additional mechanism could be introduced to provide further incentives for operators with existing lower-carbon traction to increase their usage. For example, similar to the approach adopted in Spain to encourage modal shift and electric traction, the discount scheme could be developed further to provide a larger discount for operators that increase the number or proportion of traffic undertaken using lower-carbon traction. This would have to be subject to an overall increase in the mix of lower-carbon traction, to avoid an operator getting a discount for winning a tender on an electric-only route. Applying this discount would require GBR to assess ex post the growth in traction types for each operator.

Alternatively, a more bespoke, evidence-based approach could be introduced to assess the capacity for each operator to run services using lower-carbon traction vehicles, with targets established for each operator that are linked to the discount they receive, which would take into account whether the choice to use diesel reflects an operating decision, infrastructure constraints, or other factors. However, this would need to be assessed against the evidential requirements, administrative complexity, and potential distortions/discrimination impacts.

Prior to the introduction of any discount policy, GBR should undertake an assessment of the additionality that is expected to be generated. A further assessment of the impact that has been realised should also be completed at the end of FP1 to inform the design of any discount policy that may be applied in future funding periods. While annual monitoring of the impact of the policy during FP1 may provide GBR with useful insights on the performance of the scheme, the level and scope of support should not be subject to revisions within the funding period, to provide certainty to operators and support incentives to invest in lower-carbon traction.

Any discount policy would require sufficient funding and, where necessary, a process for ensuring that the total discount provided remains within the budget available. As discussed in section 3, the TAC

discount applied in Germany to support modal shift adjusted the rate of support provided to each operator based on realised total traffic flows, to ensure that the scheme remains within the funding available. However, any in-period adjustment mechanism for the level of support an operator will receive introduces uncertainty and could affect incentives to invest. In contrast, the temporary electricity price cap applied in Germany in 2023 provided operators with certainty regarding future electricity prices, with the risk associated with energy price volatility transferred to the government.

At this stage, the discussion set out in this report should not be taken as a conclusion that any of the policy options would comply with the subsidy control principles. Reaching such a conclusion would require further detailed analysis once the preferred policy design, level of support, eligibility criteria and implementation arrangements have been developed. In particular, further analysis would be required in relation to:

- **Principle B**, including whether the level and duration of support are limited to what is necessary to achieve the policy objective; and
- **Principle F**, including the potential effects of the discount on competition and investment between operators, traction types and competing suppliers of rolling stock and fuels, as well as competition with other modes of transportation.

6 Conclusion

This report has developed and assessed three options for a traction discount policy that GBR could introduce through TAC during FP1 (2029–34), to address the operating cost differential between diesel and lower-carbon traction.

While Network Rail has experience administering TAC discounts to support modal shift, it has not previously incentivised traction choices using this mechanism. However, our review of EU policies in rail and aviation demonstrate that discounts can be implemented effectively within an existing charges regime to support environmental and wider objectives, with useful lessons for the design and implementation of a GBR scheme. The precedents illustrate a range of approaches to calibrating support (including by traction type, load factor and traffic growth), to funding and administering support (including ex-post subsidy and pass-through discounts), and to managing the risk of energy price volatility.

We have developed three distinct benchmark policy options, each reflecting different choices regarding the scope of support, administrative complexity, precision in targeting the operating cost differential, and broader alignment with the defined principles for a GBR traction scheme. Options 1 and 3 both provide a discount on the VUC, with different degrees of calibration and evidential requirements for both GBR and operators; while Option 2 introduces a discount on the EC4T, which would benefit electric traction only.

Our report makes clear that the design and implementation of each policy option can be further refined in line with the design considerations set out in section 4.3, and in consultation with stakeholders as GBR's priorities develop further. Any discounts policy would also require a formal subsidy control assessment, entailing further detailed analysis once the preferred policy design, level of support, eligibility criteria and implementation arrangements have been developed.

Next steps

This report does not recommend a specific policy option, as we understand that Network Rail intends to explore the relative merits of each approach further with industry stakeholders in autumn 2026, with a

formal GBR consultation on access charging policy scheduled for April 2027.

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