

PR23: Impact assessment on availability of modelled EC4T consumption rates

June 2023

Policy area	EC4T - modelled consumption
<p>Background</p>	<p>The traction electricity (electric current for traction, or EC4T) charge is paid by all operators who use electricity to power trains.</p> <p>This charge is calculated based on one of the following three approaches: (a) metered consumption (based on readings taken from meters on trains); (b) modelled consumption (based on estimated consumption, subject to an end of year volume reconciliation exercise); or (c) partial fleet metering (although no operator currently uses this charging approach).</p> <p>Modelled consumption is calculated by multiplying an estimated consumption rate by total electrified mileage in each rail period. Consumption rates are derived from theoretical and empirical relationships between consumption, vehicle characteristics and typical operating characteristics. The EC4T charge is then obtained by multiplying modelled consumption by electricity market prices paid by Network Rail.</p> <p>An EC4T volume reconciliation (also known as the ‘volume wash-up’) is then undertaken between operators and Network Rail at the end of each financial year, to determine whether operators have been under or over-charged and whether ‘wash-up’ payments need to be made either from the operators to Network Rail when undercharged, or vice-versa.</p> <p>There are three broad types of modelled consumption rate that operators can use to pay for traction electricity:</p>

	<ul style="list-style-type: none"> • A ‘bespoke’ modelled consumption rate, which applies to a particular vehicle type operating on a particular train service code on the network; • A ‘generic’ consumption rate, which applies to a particular vehicle type operating anywhere on the network; and • A ‘default’ modelled consumption rate. This was introduced by Network Rail for passenger services in CP6, and is set equal to the highest rate on the modelled consumption rates list at the start of the control period.
<p>Proposed change to charging framework being considered</p>	<p>In our April 2022 consultation, we proposed removing modelled consumption rates for new train services from the beginning of CP7¹. The primary objective of this proposal is to encourage metered consumption of EC4T, which we consider has several benefits. In particular, greater use of on-train metering (OTM) means EC4T charges will be more cost-reflective. This can serve to:</p> <ul style="list-style-type: none"> • Strengthen operators’ incentives to optimise their energy consumption, as they will pay for their actual consumption on the network rather than an estimated amount of consumption (which is less closely related to their use of energy on the network). • In turn, by encouraging lower energy consumption, this can improve the overall efficiency and environmental sustainability of the rail network. • In doing so, it also reduces the amount of consumption subject to the end-of-year volume wash-up, which can lead to unpredictable fluctuations in cashflows. <p>Having reviewed responses to our April 2022 consultation, we considered that the effectiveness of this proposal would be affected by the availability (or not) of generic consumption rates. This is because removing the facility to obtain a bespoke modelled rate could otherwise lead operators to instead adopt a generic consumption rate (which are generally less cost-reflective than bespoke modelled rates), which would mitigate the intended benefits of this proposal.</p> <p>As part of its recalibration process, we asked Network Rail to consult on the implications of removing generic rates from the EC4T charging regime. Network Rail consulted on this issue in November 2022 and issued its conclusions in May 2023, in which it confirmed its intention to proceed with the removal of generic consumption rates.</p> <p>We have now considered the impact of removing the facility to obtain a new ‘bespoke’ modelled rate, as well as removing existing generic consumption rates, from the start of CP7. With regards to the latter,</p>

¹ New train services are defined as any service that uses vehicles which are brand new to the industry, or existing vehicles that require a new consumption rate (for example because their operator moves them to a new service code).

we have taken account of responses to Network Rail’s recalibration consultation, as documented in its conclusions document.

For the avoidance of doubt, under this proposal, existing services using a bespoke modelled rate could continue to be charged for EC4T this way in CP7. Furthermore, the set of ‘default’ EC4T consumption rates would also be retained as a way of billing passenger services for EC4T.

Impacts on affected parties (relative to making no change)

(1) Network Rail

This proposal should not impact Network Rail’s cost recovery, as the EC4T charge (however it is billed) is largely passed through to train operators.

We consider there may be some benefits to Network Rail from implementing this change, as follows:

- Savings from administering the EC4T charge: This proposal would mean Network Rail would no longer be required to calculate any new bespoke modelled rates on behalf of train operators. Furthermore, as new modelled rates often take effect retrospectively, it could also avoid the number of delays which currently occur between services first operating on the network and modelled consumption rates being approved. This involves retrospectively recharging a journey, which can be time-consuming and costly.
- Improved data on energy consumption on the network: On-train metering provides information about the specific amount of energy required to power electric trains. As such, if this proposal leads to an increase in the number of metered services on the network (the likelihood of which we consider below), this could improve Network Rail’s overall picture of where and how traction energy is being consumed across the network. This could help it to identify factors that affect energy efficiency, which may inform improvements to electrified parts of the network (e.g. if very high meter readings were recorded over a particular portion of track).

We also note that Network Rail has expressed support for this proposal in its response to our April 2022 consultation, and through its own recalibration exercise.

(2) Passenger operators of electrified services

We have considered which passenger train operators would be affected by this proposal. In broad terms, we consider there are four types of passenger services:

- 1) Existing passenger services that are currently billed for EC4T using a bespoke modelled rate.
- 2) Existing passenger services that are currently billed for EC4T using a generic consumption rate, and which have no plans to move onto OTM before the start of CP7.

- 3) New passenger services that are introduced in CP7 using new rolling stock.
- 4) New passenger services that are introduced in CP7 using existing rolling stock.

We have assessed the impacts on each of these groups below.

Group 1

Under this proposal, passenger services in this group can continue being billed for EC4T using existing bespoke modelled consumption rates. These services would therefore not be impacted by this proposal.

Group 2

Passenger services in this group would be affected by the proposal to remove generic consumption rates from the traction electricity price list. The options for continuing to be billed for EC4T would be as follows:

- obtain a bespoke modelled consumption rate before the start of CP7;
- opt into OTM (which may involve some installation costs to retrofit meters); or
- move onto the passenger default rate.

Network Rail has undertaken further work to assess the number of existing services that rely on generic consumption rates to be billed for EC4T. To do this, Network Rail analysed a sample of billing data from its Track Access and Billing System (TABS). It also surveyed passenger operators about their future EC4T billing arrangements, to understand how the use of generic consumption rates may change in future (for instance due to meter fitment plans)². This analysis indicates that there are only three passenger operators with services that fall into this group.

The impact of this proposal for these services would depend on their choice of options set out above. We understand that meter fitment is a requirement in these operators' contracts, so we consider that the most likely response would be to bring forward the date on which they would move onto metered consumption. Network Rail also noted that two of these passenger operators have OTM equipment partially installed on the impacted fleets, which would reduce the incremental cost and effort of opting into OTM.

If operators instead choose to obtain a bespoke modelled rate for some or all of their affected fleet, this would involve a cost. We understand from Network Rail that the cost of calculating a bespoke modelled rate is around £12,000. Given the number of affected services, we consider it would be feasible for these services to apply for and have a bespoke modelled rate approved before the start of CP7³. These rates would also

² We noted in our April 2022 consultation that the terms of DfT's existing concession agreements with passenger operators require operators to use metered consumption as soon as reasonably practicable.

³ Network Rail has also said that if an application for a new bespoke consumption rate is in progress before the end of CP6, then the operator will be allowed to complete the application during the first year of CP7.

be more accurate than the existing generic rates, and so this should improve the accuracy of the overall EC4T regime and reduce the volatility of wash-up payments.

For these reasons, we do not consider this proposal would have a significant adverse impact on this group of services.

We also note that Network Rail has been liaising with these affected operators to ensure that they are aware of the impact of this change, and will continue to work with them if they choose to pursue applications for bespoke modelled consumption rates or the installation of OTM on the remainder of their fleets.

Group 3

We would expect new passenger services that are introduced in CP7 using new rolling stock to opt into OTM. This is because we understand that almost all new rolling stock for freight and passenger services include on-board meters fitted as standard, so there would be no incremental cost of doing so. This would deliver the benefits associated with OTM described above, relative to a scenario where generic or bespoke modelled consumption rates were still available for operators to use, and some operators chose them instead of adopting OTM.

Some respondents to our April 2022 consultation said that there are sometimes teething problems with commissioning and setting up the metering interface on new services. We have considered these arguments in paragraph 2.40 of our October 2022 conclusions document, and we do not consider that this should preclude the use of OTM by services which have the capability to do so. Furthermore, we have recently [updated](#) our general approvals process for passenger track access contracts, which should make it easier for parties to move onto OTM without the requirement for an industry consultation or specific ORR approval.

Group 4

Passenger services that are introduced in CP7 using existing rolling stock would have two options for the purposes of EC4T: opt into OTM (which may involve some installation costs to retrofit meters); or use the passenger default rate.

For services for which existing rolling stock is already fitted with meters (either partly or fully), we would expect operators to use OTM as their billing approach, given the benefits of OTM as discussed above.

For services which do not have meters installed, we have not identified any major barriers that would prohibit existing passenger rolling stock which is already being used on Network Rail's infrastructure to be fitted with meters. There would be an incremental cost associated with retrofitting meters, which operators would be expected to weigh against the impacts of using the passenger default modelled consumption rate (which is set equal to the highest rate on the modelled consumption rates list at the start of the control period). We have previously estimated the

	<p>cost of an on-train meter to be around £12,000 for AC train-sets and £24,000 for DC train-sets⁴.</p> <p>We have also considered the likely size of this group. We recognise that this group would cover entirely new services introduced using older rolling stock, as well as existing services which are cascaded to a new route on the network (and therefore could not use an existing bespoke modelled rate). However, taking account that a significant number of passenger operators have contractual requirements around moving to OTM as soon as reasonably practicable (as discussed above), we would expect fewer and fewer services to fall into this group over time.</p>
<p>(3) Freight operators of electrified services</p>	<p>We have considered which freight services would be affected by this proposal. As with passenger services, we have considered separately the impact on four types of services:</p> <ol style="list-style-type: none"> 1) Existing freight services that are currently billed for EC4T using a bespoke modelled rate. 2) Existing freight services that are billed for EC4T using a generic consumption rate, and which have no plans to move onto OTM before the start of CP7. 3) New freight services that are introduced in CP7 using new rolling stock. 4) New freight services that are introduced in CP7 using existing rolling stock. <p>We have assessed the impacts on each of these groups below. We note that no default rate for freight operators currently exists within the traction electricity modelled consumption rates list. However, as part of PR23, Network Rail has said it will introduce a new default rate for freight operators, set to equal the highest modelled consumption rate for each class of service (following the approach for the passenger default rate). Freight operators will be able to use these rates from the start of CP7.</p> <p>Group 1</p> <p>Similar to group 1 for passenger operators, freight services in group 1 can continue being billed for EC4T using existing bespoke modelled consumption rates. These services would therefore not be impacted by this proposal.</p> <p>Group 2</p> <p>Freight services in this group would be affected by the proposal to remove generic consumption rates from the traction electricity price list. The options for continuing to be billed for EC4T would be as follows:</p> <ul style="list-style-type: none"> • obtain a bespoke modelled consumption rate before the start of CP7;

⁴ See footnote 46 of our July 2021 [consultation](#) on the PR23 access charges review.

- opt into OTM (which may involve some installation costs to retrofit meters); or
- opt into the new default rate available to freight services from the start of CP7.

It is unclear what the most likely response would be for this group. However, Network Rail has estimated that the impact of moving to a new default rate would be very small. This is because the proposed default rates are either identical to existing generic rates, or (in the case of heavy haul and intermodal traffic), only slightly above the existing generic rate. Network Rail has estimated the overall financial impact of this to be negligible (e.g. less than £2,000 for a 9-month billing period)⁵. As such, we do not consider this proposal would have a significant adverse impact on this group of services.

If operators instead choose to opt into OTM or obtain a bespoke modelled consumption rate, this may involve a cost. However, both these billing approaches would be more accurate than the existing generic rates, and so this should improve the accuracy of the overall EC4T regime.

Group 3

As with passenger services, we would expect new freight services that are introduced in CP7 using new rolling stock to opt into OTM (as we understand that almost all new rolling stock for freight and passenger services include on-board meters fitted as standard). This would deliver the benefits associated with OTM described above for this group of services, relative to a scenario where generic or bespoke modelled consumption rates were still available for operators to use, and some operators chose this billing approach.

Some respondents to our April 2022 consultation said that there are sometimes teething problems with commissioning and setting up the metering interface on new services. We have considered these arguments in paragraph 2.40 of our October 2022 conclusions document, and we do not consider that this should preclude the use of OTM by services which have the capability to do so.

Group 4

Freight services that are introduced in CP7 using existing rolling stock would have two options for the purposes of EC4T: opt into OTM (which may involve some installation costs to retrofit meters); or use the default rates that will apply from the start of CP7⁶.

⁵ See paragraph 4.47 of Network Rail's recalibration conclusions document.

⁶ Some stakeholders suggested that operators might respond to the removal of modelled rates by increasing or prolonging the use of diesel traction (or other transport modes). We considered this as part of our October 2022 conclusions document (see paragraphs 2.46 to 2.48). For the reasons set out there, we consider the risk of this outcome to be very low.

We have not identified any major barriers that would prohibit existing rolling stock which is already being used on Network Rail's network to be fitted with meters. We specifically considered this as part of our October 2022 conclusions document, including by asking train operators to share with us information regarding the size of their fleet that cannot be fitted with meters. The information we received suggests there are no major barriers that would prohibit existing rolling stock which is already being used on Network Rail's network to be fitted with meters⁷. We are also not aware that any operator provided any such information in their engagement in Network Rail's consultation on recalibration issues.

However, for services which do not have meters installed, there would be an incremental cost associated with retrofitting meters, which operators would need to weigh against the use of the freight default modelled consumption rate. We recognise that freight operators introducing a new service with rolling stock that does not have OTM capability may therefore choose to use default modelled consumption rates, rather than incurring this incremental cost⁸. If so, there may not be clear benefits from this proposal for this group of services. However, there would also be no significant adverse impacts, given that the new freight default rates that Network Rail has proposed are very similar to existing generic rates (as explained above for group 2).

(4) Other impacts

Simplification: We consider that removing these types of modelled consumption rate would simplify the overall EC4T charging framework by streamlining the modelled consumption rate charging approach. Combined with our proposal to also remove partial fleet metering, this means that new train services will have a clear choice to either opt into the OTM charging approach, or be charged a default EC4T rate, which makes for a simpler overall charging structure.

Environmental impacts: As described above, we consider that a more cost reflective EC4T charge (i.e. one which is billed using OTM and based on actual consumption of energy) would strengthen operators' incentives to optimise their energy consumption. This could serve to lower the overall amount of traction electricity consumed on the network, which would improve environmental outcomes and make the rail network more sustainable in the longer-term.

We note some stakeholders' views that this proposal could have some perverse environmental impacts if it led to greater use of diesel traction, but, for the reasons set out in our October 2022 conclusions document, we do not consider this to be a likely outcome of this proposal.

⁷ See paragraph 2.41 of our October 2022 conclusions document.

⁸ As above, we have previously estimated the cost of an on-train meter to be around £12,000 for AC train-sets and £24,000 for DC train-sets.

Recommendation and next steps

Recommendation	<p>Remove the facility to obtain a new 'bespoke' modelled rate from the start of CP7, and remove the existing set of 'generic' consumption rates that are used to charge EC4T for some services, from the start of CP7.</p> <p>We consider that this change will increase the use of metered consumption on the network in the long term, primarily by encouraging new services to opt into OTM rather than relying on modelled consumption (groups 3 identified above). For some new services without OTM capability (groups 4), opting into OTM may involve an incremental cost, but we consider these costs would be proportionate when set against the overall efficiency and environmental benefits of increasing the proportion of traction electricity consumption which is metered. Existing services (groups 1 and 2) would not be significantly affected by this proposal.</p> <p>In doing so, this change will also significantly simplify the administration of the EC4T charge, with associated cost savings.</p>
Next steps	<p>This proposal requires a change to the Traction Electricity Rules. We will consult on the specific changes required as part of our forthcoming consultation on drafting changes to model access contracts.</p> <p>We will also work with Network Rail and train operators in respect of any implementation issues that arise – particularly in respect of those passenger services which are currently users of generic consumption rates and which may need to amend their billing arrangements before the start of CP7 (i.e. groups 2 as set out above). At this stage, for the reasons outlined in this assessment, we consider that it should be feasible for these services to complete any necessary activities before the start of CP7.</p>



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