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10 April 2013

To: members of the traction electricity steering group

The consultation is open to all.

Dear colleague

PR13: consultation on electricity for traction charges for control period 5 (CP5)

This letter forms part of our periodic review of Network Rail (PR13), and sets out our consultation on charges for electric current for traction (EC4T). We consult on assumed levels of transmission losses for CP5 and how we propose to reform the volume wash-up.

On behalf of its customers, Network Rail is already the single biggest user of electricity in the UK. By the end of CP5, it expects electricity consumption to have increased by around 25% on current levels, which given that electricity prices are forecast to rise (based on the latest government forecasts), implies a doubling of expenditure on EC4T. The effect of rising electricity prices increases the need for the rail industry to use electricity efficiently.

Promoting more efficient energy use in the railways supports our statutory duty to contribute to the achievement of sustainable development. Therefore, it is critical that we have a charging framework in place for electricity usage that incentivises Network Rail and operators to manage electricity as efficiently as possible. We continue to see on-train metering of EC4T as a key enabler of this.

We are consulting on a framework for charging for EC4T that:

- (a) exposes Network Rail to a proportion of the volume wash-up, this is consistent with our view that transmission losses can be efficiently managed by Network Rail, which means that it should be incentivised to manage these costs efficiently in the same way that we incentivise Network Rail to manage its other controllable costs. This change would also mitigate risks to unmetered operators of inaccuracies in the estimate of transmission losses; and
- (b) gives operators greater certainty to invest in on-train metering, by fixing particular charges for transmission losses for the whole of CP5 and exempting metered services from the year-end reconciliation of consumption (“the volume wash-up”), irrespective of the proportion of consumption that is metered.

Our consultation is set out in Annex A to this letter.



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We welcome responses on any aspect of this consultation letter. In particular we welcome responses to the specific questions we ask throughout this document.

This is a four week consultation. Please send your responses in electronic format (or if not possible, in hard-copy format) by **8 May 2013** to:

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Our aim is that all documents on our website adhere to certain standards of accessibility. For this reason, we would prefer to receive your correspondence in an editable format such as Microsoft Word. If you do send a PDF document or similar, we would be grateful if you could create it from an electronic file rather than an image scan, and ensure that no security is set in the document properties.

If you send a written response, you should indicate clearly if you wish all or part of your response to remain confidential to ORR. Otherwise, we would expect to make it available on our website and potentially to quote from it. Where your response is made in confidence please can you provide a statement summarising it, excluding the confidential information, which can be treated as a non-confidential response. We may also publish the names of respondents in future documents or on our website, unless you indicate that you wish your name to be withheld.

We will conclude on this consultation as part of our draft determination, which we will publish in June 2013.

Yours faithfully

A handwritten signature in black ink, appearing to read 'C. Ross', written over a light grey rectangular background.

Cathryn Ross

Annex A: EC4T consultation

Introduction

1. This consultation on track access charges for electric current for traction (EC4T) forms part of our periodic review of Network Rail (PR13)¹.
2. EC4T is procured by Network Rail on behalf of the train operators. Costs (excluding the costs of Network Rail's own use of electricity, for example consumption at some Network Rail managed stations and for signalling) are then charged to those operators. The current charging framework is set out in Box A.1.
3. We are responsible for developing the charging framework including consulting on changes to charging policy. Network Rail is responsible for calculating all existing track access charges, including charges for EC4T, in accordance with the charging objectives and general guidance that we specify². As part of this, it consults on its charging proposals and then concludes on them. We review all Network Rail's charging proposals and conclusions. As part of this process, we often appoint an independent reporter³ to scrutinise Network Rail's work. Network Rail is in the process of publishing draft price lists for all variable charges. As part of our draft determination in June 2013, we will assess and consult on any changes we think should be made to Network Rail's charging calculations. The process ends with Network Rail publishing price lists which we approve and which will be fixed for the whole of CP5.

¹ PR13 will establish Network Rail's outputs and access charges for control period 5 (CP5), which will run from 1 April 2014 to 31 March 2019. PR13 also involves establishing the wider regulatory financial and incentive framework for CP5 that applies to Network Rail and train operators.

² The objectives and guidance are included in our May 2011 consultation and our December 2011 consultation on incentives.

³ Reporters are independent experts who provide us with assurance of the accuracy and reliability of Network Rail's information.

Box A.1: EC4T charging framework for CP4

EC4T is procured by Network Rail on behalf of the train operators. Costs (excluding the costs of Network Rail's own use of electricity) are then recharged to those operators. EC4T can take four key forms:

- electricity consumed by trains;
- electricity consumed for non-traction purposes by Network Rail and other parties (e.g. London Underground Ltd);
- electricity lost in transmission through the infrastructure (i.e. third rail or overhead line equipment); and
- electricity generated through trains' regenerative braking (to return the energy generated through braking into the electrification system).

Currently around 25% of EC4T consumption is charged on the basis of consumption recorded by on-train meters (OTM). Metered regenerated energy is netted off the energy charged. Operators pay a mark-up on metered consumption net of regenerated energy to recover estimated transmission losses.

Until April 2010, all train services were charged on the basis of modelled (i.e. unmetered) electricity consumption rates (taking the form of kWh per train mile or gross tonne mile), and around 75% of all EC4T is still charged in this way. Modelled services with regenerative braking are charged at a discounted rate. Under this system, modelled and actual consumption are reconciled through a year-end wash-up referred to as the volume wash-up. Transmission losses are charged for implicitly through the modelled rate and volume wash-up; they are not charged for explicitly. This volume wash-up reconciliation occurs at the level of the electricity supply tariff area (ESTA). ESTAs are defined in schedule 7 of the track access contracts and the definitions of the ESTAs are shown in Annex B of this document. Network Rail's consumption amounts to around 3% of all EC4T and is also subject to the volume wash-up.

Track access charges, including EC4T charges, are contractualised in schedule 7 of the track access contract. For metered operators, this is supplemented by the EC4T metering rules, which apply to all services billed through OTM. Currently, most aspects of the EC4T metering rules can be changed through an industry-led change process involving consultation, majority endorsement and our approval.

There are contractual and industry processes for procuring electricity and reconciling electricity prices (i.e. £ per kWh). Network Rail has discussed these processes as part of its consultation and conclusions, and we do not discuss them further in this document.

4. Network Rail has consulted and concluded on charging for EC4T, included consumption rates for modelled (i.e. unmetered) services and discounts for regenerative braking^{4, 5}. We are broadly content with Network Rail's conclusions and we will set out the key issues that Network Rail raised and its conclusions in our draft determination in June 2013⁶. However:

- (a) in this document we consult on the charges for transmission losses, which Network Rail has previously consulted on, as this is a key concern for operators considering investing in on-train metering (OTM). New evidence has emerged since Network Rail's September 2012 consultation, and we wish to make changes to Network Rail's proposals; and
- (b) we are not now intending to require an uplift to be levied on modelled services to incentivise operators to switch to metering. We explain our reasoning for this below (paragraph 39 to paragraph 40).

5. This consultation also proposes changes to the EC4T charging framework, in particular the framework by which discrepancies between modelled and metered consumption and actual consumption (including transmission losses) are dealt with. In particular, in this document we are consulting on the following topics that were not covered by Network Rail's consultation:

- (a) a means to expose Network Rail to the risk of transmission losses for the first time following our decision that this cost is controllable by Network Rail;
- (b) a basis for charging partially metered services; and
- (c) the basis on which Network Rail is charged for its own consumption.

6. This document builds on our May 2012 framework document⁷, in which we set out our decisions and approach on key aspects of the overall regulatory framework for CP5. It also builds on our December 2012 decisions on the financial framework⁸, in which we concluded that there were elements of EC4T that we would treat as not being sufficiently controllable by Network Rail (which would be passed through to train operators) and that there were elements that were controllable, in particular transmission losses, for which

⁴ Network Rail (2012), Traction electricity and electrification asset usage charges full consultation, September 2012, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064783482> and Traction Electricity and Electrification Asset Usage Charges in CP5 – Conclusions of Network Rail's Consultation, February 2013, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784907>.

⁵ Network Rail (2012), DC losses consultation, November 2012, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784066>.

⁶ We will conclude on our document as part of our draft determination.

⁷ ORR (2012), Periodic Review 2013: Setting the financial and incentive framework for Network Rail in CP5, May 2012, <http://www.rail-reg.gov.uk/pr13/publications/financial-incentives.php>.

⁸ ORR (2012), Financial issues for Network Rail in CP5: decisions, December 2012, <http://www.rail-reg.gov.uk/pr13/PDF/pr13-financial-issues-decisions-dec12.pdf>.

we would set Network Rail an ex-ante allowance (in the form of an ex-ante charge for transmission losses to operators) with the risk of the outturn being different being taken by Network Rail.

7. This consultation is structured as follows:

(a) we set out our proposals for setting transmission losses, this includes:

- (i) the process for setting the level of losses; and
- (ii) how we are proposing to charge for losses incurred by metered services;

(b) we explain our proposal to allocate Network Rail a share of the volume wash-up, reflecting the responsibility it has for managing transmission losses, this includes:

- (i) our reasons for proposing the change;
- (ii) our proposed method for allocating a share of the volume wash-up to Network Rail; and
- (iii) our assessment of the risks and impacts of this change;

(c) we explain why we do not wish to provide an uplift on modelled consumption; and

(d) we also consult on other matters, namely:

- (i) charging for services for which a sample of a fleet is metered (partial fleet metering (PFM)); and
- (ii) the basis on which Network Rail is charged for its own consumption.

8. Annex B shows the ESTAs, i.e. the geographical areas at which modelled and actual electricity consumption are reconciled.

Setting transmission losses

Process for setting the level of losses

9. Metered train services are currently billed on the basis of consumption plus a mark-up to reflect transmission losses. These mark-ups are referred to contractually as DSLF, which stands for distribution system losses factor, and are a percentage increase on metered consumption net of any metered regenerative energy. They are tabulated in Appendix 3 of the EC4T metering rules (which currently permit a different value for AC and DC services for each ESTA). Prior to the establishment of the EC4T metering rules in June 2011⁹, we wrote to the industry stating that we would set the DSLF for AC services for the remainder of CP4. There was strong widespread support for this approach because it reduced uncertainty for operators preparing their business cases for using OTM. The EC4T metering rules are incorporated into

⁹ The EC4T metering rules were established through bilateral negotiation between the first operator to use on-train metering, Virgin Trains, and Network Rail, subject to industry consultation and our approval. They were not established as part of a periodic review.

metered operators' access agreements, and as such those parts which concern the setting of access charges fall within the scope of our periodic review, and we have accordingly planned to determine the DSLF for the whole of CP5 also.

10. The metering rules do, however, allow for changes to the DSLF at any time, using the same process for modifying the DSLF as for modifying other aspects of the rules set out in rule 11 of the EC4T metering rules. As such, any metered operator or Network Rail can propose changes to the DSLF (whether industry-wide, or specific to certain operators), and such proposed changes will be subject to consultation and require from metered operators and Network Rail a majority vote in favour, before being submitted to us for our approval. ORR also has the right to modify the metering rules without a vote taking place, where we are satisfied that such a modification is reasonably required in order to promote or achieve the objectives specified in section 4 of the Railways Act 1993 (this is described in broad terms – the full detail is set out in rule 11.21 and the following rules of the EC4T metering rules).

11. The DSLF is an important determiner of the allocation of electricity costs between metered services, on the one hand, and unmetered services on the other, potentially with some apportionment to Network Rail. The current change process provides that metered operators (but not modelled (i.e. unmetered) operators) may vote on a proposal to change any part of the metering rules, including the DSLF. The calculation of the DSLF is highly complex, and requires an impartial examination of evidence. Moreover, the industry has consistently argued that it wants to have the DSLF fixed for a period of time in order to reduce uncertainty thereby promoting investment in metering. We therefore propose that we set the DSLF through an access charges review (i.e. a periodic review)¹⁰, and remove the ability for metered operators (or Network Rail) to propose and vote on changes to the DSLF through the metering rules. We would therefore set the DSLF as a part of our wider access charges policy decision, to be considered in line with the relevant legislation including our section 4 duties, rather than letting the industry propose and make changes as and when a party decides to do so at any time during the next control period.

12. Hence we confirm our proposal that as part of PR13 we will set the DSLF, by ESTA, for the whole of CP5. We are also consulting on whether, to increase certainty, we should amend the traction electricity rules as part of this periodic review so that the DSLF mark-up cannot be amended under the existing metering rules change mechanism (save where we use our modification right).

Questions

1. We would like to know your views on all of the issues raised in this section of our letter. In particular, should we amend the traction electricity rules so that we take the decision on the DSLF as part of an access charges review (i.e. a periodic review or interim review), and remove the industry's ability to propose and vote on the same?

¹⁰ In the case of newly electrified infrastructure associated with a new ESTA, this would need to occur when the ESTA is introduced, rather than as part of an access charges review.

Our proposal for charging for losses for metered services

13. We have been working hard for some time with Network Rail to improve its understanding and estimation of transmission losses, and have previously noted our concern with Network Rail's progress in this area¹¹. Network Rail has now made a step change in its understanding of losses, which it outlined in its updated losses report published in January 2013¹². This follows Network Rail's earlier reports on transmission losses, which it published to support its September 2012 consultation on EC4T¹³. We appointed an independent reporter, AMCL, to review Network Rail's estimation of transmission losses. AMCL made a number of recommendations to Network Rail, particularly concerning the calculation processes and correction of technical inconsistencies with the input data, as a consequence of which Network Rail issued the updated reports to address AMCL's concerns.

14. Network Rail did not consider the impact of regenerative braking on losses as part of its work and assumed instead that regenerative braking had no net impact on losses. The reporter argued that this would tend to underestimate losses. It is regrettable that Network Rail did not consider the impact of regenerative braking on transmission losses, and we expect it to do further work in this area during CP5, in particular with respect to newly electrified infrastructure which we discuss below.

15. We also need to consider the computational question of how the DSLF should be applied. Network Rail has recently argued that, as it expressed its most recent (January 2013) estimation of losses as a percentage of metered consumption (gross of any regenerative braking), and that the mark-up was applied net of regenerative braking, then the mark-up should be increased by a factor to take account of the discrepancy in these definitions¹⁴. We think that a better approach would be to change the EC4T metering rules, so that the losses mark-up is levied on gross consumption rather than consumption net of regenerative energy, as it is currently. This is consistent with our understanding of the interaction between

¹¹ For example in page 8 of the Q3 2010-11 Network Rail Monitor, <http://www.rail-reg.gov.uk/upload/pdf/nrm-key-statistics-1011q3.pdf>.

¹² Network Rail (2013), Updated: estimate of AC losses report, January 2013, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784497> and Network Rail (2013), Updated: Estimate of DC losses – electricity supply tariff area analysis, January 2013, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784067>.

¹³ Network Rail (2012), Traction electricity and electrification asset usage charges full consultation, September 2012, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064783482> and Network Rail (2012), DC losses consultation, November 2012, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784066>.

¹⁴ Set out in its response of 1 February 2013 to London Midland's consultation on changing the EC4T metering rules, <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064784795>.

regenerative braking and transmission losses, and so we are now consulting in this document on changing the EC4T metering rules so that the DSLF is applied to the “gross” metered consumption¹⁵.

16. Network Rail concluded that there should be a single network value for AC across all ESTAs on the basis that:

- (a) the uncertainties in estimating the level of losses are such that differences in DSLF between ESTAs may be spurious; and
- (b) that the characteristics of individual ESTAs could change substantially in CP5, in particular towards the end of CP5 as a consequence of widespread electrification, which would make the accuracy of different rates by ESTA questionable.

17. We agree with several of the operators who argued that the DSLF should be set by ESTA as that is more cost reflective, improves transparency and promotes scrutiny and challenge of the management of losses. We also think that the impact of network changes on the average level of losses in an ESTA can be readily managed in the way that ESTAs are re-defined (given that ESTAs are constructed primarily, if not exclusively, for billing purposes), so that changes to the definition of the network within existing ESTAs are minimised, and newly electrified infrastructure is, where possible, allocated to newly established ESTAs, at least for the remainder of CP5.

18. We think that it is important that Network Rail continues to improve its understanding of transmission losses in CP5, in particular that it improves its understanding of how regenerated electricity affects losses. We propose to approve the DSLF for new ESTAs on the basis of an equivalent methodology to that used to calculate the DSLF for existing ESTAs (as set out in Network Rail’s losses reports), except to the extent that the methodology has been refined to take account of the impact of any regenerative braking.

19. In its conclusions document, Network Rail noted that average annual energy usage was forecast to increase during CP5. It said that the effects of this were difficult to quantify, though “a conservative estimate of the AC network’s average losses increasing from 4% to 5% throughout CP5 would be a valid assumption”. It does not support this statement with empirical evidence. We understand that a number of factors could result in the levels of losses increasing or decreasing over CP5, including investment that results in reduced losses and increased traffic that considered in isolation may increase losses. Considering traffic levels in isolation is potentially misleading, so in the absence of other evidence, we propose to assume that the losses estimates prepared by Network Rail do not change during CP5.

20. We think that it is important to set the DSLF as a conservative estimate, because setting the DSLF too high would result in dis-incentivising operators from switching to OTM. The reporter advised that, by

¹⁵ This proposal would negate the adjustment to losses for regenerative braking that Network Rail argued for in its response to London Midland’s proposal to change DSLF.

ignoring the impacts of regenerative braking, Network Rail's estimates of losses do this. Therefore, we are proposing to set DSLF by ESTA on the basis of Network Rail's median estimates of losses, subject to it being levied on gross consumption.

21. These values are set out in the final column of Table A.1. The ESTAs with DC supplies, ESTAs M and U, have significantly higher losses than those for AC ESTAs. The wide variance on the DC losses between the Merseyside Network (ESTA M) and the South East Network (ESTA U) is due to differences in infrastructure configuration, rolling stock characteristics and overall system loading. Descriptions of each ESTA are given in Annex B.

Table A.1: Proposed values for DSLF, by ESTA, for consultation

ESTA Letters	Network Rail median estimates of losses as a percentage of energy consumption	ORR proposed DSLF (= % losses / {1-% losses})
D, F	4.66%	4.89%
A,B,C,E,I,J,N,S	4.06%	4.23%
G,H,Q,V	3.72%	3.86%
O,P,R	3.11%	3.21%
T	3.30%	3.41%
M	[Not stated]	11.56%
U	[Not stated]	17.01%

Questions

2. We would like to know your views on all of the issues raised in this section of our letter, in particular the questions below:

(a) we are minded to set a DSLF by ESTA and establish new ESTAs for new electrified infrastructure, at least for CP5. Do you agree with this policy? Please give reasons for your view. It would be useful if you could cite specific examples why you think this would or would not be appropriate;

(b) we propose to change the basis on which transmission losses for metered consumption are charged so that the DSLF is applied to the gross metered consumption, rather than metered consumption net of metered regenerative braking, as it is currently. Do you agree that this will deliver a more cost-reflective basis of charging for transmission losses? Please give reasons for your view; and

(c) we propose to accept Network Rail's median estimate of the DSLF, subject to it being levied on gross consumption, but we do not accept Network Rail's assertion that losses would necessarily increase over CP5. Do you agree with our assessment? Please give reasons for your view.

Exposing Network Rail to the volume wash-up

Exposing Network Rail to, and exempting metered services from, the volume wash-up

22. In our May 2012 document¹⁶, we concluded that the year-end volume wash-up should be shared between unmetered services and Network Rail. We noted that this would place an incentive on Network Rail to manage transmission losses more efficiently because it would be exposed to the costs associated with those losses through the volume wash-up. It would also reduce the risk to which modelled operators (i.e. operators with electrified vehicles that do not have OTM billing) are exposed to resulting from errors in the estimation of transmission losses.

23. Network Rail has shared analysis with us that showed that it would be exposed to risks (through its share of the volume wash-up) which would increase as more operators are metered. These risks take the form of errors in modelled rates and errors in the DSLF. Network Rail has argued on this basis that if it were to share the volume wash-up it would actually have a disincentive to promote metering.

24. In developing our policy, it is important to assess the incentives that the proposed charging framework provides. In particular, we think that there is potentially a perverse incentive for Network Rail not to facilitate the introduction of OTM irrespective of whether it shares in the volume wash-up, because OTM delivers greater transparency regarding electricity consumption, and hence better enables us to hold Network Rail to account for its stewardship and operation of its electrified rail assets. We are pleased that Network Rail has shown real industry leadership in its efforts to enable and facilitate the switch to billing through OTM. We recognise the importance of this leadership, and are keen that it continues.

25. We accept Network Rail's point that sharing a portion of the wash-up reduces its incentives to facilitate the introduction of OTM but, because it increases Network Rail's accountability for transmission losses, we think that, in any case, this is an issue inherent in the introduction of OTM. Our analysis also suggests that the potential effects on Network Rail are likely to be small. Nevertheless, we will continue to be alert to any changes in Network Rail's approach to this important reform through our close involvement in the process. Also, Network Rail has enforceable obligations under schedule 7 of the track access contract.

26. This concern needs to be balanced against other important benefits from Network Rail sharing the volume wash-up. In particular, its risks and incentives need to be balanced against risks and incentives experienced by operators of metered and unmetered services.

27. A particular feature of the volume wash-up process, is that currently, if more than 90% of consumption in an ESTA is metered, metered services are included in the volume wash-up. We propose that, with Network Rail sharing a proportion of the volume wash-up, metered services would not be included in the

¹⁶ ORR (2012), Periodic Review 2013: Setting the financial and incentive framework for Network Rail in CP5, May 2012, <http://www.rail-reg.gov.uk/pr13/publications/financial-incentives.php>.

volume wash-up, even under very high levels of metering in a particular ESTA. This change is important because it reflects the accuracy of metered billing over modelled billing even in instances where modelled billing is a small component of total consumption. This reform would not be possible in the absence of Network Rail sharing the volume wash-up because it could lead to disproportionate risks to marginal services.

28. The increased certainty for metered operators that this reform would deliver may be an important component of the business case for OTM. This is because we understand that the industry thinks that one of the major perceived benefits of becoming metered is that operators are no longer exposed to the wash-up. By reforming the 90% rule we remove the possibility that an operator in an ESTA that is using OTM, has to go back into the wash-up for that ESTA because other operators have introduced OTM in that ESTA, thereby giving operators greater assurance with which to prepare a business case for OTM.

29. In addition, by allocating Network Rail a share of the volume wash-up, the risk to modelled operators of the DSLF being set too low (and therefore being recovered in the ESTA's volume wash-up) is mitigated.

Questions

3. We would like to know your views on all of the issues raised in this section of our letter, in particular we propose that metered services be exempt from the volume wash-up, even in cases where more than 90% of consumption is metered, this reform would be coupled with Network Rail being exposed to the volume wash-up. We seek your views on this proposal.

Network Rail's share of the volume wash-up

30. We propose to introduce the following framework for exposing Network Rail to the volume wash-up, over and above its current exposure in the form of its own use of EC4T.

31. We propose that Network Rail's share of the wash-up reflects the proportion of costs for which it has control through its management of transmission losses, which we take to be equal to the total estimated level of losses in each ESTA (which is the total consumption, gross of losses \times DSLF / $\{1+\text{DSLF}\}$). Network Rail's shares of the wash-up were shown in Table A.1 above and are reproduced in Table A.2 below. We propose that this applies for the whole of CP5. This is a pragmatic proposal, which takes account of the impacts of the policy, reflecting the difficulty in calibrating the incentives, given that most of the electricity consumed is not metered.

32. For each ESTA, suppose:

- (a) losses are estimated as X% of the ESTA's electricity consumption (X% is simply $\text{DSLF} / \{1+\text{DSLF}\}$);
- and

(b) Y% of the electricity consumption is modelled (and hence included in the volume wash-up) with the remainder being metered.

Then Network Rail's share of the volume wash-up would be $X / \{Y+X\}$.

33. So for example:

(a) if all services were modelled (not metered), Network Rail's share of the volume wash-up would be $X / \{100+X\}$; and

(b) if only 50% of the electricity consumption was in the volume wash-up (with the remainder being metered), Network Rail's share of the volume wash-up would be $X / \{50+X\}$.

Table A.2: Our proposal for Network Rail's share of the wash-up for its own consumption

ESTA Letters	DSLFF	Network Rail share of wash-up (= DSLFF / {1+DSLFF})
D, F	4.89%	4.66%
A,B,C,E,I,J,N,S	4.23%	4.06%
G,H,Q,V	3.86%	3.72%
O,P,R	3.21%	3.11%
T	3.41%	3.30%
M	11.56%	10.36%
U	17.01%	14.54%

Note: the ESTAs are defined in Annex B.

34. This formulation applies in the case where services are billed either on the basis of modelled rates or metered rates. In paragraph 42 to paragraph 50, we discuss the case where services are billed on the basis of a sample of metered services, i.e. partial fleet metering. As we set out in that section, in such instances we propose an alternative formulation of Network Rail's share of the wash-up.

Risks and impacts of the charging framework

35. The charging framework we have proposed incentivises the introduction of OTM, by removing the risk to metered operators associated with the volume wash-up and by taking a conservative approach to setting the levels of the DSLFF. This is appropriate because OTM has wider industry benefits beyond that of individual operators, in particular in the form of greater scrutiny of Network Rail's transmission losses leading to more efficient management of the network, and because the length of current franchises means that operators have less incentive to invest in OTM (because the case for OTM takes the form of an upfront cost followed by a number of years of reduced electricity bills). The incentives associated with this charging

framework have a small effect relative to the other costs and benefits of OTM, reflecting our concern that we need to balance these incentives against the risk to Network Rail and to modelled operators (i.e. operators with electrified services that do not have OTM billing). This is a shortcoming, but it is also important to recognise that it may not be appropriate to meter all services in the short to medium term, for example in cases where the rolling stock is old or where the operator's network is in large part segregated from other users.

36. This approach exposes Network Rail to some risk associated with its share of the volume wash-up. However, this risk is small as we estimate that Network Rail may gain by up to £2 million a year if no further metering occurs (e.g. if the volume wash-up under the status quo is positive), or could lose out by up to £4 million a year under various scenarios for the take-up of meters (for example if the DSLF is set below the actual level of losses, and the unmetered operators have modelled rates that are too low).

37. There is a risk that Network Rail will receive a small windfall gain if no further metering occurs. However, we think that this risk is small, not least because of the way we are proposing to set the DSLF and because rising electricity prices strengthen the case for metering. We consider that this small risk is more than outweighed by the benefits that this reform makes in terms of giving greater certainty to metered operators while mitigating risk to modelled operators and helping incentivise Network Rail to manage transmission losses.

38. The proposed changes to the charging framework will impact on modelled operators. This may occur, as now, if the DSLFs are set below the actual levels of losses (we have set the DSLFs so that there is a relatively low chance that they are above the actual levels of losses, so that we do not disincentivise the introduction of OTM). However, Network Rail's work measuring and modelling transmission losses has reduced the risk associated with such an error. This risk is more pronounced for operators of services in DC ESTAs, where the levels of losses and hence associated uncertainty are higher, and for operators that have only a small presence in the ESTAs in which they run services. This risk is mitigated through Network Rail's share of the volume wash-up. Under the range of realistic scenarios we have tested, this could result in an increase in the electricity bill for modelled operators of up to 10%. Under such scenarios each DSLF would be significantly below the actual level of losses and therefore the gains operators would realise by switching to OTM would be greater, and hence the incentive to use OTM would be higher.

Questions

4. We would like to know your views on the issues raised in this section of our letter, in particular our proposed formulation for Network Rail to share the volume wash-up. We welcome your suggestions for specific alternative formulations.

5. We also seek your comments on our assessment of risks and the incentive properties of the different options.

Applying an uplift on modelled consumption

39. In May 2012¹⁷ we concluded that the modelled consumption rates should be subject to an incentive uplift to incentivise operators to move to OTM. Network Rail consulted on a specific proposal to implement this approach in the form of a 10% surcharge on modelled consumption rates that would be paid back to all operators in proportion to their final traction electricity bills. Network Rail said that this policy was largely a matter for ORR, though it did see the merits of such a charge.

40. We have decided not to implement this policy, i.e. we are not going to provide an uplift to modelled rates. This is because we now consider that the framework described above provides a better approach, namely that the DSLF is set at a conservative level, so as not to disincentivise metering, and that risks to modelled services are mitigated by Network Rail sharing the volume wash-up. We also note that we do not consider that the policy on which Network Rail consulted, i.e. one in which the funds from the uplift are redistributed to other operators rather than go towards the recovery of Network Rail's costs, is consistent with the legislative framework for track access charges.

Other matters for consultation

41. In this section we discuss the treatment of:

- (a) the partially metered fleet with respect to the volume wash-up; and
- (b) Network Rail's own consumption in the volume wash-up and the wider contractual framework.

Partial fleet metering

42. Operators have found that the costs of OTM billing have been higher than anticipated in PR08, in particular due to the costs of managing the data. As a cheaper alternative, the industry has investigated some of the implications of metering only a sample of the fleet. Under this system, the consumption from the services that were not metered would be billed an equivalent amount to those metered. We refer to this proposed system of billing as PFM.

43. PFM has lower costs of meter installation and maintenance. It is not clear at this stage whether the costs of data management are lower or higher than OTM billing, though in principle they should be lower as the quantity of data would be substantially less. The key issues associated with PFM are:

- (a) the accuracy of the bills of those services that are not metered, if the relevant operator treated metered and unmetered services on an equivalent basis; and

¹⁷ ORR (2012), Periodic Review 2013: Setting the financial and incentive framework for Network Rail in CP5, May 2012, <http://www.rail-reg.gov.uk/pr13/publications/financial-incentives.php>

(b) whether operators might have an incentive to treat metered and unmetered vehicles differently (for example by allocating the most "energy efficient" drivers to the metered trains, or not switching the unmetered trains lights off), which would distort metering and provide unhelpful data.

44. The industry has commissioned Birmingham University to undertake considerable work investigating the accuracy of the bills, using actual metered data, and has measured errors associated with different levels of metering over different billing periods, advising that the estimation stabilises for billing periods of more than 28 days¹⁸. We have also discussed the potential perverse incentive issue with operators and they have argued that drivers, as a key example, would be subjected to the same driver training and guidance regarding their driving technique to promote energy efficiency.

45. We think that it is appropriate that the industry, rather than we, devise the contractual framework for PFM, just as it did for OTM, subject to our approval. Also, it makes sense for us to have a greater role in specifying how the risk will be shared between OTM, PFM, modelled services and Network Rail through the volume wash-up. This is because the calculation of the DSLF is highly complex, and requires an impartial examination of evidence.

46. We think that it is a pre-requisite for PFM that operators treat their metered and unmetered vehicles on an equivalent basis, and this should be supported by an appropriate audit. It is also a pre-requisite that if PFM is used it is able to deliver accurate estimates of EC4T consumption of the services that are not metered. This does not need to be the same standard as that for OTM, but any inaccuracies in billing over the course of a year should not be material.

47. We have consulted on the services subject to OTM being exempt from the volume wash-up. In the case of PFM, we consider that it is still appropriate that services that have consumption estimated by PFM should be included in the volume wash-up, but, as we set out below, that their share of the wash-up is less than for modelled services per kWh of electricity estimated to be consumed. Such distinctions incentivise PFM but also retain an incentive for the full use of OTM.

48. There are various ways in which this can be achieved. In principle, we think that:

(a) PFM at a level that produces an estimate to a high level of accuracy should have substantially reduced exposure to the volume wash-up¹⁹; while at the same time

(b) the incentives to meter all services (for example for new rolling stock) are not undermined, because full metering would result in less exposure to the volume wash-up.

¹⁸ From a Birmingham University presentation to ATOC of 20 July 2012.

¹⁹ We expect the industry to lead on determining the criteria by which PFM can be considered sufficiently accurate for billing purposes.

49. We suggest a particular formulation to achieve this, set out in Box A.2, and would be open to consider other formulations.

Box A.2: Possible mechanism for allocating the volume wash-up to services with PFM

Currently, where a service has modelled consumption of C kWh, its share of the year-end volume wash-up in CP5 would be $C / \{\text{total modelled consumption} + \text{Network Rail's share}\}$.

Suppose instead there is a single service in the ESTA that has PFM, with consumption C and that k% of the services are metered. In this case we propose that its share of the volume wash-up could be:

- $(1-k)^4 \times C / (\text{total consumption by modelled services and PFM services} + \text{Network Rail's share})$

Note: Network Rail's share of the volume wash-up would be the amount not allocated to modelled services or PFM.

So, for example, in the case where most services in an ESTA are modelled:

- if 30% of the PFM services were metered, the share of the wash-up would be 24% of that which it would be for equivalent modelled services (because $\{1-30\%\}^4$ is approximately 24%); and
- if 50% of PFM were metered, the share of the wash-up would be 6% of that which it would be for equivalent modelled services (because $\{1-50\%\}^4$ is approximately 6%).

This is a non-linear formula, and so, if the proportion of services metered varied by group of service, it would result in different shares of the wash-up depending on the way in which services are disaggregated. We think that the appropriate degree of disaggregation is that consistent with ensuring accurate billing, which means in practice a relatively homogeneous group of services (potentially a service code for example). This would need to be resolved as part of the contractualisation of PFM.

50. We also note that Network Rail's OTM billing system, which required significant investment to establish, does not charge on the basis of PFM. We would expect Network Rail to manage the changes required to its billing to accommodate PFM. This would not necessarily mean that Network Rail implement a full upgrade to its system for PFM until such time that it had confidence that PFM would be sufficiently widespread that it would be proportionate to do so. A less automated solution, probably involving a year-end reconciliation, may be appropriate in the interim, as was the case for OTM during the first year of its billing. A less automated system may have risks if rapid adoption of PFM were to occur, which Network Rail would need to manage.

Questions

6. We would like to know your views on the issues raised in this section of our letter, in particular:

- (a) do you agree with our views on PFM and the basis on which it should be charged?
- (b) what is your view of our suggested method for allocating the volume wash-up?
- (c) do you have an alternative formulation that you wish to propose?

In all cases, please give reasons for your views and/or proposals.

Network Rail's own consumption of EC4T

51. Network Rail currently uses around 3% (£9m) of EC4T for its own use (for example for engineering trains and for certain signalling equipment). In addition, Network Rail bills third parties, such as London Underground, for using EC4T. Network Rail's management of its traction electricity has improved; by December 2012 it had metered 85% of its usage excluding heated conductor rail energy. This also improves its accountability. Network Rail aims to meter the majority of the remainder of its usage by the end of CP4 but even in the medium term it may not be sensible for Network Rail to meter some of its smaller activities that use electricity, because the cost of doing so may be disproportionate to the cost of the energy consumed.

52. Currently Network Rail's consumption and the consumption by third parties are treated in the volume wash-up in the same way as modelled train services. This treatment is not contractualised at the moment, so we are proposing to include it in the traction electricity rules.

53. However, there are arguments that Network Rail's metered consumption should be treated on an equivalent basis to the metered consumption of train services, i.e. it should be excluded from the volume wash-up and consumption should be subject to a mark-up to reflect transmission losses, because the bills for Network Rail consumption would have equivalent levels of accuracy as the bills for OTM. Any such change would need to be contractualised in the traction electricity rules.

54. Metering Network Rail's consumption has been a priority for CP4. However, changing the contractual framework to reflect this issue, has been a lower priority for us and Network Rail and it would not be feasible to make such changes within the timeframe of PR13. If Network Rail wanted its metered consumption to be excluded from the volume wash-up, we would support that proposal. However, that support is conditional on the standard of its electricity consumption data being at least as high as that of OTM and also being subject to an appropriate audit.

Questions

7. We would like to know your views on the issues raised in this section of our letter, in particular whether you agree that Network Rail's metered consumption should be treated on an equivalent basis to other metered consumption? What conditions do you think should apply to this? Please give reasons for your views.

Annex B: Definition of ESTAs

The following table is the definition of electricity supply tariff areas (ESTAs), as contained in Appendix 7B of schedule 7 of the passenger track access contract in CP4.

ESTA	Traction electricity Geographic Area / Tariff Zone	Description
M	Merseyside	Comprises the Merseyside third rail electrified system between Liverpool, Southport, Ormskirk, Kirkby, Hunts Cross, Ellesmere Port, Chester, New Brighton and West Kirby
N	Midland Main Line	Comprises the overhead line electrified routes from London St Pancras, Farringdon and Moorgate (Midland) to Bedford
O	London Tilbury & Southend	Comprises the overhead line electrified London Tilbury and Southend routes from Fenchurch Street to Shoeburyness via Laindon, Rainham and Chafford Hundred; the route from Barking to Forest Gate Junction; and the route between Gas Factory Junction and Bow Junction
P	Great Eastern	Comprises the electrified Great Eastern Main Line routes from Liverpool Street to Bow Junction, Upminster, Southend Victoria, Southminster, Braintree, Sudbury, Clacton, Walton-on Naze, Harwich Town and Norwich; the West Anglia route from Liverpool Street to Hackney Downs station; the Lea Valley Line between Stratford and Coppermill Junction, and the ac & dc section of the North London Line route between Stratford and York Way neutral section (north of Kings Cross)
Q	West Anglia	Comprises the electrified West Anglia routes from Hackney Downs station to Chingford, Enfield Town, Hertford East, Stansted Airport, Cambridge and Kings Lynn and the electrified route between Cambridge Junction (on the East Coast Main Line near Hitchin) and Cambridge

R	East Coast Main Line South	Comprises the electrified East Coast Main Line from Kings Cross to the neutral section at Tallington (between Peterborough and Grantham), the electrified route between Moorgate and Finsbury Park; the electrified route between Canonbury West Junction and Finsbury Park; and the Kings Cross Incline between Camden Road East Junction and Freight Terminal Junction
A	East Coast Main Line Central	Comprises the electrified East Coast Main Line between the neutral sections at Tallington (between Peterborough and Grantham), South Kirkby and Hambleton Junction (between Doncaster and York)
B	East Coast Main Line North	Comprises the electrified East Coast Main Line between the neutral sections at Hambleton Junction (between Doncaster and York) and Chathill (between Alnmouth and Belford)
C	East Coast Main Line Leeds	Comprises the electrified East Coast Main Line between the neutral section at South Kirkby and Leeds, Bradford and Skipton
S	Scotland Glasgow	Comprises the electrified routes in Scotland between the neutral sections at Coatbridge, Rutherglen, Bishopston, Lochwinnoch & Carstairs
D	Scotland East	Comprises the electrified routes in Scotland between the neutral sections at Chathill (between Alnmouth and Belford) and Auchengray (between Edinburgh & Carstairs)
E	Scotland North & West	Comprises the electrified routes in Scotland on the North Clyde between the neutral sections at Coatbridge & Rutherglen, the routes from Bishopston neutral section to Gourock & Wemyss Bay and the routes from Lochwinnoch neutral section to Ayr & Largs
F	Scotland WCML	Comprises the electrified routes in Scotland between the neutral sections at Penrith, Carstairs and Auchengray (between Edinburgh & Carstairs)
T	West Coast Main Line South	Comprises the West Coast Main Line routes from Euston to the neutral sections at Berkswell and Nuneaton; the third rail electrified lines from Euston to Watford Junction; the West London Line to the North Pole junction; the North London Line between South Acton and York Way (north of Kings Cross) and the route between the Primrose Hill tunnels and Camden Road
G	West Coast Main Line Central	Comprises the West Coast Main Line routes between Nuneaton and Liverpool bounded by the neutral sections at Nuneaton, Queensville (Stafford), Stone – Colwich, Stone - Norton Bridge, Kidsgrove, Chelford and Weaver Junction
H	West Coast Main Line West Midlands	Comprises the West Coast Main Line routes around Birmingham between the neutral sections at Berkswell and Queensville (Stafford)

I	West Coast Main Line Manchester	Comprises the West Coast Main Line routes between Manchester and Stone bounded by the neutral sections at Stone – Colwich, Stone - Norton Bridge, Kidsgrove, Chelford
J	West Coast Main Line North	Comprises the West Coast Main Line routes between Weaver Junction and Penrith (neutral sections)
U	Southern	Comprises all third rail electrified routes south from Farringdon, Cannon Street, Charing Cross, London Bridge, Waterloo and Victoria, covering the international route as far as the Network Rail/Eurotunnel boundary; the West London Line to the south of North Pole junction; and the North London Line between Richmond and Acton Central
V	Great Western	Comprises the electrified route from Paddington to Heathrow Airport

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