



DETAILED OPTIONS ASSESSMENT REPORT

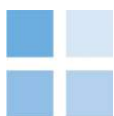
RAIL DELIVERY GROUP

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Prepared by:

Cambridge Economic Policy Associates Ltd



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1. INTRODUCTION AND BACKGROUND

The Rail Delivery Group (RDG), supported by Cambridge Economic Policy Associates (CEPA), has undertaken Phase 3 of its review of the charges and incentives regime for use of Network Rail's infrastructure. This Detailed Assessment Report is the third report in Phase 3. Two earlier stand-alone reports have been published in this phase:

- **'Factors' Report:** *An initial contextual document, setting out the factors impacting the form and/or the effectiveness of charges and incentives. This has informed the analysis in the subsequent stages of the review.*
- **Initial Assessment Report:** *An initial high-level assessment of a list of 22 options for the charges and incentives regime, which looked at each option in the context of several key criteria in line with RDG's Vision. It identified the seven options to be taken forward into the more detailed assessment.*

This report describes the detailed assessment of the seven options identified in the previous stage of this phase. The rest of this report outlines the approach and results of this detailed assessment.

1.1. Scope of this chapter

This introductory section sets out the:

- context for the report;
- the seven options that this report considers;
- approach to this stage of analysis; and
- the structure of the remainder of the report.

1.2. Purpose

The purpose of this report is to discuss our detailed assessment of seven options for changes to the charges and incentives regime for use of Network Rail's infrastructure. We set out our approach to the work, describe our modelling, and summarise the detailed assessments which are appended in Annexes B to H.

The seven options considered in this report should not be interpreted as those where there is any industry consensus as to the desirability of those options, rather that they are options that stakeholders thought merited more detailed analysis to inform the debate for ORR's next periodic review.

This report can be read on a standalone basis, but accompanies the two earlier reports produced in this Phase of RDG's Review of Charges.

1.3. Introduction

RDG's Contractual and Regulatory Reform workstream is carrying out a review of the charges and incentives regime. This project began in Spring 2014 and is expected to be completed by the end of 2015.

Once completed, RDG's review should allow the industry constructively to inform the Office of Rail and Road's (ORR's) next periodic review process (the 2018 Periodic Review (PR18)), and future reviews, by presenting the industry's own views on the regime.

By setting out the industry's views before the start of PR18, RDG can provide ORR with information that can help inform ORR's decisions, and potentially allow it to prioritise work in certain areas.

RDG has commissioned Cambridge Economic Policy Associates (CEPA) to assist in Phase 3 of its review. This follows RDG's previous work in Phases 1 and 2 of the review,¹ which produced:

- RDG's vision for the charges and incentives regime in the long run (the RDG Vision);²
- an assessment of the current charges and incentives regime;³ and
- a description of current and potential alternative States of the World (SoWs).⁴

We, CEPA, are working with RDG in Phase 3 to develop and assess options for a new and/or updated charges and incentives regime.

The detailed assessments developed in Phase 3 of our work reflect CEPA's independent assessment of a number of potential options for change to the current charges and incentives regime. These assessments have had the benefit of significant input from RDG representatives and the wider rail industry e.g. in order to scope options which mitigate industry concerns or reservations about a particular form of charge. This input has allowed us to ensure that the development of the options and our assessments of them are grounded in the reality of the range of business models currently in operation within the rail industry.

In addition, RDG members wanted to be able to demonstrate to ORR the range of views that exist within the industry, including where there is no collective view. We have sought to capture the range of views within this report. Stakeholder views on the implications or uncertainties of each option are specifically documented as part of each option assessed. This is intended to provide ORR access to the range of industry views of each option, and

¹ The publications released to date in RDG's Review of Charges are accessible via: <http://www.raildeliverygroup.com/what-we-do/our-work-programme/contractual-regulatory-reform/review-of-charges.html>.

² RDG (Dec 2014) "RDG vision for the charges and incentives regime in the long run" available [here](#)

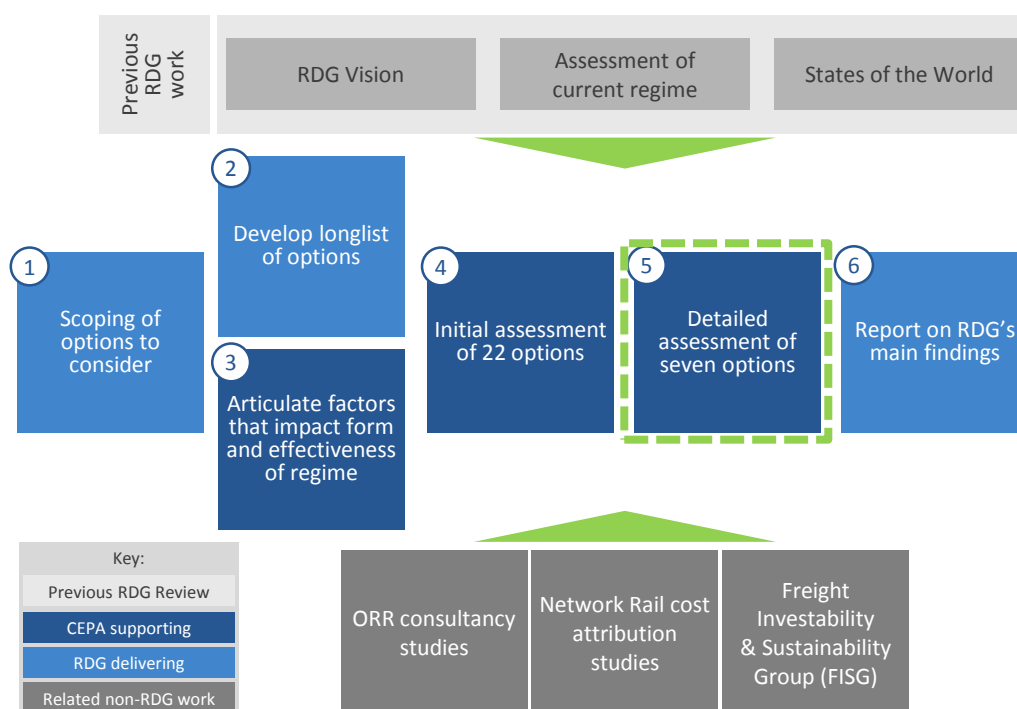
³ RDG (May 2015) "Assessment of the current charges and incentives regime" available [here](#)

⁴ RDG (May 2015) "Current and potential alternative states of the world" available [here](#)

should help inform ORR as it takes the work forward from the final phase of the RDG Review of Charges into the PR18 programme.

The objective of Phase 3 of RDG’s Review of Charges is to develop options for changes to the charges and incentives regime. As shown in Figure 1.1 below, work has already been completed to perform an initial assessment of a list of 22 options, to filter them to seven options for detailed assessment, and to review the factors that affect the form and/ or effectiveness of the charging and incentives regime.⁵

Figure 1.1 – How this report fits into Phase 3 of the RDG Review of Charges



Source: CEPA amendment of RDG diagram

1.4. Overview of assessment methodology

The RDG Vision, established in Phase 1, provided the assessment criteria used to assess each option. The descriptions of current and potential alternative SoWs, established in Phase 2a, provided a set of scenarios under which the list of 22 options could be assessed. The work to assess the current charges and incentives regime, completed in Phase 2b, informed the RDG work at the start of Phase 3 to establish an initial list of 22 options. The RDG’s charges and incentives user guide,⁶ developed as part of RDG’s Review of Charges, helped to identify the counterfactual elements of the regime against which options could be assessed. The work on factors impacting the form and/or the effectiveness of charges and incentives, also completed in Phase 3, informed the analysis of what could be achieved by each option in

⁵ CEPA (Nov 2015) “Review of factors impacting the Form and/or the Effectiveness of Charges and Incentives”

⁶ RDG (Jul 2014) “Charges and incentives user guide” available [here](#)

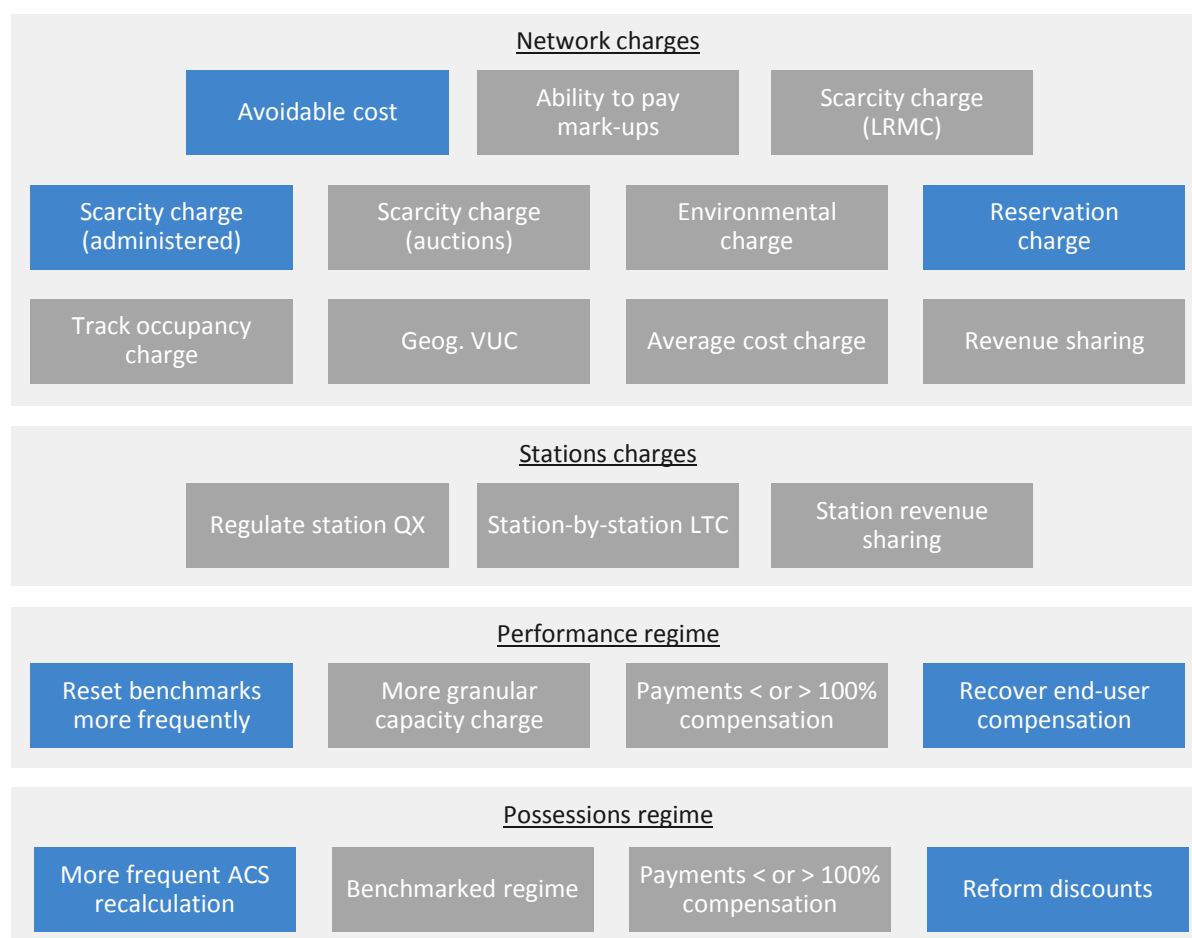
different SoWs. In the second report for Phase 3, seven options were selected as meriting more detailed assessment, which is the subject of this report.

While building on the work completed earlier in RDG's review, this report also serves as a standalone resource with its set of detailed option assessments provided in Annexes B to H. The individual assessments capture industry views on each option under each SoW. They provide a useful body of evidence should the ORR wish to pursue one of these options or if the sector were to move towards an alternative SoW.

1.5. The detailed assessment options

The options shown in green in Figure 1.2 below are those for which further detailed assessment was undertaken. The selection of these options does not represent an industry consensus that any options represent an improvement on the present charging system; they are not recommended options. Rather, these are options that RDG representatives considered would merit further assessment. For example, an option may have been selected because it sought to address a weakness or gap in the current arrangements and / or because ORR might pursue such an option and the industry wishes to provide views as part of the debate and to inform ORR's consultation in more detail from the initial assessment.

Figure 1.2 – The options selected for detailed assessment (in blue) in the context of all options assessed



When developing the options for assessment, we have, as far as possible, attempted to envisage implementation of those options that maximise their practical feasibility in operation, although clearly more detailed work may be required. Further explanation of how we chose the seven options to assess in more detail is set out in the initial assessment report.⁷

In this context, it is important to note that the selection of options for further assessment does not rule out other options. Initial assessments remain valid and some could be pursued; only a minority were entirely disregarded for reasons such as legality or practicality. We also note that given the large number of potential combinations of reforms that could be made at the same time,⁸ the analysis presented in this report has focused primarily on the merits of each option in isolation.

The options considered in further detail include three network charging options, two options for reforming the Schedule 4 possessions regime, and two options for reforming the Schedule 8 performance regime, in one case removing the capacity charge. No stations

⁷ CEPA (Nov 2015) "Initial options assessment report"

⁸ There are 128 combinations of the seven options considered in this report.

charges options were taken forward for more detailed assessment. The group considered that the most significant issues in relation to stations were structural and contractual. Therefore, whilst charges are an important consideration for stations, the group thought that the other issues should be addressed before seeking to reform stations charges.

1.6. Input from RDG representatives

Our findings have been discussed with RDG and other industry representatives through a series of workshops and one-to-one meetings to gather the information we required to develop our findings.

The project was guided by a working group (Review of Charges Executive Group) which included representatives from passenger operators, freight operators, Network Rail and governments (Department for Transport (DfT), Transport Scotland and Welsh Government), with ORR attending as an observer.

1.7. Report structure

The remainder of this report is set out as follows:

- Section 2 sets out the assessment methodology applied and the criteria used. It also summarises the simulation modelling work for the detailed assessments, which is covered in more detail in Annex A. Information on the evaluation criteria and the SoWs in which options were considered is provided in Annexes I and J.
- Section 3 summarises the seven options considered in the detailed assessment.
- Section 4 summarises the detailed assessments, which are provided in full in Annexes B to H.
- Section 5 provides a summary of the findings of the detailed assessments, including how the options might fit together and the degree of scope for change in the current SoW.

2. ASSESSMENT METHODOLOGY

This section sets out the methodology used for the detailed analysis of charges and incentives regime options. It builds on earlier stages of the RDG Review of Charges.

2.1. Scope of this chapter

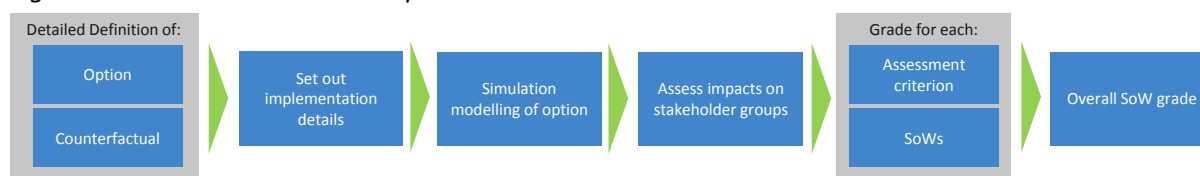
This section describes:

- the detailed assessment methodology;
- the SoWs used;
- the “traffic light” grading system used; and
- how overall grades were awarded to each option.

2.2. Detailed assessment methodology

Figure 2.1 provides an overview of the high-level assessment process.

Figure 2.1 – Detailed assessment process



The detailed impact assessments used standardised templates, designed with input from RDG representatives. The template required an assessment against 19 agreed criteria and also included additional sections to capture relevant wider information and to inform the process. These additional sections comprised:

- a detailed description of the option, including other issues aiding understanding of the option;
- the counterfactual charging arrangements, which identify the benchmark the proposal was assessed against;
- factors impacting the form and/or the effectiveness of the proposal as identified earlier in Phase 3;
- implementation issues, including information requirements, drivers of differentials in the charge, how the charge would be calculated, practical issues, and an assessment of resources required for implementation; and
- implications of the proposal for different stakeholders, informed by the simulation modelling work carried out.

We carried out simulation modelling to consider the potential impact of implementing the options considered in the detailed assessment, to the extent that it was practical to do so. In most cases we have undertaken simulation modelling on the basis of realistic assumptions, confirmed with industry and/or using existing data and analysis. The modelling is ‘indicative’ and is designed to give an ‘order of magnitude’ impact of the option rather than precise estimate of the impact. This simulation modelling is discussed further in Annex A.

The simulation modelling informed our understanding of the impact on stakeholders and also assisted us to refine, and in some cases adjust, our assessment of the options against the criteria. However, any option considered for implementation would require more substantial and detailed modelling to be undertaken.

We assessed each option against the 19 agreed criteria, which are set out in Section 2.3. The main assessment assumes that each option would operate in the current SoW and is therefore affected by the constraints that are discussed in the ‘Factors’ report e.g. the modest impact of charges on franchised passenger operators. However, we also made subsidiary assessments, on the same basis, of the options in the seven alternative SoWs that are set out in Section 2.4.

Each option was assessed based on its performance against the relevant counterfactual, i.e. an assessment of whether or not the option being assessed would be an improvement on the relevant part of the existing regime.

We graded each option using a directional “traffic light” system, described in Section 2.5. The traffic light system is slightly more granular compared to the initial assessment – we have added two additional grades of ‘- -’ and ‘++’. The assessment criteria do not provide for a meaningful quantitative metric and therefore, we have retained the qualitative summary assessment for the detailed assessment.

As with the initial assessments, each detailed assessment includes an overall traffic light grading for each option in each SoW. This grading reflects an ‘in the round’ judgement; it is not a simple sum of the subsidiary grades. The overall grade is supported by a qualitative summary of the reasons for it.

Throughout the process of developing the detailed assessments we sought feedback from industry representatives, primarily from RDG’s Review of Charges Executive Group, through workshops, sharing of drafts, one-to-one meetings and discussions with individuals. This engagement process allowed us to capture some nuances/detail that are relevant for each option and to set out industry views on each option under each SoW. In a separate section of the assessment template, we present the viewpoints of different industry representatives regarding the different options.

2.3. Assessment criteria

As shown in Figure 2.2, the assessment criteria we used for the initial assessment of options were drawn directly from the RDG Vision. Using the RDG Vision in this manner ensured that the assessments captured the most important considerations for the rail industry. These are the same criteria used in the initial assessment.

Figure 2.2 – Assessment criteria

Axioms	Objectives
• System safety • Consistency with law • Funding of Network Rail efficient costs • Allowance for market conditions • A single approach to the network as a whole	• Service costs recovery • Efficient whole-system whole-life industry net costs • Efficient long run investment decisions • Efficient performance management • Efficient use of network capacity
Judgement criteria	Outputs
• Predictability • Simplicity • Transparency • Low transaction costs	• Network Rail accountability • Non-arbitrary allocation of costs • Optimal traffic growth • Aligning industry incentives • Value for money for funders, taxpayers and users

Full descriptions of the criteria drawn from the RDG Vision are provided in Annex I. A small number of minor clarifications, capturing industry feedback on how the RDG Vision should be used for the initial assessments, were made to the descriptions of four of the nineteen criteria:

- consistency with law – clarified to note particular regulations and laws that would be captured, as well confirming that this would be the criterion to capture specific impact tests considered by ORR such as those regarding the environment;
- allowance for market conditions – clarified to note that legal considerations related to market conditions would be captured here rather than under consistency with law;
- simplicity – clarified to capture an extended description developed in Phase 2b⁹ of RDG’s work and to note that it would capture practicality i.e. is it possible to calculate and apply the charges at the required level of granularity; and

⁹ L.E.K. (May 2015) “Assessment of the current charges and incentives regime” available [here](#) p7

- value for money for funders, taxpayers and users – a description was provided by RDG for this criterion as it was not defined in the RDG Vision. This reflects the use of the “Output” category of the RDG Vision as criteria rather than the outcomes that would occur when the other criteria were fulfilled.

The criteria used here differ from the “proposed criteria” that the ORR presented at the “discussion on the structure of charges” workshop on 21st July 2015 but the differences are primarily in presentation and emphasis rather than substantive content.

2.4. States of the World

A number of the external factors that interact with the charges and incentive regime may vary over the medium to long term. These have the potential to influence the effectiveness of any given charging or incentive option. A SoW, therefore, describes the broader industry arrangements in which the charges and incentives regime might operate.

Seven alternative SoWs were developed during Phase 2a of RDG’s Review of Charges¹⁰ and have been adopted here to allow the impact assessments to capture a broader range of potential future industry landscapes. These are in addition to the current SoW, which describes the industry as it is today, i.e. considering Network Rail (as the infrastructure provider), passenger and freight services, funders, governments and regulation. Alternative SoWs reflect potential changes along one, or several dimensions that affect these market participants. These are listed in Table 2.1. Further detail is provided in Annex J.

Table 2.1: Alternative States of the World

No.	State of the World	(Short name)
1.	A more dynamic railway	(Dynamic railway)
2.	On-rail competition via flexible franchising	(On-rail comp)
3.	More highly specified franchises	(Specified franchises)
4.	Freight protection / subsidy	(Protect freight)
5.	Beneficiary pays for capability	(Beneficiary pays)
6.	Change in approach to capacity allocation	(Capacity allocation)
7.	More regional decision making	(Regional powers)

SoWs reflect high-level changes to the structure of the industry. Changes are not described in detail because the purpose of the SoWs is to help test potential changes to charges and incentives. Greater detail of alternative SoWs would require additional assumptions and these are unlikely to accurately reflect any actual changes to the current SoW. Therefore, the impact of charging options considered in the detailed assessments under alternative

¹⁰ RDG (May 2015) “Current and potential alternative states of the world” available [here](#)

SoWs are also made at the level of principle. A review of detailed implementation issues in and additional quantitative assessments, for alternative SoWs were not considered to be practicable and have not been attempted. Impacts in the current SoW were often common across alternative SoWs, so comments were only made by exception for alternative SoWs.

2.5. The five-level traffic light grading system

We do not think that it is helpful to provide an assessment of each option based on a mechanistic assessment, e.g. by taking a weighted average of the scoring against each of the 19 criteria. Whilst our analysis is relatively detailed, the criteria do not provide for meaningfully precise metrics or weightings. However, in view of the more detailed information against which we have assessed the options, we have extended the “traffic light” system we used in the initial assessment from three levels to five levels, to indicate how well an option was expected to perform against each criterion. The following grades were given with reference to the current charges and incentives regime:

- **Dark Red (--):** indicates that the option is expected to have a clearly or strongly negative impact on a given criterion (compared to the current regime);
- **Red (-):** indicates that the option is expected to have a somewhat or probably negative impact on a given criterion (compared to the current regime);
- **Amber (=):** indicates that the expected impact on the criterion was equivalent to the current regime, or the impact is unclear; and
- **Green (+):** indicates that the option is expected to have a somewhat or probably positive impact on a given criterion (compared to the current regime); and
- **Dark Green (++):** indicates that the option is expected to have a clearly or strongly positive impact on a given criterion (compared to the current regime).

These grades were considered under each SoW for each criterion. It is important to reiterate that each option has been considered in isolation. Therefore, grades reflect the impact of the introduction of that particular option only and not any other charges that could be introduced alongside it to mitigate any anticipated negative impacts or enhance the positive. We discuss this further in Chapter 5 where we consider the options as part of an overall charging package.

An example of scoring for one assessment criterion is shown in Figure 2.3 below.

Figure 2.3 – Example of traffic light system

	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Funding of NR efficient costs	=	--	+	-	-	=	++	=

In the assessment templates, each traffic light score is also accompanied by a brief description justifying the grade.

It is important to stress that the traffic lights indicate directional impacts only and are not directly related to potential magnitudes of impacts. The individual grades were not designed to capture relative magnitudes of impacts. Any such observations were made in the accompanying commentary or reserved for the overall grading.

2.6. Overall grades

Each charging option received an overall grade based on a balanced consideration of the individual grades for each assessment criterion. The overall assessment grade is not a simple sum of the individual grades, because the individual grades are qualitative and there is no clear metric which can be used for weightings. A particular option may receive a mixture of Red, Amber and Green grades based on individual criteria while receiving, say, a Green grade overall. In any case, the aim of this review is not necessarily to provide a clear recommendation, but rather to contribute to ORR's periodic reviews and indicate the views and impacts on various stakeholders of the different options. The overall grade is illuminated by a commentary.

The evaluation has been informed by workshops with RDG's Review of Charges Executive Group, comments on drafts received from the Executive group and other stakeholders, and meetings with individual stakeholders.

However, whilst the traffic-light grading reflects our, CEPA's, assessment of an option, the commentary highlights the main areas where CEPA's assessment differs from the views of RDG representatives. Therefore, it is important that readers consider both the traffic light grading and the accompanying commentary to understand the findings of RDG's work.

3. SELECTION OF OPTIONS FOR DETAILED ASSESSMENT

This chapter introduces the seven options which have been selected for more detailed assessment. It includes three options for network charges, two options for the Schedule 4 possessions regime and two options for the Schedule 8 performance regime.

3.1. Scope of this chapter

This section:

- discusses the selection process to identify the options for detailed assessment; and
- describes, at a high level, the options selected for detailed assessment.

3.2. Option selection

An initial assessment of 22 options was completed earlier in Phase 3 of RDG's Review of Charges.¹¹ An overview of the initial assessment is provided in Table 3.1 below but with the revised grades provided for the detailed assessment options highlighted within the table.

As the overview indicates, only capacity auctions rated poorly throughout the initial assessment. Although some other options were given red grades overall e.g. for reasons of practicality or legality, the majority of options assessed were found to have some positive attributes in the current or alternative SoWs.

¹¹ CEPA (Nov 2015) "Initial options assessment report"

Table 3.1: Overview of CEPA initial and detailed option assessments in the current SoW

Option group	Network charges											Station charges			Performance regime				Possessions regime			
Option	Avoidable cost	Ability to pay mark-ups	Scarcity charge (LRMC)	Scarcity charge (administered)	Scarcity charge (auctions)	Environmental charge	Reservation charge	Track occupancy charge	Geog. VUC	Avg. cost charge	Revenue sharing	Regulate station QX	Station-by-station LTC	Station revenue sharing	Reset benchmarks more frequently	More granular rebranded capacity charge	Payments < 100% compensation	Recover end-user compensation	More frequent ACS calc.	Benchmarked possessions regime	Possessions compensation < 100%	Reform discounts
Option No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Axiom																						
System safety	=	=	=	=	-	=	=	=	=	=	=	=	=	=	=	=	=*	=	=	=	=*	=
Consistency with law	=	=	=	=	-	=	=	=	=	-	=	=	=	=	=	=	=	=	=	=	=	=
Funding of Network Rail efficient costs	=	=	=	=	-	=	=	=	=	-	=	=	=	=	=	+	=	=	++	=	=	=
Allowance for market conditions	=	+	=	-	-	-	=	=	-	-	+	=	=	+	=	=	-*	=	=	=	-*	+
A single approach for the network as a whole	+	=	+	=	-	=	=	+	=	+	-	+	+	-	+	=	=	=	=	=	=	=
Objective																						
Service costs recovery	=	=	=	=	-	=	=	=	=	=	=	=	+	=	-	+	=	=	++	=	=	=
Efficient whole-system whole-life industry net costs	=	=	=	=	-	+	+	=	+	=	+	=	+	+	=	+	+	=	=	=	=	-
Efficient long run investment decisions	=	=	=	=	-	+	=	=	+	=	=	=	=	=	=	=	-*	+	+	=	=	=
Efficient performance management	=	=	=	=	-	=	=	=	=	-	=	=	=	=	=	=	+	+	=	=	+	+
Efficient use of network capacity	=	+	=	+	-	-	+	=	+	-	=	=	=	=	=	+	=	=	=	=	-	+
Judgement criteria																						
Predictability	=	=	-	-	-	=	-	=	=	+	=	=	-	=	+	=	=	=	-	=	=	=
Simplicity	=	=	-	-	-	-	=	=	-	+	=	+	+	-	+	=	=	-	-	+	=	+
Transparency	+	=	+	+	-	=	+	=	=	+	=	+	+	=	+	+	=	=	=	+	=	=
Low transaction costs	-	=	=	-	-	-	-	=	-	+	=	-	-	=	-	-	=	-	-	=	=	=
Outcome																						
Network Rail accountability	=	=	=	=	-	=	=	=	+	=	+	=	+	+	+	=	-*	++	=	=	-*	=
Non-arbitrary allocation of costs	++	=	+	=	-	+	=	=	+	-	=	=	+	=	-	=	=*	=	++	=	-	-
Optimal traffic growth	=	+	=	+	-	-	=	=	+	-	=	=	-	=	+	+	=	=	=	=	=	=
Aligning industry incentives	+	=	+	+	-	=	+	-	=	-	+	=	+	+	=	=	+	+	=	-	+	+
Value for money for funders, taxpayers and users	=	=	=	=	-	-	+	=	=	-	=	=	+	=	=	+	-	+	+	=	-*	-
Overall																						
Option assessed in isolation	=	=	=	+	-	-	+	-	=	-	+	=	-	-	+	+	=	+	+	=	=	=

Key: * Grading would change if direction of options 17 and 21 flip; Options selected for assessment in Stage 3 are indicated by a black border

3.3. Selection of detailed assessment options

Seven of the 22 options were selected for further analysis. These seven options were chosen based upon discussions with RDG's Review of Charges Executive Group, informed by CEPA's analysis in the initial assessments. Table 3.2 summarises the reasons for selection of the seven options chosen.

The selection of the seven options should not be interpreted as representing an industry consensus that **any** of these options represent an improvement on the present charging system. Similarly, the fact that an option was not selected for further assessment should not be seen as a rejection of that option, but rather that it did not merit more detailed investigation at this stage.

The seven options are those where RDG considered that there was merit in undertaking more detailed analysis because:

- the option scored well in the initial assessment, and RDG wanted to explore the opportunities of the option further; or
- RDG thought that the option was likely to be considered in the next periodic review and wanted to set out industry views, supported by further evidence, to inform the debate in PR18.

The options considered for detailed assessment include three network charging options. These were selected because they address known issues related to the allocation of fixed costs and scarce capacity. There are also two performance regime options and two which relate to the possessions regime. These were selected, in the main because they investigate the relationship between the infrastructure manager and the operators.

No stations charges options were taken forward for more detailed assessment. The group considered that the most significant issues in relation to stations were structural and contractual. Therefore, whilst charges are an important consideration for stations, the group thought that the other issues should be addressed before seeking significant reform of stations charges. The three stations charges options considered in the initial assessment were discussed with a working group reviewing stations charging, which agreed with these conclusions.¹²

¹² RDG (Oct 2015) *“Review of Charges: Stations Charges”*

Table 3.2: Summary of options selected for detailed assessment

Area	Option	Summary
Network charges	1. Avoidable cost (Option 1)	- Avoidable cost provides an alternative means by which to allocate fixed cost. It fits well with ongoing work being undertaken by Brockley Consulting for Network Rail that is assessing the ability to allocate costs on this basis. Although it was graded amber by the initial assessment in the current SoW, it has more positive attributes in other SoWs. - It was considered that this option would be developed as a mark-up which is why the initial assessment option of marks-ups was not selected for further assessment.
	2. Administered scarcity charge (Option 4) noting linkages to Geographically Disaggregated VUC (Option 9) and differences to LRMC (Option 3)	- The scarcity-based options are relevant to the ongoing debate about how to allocate capacity. They consider alternative approaches to this in part to prompt debate about which might be most effective. - Both options have the potential to add value in the current SoW, although benefits may be greater in SoWs which encourage greater competition. - As is the case for avoidable cost, these options also consider elements of other initial assessments that were not progressed to this stage of the analysis e.g. scarcity charge options could fit well with further geographic disaggregation of the VUC.
	3. Reservation charge (Option 7)	
Performance regime	4. Reset benchmarks more frequently (Option 15)	- Selected for detailed assessment given its potential to address the current issues with the capacity charge: the capacity charge's link to the Schedule 8 performance regime was not considered to be sufficiently clear in name or application. - This option was initially rated amber, whilst a more granular and rebranded version of the capacity charge was rated green. - However RDG and industry participants considered that the issues with the current charge are significant and require a wholesale re-evaluation of the approach rather than a degree of 'tweaking'. - Other stakeholders were concerned about the cost redistribution effect of removing the capacity charge. We considered that these can be addressed straightforwardly and that this would be considered further in the detailed assessment of this option.
	5. Recover end-user compensation (Option 18)	This option was selected for detailed assessment given that the performance regime is not considered to give adequate attention to the short-term impact of delays which require passenger operators to

Area	Option	Summary
		provide passengers with compensation. • Passenger compensation is currently undergoing a series of changes, with the move to Delay Repay and C2C introducing automatic refunds in 2016, industry therefore considers that it is an appropriate time to consider how passenger compensation requirements could be incorporated into Schedule 8. • CEPA initially gave preference to the revenue sharing option but industry representatives were of the view that this was considered in PR13. There was a strong preference to undertake further analysis of end user compensation given the current profile of this issue so this item was added to the list of detailed assessments and revenue sharing was removed.
Possessions regime	6. More frequent ACS calculation (Option 19)	• This option was selected for detailed assessment as it addresses concerns in the industry about over-recovery of Schedule 4 costs by Network Rail when the workplan used to set the ACS at the periodic review subsequently changes resulting in a lower number of actual possessions being taken.
	7. Reform Schedule 4 discounts (Option 22)	• This option involves reforming the notification discount factors applied to Schedule 4 compensation rates when possessions are booked more than a given amount of time in advance of taking place. The option was selected for detailed assessment as a result of industry concerns that the current discount structure may incentivise early notification of possessions but not the efficient planning of work. • It is also considered an area where the approach may not have kept up to date with the fact that passengers now have better information and more immediate access to information about timetables and impact of engineering works. • The option was rated amber by CEPA because the impacts are more difficult to estimate and or may depend on how the option is implemented; this option would need to be part of and consistent with the wider possessions planning regime if it is to be effective. Despite reservations about the scale of benefit it was considered, by industry to be an area worthy of further analysis.

4. SUMMARY OF DETAILED ASSESSMENTS

Full detailed assessments of the seven options considered in this report are provided in Annexes B to H. This chapter summarises the key assumptions and findings from the detailed analysis.

4.1. Scope of this chapter

This chapter provides summaries for each of the seven detailed assessments. The summaries are organised into sections as shown in Table 4.1.

Table 4.1: Detailed assessment options

Network charges	Performance	Possessions
1. Avoidable cost	4. Reset benchmarks more frequently	6. More frequent ACS calculation
2. Administered scarcity charge	5. Recover end-user compensation	7. Reform Schedule 4 discounts
3. Reservation charge		

Each summary draws out key elements from the full detailed assessments provided in Annexes B to H. In each case, we provide information on:

- the underlying issue in the regime that the option seeks to address;
- what we envisage the option would change or add to the regime;
- key impacts identified in the detailed assessment;
- a summary of our findings from the detailed assessment; and
- the option's overall grading against the RDG Vision across the States of the World considered.

At the end of each summary, we also highlight the main observations provided by industry stakeholders during this process. Further details on this and on the other points highlighted above can be found in the full detailed assessments, provided in Annexes B to H.

4.2. Network charge options

This section contains summaries for the following options, noting the annex to this report in which full details can be found:

- Fixed charge based on avoidable cost (Annex B);
- Administered scarcity charge (Annex C); and
- Path reservation charge (Annex D).

4.2.1. Fixed charge based on avoidable cost

Avoidable cost charging is an option to set charges used to recover Network Rail's net revenue requirement in a way that is more reflective of underlying costs than the existing Fixed Track Access Charges (FTACs), and with greater clarity of purpose.

Industry participants supported this option being selected for further investigation given its potential to send more informative price signals to train operators and their funders in the context of anticipated changes to money flows, i.e. a significant reduction in the Network Grant. We estimate that changes in money flows could result in an increase in charges to recover the net revenue requirement, putting them at almost ten times their current level¹³ and increasing the influence of the approach used to calculate them. It was also selected for detailed assessment to investigate freight sector concerns about the implications of using avoidable cost information in charges.

For this option, we envisage that the current FTACs would be replaced with a new charge based on long-run incremental cost (LRIC) principles. This would produce a set of tailored charges based on causal links between train services and infrastructure costs.¹⁴ They would be highly disaggregated by geography and by the specific demands train services place on the network. We assume in this detailed assessment that this option could be implemented as a "mark-up" consistent with the terminology of Commission Implementing Regulation (EU) 2015/909. Further legal analysis is required in this area but given its potential role in protecting the financial viability of non-franchised operators, we note that this is potentially a crucial assumption in the analysis.

The current FTAC methodology, which allocates costs based on traffic metrics (e.g. train km), results in charges that recover costs in areas where traffic is greatest. As shown in the table below, an avoidable cost methodology has the potential to be much richer.

Table 4.2: Comparison of FTAC and avoidable cost charging

	FTAC	Avoidable cost charge
Increase with own traffic	Yes	Yes
Capture utilisation of assets	No	Yes
Capture costliness of assets used	No	Yes
Capture cost of user-specific demands	No	Yes

Indicative modelling completed in support of this assessment uncovered potential for large shifts in charges between operators. In particular, it might be possible to see shifts between train services operating on busy lines where economies of scale are realised to those where

¹³ £4.4bn per year (2012/13 prices).

¹⁴ We envisage that this option could be implemented as a "mark-up," potentially affording "ability to bear" protections to more vulnerable operators but further legal analysis is required in this area.

they are not. We also saw potential to attribute avoidable costs to freight operators, which could be substantial, but found they would require significant protection from them, with estimated charge increases (before considering any potential “mark-up” protections afforded by EU legislation) easily outstripping current profits.

Overall, we found that while there could be informational benefits from investigating avoidable costs, this should not be conflated with those benefits that might arise through charging. In the current SoW, we anticipate minimal benefit from putting avoidable cost information into charges, given the nature of current franchising arrangements and decision making.

It is not clear that there would be sufficient benefit from this option to outweigh the non-trivial burden of the supporting calculations, and to calibrate the level of the mark-up to ensure the viability of open access and freight operators. Despite the weak overall performance of this option against the RDG Vision in the current SoW, we did identify potential for this option to be beneficial in four alternative SoWs (indicated above), making this option far more attractive if the sector were to move in those directions.

Limiting the scope of the charge to franchised passenger operators, it is possible to envisage some elements being introduced at PR18. For wider application, we anticipate far more time being needed to get the supporting framework right, at which point we might be in quite a different SoW.

Table 4.3: Avoidable cost

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
=	++	+	=	=	+	+	=
Summary of industry commentary							
Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.							
- There was some consensus on the investigation of avoidable cost information as a route to improving understanding of Network Rail's costs but there was only limited support for using such information in charges, particularly in the current SoW. Despite this, some passenger operators saw this as means to make the FTAC more rational, particularly if combined with the removal of the capacity charge, which was seen to allocate fixed charges in a similarly arbitrary manner. - Passenger operators expressed the view that it is important to distinguish between informational benefits and those from using avoidable cost information in charges. They saw minimal benefit from avoidable cost charging in the current SoW particularly given the burden of calculating the charges and ensuring that operators without public service contract income would be able to pay the charge and remain financially viable. - The issue of ensuring the viability of freight operators was shared by all industry participants, with some passenger operators expressing the view that this issue must be explicitly addressed as it is an inevitable requirement. They also expressed the view that it is essential for further work to be done to close down the legal uncertainties of this option either at this stage of policy development or at least before implementation. A particular legal issue for many parties was the status of the charge, a "mark-up," "directly incurred cost" or something else. - Passenger operators considered it important to address the impact on service sponsors and funders, particularly those associated with regional public service obligation (PSO) contract. - Open access operators expressed the view that there is a strong link between the existing charges structure and processes for capacity allocation and Network access processes. Existing Open Access operators do not pay FTAC with one rationale being that this reflects the different markets served and the fact that they access to the network in a different way. In particular, Franchised Operators are able to access the whole of the relevant passenger market while the Open Access operator access is controlled by the Not Primarily Abstractive (NPA) test amongst other mechanisms. If Open Access operators were to face an avoidable cost charge, there would need to be a parallel adjustment to the Capacity Allocation process. - Transport Scotland explained that this option is only significant to Scotland if there is a move away from the current model where all Scottish fixed charges are allocated to the ScotRail franchise. - Network Rail considers that the current approach that is used to allocate Network Rail's 'fixed' costs is too simplistic; it could be improved to better reflect the actual underlying railway economics. It considers that the informational benefits of this could be powerful, even if it were concluded not to fully reflect this in charges.							

4.2.2. Administered scarcity charge

The purpose of a scarcity charge is to encourage the release of lower value uses from scarce capacity and enable higher value uses to take over that capacity.¹⁵ Many important parts of the railway network are used to full capacity, and in some cases there are valuable additional uses that are prevented, or required to use inferior timings or routings. An additional variable charge, applied only to 'scarce' parts of the network, could encourage better use of that scarce capacity, e.g. by discouraging low value uses of the network or by encouraging Network Rail to find a way of scheduling more trains.

We have carried out a detailed assessment of an administered, value-based, scarcity charge because it appears to be the most practical form of this type of charge. The alternative to administered is market-determined, but that appeared impractical given the difficulty of devising workable mechanisms consistent with the complexity of railway scheduling. The alternative to value-based is cost-based, but that appeared too complex and less relevant.

A reservation charge, which has also been assessed in more detail, is a different type of charge related to efficient use of network capacity. A reservation charge and administered scarcity charge could both exist in the same charges regime.

The scarcity charge would be an additional variable charge, i.e. levied in addition to the variable usage charge. Our interpretation of European legislation suggests that it permits a scarcity charge, which is not a mark-up, in addition to the cost directly incurred within the charge for the minimum access package. It would therefore not be legally limited by ability to pay. It does not have to be restricted to locations formally declared as congested infrastructure.

The definition of value we are using is the commercial opportunity cost, the net income lost by putting a scarce resource to one use rather than another use that has been excluded. We initially suggested the opportunity cost could reflect full economic value, which would include non-financial socio-economic values. However, our further work suggests that it is more practical and appropriate, at least in the first instance, and particularly in the present state of the world, to use the 'commercial' opportunity cost. There is precedent for such an approach in other industries, and was the basis of earlier studies for ORR on its application, and presents opportunities to keep it simple and practical, through being narrow in application.

To focus on the key issues and minimise potential issues of feasibility and complication, we have envisaged a simple scarcity charge that would apply as a path charge to only the busiest and most commercial corridors, with a high peak charge, a much lower off-peak charge, and no charge at times of day when there is spare capacity. We assume that the path charge would apply to all services passing through the key bottleneck of the path. In

¹⁵ What is meant by "value" in this context is discussed later in this section.

this simple vision of the charge, many, or even most, locations in the network, where the infrastructure is used to capacity, would not attract the charge, because such is the level of non-commercial services operating there that capacity would not be said to be the prime constraint on expanding commercial operations. It would not correspond to the technical EU definition of “congested infrastructure.”

Clearly a more detailed scarcity charge could be implemented, charging many more nodes according to their relative scarcities. For example, the definition of opportunity cost could be extended to include social value but would complicate the calculation and application of the charge. Nevertheless, we can note that there are options for a more sophisticated charge if the simple charge works well and is deemed worthy of extension.

We have assessed that in the current SoW such an administered scarcity charge could have positive benefits in incentivising more remunerative use of existing capacity among commercial users of that capacity. Whilst discouraging uses of low commercial value, it would not entirely resolve policy issues in relation to competition between open access and franchised operators for commercially profitable services. This is because it does not address issues relating to abstraction and cross-subsidy of subsidised services.

This charge would also have important effects at the boundary of commercial and subsidised services, where they share the commercially valuable capacity, making funders decide whether the social benefit of their funded service justified paying the premium. Some might consider this an inappropriate way of making trade-offs between commercially beneficial and socially beneficial uses of infrastructure. For services that provide social benefits but are not procured by funders e.g. freight services, they may not be able to accessing funding to offset the effect of this charge.

In alternative SoWs which introduce greater on-rail competition, or which allow train operators to play a greater role in capacity allocation, this option could have greater positive impact. In SoWs where train operators are more protected from charges, or where funders play a greater role in capacity allocation, it would be less relevant.

Any ‘premium’ charge has the effect of increasing the price of access and reducing demand. Therefore, if the current capacity charge remained, we would not expect the scarcity charge to be added to the capacity charge, and it would be inappropriate to do so. In locations where both a capacity charge and a scarcity charge applied, the actual charge would be the larger of the two.

A scarcity charge potentially works well with a geographically distinguished variable usage charge (VUC). Previous work by ORR on a geographically disaggregated VUC suggested it would be low in intensively used areas, and thus a countervailing charge representing that intense use would be useful to avoid further concentrating use in those areas. In practice the simple and focused scarcity charge we have envisaged as most practical to implement would only have this countervailing effect in a few locations of particularly high scarcity. Ultimately a more sophisticated scarcity charge would work best with a more granular VUC.

Table 4.4: Administered scarcity charge

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	++	-	+	+	++	+
Summary of industry commentary <i>Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.</i> - Several industry representatives suggested that socio-economic as well as commercial value should be included in the measure of scarcity value. However, freight and passenger operators raised a some potential risks with the introduction of a scarcity charge: - Some operators argued that there was some uncertainty regarding the assumption made in this report that a scarcity charge could be a “mark-up” such that ability to pay would be taken into account in its application. This uncertainty in part come from scarcity not being included as an admissible cost in the implementing regulation 2015/909, which defines costs directly incurred. Some also expressed a degree of uncertainty regarding the assumption made in this report that under Directive 2012/34, a scarcity charge could apply beyond locations formally declared as congested infrastructure. Both these points of legal uncertainty would need to be clarified ahead of implementing such a charge. - Using price to encourage reallocation of capacity between funded and commercial services would be politically controversial. - The binary nature of the proposed scarcity charge could lead to a high degree of instability as the route flipped between being “full” and having a spare path. - It could lead to gaming by a dominant operator filing a route to make it scarce and impose charges on competitors. - If the scarcity charge applies to freight and Open Access operators, there would need to be a parallel adjustment to the capacity allocation process to make them freer to obtain paths they are willing to pay for. - There would be boundary problems if the charge were to change by a large amount at a sharp time boundary, and difficulties if a path were re-timed to the expensive side of the boundary. - Network Rail considers that there could be merit in carrying out more work to better understand the full economic value (i.e. societal and commercial) of each train path. They would be concerned about pricing off traffic of high social value’ if a purely commercial value approach were adopted. - Transport Scotland observed that the application of a scarcity charge on the West Coast Main Line (WCML) and the East Coast Main Line (ECML) could result in disproportionately increased service funding costs for Transport Scotland, given the funding treatment of cross-border services and allocation of the FTAC. Transport Scotland has a tightly defined public service specification and does not anticipate changing that policy.							

4.2.3. Path reservation charge

A reservation charge is non-refundable charge for booking capacity. It is an alternative kind of scarcity charge whose purpose is to discourage users from booking capacity that they do not in practice require. Such a charge might encourage operators to manage their network usage more efficiently and discourage booking capacity beyond what they predict will be required, except to the extent a firm option of being able to run is sufficiently valuable to them to pay the charge.

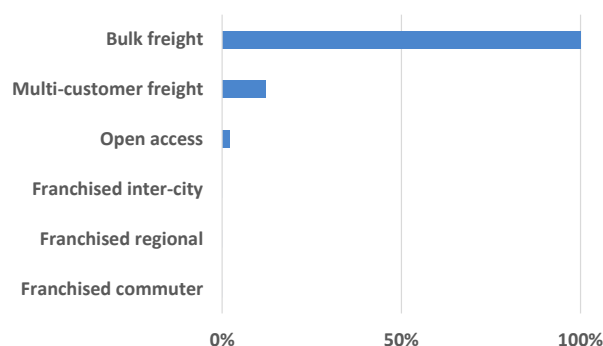
The reservation charge we considered for the purpose of this assessment was a **deposit** (or obligation) based scheme payable only for **firm access rights**. It can be defined equivalently either as a non-returnable deposit which is then set off against charges for paths actually operated, or else as a charge for rights not used. We assume the reservation charge being assessed as a fee **per train km**.

While it is not what EU law would define as a “cost directly incurred,” basing the reservation charge on the expected VUC would be a simple way to calculate a per km charge, which is explained in the *Implementation* section of the detailed assessment template. We have therefore used the VUC as the basis for our modelling and have assumed a separate rate would apply to passenger operators and freight.

This charge most strongly impacts those train operators that have low utilisation levels for their booked capacity, and evidence suggests that this is most significant for train operators running bulk freight services. Other train operators tend to have high levels of utilisation of allocated capacity. The chart below shows the modelled relative impact of the reservation

charge on total charges paid by stylised operators (compared to bulk freight).

Figure 4.1 – Modelled relative impact on charges paid by stylised operator (mid scenario)



Source: CEPA modelling

In the current SoW, reservation charges could have some positive benefits in incentivising better use of existing capacity but in some forms could significantly adversely impact freight. Impacts on franchised passenger operators under the current regime are likely to be small given that the current arrangements provide protection from change and limit the scope to change

service levels. This form of scarcity management has some precedent given that it is in use on HS1, in France and Germany and is being considered for Crossrail.

Assuming adverse impacts could be managed, such that freight (and potentially other smaller operators) retains the flexibility required, the overall benefit could be positive but may be small. More detailed analysis would be required to assess whether likely benefits

outweigh issues such the transaction costs involved in introducing and managing a reservations system.

In alternative SoWs that introduce greater on-rail competition or which place greater emphasis on the value of capacity this option could have greater positive impact (although it would need to be weighed against other options for value based charging). In SoW where operators have increased protection from change, the option would have less impact.

Table 4.5: Path reservation charge

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current Sow	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	+	+	+	=	+	+	+
Summary of industry commentary <i>Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.</i> • <i>There was consensus in the industry and Government that a path reservation charge would almost exclusively 'bite' upon freight operators, raising a wide range of concerns that it could be impractical given the nature of the market within which they operate.</i> • <i>Freight operators require some flexibility in their access due to variability in demand. However, freight operators noted that passenger operators have paths in expectation of demand, whereas freight operators react to demand, which is why freight operators have a lower utilisation rate.</i> • <i>Reservation charges in other countries (e.g. France) are thought by freight operators to have led to a significant decrease in rail freight volumes and reduction in quality of service.</i> • <i>Work on the holding and management of freight capacity has been ongoing since 2007. This has contributed to a significant release of access rights by the rail freight sector (information from Network Rail and freight indicate that approximately 20% of access rights have been released since 2014).</i> • <i>A charge could encourage short-term booking of paths, which would add to operational costs. Short term planning may also pose a significant risk to performance</i> • <i>The charge would have to be designed to ensure that</i> ○ <i>customers and operators are not punished for unmanageable variation in demand;</i> ○ <i>there is not incentive for operators to run shorter trains; and</i> ○ <i>small operators and new entrants are not penalised.</i> • <i>Freight operators noted that with more freight operators in the market there are likely to be more paths required but not used.</i> • <i>Passenger operators did not expect that this option would have any material impact, as the real issue is capacity allocation and timetable development. Unless freight operators were charged for the paths "reserved" for them in the timetabling process, nothing would actually be changed by the introduction of the charge.</i> • <i>Freight operators suggested that transaction costs are likely to be far too high for the level of benefit that could be realised.</i> • <i>Network Rail commented that as the network becomes more 'full' it will become increasingly important that all mechanisms that could improve utilisation are considered. However, there has already been a significant amount of work undertaken by Network Rail and freight operators to determine paths that could be 'given back' for other uses. Network Rail would however be</i>							

concerned if the charge led to freight operators making greater use of short term planning resources to gain access to the network, in seeking to avoid a reservation charge.

4.3. Performance incentive options

This section contains summaries for the following options, noting the annex to this report in which full details can be found:

- Reset Schedule 8 performance benchmarks more frequently for changes in traffic volumes (Annex E); and
- Recover end-user compensation through Schedule 8 (Annex F).

4.3.1. Recalculate benchmarks for traffic changes and remove capacity charge

Schedule 8, the performance regime, is in place to provide train operators with compensation for disruptions to their services and therefore to their business. This option is envisaged to update Network Rail's Schedule 8 performance benchmark annually to take account of traffic growth (or decline), as an alternative to the current separate 'capacity charge' which aims to reimburse Network Rail for its traffic-related portion of Schedule 8 compensation payments. The capacity charge's current link to Schedule 8 is not obvious in its name: it is sometimes wrongly assumed to be similar to a 'scarcity charge'. The capacity charge is not understood well by the industry or considered to be cost reflective, and therefore rather than explore opportunities to make the charge more granular or adjust its calculation in any other way, this option envisages removing the charge entirely.

Network Rail's Schedule 8 benchmark is set at the Periodic Review preceding the control period. The Periodic Review also outlines updates to the benchmark each year of the control period to reflect the changes in Network Rail's performance targets. This option proposes that Network Rail's benchmark also includes an annual update to account for the actual increases or decreases in traffic (using the latest year of available data each time), which could allow for the removal of the capacity charge. The capacity charge is currently intended to recover the amount of additional compensation paid out by Network Rail through Schedule 8 due to increases in network traffic making it more difficult for Network Rail to recover services after a delay, and is levied per actual train mile at an ex ante tariff rate set at the Price Review.

There are a range of options for change to address the current issues with the capacity charge, and this option is envisioned with the following key characteristics:

- Annual updates under this option are intended to 'smooth' the effect of traffic growth, as the benchmark would be updated a little each year to take account of the level of traffic.

- The industry's understanding of the charge and its intentions could be improved by better integrating the recovery of Schedule 8 Congestion-Related Reactionary Delay (CRRD) costs into Schedule 8 itself.
- The method of updating the benchmark would ideally be simple and mechanistic, to ease understanding and calculation, therefore also minimising transaction costs.

There are some benefits to this option, mainly ensuring that the Schedule 8 benchmark is more reflective of the appropriate achievable level of performance and the likely improvement in industry understanding that could result. However, there will also be costs involved in the initial calculation of the appropriate adjustment to the benchmark, which would likely require a level of resources comparable to that required to recalibrate the capacity charge at CP5. Subsequent annual updates could be devised as simple mechanical calculations, reducing the complexity and cost of implementation.

This change would reduce the variable charges that operators pay, and hence Network Rail's income from track charges when new capacity is put into operation. This also reduces the marginal cost of running an additional train. The capacity charge reflects, when levied on additional trains (introduced after the start of a Control Period), the marginal performance costs of running additional services. The charge does not reflect this perfectly as it does not adjust for time periods such as peak and off-peak, only for weekend vs weekday services, so the rate is averaged within those two. It also has a single flat rate across the network for freight and charter operators so does not reflect geographic differences in the marginal performance cost of running additional services. Nonetheless, the capacity charge at present, to some extent, discourages additional services running where it would worsen congestion, even though this is not its primary purpose. Removing the capacity charge might result in some additional trains that might not otherwise have run, which could be considered a less efficient outcome in terms of use of network capacity (the cost to other running trains of the congestion that additional train running will cause may be higher than the benefits the additional train itself will bring).

Without other changes to the regime, we expect that revenue previously recovered through the capacity charge, which is paid by all operators, would instead be recovered through the FTAC, paid only by franchised passenger operators. This would lead to a redistribution of charging income from open access and freight operators to franchised passenger operators, and also some redistribution between franchised operators. This is because the capacity charge is offset against the FTAC at present. This redistribution could also affect the allocation of cost across administrative boundaries, due to the current arrangement of cross-border services between England and Scotland.¹⁶ However, the redistribution across boundaries is likely to be relatively small.

¹⁶ This arrangement means that English franchises pay the capacity charge but not the FTAC for use of the Scottish areas of the network, and vice versa. However Transport Scotland state that this is unbalanced against Scotland.

We note that there are options, such as a scarcity charge, which could be implemented alongside this change to the regime to reverse some of the redistribution effects, and also to provide more explicit and targeted incentives around use of capacity than the capacity charge does at present.

Overall, we have rated the impact of this option as slightly positive in many SoWs, as we don't expect impacts to differ materially between SoWs.

Table 4.6: Recalculate benchmarks for traffic changes and remove capacity charge

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	+	+	+	+	+	+	+
Summary of industry commentary							
Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.							
- Funders and passenger train operators raised concerns that annual adjustments would take time and resources. This option has therefore been envisaged as a simple and mechanistic adjustment which should reduce the transaction costs involved while having the benefit of improving the transparency of the relationship between performance and variations in traffic levels. Network Rail noted that a similar mechanistic approach is already in place for freight operators' benchmarks, and that seems to reflect the impacts of changes in traffic well without being overly complex. - The current capacity charge level depends in part on the use of the network by other operators, but the concern raised by the freight sector is that this option would increase that effect since the current capacity charge is levied per train mile actually travelled by the operator. In contrast, this option would adjust Network Rail's benchmark for all operators in that service group. A further concern raised by passenger operators is that changing Network Rail's benchmarks may have knock-on effects on TOC benchmarks given that it will adjust the level of delay that is considered 'efficient.' - DfT were concerned that by creating more frequent opportunities to change the benchmarks and therefore the terms of the franchised operators' contracts, there would be more frequent requests by franchised operators for renegotiation of the contracts. Assuming the impact is sufficient to be a Qualifying Change this would place additional resource requirements on both DfT and the franchised operators. It may therefore be useful to consider whether the mechanistic process employed for the charge could be extended to dealing with impacts on the franchise agreements. - DfT and Transport Scotland expressed concerns that this option could cause a 'shift' in costs to Transport Scotland due to the arrangements that cross-border services currently have in place with regards to the capacity charge and FTAC. Currently, cross-border services pay the FTAC in the operator's country only, and pay the capacity charge relevant to the route regardless of country. Therefore, removing the capacity charge would remove the element of charges that cross-border services pay to use the infrastructure outside of its own country.							

4.3.2. Recover end-user compensation through the performance regime (Schedule 8)

Schedule 8 reimburses train operators for estimated revenue losses as a result of disruptions to its services, given that passengers may choose not to travel in future due to the reputational impact of disruptions to service. This option was selected for detailed assessment given that the performance regime does not provide compensation to train operators that are required to provide delay compensation to their end-users. This option particularly looks at passenger operators as these are required by contract to provide end-user compensation, and also recognises that it might be appropriate to include an element for freight operators.

A key objective of this option is to make the intention of the performance regime clearer to the public, as there is currently a high level of misunderstanding in assuming that the Schedule 8 compensation for passenger operators should be passed onto passengers as delay compensation, rather than its actual intention to compensate train operators for the longer term revenue impact of delay (and some short-term impacts such as replacement buses). Given that passenger compensation is currently undergoing a series of changes, it is an appropriate time to consider how passenger compensation requirements could be incorporated into the performance regime. It is important, at the same time, to consider whether an appropriate end-user compensation mechanism for freight could be implemented given that freight operators often compensate their end-users for delays.

Schedule 8 currently compensates train operators for the longer-term financial impact of disruptions to services. There is no component to reimburse train operators for end-user compensation (i.e. passenger compensation paid through Delay Repay, or freight operators' case-by-case contract); this option proposes introducing such a component in addition to the current Schedule 8 compensation.

This option aims to redistribute the risk associated with end-user delay compensation. Currently in passenger services all of the risk of delay compensation is on the passenger operators, despite each type of passenger operator causing only between 10 and 30 percent of their own delays. While franchised passenger operators do include a 'risk premium' for this into their franchise bid value, they are then at risk for any deviations from their estimate.

This option has several clear benefits. It would be likely to reduce incentives on passenger operators to limit compensation paid to passengers. It also aligns the cost of delays more closely to those who caused them by 'passing through' an element of passenger compensation to the at-fault party. The main concerns relate to its practicality and transaction costs. In particular, the effectiveness of this option relies on passenger and freight operators passing through compensation to their end-users. This might be particularly difficult to measure in freight where explicit compensation payments might be foregone to instead charge customers lower prices to account for the risk of potential delay. There is typically a low claim rate among eligible delayed passengers (no comparable freight

data is available), often attributed to a lack of awareness driven by train companies not actively providing passengers with the relevant information. Use of delay claims processes, such as cash refunds and online forms, make it likely that there will be an increase in the rate of claims by those eligible. Therefore, an automatic refund might provide an effective delivery mechanism to ensure that there is not a large disparity between the amount claimed by passengers and the amount passed through Schedule 8 (at a lower level of transaction costs than some manual methods would bring).

There are difficulties associated with applying this option to freight, since there are not standard compensation terms for freight operation, and it could be discriminatory to make use of the varying and confidential terms in contracts. In principle, standard rates could be applied according to some categorisation. But it would also impact upon the economic viability of freight if this resulted in increased payment rates to cover the cost of the scheme – freight operators may prefer to take the risk themselves and pay lower payment rates. Nevertheless, implementing this option will need to ensure that Schedule 8 is not unduly discriminatory against freight: freight should be included in the two-way payments if it is deemed appropriate. This option assumes that it is possible to determine an appropriate mechanistic calculation for freight end-user compensation, however it is not certain that freight would desire the additional complexity that even a simple mechanistic approach would bring when freight operators are currently able to negotiate the issue through their contracts individually with each customer.

While our analysis has showed an overall positive grading of this option, the magnitude is unclear, and further work would be required on reasonable practicality and cost. Train operators might also oppose the added complexity that this might bring to Schedule 8 (see RDG Phase 2b Feature 8.12). This option will, in several areas, have a stronger impact (negative or positive as appropriate) in the SoW where there will be greater flexibility to train operators (Dynamic railway and On-rail competition). However, these extremes have balanced each other out to mean that these SoW are given a small positive grading as with the other SoWs.

Table 4.7: Recover end-user compensation through the performance regime (Schedule 8)

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	++	+	+	+	+	+
Summary of industry commentary <i>Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.</i> <i>There was some consensus on considering this option, as something which might improve the passenger perception of the industry. The intention of the performance regime, passenger operators noted, could be clearer to both industry and passengers.</i> <i>It was noted by the freight sector, but applies to both freight and passenger operators, that increasing the costs of delaying a service increases the expected cost of running an additional service if it is assumed that an additional service might at some point delay other operators. However, this is part of the incentive impact that is intended with the redistribution of risk through this option: this option envisages that operators would be at risk for the delays that they cause to other services.</i> <i>It would be more difficult to implement this option for freight operators. Freight contracts with their customers are confidential, one-to-one, and likely to vary widely depending on the type of customer (some types of commodity may be more affected by delays to transportation than others). Furthermore, freight operators are able to choose to forgo a compensation clause in a contract to instead charge their customers lower prices to account for the risk of potential delay.</i> <i>Franchised passenger operators will have included in their franchise bids a risk premium to reflect the uncertain level of passenger compensation they will need to provide. This option aims to reduce that risk premium in new franchises but given the staggered franchising process there would be a time lag until it was accounted for in all contracts. There could be some transaction costs and transitional issues if ORR tried to implement this option without double-reimbursing franchised operators.</i> <i>Passenger operators asked whether this option fits within Schedule 8, or whether it might be better placed as part of a wider review of passenger compensation. They also questioned the extent to which this option would impact Network Rail's incentives to prevent delay, as it is small in magnitude compared to overall business and Schedule 8.</i>							

4.4. Possessions incentive options

This section contains summaries for the following options, noting the annex to this report in which full details can be found:

- More frequent Access Charge Supplement calculation (Annex G); and
- Reform Schedule 4 discount structure for notice period of possession (Annex H).

4.4.1. More frequent Access Charge Supplement calculation

The Access Charge Supplement (ACS) allows Network Rail to recover the amount it is expected to pay out in passenger Schedule 4 compensation over the control period, should it undertake the estimated level of works efficiently. The ACS is set at the start of a price control period based on the estimated volume of engineering works (maintenance and renewals) that will be carried out during that control period and a Schedule 4 unit cost for each type of activity estimated from historical data.

This option was selected for detailed assessment as it addresses some concerns in the industry that Network Rail has tended to delay work relative to the anticipated programme, thus taking fewer possessions than scheduled, and resulting in over-recovery of costs relative to the ACS set at the periodic review.

We envisage that the most likely possibility for implementing this option involves recalculating the ACS annually based on changes in the volume of engineering works planned, as more accurate predictions become available. Our study of this option, as we have envisaged it, suggests that it brings benefits primarily in terms of better reflecting Network Rail's efficient Schedule 4 costs based on the works carried out, and avoiding the risk that Network Rail will benefit from deferring or cancelling maintenance and renewals works. The main downside of the option would appear to be the potential difficulty with concluding whether variations in activity and expenditure volumes in any particular year are efficient, relative to ORR's Final Determination (the ACS is calculated to reflect the efficient level of work that Network Rail must undertake to maintain and renew the network in the control period). However Network Rail has already started reporting in its Regulatory Accounts the amount of financial under/over performance related to variation in the volume of works. This suggests the information necessary for recalculating the ACS on a more frequent basis should be available.

ACS reform potentially reduces the problem of Network Rail's over-recovery of costs in an environment where it under-delivers on the volume of work. This option has a direct impact only on franchised passenger operators as they are the only train operators to pay the ACS at the moment. But in the present SoW any potentially useful effect in reducing operator costs by reducing their risk exposure is limited, because of protection against changes in charges in existing franchise arrangements.

The impact on specific (types of) operator will depend on the extent to which the planned

activities set out at the periodic review subsequently change on different routes. Train operators using a route where the planned activity volumes are delivered according to the initial plan would not see their ACS change (at least in relation to operations on that particular route) while operators on a route where a significant portion of activities are being deferred would benefit from a reduction in their ACS during the control period.

To some extent, the benefit that the option brings in terms of better reflecting efficient Schedule 4 costs based on volume of works carried out by Network Rail is counterbalanced by the costs associated with added complexity and volatility of charges within the price control period in the current SoW. However, even if franchised operators are less impacted by this option in this SoW, the option would still result in a better allocation of costs between funders and Network Rail. The proposed option would bring additional benefits in the “Dynamic railway” SoW where franchised passenger operators are exposed to changes in access charges. In that case, a more frequent recalculation of the ACS reflecting volume of work actually carried out would reduce the financial risk exposure of passenger operators and potentially have a positive impact on the value for money of franchises and passenger fares.

Table 4.8: More frequent Access Charge Supplement calculation

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	+	+	+	+	+	+
Summary of industry commentary							
Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.							
- Stakeholders have generally commented that the benefits of the option for train operators are unlikely to be significant in the current SoW but that under-delivery of planned activity volumes leading to over-recovery of Schedule 4 costs has been an issue in recent years. In particular: - Some stakeholders remarked that the difference between the Schedule 4 ACS paid and the compensation received was material. - Open access operators commented that they do not currently see the benefit of paying the ACS in return for full Schedule 4 compensation. - Train operators also raised general concerns regarding the benefits of having the ACS and stated the need to establish greater clarity as to its purpose before moving on to assess any reform options. - Passenger operators commented that a more general objectives-driven review of the possessions regime is needed; and the benefits of this option would be counterbalanced by increased complexity and volatility of charges. - Network Rail considers that it is important that the ACS reflects the efficient level of compensation Network Rail expects to pay to train operators, as a result of undertaking engineering work to maintain and renew the network. - Funders considered that whilst this option addresses a recognised issue and could bring some benefits, a yearly change in the ACS would result in yearly adjustments to franchise payments increasing the negotiating burden between funders and franchised operators.							

4.4.2. Reform Schedule 4 discount structure for notice period of possession

This option involves reforming the discount structure applied to Schedule 4 compensation rates paid by Network Rail to passenger train operators for revenue loss due to disruption arising from planned track possessions. The current discounts vary according to how much notice of the possession is given and reflect the existing evidence that there is a lower impact on long-term passenger demand from disruption announced well in advance.

Reforming the structure of discounts aims to address some concerns in the industry that while discounts incentivise early booking of possessions, they can be counterproductive for efficient planning of works and possessions. The discount structure provides incentives to Network Rail to plan and book possessions early, in particular more than 26 weeks in advance, when the largest discount is given. The concern is that the workplan for some of those possessions may not be fully developed at that stage, potentially resulting in inefficient use and late cancellations of possessions. Currently more than 90% of possessions are booked in this timeframe.

The discount structure also makes it costly for Network Rail to re-plan possessions, reducing the incentive for Network Rail to make changes to possession plans after the initial notification, even in cases when it would otherwise be beneficial. This option was also considered as an area where the approach may not have kept up to date with the fact that passengers now have better and more immediate access to information about timetables and impact on services of engineering works.

There are numerous ways in which such an option could be implemented, including increases, as well as reductions, in the discounts, and changes in the notice dates at which the discounts apply. We have examined several options that we envisage cover a range of possibilities for implementing this option. The scenarios considered involve:

- Reducing or removing the discounts – current notification timeframes are kept but early notification discounts are reduced or removed altogether; and
- Reforming notification thresholds and discount rates – notification thresholds are adjusted as well as reducing the discounts applied for early notification.

The viability of the option critically rests on how much difference early notifications make in reducing the disruptive impact of possessions and whether reducing discounts will alter Network Rail's possessions planning processes. An analysis of the impact of planned disruption on passenger demand is currently being undertaken by the Passenger Demand Forecast Council (PDFC) and is expected to conclude in early 2016. A decision on the level of discount factors should incorporate this latest evidence.

Given the current timetabling process, and particularly the requirement to have the timetable, and therefore most possessions agreed by T-12¹⁷ (the Informed Traveller timetable), reducing discounts alone is likely to have only a marginal impact on Network Rail's possessions planning process. Any reduction in discounts, particularly for the earliest timeframe, will increase total Schedule 4 compensation (and also be reflected in a higher ACS). In the current SoW, higher Schedule 4 payments would provide additional revenue to passenger train operators with the higher ACS costs being largely passed on to funders, at least for the duration of existing franchise agreements. In the "Dynamic railway" SoW, with less franchise protection, the higher ACS would be borne by train operators with the overall impact being neutral if Schedule 4 costs are in line with the baseline set at the periodic review. The measure which could potentially provide most benefits involves reconsidering the notification thresholds, for example, by setting a threshold more closely linked to passenger milestones (such as T-12 when advance tickets become available).¹⁸ These benefits are harder to quantify without a clear view of how Network Rail's possessions planning would change as a result; however introducing more flexibility by allowing Network Rail to benefit from a discount when possessions are notified in time for T-12 could bring benefits in terms of more efficient planning of possessions without increasing Schedule 4 costs significantly, if discount factors are not significantly reduced.

At the moment there are several ongoing reviews that could have an impact on the Schedule 4 discount structure including: RDG's Asset, Programme and Supply Chain Management (APSCM) sub-group's work on how possessions are planned and delivered, Network Rail's IAP¹⁹ and the PDFC's work on the impact of planned disruption on passenger demand. Any changes to possessions planning and timetabling or new evidence on passenger behaviour arising from these initiatives should be taken into consideration.

¹⁷ T-12 refers to 12 weeks before the timetable is operational.

¹⁸ It should be noted that some intercity operators may allow passengers to book tickets up to six months in advance although this is mainly for mid-week services which are less likely to be affected by possessions.

¹⁹ The **Industry Access Programme** (IAP) is a Network Rail and industry project looking at how to optimise track access including possessions for maintenance, renewals and enhancement works

Table 4.9: Reform Schedule 4 discount structure for notice period of possession

Overall CEPA grading of performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
=	=	=	=	=	=	=	=
Summary of industry commentary							
<i>Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.</i> <i>Stakeholders have commented that the most important milestone to be borne in mind when setting discounts is to have possessions reflected in the Informed Traveller timetable (T-12) when tickets are first put on sale. In practice this would mean having possessions agreed prior to that deadline in order to allow possessions to be incorporated into the timetable uploaded at T-12.</i> <i>Passenger operators noted that it is important to bear in mind that the main reason for Schedule 4 discounts is related to the impact on passengers' willingness to travel and not to incentivise better planning (both possessions and work planning).</i> <i>Passenger operators also stressed the need to have clarity about the purpose of the current regime in order to assess whether a reform option is sensible or not. A more general objectives driven review of the whole performance incentive/compensation arrangements is needed.</i> <i>Network Rail noted that the Notification Discount Factors (both the level of discount and the timing thresholds) must be based on robust evidence of genuine lost future operator revenue at different notice periods. Therefore, further work to review this as part of PR18 appears appropriate. However, the inherent uncertainty for Network Rail in planning a long way ahead of a possession must also be recognised.</i> <i>Transport Scotland noted that the issue of possessions being booked early has been raised multiple times before. Any perverse incentives in the regime should be removed and aligned with the Informed traveller T-12 deadline.</i>							

5. ANALYSIS

The detailed analysis of options in this report primarily focuses on each reform being made independent of others. In this chapter, we consider how the options might fit together. It draws insights from our work on factors that affect the form and/or effectiveness of the regime.

5.1. Scope of this chapter

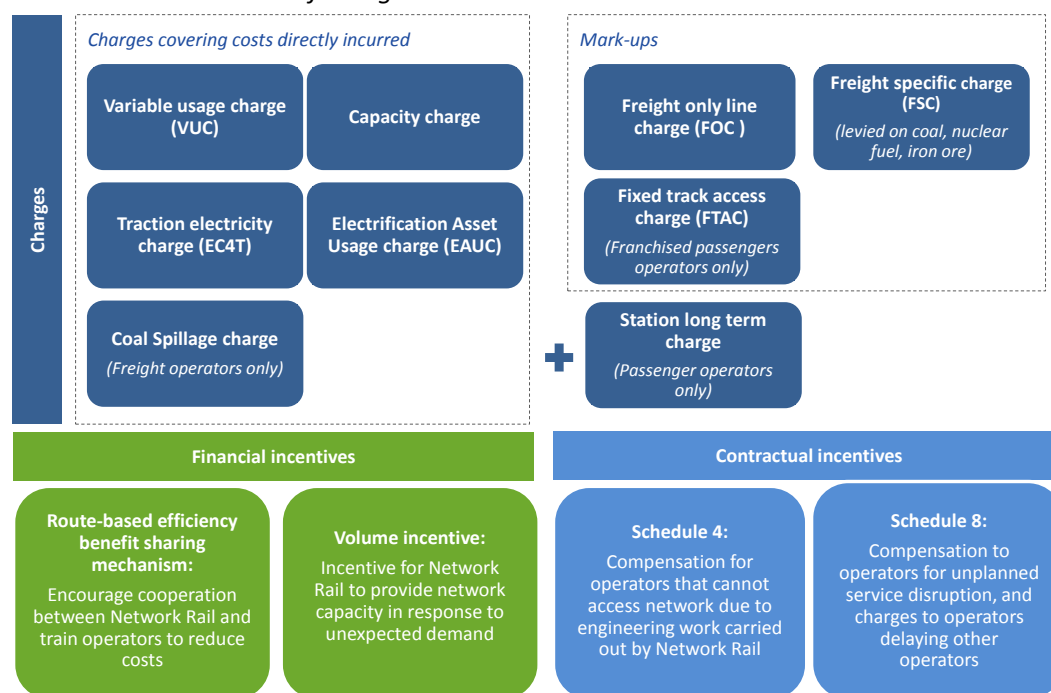
This section:

- considers the operation of detailed options that have been assessed both as a charging package and also as part of the current charging and incentives regime;
- reflects on the ‘Factors’ report²⁰ in particular on the degree of scope for change in the current SoW and how this might change in other states; and
- sets out a summary of findings from the analysis presented in this report.

5.2. Detailed assessment options as part of a package

The detailed analysis of options in this report primarily focuses on each reform being considered, in the current SoW, i.e. within the range of wider factors that affect the current regime and which are the subject of our ‘Factors’ report, and within the context of the current structure of charges and incentives as shown in Figure 5.1.

Figure 5.1 – Current structure of charges and incentives



Source: CEPA

²⁰ CEPA (Nov 2015) “Review of factors impacting the Form and/or the Effectiveness of Charges and Incentives”

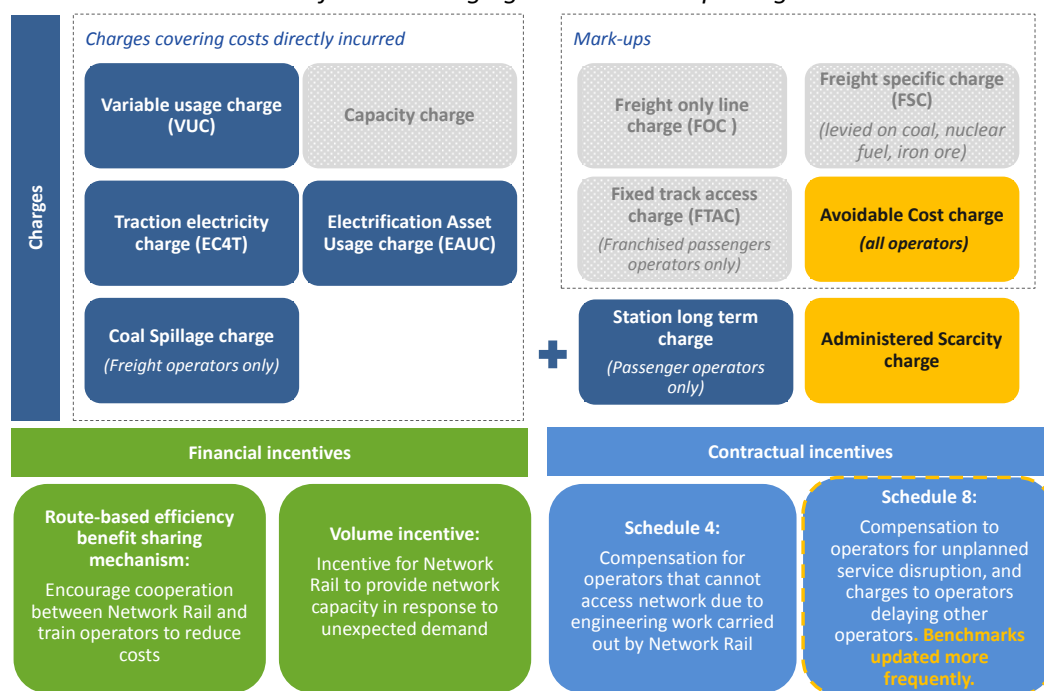
The large number of potential combinations of reforms that could be made at the same time²¹ has led the analysis presented in this report to focus primarily on the merits of each option in isolation.

As discussed further below in Section 5.2, the effectiveness of an option may depend on the SoW in question. Its effectiveness will also depend on what other charges and incentives are in place and therefore, it is relevant to use insights from the analysis of individual options to consider what packages of multiple options might perform well together. **However, these packages should not be taken to represent a proposed set of changes. The packages are used to illustrate how well each option could perform with other options.**

It is relatively early in the process to be considering such charging packages, not least because at the time of writing, ORR had yet to consult on its options but also because there is significant work to do to consider the precise form and mechanics of the options themselves. But to demonstrate some of the key potential interactions between the different options, in this section we present analysis of a potential package combining avoidable cost charging (option 1), an administered scarcity charge (option 4) and resetting Schedule 8 performance benchmarks more frequently for changes in traffic volumes (option 15).

These potential modifications to the charging and incentives regimes are highlighted in Figure 5.2 below. Orange boxes and text note additions to the regime, grey boxes represent charges that are potentially removed.

Figure 5.2 – Potential structure of a new charging and incentives package



Source: CEPA

²¹ There are 128 combinations of the seven options considered in this report.

In principle, the current FTAC could be replaced by a mark-up based on avoidable cost, although we note the limited impact of this option in the current state of the world and its potentially long lead time. Use of avoidable costs would however bring greater transparency and cost reflectivity to what is currently often considered as a 'balancing item' in the existing regime. It could also be used to consolidate existing freight charges, which seek to recover 'fixed costs', into a single mark-up. However, one of the potential issues of an avoidable costs based approach to fixed charges is that it would likely increase costs on more lightly used areas of the network and, as a result, potentially influence decisions as to the future usage of the network – for example leading to consideration of reduced operation of lightly used parts of the network and increased usage of already congested parts of the network. For this reason an administered scarcity charge might be complementary to this option.

Imposition of a scarcity charge could also fill the gap left by a removal of the current capacity charge achieved through updating Schedule 8 benchmarks more frequently for increases in volume, and could be an improvement on it in terms of scale, applicability and transparency. The option that we have considered would, in our view, not need to be a mark-up, since EU legislation appears to CEPA to provide for a capacity charge that is additional to the costs directly incurred, but not a mark-up, and therefore applicable to all users of the network. However, as we noted in the 'Factors' report, the legal position on this is not entirely clear and some parts of the industry consider that such a charge could only legally be a mark-up.

Introduction of a scarcity charge would also perhaps create an opportunity to revisit further geographical disaggregation of the VUC (an option considered earlier in Phase 3); although we note that the industry view is that the current VUC functions reasonably well and is well understood.

The analysis above assesses only how the options we have considered at a detailed level might fit with and / or amend the current structure of charges. There is however scope for a number of packages of options to be considered. We understand that ORR is taking this approach to its review of the charges and incentive regime and that its packages will form the basis of its consultation in December.

This report predominantly considers options in isolation, when considering what exact options might be introduced in practice, failing to consider multiple reforms creates risk. Failing to consider the wider impacts of changes to a particular charge might result in overlooking opportunities to further improve the regime and, more importantly, could fail to miss the bigger picture, disrupting the efficacy of the charges and incentives regime as a whole. The indicative package of options considered here identifies cases where options might complement each other but this may not always be the case. The case for making multiple reforms must also be balanced against stability of the regime, the costs and benefits of making change and the level of complexity entailed. There is significant further work to do in this respect.

To this end, we consider that this project provides a substantial body of material and analysis to facilitate the process of considering packages of charges but its scope does not extend to the detailed analysis required to consider the interactions between them and the overall financial effect. It has however been produced sufficiently early to allow ORR and the rail industry to consider these issues fully in anticipation of and during PR18.

5.3. Variations by State of the World

The current SoW introduces a range of limiting factors to the impact on the industry of many of the options that have been considered e.g. the limited impact of charges and incentives on franchised passenger operators within the current franchising regime. However, as the 'Factors' report indicates there is some scope for change. The SoWs developed by the RDG in Phase 3 have therefore been used throughout the assessment of options, allowing the assessment not to be constrained by current industry arrangements and to help identify in which SoWs they might be more or less effective.

Table 5.1 below synthesises the findings from the individual assessment of options to consider how each SoW might affect judgements of how each option performs against the RDG Vision.

Table 5.1: Performance of options against the RDG Vision in alternative SoWs

SoW	Performance of options
"A more dynamic railway" (Dynamic railway)	Among network charges, both the avoidable cost and administered scarcity charge rate better in this SoW than in the current. That is because in a more dynamic railway, the parties are assumed to have more ability to respond to incentives, are less insulated from change, and properly attributing cost to them through charges is more important. We have to assume that the industry has been reshaped in this SoW to give the parties the financial strength to respond to the dynamism created by it. Specific changes to give freight resilience are specifically addressed in another SoW. If industry participants are more able to make decisions on what services to operate, it becomes more important to reflect scarcity. We assume that this SoW is more likely to apply for intercity services rather than local PSO-type services as funders may still wish to specify socially desirable services. The experience of Heathrow Airport, where it can take decades for low value runway uses to be reassigned to higher value uses (for example, the persistence of British Midland), indicates how administrative allocation of capacity without realistic scarcity charging can result in capacity being provided for lower value usages for extended periods. Equally, it becomes more important for genuinely avoidable network costs to be signalled to users and avoidable through charging. The reservation charge mainly affects freight and so is not rated differently in this SoW. The reform of ACS is rated much better in this SoW, because franchisees are less protected against changes in charges. Therefore, passenger train operators will be more concerned about the impact of accurate costing information on its own charges and incentive mechanisms. The changes in this SoW do not materially affect the assessment of Schedule

SoW	Performance of options
	8 recovery of end-user compensation, and reforming possession discount regime.
“On-rail competition via flexible franchising” (On-rail comp)	Among network charges, both the avoidable cost and administered scarcity charge rate better in this SoW than in the current SoW, for the same reasons as noted in the Dynamic railway SoW. The reform of the ACS is not rated much better in this SoW, because franchisees are still protected against changes in charges. The changes in this SoW do not materially affect the assessment of Schedule 8 recovery of end-user compensation, and reforming possession discount regime.
“More highly specified franchises” (Specified franchises)	The scarcity charge option rates badly in this SoW, because there is even less ability of operators to respond to the incentives it may provide. The changes in this SoW do not materially affect the assessment of the other options.
“Freight protection/ subsidy” (Protect freight)	We have identified in the analysis of options above, particularly in the network charges options, that greater alignment of costs to their causes would tend to increase the charges for the freight operators. There is a strong perception that the rail freight sector provides substantial social benefits through removing a large quantity of heavy freight from the roads. Unless road freight is charged for the social costs it causes, it may be appropriate to provide rail freight funding for the social benefits it provides. Without a sustainable approach to freight charges, there is a risk of driving freight off the railway. Therefore, in this SoW, the options that seek to better align costs with those services that cause them receive better grades than in the current SoW. This SoW would help to facilitate changes in the charges and incentives regime that might be desirable. However, on its own, the overall impact of the options is not affected very much by this SoW for large parts of the railway industry. Thus the grading of options are not materially changed from the present SoW.
“Beneficiary funding of infrastructure” (Beneficiary pays)	With increased beneficiary funding of infrastructure, the proper allocation of network costs between parties becomes more important, as it comes back to the beneficiaries who will be concerned about potentially large movements in their costs and the impact this has on their budgets. Thus, this SoW is most relevant for the Avoidable Cost option, which becomes more desirable in this SoW. Other options are not materially affected by this SoW, compared to the current SoW.
“Change in approach to capacity allocation” (Capacity allocation)	In this SoW, both Avoidable Cost charging and Scarcity Charging are rated more highly, because of the potential that capacity may be allocated more closely to patterns of demand, and thus signals on the best use of capacity, and for cost allocation, become more important to facilitating capacity decisions, especially in situation (b) in the SoW definition, i.e. where there is a significant increase in network capacity. This SoW does not affect the appraisal of other options.
“More regional	This SoW, implies a more planning-driven rather than market-driven

SoW	Performance of options
decision-making” (Regional powers)	approach to the usage of capacity, since Passenger Transport Executives (PTEs) tend to be more focused on this than DfT. Therefore in this SoW, scarcity charging is less relevant than it is in the current SoW. This SoW does not affect the appraisal of other options.

Overall the analysis that we have undertaken of both the initial and detailed options demonstrates that the current SoW considerably limits the scope for effective change of the regime. This is supported in detail by the analysis presented in the ‘Factors’ report. It does not mean that there is no scope for change in the current SoW. Significant informational benefits may accrue from options such as avoidable cost based charging in the current SoW and there is some scope for scarcity options to have an impact on currently congested parts of the network. The performance and possessions regime options are not as sensitive to SoW and this presents greater scope for change in those areas.

However, the “Dynamic railway”, “On-rail comp” and “Capacity allocation” SoWs would appear to provide greater scope for changes to the charging regime to have significant impact on use of the network and operator behaviour. This would potentially create greater risk to smaller operators such as freight, although each of these SoWs could exist together with the SoW which provides protections to freight.

Therefore, where significant change to the charges and incentives regime are considered, it is likely that to have the greatest effect, reform would need to extend beyond the charges and incentives themselves and into the structure of the industry. Such reform would require collaboration between ORR and wider stakeholders e.g. funders, and an analysis of the costs and benefits of change that takes into account these wider impacts.

5.4. Summary

Earlier phases of RDG’s Review of Charges have considered gaps in the current charges and incentives regime, and potential options for reform of the regime with the aim of addressing some of those gaps.

When developing the options for assessment, we have, as far as possible, attempted to envisage implementation of those options that maximise their practical feasibility in operation, although clearly more detailed work may be required.

The ‘Review of Factors Impacting the Form and/or the Effectiveness of Charges and Incentives’ report set out the current environment that the charges and incentives regime operates within. It also attempted to make some broad forecasts of how the ‘factors’ might change in different SoWs. This drew attention to how the current charges and incentives regime fits into the current SoW and highlighted features that should be considered when assessing options for change:

- Many potential changes to charges and incentives would have limited impact in the current SoW, because the franchising and funding environment tends to negate the effects of many changes in charges and incentives. The current industry structure tends to limit the ability of franchised operators to take financial risk, and funders place emphasis on limiting likelihood of financial distress of franchisees.
- The complexity of the industry structure creates many interconnections between different parties and different contractual arrangements. Therefore, in the current SoW, feasible adjustments to the charges and incentives regime are limited in scope because of the many connections.

Nevertheless, in the current SoW, there is still potential for some of the options considered in this report to be feasible and have some effectiveness in addressing some of the gaps in the current regime. Many of the 22 options considered in the initial assessment were appraised as being potentially of some benefit. However, if the SoW changes, this could widen the range of feasible changes to the regime.

The detailed assessment stage has focused on options that RDG representatives considered to merit more detailed consideration. The fact that an option was not assessed in more detail does not necessarily mean that it has been rejected by RDG. In most cases it reflects that further investigation of an option was not considered to be productive at this stage.

A summary of the CEPA grading from the detailed option assessments against the RDG Vision in the current SoW is provided in Table 5.2 below. Table 5.3 presents CEPA's overall grading in each SoW considered. Further detail on the individual options is provided in Annexes B to H.

Table 5.2: Overview of CEPA detailed option assessments in the current SoW

Option group	Network Charges			Performance		Possessions	
Option	Avoidable cost	Scarcity charge (administered)	Reservation charge	Reset benchmarks more frequently	Recover end-user compensation	More frequent ACS calc.	Reform discounts
Option number	1	4	7	15	18	19	22
Axiom							
System safety	=	=	=	=	=	=	=
Consistency with law	=	=	=	=	=	=	=
Funding of Network Rail efficient costs	=	=	=	=	=	++	=
Allowance for market conditions	=	-	=	=	=	=	+
A single approach for the network as a whole	+	=	=	+	=	=	=
Objective							
Service costs recovery	=	=	=	-	=	++	=
Efficient whole-system whole-life industry net costs	=	=	+	=	=	=	-
Efficient long run investment decisions	=	=	=	=	+	+	=
Efficient performance management	=	=	=	=	+	=	+
Efficient use of network capacity	=	+	+	=	=	=	+
Judgement criteria							
Predictability	=	--	-	+	=	-	=
Simplicity	=	-	=	+	-	-	+
Transparency	+	+	+	+	=	=	=
Low transaction costs	-	-	-	-	-	-	=
Outcome							
Network Rail accountability	=	=	=	+	++	=	=
Non-arbitrary allocation of costs	++	=	=	-	=	++	-
Optimal traffic growth	=	+	=	+	=	=	=
Aligning industry incentives	+	+	+	=	+	=	+
Value for money for funders, taxpayers and users	=	=	+	=	+	+	-
Overall							
Option assessed in isolation	=	+	+	+	+	+	=

Table 5.3: CEPA detailed option assessments overall grading in each SoW

Option group	Network charges			Performance		Possessions	
Option	Avoidable cost	Scarcity charge (administered)	Reservation charge	Reset benchmarks more frequently	Recover end-user compensation	More frequent ACS calc.	Reform discounts
Option number	1	4	7	15	18	19	22
Current SoW	=	+	+	+	+	+	=
A more dynamic railway	++	++	+	+	++	++	=
On-rail competition via flexible franchising	+	++	+	+	++	+	=
More highly specified franchises	=	-	+	+	+	+	=
Freight protection / subsidy	=	+	=	+	+	+	=
Beneficiary pays for capability	+	+	+	+	+	+	=
Change in approach to capacity allocation	+	++	+	+	+	+	=
More regional decision making	=	=	+	+	+	+	=

ANNEX A SIMULATION MODELLING

This annex introduces the simulation modelling we have carried out of the seven detailed options, in order better to understand the impact on stakeholders and the effect they might have. The model comprises a central module, which provides common inputs and a uniform method of analysis for each simulation, and customised simulation of each option.

The simulation model is designed to provide a consistent framework for the analysis of each option. The objective of the model is to show the financial impact of charging options on different types of passenger and freight operators. There will of course be impacts on other stakeholders (notably Network Rail and funders) but these are dealt with separately in our qualitative analysis described in the assessment templates found in Annexes B to H of this report.

We have therefore segmented the market by modelling six different types of stylised operator – franchised commuter, franchised inter-city, franchised regional, open-access, multi-customer freight and bulk freight. It is important to note that these stylised operators are simplifications of reality²² and that any given company may, in reality, contain a mix of these six different types of service. Therefore it may be more intuitive to think of impacts as applying to financial flows from a particular type of service (e.g. within a company).

Broadly speaking, the model is separated into three distinct components – inputs, calculations, and outputs. The model flow is summarised in Figure A.1 and each component is described in more detail below.

Model inputs are subdivided into two types, and are described for each option in the later sections of this annex:

- **Global inputs:** these inputs set the baseline for operators and Network Rail. They include the baseline level of charges, revenues and operating costs as well as non-financial information such as train miles.
- **Option specific inputs:** these are additional inputs relevant to the individual options. For example, a key input for the reservation charge option is the utilisation rates of capacity allocated to different operators.

Each option then has its own unique set of calculations in constant 2012/13 prices that determines the change in charges or incentive payments for each type of operator. The changes in charges/incentive payments are then fed into the common (or global) calculations, ensuring the financial impacts are treated consistently for each option. There are two key assumptions sitting behind the common calculations:

²² For example, some but not all bulk freight services may compete with road.

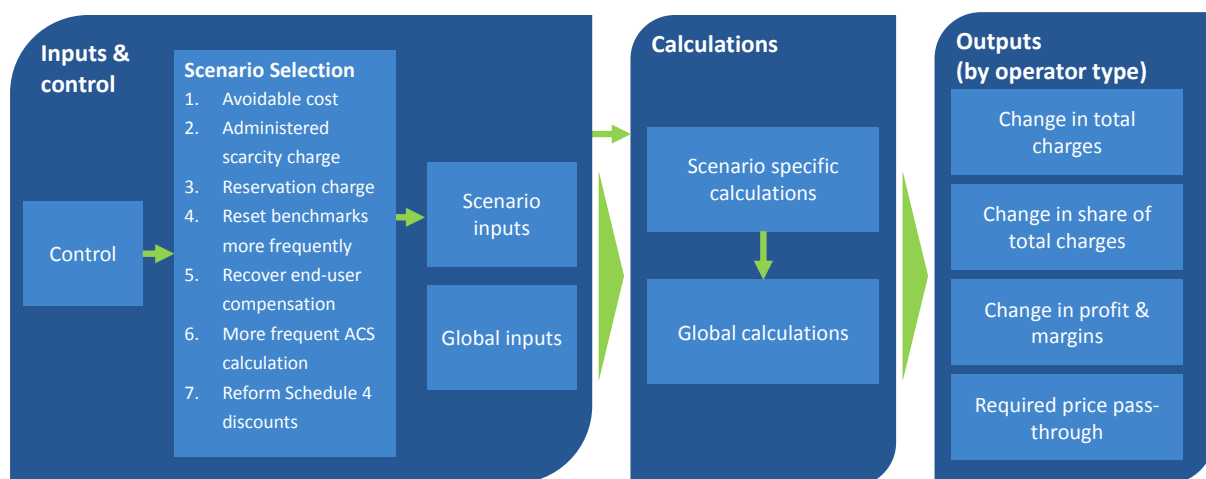
- FTAC is used to make up the difference between Network Rail's revenue requirement and total charges, after the charges in each option have been calculated. It is distributed based on current shares of FTAC between operators.
- We assume no network grant is in place. This reflects the recent Budget announcement in relation to rail industry money flows. This results in a significant increase in the net revenue requirement to be recovered through the FTAC, increasing from £0.6bn to £4.4bn each year (2012/13 prices). Assuming that this would purely be a change in money flows, we assumed that operator profits would not be affected. Therefore, baseline revenues were adjusted for each franchised passenger operator so as to maintain their current level of profits.

Finally, changes to charges, share of total charges, profits and profit margins are calculated for each stylised operator. The final outputs of the model are interpreted as *ceteris paribus* effects (i.e. all other factors held constant). In practice, there may be some behavioural change resulting from the implementation of a given option (e.g. freight may release access rights under a reservation charge). The model is not intended to be a behavioural model and therefore does not capture these effects. Instead, these are discussed, where appropriate, in the respective assessment templates.

In addition to the core calculations of the model, each option has been subjected to sensitivity analysis that flexes the values of key parameters.

The model structure is described in Figure A.1 below.

Figure A.1: Simulation model flow



A.1. Fixed charge based on avoidable cost

We examined the potential change in fixed charges that could result from moving from the simple allocation of costs based on traffic metrics, to a model based on the attribution of avoidable costs. We drew on previous studies of geographical distribution of costs and freight avoidable costs to examine scenarios based on incorporating increasing amounts of such information into charges.

Scenarios:

- Lower – Avoidable cost information used to set charges for franchised services. Freight only line charge and freight specific charge rolled into the charge.*
- Mid – As “lower” but open access charged in line with modelled ratio of fixed to variable charges for intercity services. Freight charges set at lower bound of freight avoidable costs identified for PR13.*
- Upper – As “mid” but using upper bound of freight avoidable costs identified from PR13.*

From the investigation of these scenarios we found that moving to avoidable cost charging has the potential for significant shifts in charges between different types of operators or at least between the different types of train services they run. Based on the assumptions we have used, it is conceivable that there could be a redistribution from inter-city services (using specialised but well utilised assets) to regional services. There also likely exists potential to attribute significant costs to freight operators. This would remain a small portion of total industry costs but we envisage that mechanisms would need to be put in place to protect certain operators’ financial viability. The indicative static modelling found that a substantial portion of these costs would need to be passed on to consumers or to Government given the magnitude of the increase in charges relative to their modelled profit margins.

Our modelling of replacing the FTAC with a fixed charge based on avoidable cost drew primarily on previous studies of differences in variable usage charges on different track types,²³ and on freight avoidable costs.²⁴

Fixed costs are the residual revenue requirement that Network Rail is allowed to recover from operators once other forecast revenue from charges and grants is taken into account. Currently, the FTAC recovers these costs from franchised passenger operators. Using industry financial data it was possible to identify indicative shares of FTAC paid by each of the different stylised operators considered. We assumed that Network Rail would no longer receive the Network Grant from Government, resulting in a significant increase in the net revenue requirement to be recovered through the FTAC or avoidable cost charge, increasing from £0.6bn to £4.4bn each year (2012/13 prices). Assuming that this would purely be a change in money flows we assumed that baseline franchised operator profits would not be affected.

²³ Halcrow (2008) “Independent Reporter A: Reporter Mandate – Variable Usage Costs Final Report” available on the ORR website [here](#)

²⁴ L.E.K. (2013) “Estimating Freight Avoidable Costs Final Report” available on the Network Rail website [here](#)

A set of scenarios were developed to examine how the allocation of fixed costs might look if the charge were no longer based simply on traffic metrics and applied only to franchised passenger operators. Table A.1 below sets out the modelled shares of fixed costs allocated to each stylised modelled sector in each case.

Table A.1: Stylised allocation of residual net revenue requirement modelled

Assumption	Franchised Commuter	Franchised Regional	Franchised Intercity	Open Access	Multi- customer Freight	Bulk Freight
Counterfactual	27.4%	49.0%	23.6%	0.0%	0.0%	0.0%
Lower scenario	28.1%	54.6%	17.1%	0.0%	0.0%	0.2%
Mid scenario	27.4%	53.2%	16.7%	0.5%	0.7%	1.4%
Upper scenario	26.6%	51.6%	16.2%	0.4%	1.7%	3.5%

Source: CEPA indicative modelling

The change in the stylised franchised commuter allocation seen in the “lower” scenario compared to the counterfactual was driven by the percentage difference between the Halcrow (2008) estimate of an all-curvature London & South East (L&SE) variable usage charge and their “system-wide” estimate.²⁵ For inter-city, the all-curvature “Primary” variable usage charge was used. The remaining balance is allocated to the stylised franchised regional operators. In the “mid” and “upper” scenarios, open access were charged in line with the modelled ratio of fixed to variable charges for franchised intercity services.

In the “lower” scenario, the freight-specific and freight-only line charges were brought into the avoidable cost charge, with no net financial impact on freight operators (i.e. the reduction in charges was offset). In the “mid” and “upper” scenarios however, they were set based on L.E.K. (2013) estimates of £130m to £311m (2011/12 prices) of freight avoidable costs net of costs associated with existing charges.²⁶ The L.E.K. estimates used here were based on 35-year average forecast freight volumes, with one third of costs being allocated to multi-customer and the rest to bulk freight.

Table A.2: Percentage change in operator total charges (% of counterfactual Operator total charges)

Assumption	Franchised Commuter	Franchised Regional	Franchised Intercity	Open Access	Multi- customer Freight	Bulk Freight
Lower scenario	2%	10%	-21%	0%	0%	0%
Mid scenario	0%	8%	-22%	240%	113%	99%
Upper scenario	-2%	5%	-24%	233%	271%	252%

Source: CEPA indicative modelling

²⁵ Halcrow (2008) Figure 6.2.1 “Table of Route & Curvature charges (£/kgtkm)”

²⁶ L.E.K. (2013) p38

The outputs of the modelling exercise are discussed in the avoidable cost detailed assessment in Annex B but it is worth underlining here that the impacts considered in this analysis were “static” in as far as we did not consider how operators or users might react to the reforms as there is significant uncertainty about that and ways in which the impacts could be managed. We envisage that in practice the charges would be set based on the aggregate of the train services expected for a given operator, rather than simple splits by operator as used in this exercise. Therefore, the impacts discussed for this option in Annex B might over-estimate the differences that would be seen between operators (which would be an average of the different train services they run) but under-estimate the difference that could be seen between a particular operator’s services running on different types of track at different times of day.

There are a number of ways in which avoidable cost information could be calculated and how it could be used in charges. Therefore, at this point it is not possible to estimate the impact on particular operators with any degree of accuracy. The purpose of this exercise is to tease out some of the effects that could potentially emerge if this option were pursued in further detail.

A.2. Administered scarcity charge

Scenarios:

- *Lower – Peak path charge £12,000, on 50,000 chargeable paths. Off-peak path charge £600 on 210,000 chargeable paths.*
- *Mid – Peak path charge £14,000, on 70,000 chargeable paths. Off-peak path charge £700 on 290,000 chargeable paths.*
- *Upper – Peak path charge £16,500, on 110,000 chargeable paths. Off-peak path charge £800 on 400,000 chargeable paths.*

In all scenarios, intercity services take the greatest part of the charge. However, as this additional income is assumed to reduce FTAC, regional services see a substantial charge reduction in compensation. Open Access and Freight experience small charge increases in absolute terms, but these can be large in proportionate terms especially in the upper scenario.

The effect on commuter services is mixed. Our analysis suggests that this option would reduce overall charges for this group in the low and mid scenarios and increase overall charges in the high scenario.

The scarcity charge value is based on a 2005 ITS study, uplifted to present day value. Some of the assumptions relating to charge applicability were based on an SKM study of capacity usage. Some operational assumptions are CEPA's own assumptions.

Our modelling of a scarcity charge is based upon an estimate by ITS (2005).²⁷ The ITS estimates were based on investigations using its PRAISE model which simulates railway route revenues. They found that the commercial opportunity value of Britain's key intercity routes to London, in 2005, was approximately £20/km peak and £1/km off peak. They suggested that charges should be for a full path, not the section actually driven, and that a standard path length for these purposes would be typically 300km. We find this appropriate to our envisaging of a simple scarcity charge, since we intend a simple path charge on commercially valuable corridors only. This suggests a typical path charge of £6000 per path for peak, and £300 per path off for peak, in 2005 prices.

The first step in the model is to update these values to present day conditions. It seems likely that the value of a path will grow faster than the rate of growth of ticket receipts, since many costs are fixed and economic value is related to net income. We have taken the real growth in intercity ticket income over 10 years from 2004/5 to 2014/15, and applied, as scenarios, three elasticities to this growth, of 1.0, 1.5 and 2.0, to uprate the path value.²⁸

²⁷ Scoping study for scarcity charges, (2005, revised 2006), C Nash, D Johnson, Institute for Transport Studies, University of Leeds, and J Tyler, Passenger Transport Networks, York, report commissioned by ORR.

²⁸ Since these are applied to large changes, and sensitivities are likely linear rather than constant elasticities, these are used to represent simple elasticities, not arc elasticities. But these scenarios can also represent other uncertainties about the value of the path charge.

Thus we obtain, in constant 2012/13 prices, a range of peak path values from approximately £12,000 to £16,500, and off-peak values from approximately £600 to £800.²⁹

The next step in the model is to assess the likely applicability of these charges to train operators, which in our modelling framework are represented by six stylised operators. The key assumptions are shown in the following table. We explain how these assumptions are used further below.

Table A.3: Selection of Modelling Assumptions for Scarcity Charging (Administered)

Assumption	Franchised Commuter	Franchised Regional	Franchised Intercity	Open Access	Multi- customer Freight	Bulk Freight
Typical Path length (km)	46	67	194	378	163	142
Proportion of peak paths %	18%	20%	16%	8%	2%	2%
Proportion of paths outside chargeable time %	22%	20%	22%	5%	40%	40%
% Chargeable – lower	1.0%	0.5%	40.0%	90.0%	2.0%	1.0%
% Chargeable – mid	2.0%	1.0%	50.0%	95.0%	5.0%	2.0%
% Chargeable – upper	4.0%	2.0%	60.0%	99.0%	10.0%	5.0%

Source: CEPA indicative modelling

Since the charge is a charge per path, we need first to estimate how many paths are used by each operator type. We have been able to estimate average path lengths based on ORR data for different types of operator. For intercity services, the average path length is lower than the assumed Open Access average path length because some train operators in the Intercity category, in practice, provide a number of services which are more ‘regional’ in character.

We have based our estimates, for those train services attracting the charge, on the East Coast corridor as a case study. SKM (2012)³⁰ has shown in this case that the key bottleneck, at the time of that study, is the Stevenage-Peterborough section which admits 10 trains per hour. SKM additionally provide data as to what category of train is occupying the paths at different times of day. Open access operators have suggested that there is commercial value in operating between the morning and afternoon peak and they are unable to secure additional paths, so we assume that paths are scarce at this inter-peak plateau level of demand and an off-peak scarcity charge will apply. We assume that the scarcity charge does not apply at times when demand for paths is below this plateau level, and presumably requests for capacity can be met.

We can, from the SKM data, together with suitable data and assumptions related to Saturday and Sunday demand, estimate peak and non-chargeable proportions of paths for

²⁹ The model uses non-rounded outputs of the elasticity calculation.

³⁰ Assessment of capacity allocation and utilisation on capacity constrained parts of the GB rail network, SKM, 2012, report commissioned by ORR.

the intercity and open access services. Similar data from SKM on other busy areas enables a similar estimate for commuter and regional services. Estimates for freight services are CEPA's own assumptions partly based on this data and partly on comments received from elsewhere, such as on the proportion of freight trains that travel at night and at weekends.

The final, and most difficult, assumption is to assess what proportion of train paths are chargeable, overall for each stylised operator. Due to data limitations in this area, the values assumed here are conventional consultant assumptions rather than data driven. Establishing these values would require separate studies to establish realistic numbers. The main factor here is the number of corridors that are determined to be subject to the scarcity charge. We can reasonably assume the ECML, WCML and Great Western intercity corridors would be chargeable but it is possible that others might also be.

Our analysis suggests that the scarcity charge, modelled here, raises substantial additional revenue. This additional revenue is assumed to be deducted from FTAC. FTAC is then reallocated among franchise operators according to the metrics currently used, thus giving a final impact. The modelling results are in the following table.

Table A.4: Impact of Scarcity charge by scenario for stylised operators (2012/13 prices)

Net Track Access Charge impact by scenario	Franchised Commuter	Franchised Regional	Franchised Intercity	Open Access	Multi-customer Freight	Bulk Freight
£m Lower	-10	-37	70	7	0	0
£m Mid	-9	-58	99	8	1	1
£m Upper	1	-89	124	10	2	2
% Lower	-6%	-14%	31%	156%	3%	2%
% Mid	-6%	-22%	43%	196%	10%	5%
% Upper	1%	-33%	55%	236%	23%	14%

Source: CEPA indicative modelling

The impact on total charges is largest, in percentage terms, for open access operators, since they use scarce paths almost exclusively (although they have a relatively low use of peak paths). Even in the lower scenario, the increase in charges would completely exhaust open access operator profits. This may initially seem curious since the charges are set at a level which ought to be profitable for the marginal train service, and thus ought to be affordable by trains which are actually running.³¹ One reason could be the types of paths that open access operators are granted access to, which is based on the “not primarily abstractive”

³¹ The charge also exhausts, several times over, the profits of franchised intercity operators, but this is because they have already exhausted their profits by bidding a premium to operate the franchise, and hence this observation is uninformative, i.e. franchise bids would reflect the expected higher charges.

test³² and may limit the ability for open access operators to compete in the most profitable markets.

The charges are material to the freight operators, at least in the mid and upper scenarios. In the upper scenario, it is sufficient to exhaust most of the profit of the operators. However these charges result from the use of a fairly small proportion of their paths.

³² In deciding whether to grant access to open access operators, ORR assess whether new services could generate their own revenue, not just take it away from the current operator(s). This assessment is called the 'not primarily abstractive' test.

A.3. Reservation charge

We examined the financial impact of imposing a reservation charge on six stylised operators. The reservation charge modelled was based on a per-km charge calculated as a proportion of the VUC. Desk-based research suggested that capacity utilisation was lowest among bulk freight operators (and to a lesser extent intermodal services), while passenger services generally had a high level of path utilisation. We estimated km of unused access rights based on current utilisation rates of timetabled schedules (as utilisation rates for access rights were unavailable). We conducted sensitivities around the central scenario of access right utilisation to help capture the degree of uncertainty in point estimates of access right utilisation. These scenarios, in order of increasing impact (i.e. the lower scenario is one which results in lower impacts) were:

Scenarios:

- Lower – Bulk freight use 90% of rights, no overbooking for other segments. Low level of redistribution of rights.*
- Mid – Bulk freight uses 70% of rights, some over-booking for all. 50% of unused rights redistributed.*
- Upper – Bulk freight uses 60%, others use 90% access rights. A high proportion of unused rights are redistribution.*

The modelling results were driven primarily by the assumed level of over-booking, and consequently the greatest impact was found to be on bulk freight operators. The absolute level of impact on bulk freight was calculated to be modest, both in terms of profits and the level of charges paid. However, even small increases in charges have the potential to have a material impact on freight operators (in particular intermodal) due to competition from other modes of transport (primarily road) and the resultant price elasticity of demand of rail freight services.

The reservation charge envisioned in this assessment was modelled as a per-km charge applicable to all operators based on non-utilisation of firm access rights. We have modelled the charge based on a proportion of the VUC. The unit rate is calculated by taking the 25% of the baseline VUC and dividing by the number of train km for each operator. A separate unit charge is defined for passenger and freight operators by taking the average unit rate calculated in the previous step (averaged across passenger operators and averaged across freight operators).

Unit rates are then multiplied by train-km for each operator type, giving us the quantum of reservation deposits that are eventually returned to operators.^{33,34} We then scale this by capacity utilisation rates to arrive at gross reservation charges (i.e. reservation charges that are paid plus deposits that are refunded).

³³ This is because the train-km measure only captures services that actually run.

³⁴ The measure of train km used is based on services run and therefore will include some spot bids and services with contingent rights. For the purposes of modelling we ignore these.

Our estimation of access right utilisation rates is based on utilisation rates of paths in the timetable. We recognise this will be inaccurate to an extent as the timetable includes spot bids and contingent rights (which would lead to overestimation of impact), and it does not capture any rights that are held but not exercised (which would lead to underestimation of impacts). However, at the time of modelling information on the utilisation of access rights themselves was unavailable, and we have therefore used utilisation rates based on scheduled services as a proxy.

We were informed by Network Rail that approximately 22% of freight paths go unused, which is much lower than in the past due to recent releases of access rights by the industry.

³⁵ A split of this value for intermodal/bulk freight was not available. We therefore assumed that intermodal freight continued to use a high proportion of their paths (95%), as was found in the 2007 Freight RUS. We assumed the rest of the unused paths were attributable to bulk freight (i.e. the remainder of the 22%). This gave us an overall bulk freight utilisation rate of 30% in the mid scenario. While desk based research did not give us a specific path utilisation rate for passenger services it did indicate that passenger services used a high proportion of booked paths. We therefore assumed a 95% utilisation rate across all passenger services in the mid scenario. The utilisation rates assumed in the model are summarised in the table below for the low, mid and upper scenarios.

Table A.5: Access right utilisation rates assumed in modelling

	Franchised commuter	Franchised regional	Franchised inter-city	Open access	Multi-customer freight	Bulk freight
Lower	100%	100%	100%	100%	100%	90%
Mid	95%	95%	95%	95%	95%	70%
Upper	90%	90%	90%	90%	90%	60%

Source: CEPA assumptions based on Network Rail and desk based research

From the gross reservation charges we then subtract the quantum of deposits returned to operators to arrive at reservation charges for each operator type. We then assume a level of redistribution of access rights. These redistributed rights receive a rebate of 75% on the reservation charge.

The rate of redistribution is an assumption, as there is no available data on the proportion of rights that operators would exchange with others if a reservation charge were in place. The alternative to including this assumption would be to remove the rebate mechanism from our modelling (equivalent to a 0% redistribution). The effect would be that financial impacts would be scaled upwards; it would not cause a redistribution of impacts as we have assumed a uniform redistribution rate. Given the estimated financial impacts are small in

³⁵ The 2007 Freight RUS also contained information on timetabled path utilisation rates, but we understand that much work has been done in recent years in reviewing the allocation of freight paths.

magnitude, this makes no difference to the overall conclusion. Our assumptions are presented in the table below.

Table A.6: Redistribution of unused access rights assumed in modelling

	Franchised commuter	Franchised regional	Franchised inter-city	Open access	Multi- customer freight	Bulk freight
Lower	33%	33%	33%	33%	33%	33%
Mid	50%	50%	50%	50%	50%	50%
Upper	67%	67%	67%	67%	67%	67%

Source: CEPA assumptions

A.4. Reset Schedule 8 performance benchmarks more frequently for changes in traffic volumes

This option involves removing the capacity charge from the ‘charging’ side of the regime and instead adjusting the Schedule 8 benchmark to account for the anticipated traffic-related increases in Schedule 8 payments.

We have looked at the knock-on effects of this option on other areas of the charging regime: if Network Rail’s revenue requirement does not change, the removal of the capacity charge component of revenue would increase the FTAC:

- *Freight and open access operators would benefit as they don’t pay FTAC;*
- *Franchised regional passenger services would see a net increase in their charges as they would face a large FTAC increase; and*
- *Franchised commuter and inter-city passenger services would also see an increase in their FTAC but not enough to counter the removal of the capacity charge.*

This option involves removing the capacity charge from the ‘charging’ side of the regime and instead adjusting the Schedule 8 benchmark to account for the anticipated traffic-related increases in Schedule 8 payments.

The modelling of this option used relatively few assumptions and used data based on forecasts of CP5 charges. One of the key assumptions was that implementing this option alone would not affect Network Rail’s net revenue requirement. This is an important assumption as the revenue formerly collected through the capacity charge is then assumed to be reallocated to the FTAC.

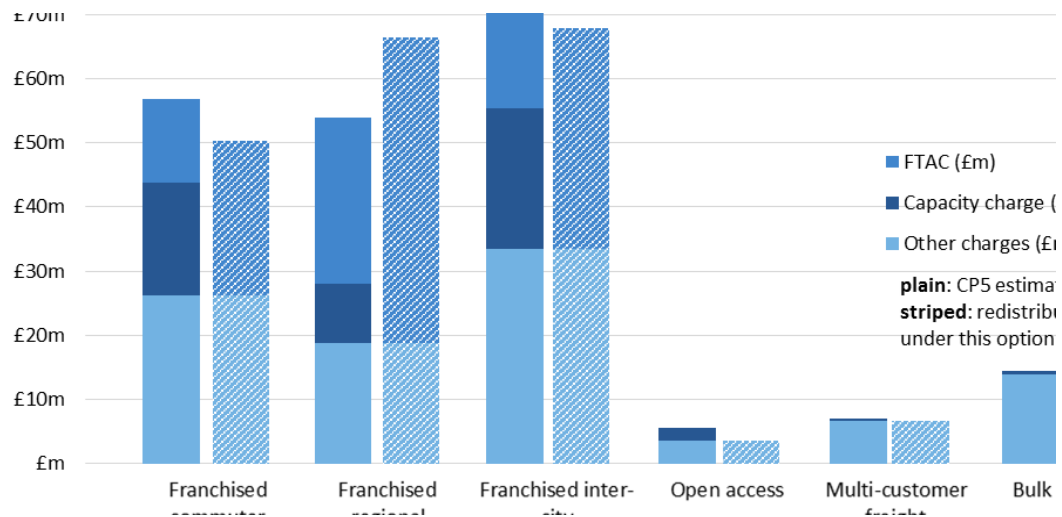
We then used forecasts of the total quantum of capacity charge paid by operators over CP5, split by stylised operator. This was taken from the PR13 final determination. The table below shows the counterfactual split of capacity charge by stylised operator as well as relative shares of the FTAC.

Table A.7: Indicative Operators' shares of the capacity charge and FTAC in CP5, Source: ORR Final Determination

Charge		Franchised commuter 10 operators	Franchised regional 9 operators	Franchised inter-city 6 operators	Open access 2 operators	Multi- customer freight 4 operators	Bulk freight 4 operators
Capacity charge	Share per operator	4%	2%	6%	0.5%	0.1%	0.1%
	Share for operator type	44%	21%	33%	0.9%	0.3%	0.6%
FTAC	Share per operator	3%	5%	4%	-	-	-
	Share for operator type	27%	49%	24%	-	-	-

We then simulated the impact of removing the capacity charge altogether and redistributing it to the FTAC. The figure below demonstrates the absolute change in charges that might be experienced by each operator, if the capacity charge revenue is distributed across the FTAC in the same proportions as the 'current' split of FTAC (in CP5) described in the table above.

Figure A.2: Total charges by indicative operator, current charging (plain) and with this option (striped)



A.5. Recover end-user compensation through Schedule 8

The modelling for this option focused on passenger compensation only, as there was no available data on compensation paid to freight customers. We developed three scenarios based on the percentage of delays caused by each party; Scenario 1 covers 85 percent of delays, Scenario 2 covers 95 percent, and Scenario 3 covers all delays.

- 1. Require Network Rail to reimburse passenger operators' end-user compensation for delays caused by them. Network Rail cause 59 percent of delays and passenger operators cause 26 percent of their own delays, therefore this scenario covers 85 percent of delays.*
- 2. Require passenger operators and Network Rail to reimburse passenger operators for end-user compensation for delays caused by them. Passenger operators cause 10 percent of delays.*
- 3. Require all train operators and Network Rail to reimburse all passenger operators' end-user compensation for delays caused by them. Freight operators cause 5 percent of delays.*

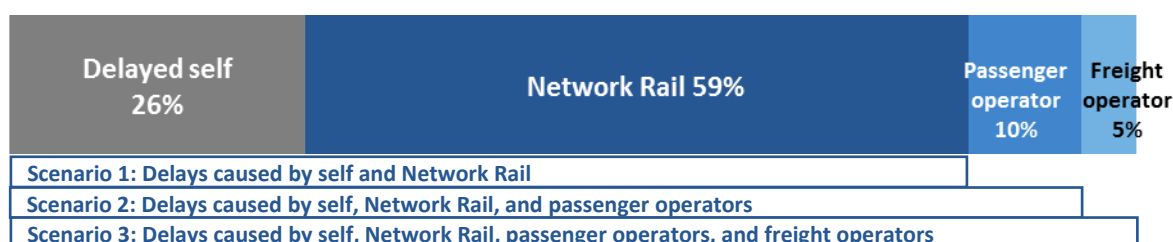
In modelling this option we used two key data series: the passenger compensation paid out in the 2014-15 as reported by gov.uk, and the attribution of delay in the year to 22nd August 2015 as reported by Network Rail. We mapped the data across to the indicative operators using relative train miles from the CP5 Final Determination to provide estimates of missing data.

As there is no available end-user compensation data for freight, we were unable to model a potential compensation system for them. Our modelling consequently focuses on passenger compensation.

The split of responsibility for delays (above three minutes) to passenger services in the year to 22nd August 2015 is shown in the figure below. We used this information to define three scenarios for our analysis:

1. Require Network Rail to reimburse passenger operators' end-user compensation for delays caused by them; this would cover 85 percent of all delays to passenger services as passenger operators cause 26 percent of their own delays while Network Rail cause 59 percent.
2. Require passenger operators and Network Rail to reimburse passenger operators' end-user compensation for delays caused by them; this would cover 95 percent of all delays.
3. Require all train operators and Network Rail to reimburse all passenger operators' end-user compensation for delays caused by them; this would cover all delays.

Figure A.3: Split of responsibility for delays to passenger services (above three minutes) and modelling scenarios



Source: Network Rail's performance statistics for the year to 22nd August 2015, available [here](#).³⁶

We then mapped the delay attribution data across our indicative passenger operators using relative train miles from the CP5 Final Determination. This gave the following split:

Table A.8: Attribution of delay to passenger services

Type of operator that caused the delay	Passenger operator delays			
	Franchised commuter	Franchised regional	Franchised inter-city	Open access
Network Rail caused	59%	56%	63%	65%
Self-caused	31%	29%	20%	11%
Passenger train caused	6%	9%	10%	21%
Freight train caused	5%	6%	7%	4%

Source: Network Rail performance statistics and CEPA analysis

Next we mapped the government's published Delay Repay and Conditions of Carriage data³⁷ across to our three indicative franchised passenger operators, and determined a pro-rata estimate of open access operators' end-user compensation according to their relative mileage; this compensation is outlined in the table below.

Table A.9: Passenger compensation paid out by indicative operator (2014/15 prices)

	Franchised commuter	Franchised regional	Franchised inter-city	Open access
Sector total	£8.9m	£3.7m	£12.7m	£0.2m
Nº of operators	10	9	6	2
Per operator	£0.9m	£0.4m	£2.1m	£0.1m

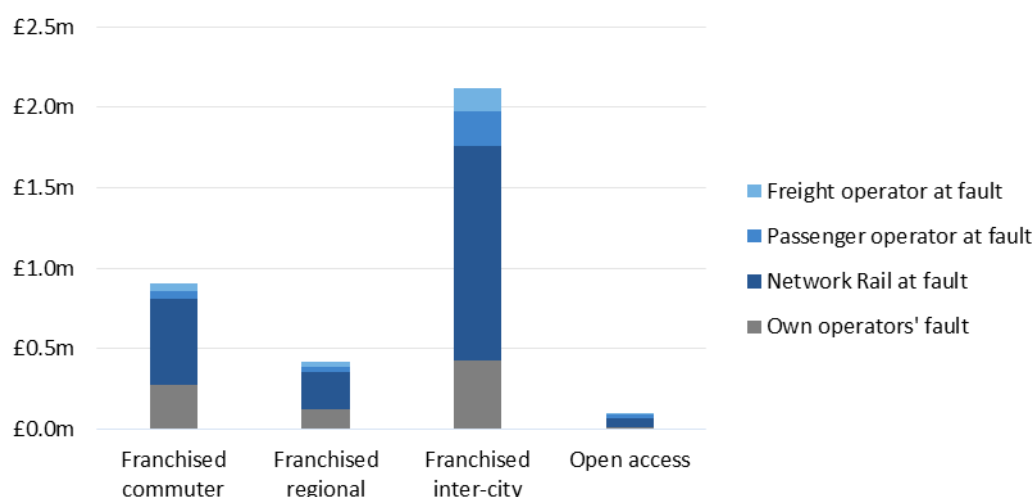
Source: ORR CP5 Final Determination and CEPA analysis

We determined, therefore, that for our four indicative passenger operators, the complete attribution of passenger delay compensation is as in the figure below.

³⁶ Network Rail also publishes annual data through the National Rail Trends (NRT) Portal, but that data does not include a 'freight' attribution category.

³⁷ Department for Transport, via gov.uk (2015) "Compensation paid by Train Operating Companies: Passenger's Charter & Delay/Repay 2009-10 – 2014-15."

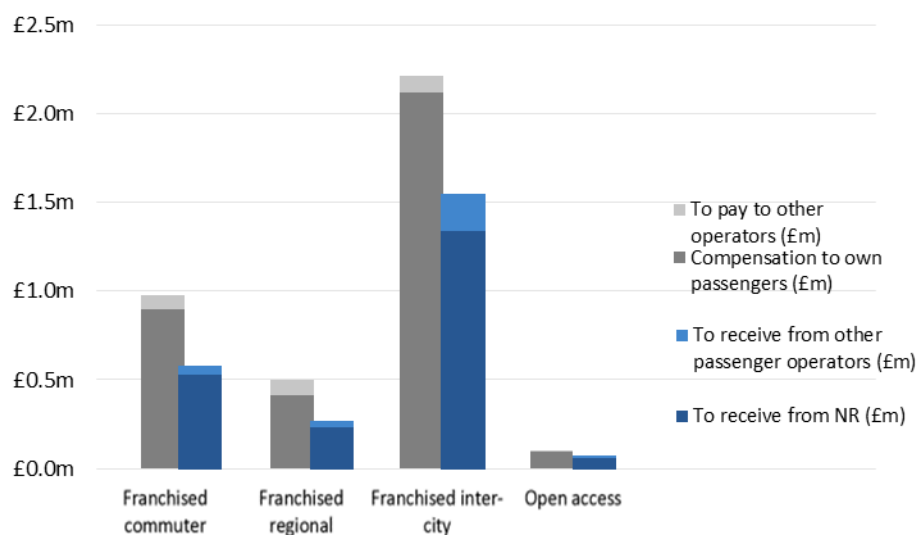
Figure A.4: Overview of allocation of passenger compensation



Source: ORR CP5 Final Determination, Network Rail performance statistics, and CEPA analysis

Under the passenger compensation mechanism considered for this option, each indicative passenger operator would have the costs (grey) and incomes (blue) represented in the figure below. The gap between costs and income is largely due to compensation that the operator has to pay due to delays it caused itself. A smaller portion is due to compensation paid to other operators.

Figure A.5: Overview of costs and incomes for passenger compensation under this option



Source: ORR CP5 Final Determination, Network Rail performance statistics, and CEPA modelling

A.6. More frequent Access Charge Supplement calculation

The modelling examined the magnitude of the change in Schedule 4 over/under recovery that would result from an annual adjustment to the ACS based on an updated volume of works planned for that particular year.

Scenarios considered include:

- *Lower – Assumes a low proportion of Schedule 4 under/over recovery is due to variation in volume of works (33% of under/over recovery);*
- *Mid – Variation in Schedule 4 costs due to volume of works based on 2014/15 data (57% of under/over recovery³⁸);*
- *Upper – Assumes a high proportion of Schedule 4 under/over recovery is due to variation in volume of works (75% of under/over recovery).*

The modelled option leads to estimated savings in the ACS paid by all types of franchise passenger operators with the average annual ACS declining by between 5% and 12%. Relative to their current profits, the biggest savings accrue to intercity services. However in the current SoW, some or all of these savings may flow to funders under specific franchise protection arrangements.

Our modelling involves estimating the changes in the ACS (and thus changes in the costs faced by train operators) from adjusting the ACS annually based on the volume of engineering works planned to be carried out during that year. We calculated an average annual ACS for each indicative passenger operator using figures from ORR's CP5 Final Determination. This was the baseline level of ACS used.

The modelling required an assumption about the level of actual Schedule 4 costs and how these may differ from the initial baseline estimate of the ACS. We calculated actual passenger Schedule 4 cost using historical data on the variation in actual Schedule 4 costs relative to the ACS, as shown in the table below. We used data from the last six full financial years (i.e. from 2009/10 to 2014/15). Based on this data, we assumed actual passenger Schedule 4 costs would be 17% lower than the baseline level used to set the ACS (equivalent to the average variation in the last six years).

Table A.10: Variation in actual passenger Schedule 4 costs relative to ACS

Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	Average
Passenger Sch. 4 costs (% of ACS)	-20%	-23%	-48%	-18%	+14%	-7%	-17%

Source: ORR data portal (Schedule 4 and Schedule 8 Costs and Income)

Next we applied scenario assumptions about the share of Schedule 4 under/over recovery resulting from variations in the planned volume of works. Starting with CP5, Network Rail's

³⁸ This estimate is based on information from Network Rail's Regulatory Financial Statements for 2014/15 about Schedule 4 costs variation relative to CP5 baseline due to deferral of activity.

Regulatory Financial Statements include estimates of the financial outperformance due to deferral of activity. Based on this information, we calculated that 57% of the outperformance in Schedule 4 costs was due to deferral of activity in 2014/15. We applied this figure as the mid scenario assumption in our modelling. The other two scenarios involved our own assumptions designed to test the possibility that a lower or higher share of Schedule 4 costs variation is due to changes in the planned volume of works.

Depending on the scenario, the ACS was adjusted by a percentage of the difference between the initial ACS and the actual Schedule 4 costs. For example, in the mid scenario, the ACS was adjusted downwards by 57% of the difference between the initial baseline ACS and the actual Schedule 4 costs. The remaining over-recovery of Schedule 4 costs is assumed to be due to better possessions management by Network Rail.

Overall the modelling results show a downward adjustment in the total ACS of between £11m and £25m per year with the mid estimate around £19m. Relative to the profits calculated in the common calculations of the simulation model, the biggest financial impact is felt by franchised intercity passenger operators followed by commuter and regional passenger operators. As open access operators have not opted in to pay the ACS and the freight Schedule 4 regime does not involve an ACS, there is no financial impact on these types of operators.

It is important to note that our modelling considered changes in the ACS at a network wide level. This resulted in an equal percentage adjustment in the ACS for all operators. In practice however the ACS is calculated based on estimated activity volumes at a route level such that the ACS adjustment for different operators could vary depending on the variation in activity volumes on the routes on which they operate.

A.7. Reform Schedule 4 discounts for notice period of possession

The modelling undertaken for this option explored the impact of different potential notification discount structures on Schedule 4 compensation payments. The scenarios considered involved:

- *Scenario 1: Keeping the current notification thresholds but reducing the discount factors applied to early notifications by 10-15%;*
- *Scenario 2: Removing discounts for early notification; and*
- *Scenario 3: Adjusting the notification thresholds as well as discount factors.*

The modelling shows that reducing or removing the discounts would lead to (potentially significant) increases in total Schedule 4 compensation paid to passenger train operators (by almost 60% if discounts for early notification are removed). This would lead to a potentially large positive financial impact on train operators although some of these gains may be transferred to funders under profit sharing mechanisms depending on the provisions of existing franchise agreements.

Our modelling of this option involved estimating the impact of changing the notification discount structure with a view to incentivise Network Rail to book possessions when it is most efficient to do so rather than focus on booking possessions very early. The notification discount factors applicable for CP5 are shown in the table below. These factors depend on the timing of the notification as well as on the type of service groups categorised by their average late time multiplier.

Table A.11: Passenger Schedule 4 CP5 notification factors (% of MRE payable under Schedule 8)

Average late time multiplier	By 26 weeks before possessions	By 22 weeks before possessions	By Applicable Timetable
4.3 or higher	40%	63%	85%
3.4 to 4.2	45%	65%	85%
2.8 to 3.3	50%	68%	85%
2.7 or less	55%	70%	85%

Source: ORR, CP5 Final Determination

To determine the share of possessions booked within each notification bracket and the value of these possessions, we used data provided to us by Network Rail on the number of possessions and the amount of revenue compensation paid out to train operators in 2014/15 in each of the notification discount brackets shown above. We establish a baseline by calculating total Schedule 4 compensation received by each operator. We also calculated the share of Schedule 4 compensation received by service group category (based on the average late time multiplier) for each operator.³⁹ This is relevant because changing the

³⁹ Depending on the types of train services operated, some train operators received Schedule 4 compensation only for one category of service group (e.g. service group with average late time multiplier between 3.4 to 4.2) while other train operators received compensation for two or more service group categories.

relative discounts for the different service group categories will have a different impact on train operators depending on the types of services they operate.

The next step in the analysis was to calculate the impact of changes in the notification discount structure under different scenarios. We conducted the analysis assuming no dynamic changes in the number and distribution of possessions across the different notification timeframes. We thus captured solely the impact of changes in the compensation rates payable under the Schedule 4 regime. Potential behavioural effects in the way Network Rail books possessions are however discussed in the detailed assessment.

The first scenario considered reducing the discounts applied for early notification of possessions by 15% for the earliest notification timeframe and by 10% for the middle notification timeframe. The rationale for these assumptions is that reducing the relative prices for booking possessions in different timeframes would reduce the incentive for Network Rail to book possessions too early. The notification discount factors applied in this scenario are shown in the table below. The Schedule 4 compensation paid out was then scaled up proportionally according to the new discount factors (e.g. for the smallest notification factor, a change from 40% to 55% represents a 37.5% increase in compensation paid in that discount bracket). Based on these assumptions the total Schedule 4 revenue compensation paid out increases by around 26%.

Table A.12: Scenario 1 notification factors assumptions (% of MRE payable under Schedule 8)

Average late time multiplier	By 26 weeks before possessions	By 22 weeks before possessions	By Applicable Timetable ⁴⁰
4.3 or higher	55%	73%	85%
3.4 to 4.2	60%	75%	85%
2.8 to 3.3	65%	78%	85%
2.7 or less	70%	80%	85%

The second scenario involved removing all discounts for early possession notification. The current notification factor for the latest notification window (85% of MRE payable) was thus applied to all possessions. This would remove the financial incentive on Network Rail to book possessions early (although requirements related to timetabling processes would still apply). This assumption leads to an increase in the total Schedule 4 revenue compensation of around 59%.

The third scenario involved a change in the notification discount thresholds as well as the discount rates applied. The potential notification thresholds considered and the rationale behind these assumptions were:

- *22 weeks before possession* – this gives Network Rail an extra four weeks to consider its possessions timetable compared to the status quo but still allows significant time

⁴⁰ By 10pm, the day before the timetable comes into effect

for revisions and consultations with train operators before the Informed Traveller timetable is published;⁴¹

- *12 weeks before possession* – this allows possessions to be agreed before the Informed Traveller timetable is published and advance tickets are generally offered to passengers;⁴² and
- *By Applicable Timetable.*

These changes required some assumptions to be made about the way possessions would be distributed within the new notification windows. As the earliest proposed notification timeframe (22 weeks before possession) involves merging the first two existing notification timeframes, we assumed the total number of possessions booked in this bracket would be equal to the sum of possessions currently booked in the first and second notification timeframes. The remaining possessions (booked after 22 weeks but before the Applicable Timetable) have been split equally between the second and third proposed notification timeframes. In this scenario we have also applied the notification discount factors used in scenario 1.

For scenario 3 the total Schedule 4 revenue compensation increases by around 21%. The increase compared to the baseline is due to the higher notification factors (i.e. lower discounts) applied in this scenario. The increase however is lower than in scenario 1 because some possessions are booked in a higher discount bracket compared to the baseline (e.g. possessions currently booked in the middle bracket are captured in the first discount bracket in this scenario).

⁴¹ The Informed Traveller timetable is generally published 12 weeks before it comes into effect

⁴² For simplicity, the 12 weeks threshold has been used, however in practice the deadline would probably need to be a few weeks before that in order to allow sufficient time for possessions to be included in the train operators' timetabling systems.

ANNEX B FIXED CHARGE BASED ON AVOIDABLE COST DETAILED ASSESSMENT

Option 1: Fixed charge based on avoidable cost							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
=	++	+	=	=	+	+	=

Avoidable cost charging is an option to set charges used to recover Network Rail's net revenue requirement in a way that is more reflective of underlying costs than the existing Fixed Track Access Charges (FTACs), and with greater clarity of purpose.

Industry participants supported this option being selected for further investigation given its potential to send more informative price signals to train operators and their funders in the context of anticipated changes to money flows, i.e. a significant reduction in the Network Grant. We estimate that changes in money flows could result in an increase in charges to recover the net revenue requirement, putting them at almost ten times their current level⁴³ and increasing the influence of the approach used to calculate them. It was also selected for detailed assessment to investigate freight sector concerns about the implications of using avoidable cost information in charges.

For this option, we envisage that the current FTACs would be replaced with a new charge based on long-run incremental cost (LRIC) principles. This would produce a set of tailored charges based on causal links between train services and infrastructure costs.⁴⁴ They would be highly disaggregated by geography and by the specific demands train services place on the network. We assume in this detailed assessment that this option could be implemented as a "mark-up" consistent with the terminology of Commission Implementing Regulation (EU) 2015/909. Further legal analysis is required in this area but given its potential role in protecting the financial viability of non-franchised operators, we note that this is potentially a crucial assumption in the analysis.

The current FTAC methodology, which allocates costs based on traffic metrics (e.g. train km), results in charges that recover costs in areas where traffic is greatest. As shown in the table below, an avoidable cost methodology has the potential to be much richer.

Table B.1: Comparison of FTAC and avoidable cost charging

	FTAC	Avoidable cost charge
Increase with own traffic	Yes	Yes
Capture utilisation of assets	No	Yes
Capture costliness of assets used	No	Yes
Capture cost of user-specific demands	No	Yes

Indicative modelling completed in support of this assessment uncovered potential for large shifts in charges between operators. In particular, it might be possible to see shifts between train services operating on busy lines where economies of scale are realised to those where they are not. We also saw potential to attribute avoidable costs to freight operators, which could be substantial, but found they would require significant protection from them, with estimated charge increases (before considering any potential "mark-up" protections afforded by EU legislation) easily outstripping current profits.

⁴³ £4.4bn per year (2012/13 prices).

⁴⁴ We envisage that this option could be implemented as a "mark-up," potentially affording "ability to bear" protections to more vulnerable operators but further legal analysis is required in this area.

Option 1: Fixed charge based on avoidable cost

Overall, we found that while there could be informational benefits from investigating avoidable costs, this should not be conflated with those benefits that might arise through charging. In the current SoW, we anticipate minimal benefit from putting avoidable cost information into charges, given the nature of current franchising arrangements and decision making.

It is not clear that there would be sufficient benefit from this option to outweigh the non-trivial burden of the supporting calculations, and to calibrate the level of the mark-up to ensure the viability of open access and freight operators. Despite the weak overall performance of this option against the RDG Vision in the current SoW, we did identify potential for this option to be beneficial in four alternative SoWs (indicated above), making this option far more attractive if the sector were to move in those directions.

Limiting the scope of the charge to franchised passenger operators, it is possible to envisage some elements being introduced at PR18. For wider application, we anticipate far more time being needed to get the supporting framework right, at which point we might be in quite a different SoW.

Key characteristics

Description of option

Under an avoidable cost approach, a causal link would be established, using long run incremental cost (LRIC) principles, to allocate “fixed” costs to operators.

In general, LRIC approaches capture the cost resulting from “non-marginal” changes (i.e. more than just a one-unit change) in output over a timeframe where network capacity could be modified to most efficiently meet the new level of demand. This might involve enhancing existing capacity or abandoning assets at the end of their economic lives.

An avoidable cost approach is a form of LRIC that examines reductions in demand and considers what expenditure could be avoided in the long run. The HS1 “OMRCA2” charge is currently set on this basis.⁴⁵ The freight only line charge also has features of an avoidable cost charge.⁴⁶

Under this option, we envisage that the ORR would set charges based on the avoidable costs of train services (both passenger and freight) by examining what elements and features of the current network could in the long run be avoided at lower levels of traffic, for example:

- in a “minimal traffic” scenario, such as only running one train per day; and/or
- when groups of trains services are removed entirely.⁴⁷

We recognise that a number of options exist for implementing avoidable cost charging. However, for the purpose of this assessment, we envisage that the charges would be set using avoidable cost information calculated in a manner similar to that explored in the ongoing Brockley Consulting study, allocating costs in Network Rail’s revenue requirement to train services with:

- a high level of geographic disaggregation;
- costs attributed to train services at each location where they would in the long run be avoided if that type of service were not to run;
- traffic metrics would be used to split attributed costs between all users to which they are attributed;

⁴⁵ ORR (2014) “ORR’s Approval of HS1 Ltd’s Five Year Asset Management Statement” available on the ORR website [here](#) p92.

⁴⁶ For information on the freight only line charge see RDG (2014) “Charges and Incentives User Guide” available on the RDG website [here](#) p14.

⁴⁷ NR (2015) “Network Rail’s review of the existing approach to cost attribution and cost allocation for the GB rail network” available on the ORR website [here](#) p51.

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- non-attributable costs at each location would be allocated across all users at that location based on traffic metrics (ensuring full cost recovery at each location); and
- remaining central costs, would be allocated across all locations based on traffic metrics (ensuring full cost recovery overall across the network).⁴⁸

As the revenue requirement allows Network Rail to recover both historic and forecast expenditure during the control period, we expect that the charges would be based on the attribution of current costs but also the attribution of forecast capital expenditure due to occur during the control period.

We assume in this detailed assessment that this option could be implemented as a “mark-up” consistent with the terminology of Commission Implementing Regulation (EU) 2015/909. Further legal analysis is required in this area but given its potential role in protecting the financial viability of non-franchised operators, we note that this is potentially a crucial assumption in the analysis.

Description of counterfactual

The current regime allocates portions of “fixed” costs to franchised passenger services for recovery through the fixed track access charge (FTAC). The allocation process is relatively simple but is seen by some operators as being “arbitrary.” Fixed costs are defined as Network Rail’s residual revenue requirement after deducting income from other charges and sources. Given the DfT’s stated intention to remove or significantly reduce the Network Grant, we anticipate that a larger proportion of fixed costs will be recovered through track access charges (instead of Network Grant) from the start of CP6.⁴⁹

Each eligible operator’s share of fixed costs is determined based on its share of total traffic metrics. Fixed costs are not allocated to freight operators but certain costs beyond wear-and-tear are recovered from freight as mark-ups in special cases.⁵⁰

Relevant factors impacting the form and/or the effectiveness of the option

- **Franchising (Factors Report Section 3.2)** – In general there is a pass-through of track access charges in franchise agreements, which weakens the price signals provided by the charges and incentive regime thus limiting its impact over the franchise period and reducing its effectiveness.
- **Track access arrangements (Factors Report Section 3.3)** – The charges regime needs to reflect the different needs of the network’s users. Cost allocation is also made more complex in a mixed use network and changes are likely to be resisted by those who lose under any change.
- **Approaches to specifying future outputs (Factors Report Section 3.4)** – The current central planning approach to investment may generate conflicts with a charging structure based on market signals.
- **Economic viability of freight/ open access operators (Factors Report Section 4.4)** – These operators have limited ability to pass cost increases on to their customers and non-discrimination rules limit special treatment. It is desirable that these operators are not excluded and so this creates restrictions on the overall level of charges, (however distributed) that can be borne by them.
- **Data availability, measurement, and billing (Factors Report Section 4.7)** – This charging option

⁴⁸ For example, in addition to the OMRCA2 charge, HS1 has a separate charge to allocate common costs. ORR (2014) p92

⁴⁹ See “Written question – 7552” available on the Parliament website [here](#).

⁵⁰ For example, the freight-only charge is applied to terminal lines with segments only used by freight and which would be closed if freight services ceased to operate. See NR (2013) “Freight Only Line Charge” available on the NR website [here](#) p1.

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relies on data, measurement, models and billing systems to set charges, measure consumption and charge the operators. Changes need to be proportionate and feasible, and may be time consuming both to establish and to embed.

Implementation

Information requirements The information required to calculate avoidable cost charges might depend on the approach adopted but we expect it to require a wide range of information, including on:

- existing network capacity and capability;
- asset information;
- traffic (demand);
- unit costs of activities; and
- usage/capability standards.

The granularity of information required might also depend on the level of disaggregation of the charges.

We anticipate that while there could be diminishing marginal returns from the accuracy of information (especially if it were to require major changes in industry processes) information would need to be captured at a relatively fine level of disaggregation in order to meaningfully attribute costs. Based on our understanding of the ongoing Brockley Consulting cost allocation study for Network Rail, we expect that the information might need to be broken down by “constant traffic section” or “strategic route section” but it is possible that these areas defined for operational purposes are not suboptimal from a charging point of view.

Drivers Ultimately, the level of avoidable cost charges should be linked to the underlying causal relationships between operators’ use of the network and costs incurred by Network Rail. Each variable noted above under “information requirements” would drive charges for train services.

We understand that the ongoing Brockley Consulting study for Network Rail is examining the traffic characteristics that drive costs. A selection of the potential longlist drivers considered for examination include:

- track categorisation;
- speed and stopping patterns;
- physical train characteristics e.g. wheel hardness;
- use of electrification assets;
- terminus occupancy; and
- peak / off-peak usage (under different definitions).

We anticipate that under avoidable cost charging, operators should expect to be charged for investments made primarily for their benefit but reflecting the useful economic life of the asset in line with the calculation of Network Rail’s revenue requirement. They should also expect their charges to reflect how well utilised the assets are.

Calculation principles The key principle behind the avoidable cost approach is the identification of (and translation into charges of) Network Rail costs that would be avoided if an operator or group of similarly demanding operators were to partially or entirely reduce their

Option 1: Fixed charge based on avoidable cost

use of particular parts of the network.

Alternative approaches include determining what elements and features of the current network could in the long run be avoided at lower levels of traffic, for example:

- in a “minimal traffic” scenario, such as only running one train per day; or
- when groups of train services are removed entirely.

We understand that the “minimal traffic” approach is likely to be preferable given that it is not affected by corporate structure but even within that approach there are different levels of detail that could be used to allocate costs based on competing cost drivers. Furthermore, there are questions regarding how common costs, including those of the “minimal traffic scenario” or of head office costs are factored into charges. For the purpose of this detailed assessment, we assume that they are allocated based on traffic metrics. Alternatively, they could be recovered as an equiproportional mark-up on all charges or paid for directly by Government, removing them from charges.

There are also key methodological decisions that must be made such as for if there is any differentiation between peak and non-peak traffic. This is important as it is the peak that normally drives the maximum capacity of the network and the peak may only be meaningful for trains running in one direction in the morning/evening. Therefore, it may not be fair to attribute peak-specific costs to train services running at times/directions where network utilisation is lower. A challenge to doing this in practice is to estimate the attributes and costs of a hypothetical off-peak only network in a consistent and mechanistic manner. However, this process could be informed by comparison with other parts of the network with similar characteristics but lower levels of demand.

There are also potential issues arising from the mixed-use nature of the railway. For example, freight operators use passing loops or take diversionary routes to allow the passage of faster passenger trains. In the absence of such passenger trains, some of that infrastructure could be avoided. Therefore, while the infrastructure is used by freight, it is caused by the usage of passenger services. The cost of such infrastructure therefore may best sit with passenger services not freight, and the charge might need to capture this level of complexity in the system.

These issues are not exclusive to freight. For example, if alternative, less-well utilised routes exist (e.g. the Hertford loop) current patterns of usage that reduce congestion elsewhere might be penalised. The effect might worsen as services move away from the less well utilised route as the cost would need to be recovered from a decreasing user base. Such issues might be partly resolved through a complementary scarcity charge or if non-attributable costs were covered by a direct grant from Government. Nonetheless, these effects underline the complexity of charging on a non-linear multi-use network.

We envisage that once calculated, avoidable cost charges would be implemented in the same manner as the current FTAC. They would be set based on forward-looking demand at each periodic review and consistent with the calculation of the overall revenue requirement, they would reflect the useful economic life of the asset, smoothing the cost over time and using the allowed cost of capital to protect its net present value.

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Practical considerations	We envisage this charge being implemented as a replacement of the existing FTAC (and potentially the freight-only line charge and freight specific charge, which are both contributions to the current FTAC). Assuming the data collection issues, which are discussed in more detail below, can be resolved we do not envisage major practical implementation issues from a pure charging perspective. As indicated above, greater challenges exist in calculating the level of charges (see sections above) where imperfect data and use of hypothetical decrements in traffic require a significant degree of judgement/discretion from the ORR and Network Rail. These challenges are greater in rail than in other regulated sectors where avoidable cost charges are used such as in telecoms. In simple terms, in other sectors, network usage is a more homogenous continuous flow (of electrons, molecules or data packets), such that assets can be treated in a less specific manner. Network usage in rail by contrast is not homogenous, it is intermittent and costs are highly specific to different geographies through which trains pass. The abovementioned Brockley Consulting study is examining what data is currently available. Usage of existing sources might reduce the cost of introducing this charging option but it is possible that new databanks and processes might need to be put in place, and new charging models developed. These could take time to establish and achieve comprehensive coverage. There may also need to be greater involvement from operators and stakeholders in this process in terms of developing forecast demand so the element of the revenue requirement relating to the capital expenditure due to take place in the forthcoming control period could be allocated to train services. The 2006 GNER v ORR case found that one important reason that the existing FTACs were acceptable was that open access operators did not have equal access to the network such that they were constrained in the downstream markets they could access. This could mean that to introduce avoidable cost charging across all operators, the access process would need to be equalised across operators. The impacts of such a process are not considered here, and no such change is explicitly included in our analysis, but this could be a significant change in the nature of the current centrally controlled model if required.
Lead time	As noted in Brockley Consulting (Mar 2015) there are some ways in which the current FTAC could be brought closer into line with an avoidable cost approach. Therefore, there may be potential for some elements of the approach, primarily those affecting the franchised rail operators, to be achieved in time for the next periodic review, particularly as they might (at least in the current SoW) be broadly held harmless to the charges. If the objective is to bring all operators' train services into the charge, a longer time period might be required to ensure: • consistent data sets and processes across train services and regions; • appropriate changes are made to the periodic review process to bring in attribution of expenditure (i.e. there may be a greater role for operators to agree to expenditure if they are going to be charged for it); • relevant forecasts, particularly of enhancements, can be developed and attributed; and • funders can establish processes to neutralise or adapt funding flows in a way that does not preclude entry of new operators or materially adversely affect existing operators.

Option 1: Fixed charge based on avoidable cost

Given the above considerations, we anticipate that PR23 might be the earliest point at which full avoidable cost charging could be put in place. However, given the potential implementation complexities and the potential informational benefits of avoidable cost studies, there might be value in ensuring that all information is in place for a “dry run” at PR23, leaving implementation in charges as an option for PR28.

Resources required for implementation As reinforced in Brockley (2015), while similar approaches have been put into place in other industries “the complexity and scale of effort required to estimate LRIC in a network as complex as rail should not be under-estimated, particularly if the analysis is conducted at a highly disaggregated level.”

We expect that marginal changes to the current FTAC inspired by the avoidable cost approach could be implemented by PR18 but that minor revisions might take place in any case as part of the normal process of the periodic review.

Moving beyond marginal changes to existing arrangements, we expect that significant resources for the ORR, Network Rail, funders and operators might be required. Regulatory, technical, legal and policy workstreams would be needed to develop the links between access policy, funding/investment policy framework and the structure of charges. We expect this to require extensive consultation, development of charging and attribution models, integration of the process with the periodic review, and the development of processes to ensure that the charging and evidence base is refreshed regularly on a consistent basis.

The resources required to do this could be minimised if part of a wider package of reforms but given the “zero-sum” nature of the charging process, such that any change creates both winners and losers, the starting methodology needs to be developed with care. Subsequent changes would need to be robust to challenge.

Performance against criteria								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=

There is no material impact of this charging approach on system safety. As an approach to the fixed charge, this option should have limited incentive properties in this area.

Consistency with law	=	=	=	=	=	=	=	=
Article 31.3 of Directive 2012/34 requires that “[T]he charges for the minimum access package and for access to infrastructure connecting service facilities shall be set at the cost that is directly incurred as a result of operating the train service.” ⁵¹								
Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 appears to set								

⁵¹ Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area Text with EEA relevance available on the EUR-Lex website [here](#).

Option 1: Fixed charge based on avoidable cost

out a minimal notion of “cost that is directly incurred” using a very short-run approach⁵² but the allocation of fixed charges using LRIC appears to be permitted as a basis for setting mark-ups by use of the wording of Article 31.3: “In order to obtain full recovery of the costs incurred by the infrastructure manager a Member State may, if the market can bear this, levy mark-ups on the basis of efficient, transparent and non-discriminatory principles, while guaranteeing optimal competitiveness of rail market segments.”

We note that the GNER v ORR (2006) case established that from a legal perspective, the FTAC was a mark-up but that it being levied on franchised passenger operators only was not discriminatory as:

- the charges were a “wholly artificial construct” to recover residual fixed costs rather than being attributed; and
- open access operators did not have the same protection from changes in charges as franchised passenger operators.

This raises important questions about the extent to which an Avoidable Cost mark-up could be levied on operators other than franchised passenger operators without extending protections to them.

One freight operator raised a concern that use of avoidable cost techniques to attribute costs might result in them being classed as costs directly incurred. Such a classification might result in charges without ability to bear protections. In market segments with limited ability to bear charges such as freight, full or partial direct subsidy might be required to cover the charges. There could be concerns regarding how that subsidy level would be calculated and also if there would be any state aid issues. One open access operator expressed the view that the type of direct subsidy required in such a case would be unlikely to be forthcoming.

Additionally, there is a question about whether if information on attribution of costs were simply to exist, the ORR might be obliged to introduce such “direct” costs into charges. The discussion of whether the charges reflected the best information available in the GNER v ORR (2006) suggested that it might be difficult to defend a charging approach that was not based on the best available information.⁵³

Whether or not this would be automatic, such a situation might arise if an operator were to identify that they might win from the change in methodology, and were to push for such a change through legal avenues.

Clearly, further legal analysis is required in this area to ensure the above issues are addressed before any changes to the charges structure were made.

⁵² Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service, available on the EUR-Lex website [here](#).

⁵³ The transcript of this case is available on the British and Irish Legal Information Institute website [here](#).

Option 1: Fixed charge based on avoidable cost								
Funding of Network Rail's efficient costs	=	=	=	=	=	=	=	=
	This approach relates to how fixed costs are allocated to (and thus paid for by) different operators' train services. As a result, it is not expected to affect the overall level of funding of Network Rail. It is assumed that any costs that cannot be attributed to particular train services would be allocated using traffic metrics, achieving full cost recovery. A further assumption is that any subsequent decisions for operators to exit the market or reduce particular train services would not have an impact on Network Rail's funding, at least in the long term.							
Allowance for market conditions	=	=	=	=	=	=	=	=
	Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 makes the following provision that "the level of charges must not [...] exclude the use of infrastructure by market segments which can pay at least the cost that is directly incurred as a result of operating the railway service, plus a rate of return which the market can bear." This implies that operators or perhaps even funders of public service obligation contracts (particularly in the "Regional powers" SoW) who could not afford to pay these charges might have to be protected from them. These protections might apply to at least some freight and open access operators but it is not clear to what extent the protection could extend to small increases in charges as there is not a clearly defined procedure or robust evidence base in place. It is important to note that if the avoidable cost approach were determined to be a cost directly incurred, rather than a mark-up, the abovementioned protections might not be binding and the assessment of this option against this criterion would be more negative. For example, this charge is similar in many ways both to the FTAC and freight-specific charges, which are both mark-ups. However, the use of processes to attribute costs using cost drivers suggests that it is more of a "direct cost" than the Capacity Charge, which falls into that category. Freight operators indicated that if this were the case, it might only be possible to sustain a viable sector under a "protect freight" SoW, in which there might be some difficult questions to answer regarding its legality under state aid legislation, and it might be necessary to consider other options to offset the impact to provide compensation for wider economic benefits not considered in the avoidable cost charge.							
A single approach for the network as a whole	+	+	+	+	++	+	+	+
	While the detail of the implementation (for example, in considering the nature of the relevant decrements in demand) might vary by location and funding arrangements (for example, in the SoW "protect freight," it might be possible to recover greater costs from freight operators through mark-ups) we envisage that the avoidable cost methodology would be applied across the network. As the current allocation is only applied to franchised passenger operators' train services, this criterion has been marked positively. However, we note in the "lower" scenario used to examine this option, there are ways in which the charges might not flow through to freight an open access. If that were the case, the option would only be graded as amber.							

Option 1: Fixed charge based on avoidable cost								
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	=	=	=	=	=	=	=	=
	We do not anticipate that this option would have any impact on Network Rail's ability to recover the total efficient costs of providing and improving all services. However, it might provide a mechanism through which additional capacity could be funded by passengers and freight users if they are willing to pay.							
Efficient whole-system whole-life industry net costs	=	++	+	=	=	=	=	=
	This option might result in a rebalancing of fixed costs from franchised passenger operators to freight (and potentially to open access) operators. In principle, such a change might lead to a change in the mix of services provided, altering the balance of passenger versus freight, the pattern of services provided within each sector and even changing the mix of services provided by each operator. Avoidable cost charging has the potential to provide a mechanism through which commercially viable enhancements could be funded by operators but perhaps more powerfully given the advanced state of development of the network, it has the potential to make operators decisions more reflective of costs in such a way that certain costs could be avoided or postponed in the long run. For example, if operators were to face the cost of assets that only they use (e.g. to expand network capacity during the morning peak that does not occur for other operators), they might adapt their service pattern to avoid triggering additional expenditure that could be recovered from their services or later when the assets need to be renewed. Even a one percent reduction in renewals expenditure has the potential to be significant if it can be achieved. At its July 2015 charging workshop, the ORR presented an estimate of annual savings on this basis of £121m. Furthermore, operators might support delaying enhancements if it could mean they would be better utilised. At the same workshop, the ORR indicated that efficiently delaying ten percent of enhancement spending by one year could deliver a present value cost saving of £1.2bn. Despite the large potential savings that could be unlocked, as the key elements of service provision are centrally planned, it is not clear to what extent avoidable cost signals could influence service provision under the current regime. In addition, there is a pass-through of access charges during franchise contracts (i.e. train operators might be indifferent to the level of charges) such that any impact of pricing signals is limited to franchise bidding processes. In the "specified franchises" SoW, the price signal might be even weaker. As a result, this criterion is marked most positively in SoWs that assume a change that might enable the rebalancing of charges to modify service provision. The grading is most positive for the "dynamic rail" SoW given the combined reduction in franchise protection from changes in access charges and increased franchised flexibility. There is potential for beneficial impacts in other SoWs but the link from charges to outcomes is less certain.							
Efficient long run investment decisions	=	=	=	=	=	+	=	+
	As discussed above, an avoidable cost allocation of fixed costs might be more cost reflective than the status quo. This has the potential to encourage more efficient long-term investment decisions but providing effective investment incentives requires a regulatory regime that is fully aligned with that objective. This option has been marked as neutral for the current SoW as there are a number of features that might reduce the effectiveness of the investment incentives. In							

Option 1: Fixed charge based on avoidable cost

particular, the central planning nature of the investment decision making process. If decisions are taken centrally and are based on a wide range of variables, price signals may not make a difference or may only have a limited impact.

The SoWs “beneficiary pays” and “regional powers” have been marked positively as they might reduce the central planning features of the regime and thus more likely to enable effective investment incentives.

One freight operator suggested that the greatest benefit from the avoidable cost approach is the information that it provides. This could inform better decision making even in a centrally planned system. However, they argued that going the next step and using the information to set charges would not be a good idea.

Efficient performance management	=	=	=	=	=	=	=	=
There is not a clear direct impact of this charging approach on performance management.								
Efficient use of network capacity	=	++	+	=	=	+	+	=
As discussed above, this option should be more cost reflective than the status quo. This has the potential to encourage efficient use of network capacity but providing effective use of capacity incentives requires a regulatory regime that is fully aligned with that objective. This option has been marked as neutral for the current SoW as it has a number of features that reduce the effectiveness of use of capacity incentives. As for the criterion “Efficient long run investment decisions,” the central planning and contractual nature of the capacity allocation process may limit or eliminate the impact of price signals. The SoWs “dynamic railway,” “on-rail competition,” “beneficiary pays” and “capacity allocation” have been marked positively, as these would reduce certain central planning and contractual features, and thus are more likely to enable capacity allocation incentives. The grading is most positive for the “dynamic rail” SoW given the combined reduction in franchise protection from changes in access charges and increased franchised flexibility.								
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	=	=	=	=	=	=	=	=
It is not clear if once implemented, an avoidable cost approach would be any more or less predictable over time than the current approach. Movements might be less “arbitrary” than they currently are, as they should be driven by changes in the nature of use of capacity or operators’ ability to bear charges but it is not clear if it would result in charges that would be more or less predictable for all or any particular type of operator.								
Simplicity	=	=	=	=	=	=	=	=
We envisage that avoidable cost charges would applied in a manner similar to the current FTAC.								
Transparency	+	+	+	+	+	+	+	+
This option should make the charging regime more transparent by basing it in causal links between use of the network and the recovery of costs.								

Option 1: Fixed charge based on avoidable cost

Low transaction costs	-	--	-	-	-	--	-	-
We expect that avoidable cost charges would be more complicated to determine than the current FTAC, creating additional set-up and ongoing transaction costs. It is possible that some of the information required for this approach is not currently available and it may not be straightforward to determine how charges might respond to a given change in usage. While significant set-up costs are anticipated (in the range of a small number of millions of pounds (see discussion on stakeholder impacts for Network Rail)), the level of ongoing transaction costs is not clear. However, once up and running there could be significant disagreement between parties about which methodology to use, updates to the methodology over time or in areas where judgement is required to determine the appropriate allocation of costs. These points will be important for operators who feel the impact of charges. In the current SoW, that may primarily be freight and open access operators. However, in SoWs such as “Dynamic railway” and “Beneficiary pays,” there might be greater scrutiny from franchised passenger operators. One passenger operator anticipated that such discussions could present an opportunity for operators to “game” the regime. However, that may already exist to some extent under the current regime, where there may be opportunities for operators to contest aspects of the more simplistic approach currently in place to determine the allocation of fixed costs.								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Network Rail accountability	=	+	=	=	=	+	=	=
There is not a clear direct impact of this charging approach on accountability under regimes in which investment decisions are made by the government. However, implementing avoidable cost charging could improve accountability in a scenario in which Network Rail needs to identify the beneficiaries of capital expenditure. As a result, the SoWs that could potentially involve Network Rail making more investment decisions are marked positively. These are the SoWs “dynamic railway” and “beneficiary pays.”								
Non-arbitrary allocation of costs	++	++	++	++	++	++	++	++
The avoidable costs approach should represent an improvement in the allocation of fixed costs to operators’ train services but it is acknowledged that certain common costs might retain a separate simplistic allocation methodology. In the “protect freight” SoW, any greater burden of costs might be reversed for freight but the changes could still flow through to other operators. Therefore, as for the other SoWs, the “protect freight” SoW is still marked positively.								
Optimal traffic growth	=	+	+	=	=	+	+	=
In principle, in the SoWs allowing greater responsiveness of operators to charges, the greater cost-reflectivity of avoidable costs might support efficient long-run investment decisions and efficient use of network capacity. One freight operator noted however, that it is important to understand that this greater cost-reflectivity might not reflect broader net benefits to society. There could remain a role for public funding to ensure traffic growth reflects societal considerations. As we envisage it, avoidable cost charging would only capture costs to Network Rail.								

Option 1: Fixed charge based on avoidable cost								
Aligning industry incentives	+	+	+	+	+	=	+	+
This charging approach should lead to better aligned incentives. We envisage that avoidable cost charging would create a clearer causal link where operators would be charged for capital expenditure incurred by Network Rail for the benefit of their train services. This might increase the role for operators and their funders to take a role in network planning. This effect might be achieved in the “Beneficiary pays” SoW even without avoidable cost charging. Avoidable cost alone cannot however capture all impacts; particularly those that arise from scarcity. Avoidable cost charging discourages use of less well-utilised routes when others are available. It is possible that this could worsen scarcity issues where such routing options exist. However, the magnitude of this effect is not clear and might be outweighed by signals for peak/off-peak usage within day on the same route.								
Value for money for funders, taxpayers and users	=	+	+	=	=	+	+	=
For the reasons discussed above, we do not expect avoidable cost charging to have a significant impact on value for money in the current SoW but we do expect that it could have potential to deliver improved value for money in certain alternative SoWs where there is greater ability for pricing signals to affect operators’ and funders’ behaviour. Based on ORR analysis, the benefits that avoidable cost could unlock, particularly in terms of efficiently avoiding or delaying expenditure have the potential to reach into the tens or even hundreds of millions of pounds a year. However, we consider that these are unlikely to be realised without the additional franchise flexibility of the “Dynamic Rail” or “On-rail comp” SoWs or the greater decentralisation and other reforms in the “Beneficiary pays” or “Capacity allocation” SoWs. We do not anticipate that these benefits could be unlocked via charging in the Current SoW. The costs of implementing avoidable cost charging could quite possibly run into millions of pounds given the time and technical resources required to establish and maintain the regime. Therefore, it might be poor value for money to pursue this option outside of a SoW that could facilitate the benefits. The ORR has argued that simply the informational benefits of having better understanding of expenditure could be very significant (see discussion of stakeholder impact for Network Rail) to the extent that avoidable cost modelling could be beneficial even without the end product of feeding into charges. Therefore, we might expect that some aspects of this option might be pursued even in the counterfactual. However, establishing the information is just one piece of the puzzle. Significant effort might be required to put the option into practice, and particularly so if non-franchised operators were expected to participate, with significant downside risk should those operators’ viability be put at stake. Therefore, even if the information were in place, there might remain a non-trivial hurdle that this option would need to overcome to demonstrate value for money to funders, taxpayers and users.								

Option 1: Fixed charge based on avoidable cost

Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	=	++	+	=	=	+	+	=

The approach used to allocate fixed costs affects the price signals faced by funders and operators. Given the anticipated changes in money flows, the approach adopted will have greater importance than it has had to date. Moving to an approach based on avoidable costs presents a clear alternative to move beyond the current simplistic arrangements, with the potential to send more informative price signals for the use of scarce resources.

At this stage, it is difficult to separate out the benefit of being able to take advantage of the greater knowledge that Network Rail, operators and funders might have about the network through conducting avoidable cost analysis and the benefit that might arise from using the avoidable cost information to set charges. There is nearly complete consensus in the industry regarding the informational benefits of this approach⁵⁴ but less so on going the next step and using that information to set charges.

In the current SoW, we anticipate that the benefits of this approach might be predominantly informational, with minimal incremental benefits from putting that information into charges given the limited incentive for most operators to change their use of the network. These may or may not outweigh the significant burden of the calculations and the expectation that certain open access or freight operators might not be able to bear the additional charges. The potential for this more sophisticated approach to provide its greatest impacts lies in alternative SoWs where price signals are stronger. The grading for avoidable cost charging is most positive for the “dynamic rail” SoW given the combined reduction in franchise protection from changes in access charges and increased franchised flexibility.

Impact on stakeholders

As discussed in the “Performance against criteria” section above, the long-term prize offered by the avoidable cost approach in certain SoWs is a network that better meets users’ needs, with investment and operational decisions being justified based on causal relationships transposed into charges. In the short-run however, the avoidable cost approach has its greatest impact on the distribution of charges. This means that there will be winners and losers but the extent to which that is felt will depend on how charges are tempered by ability to bear tests or grants.

In support of this detailed analysis, we have conducted some indicative quantitative analysis using existing industry information to understand the potential distributive changes under different scenarios. This analysis conducted is predominantly static as the way in which operators might adapt their behaviour is subject to even greater uncertainty than the level of charges.

For the purpose of this exercise, drawing on work completed prior to PR13 regarding potential geographical disaggregation of variable usage charges, we assume that the presence of increasing returns to scale will result in lower costs being attributed for more highly utilised parts of the network. We also draw on work completed prior to PR13 on freight avoidable costs and assume that train services requiring particular adaptations (e.g. high-speed inter-city services) could be attributed those costs. As with the other detailed assessments, we consider the implications of three scenarios:

⁵⁴ One freight operator highlighted the risk that attributing costs and having that information might obligate the ORR to charge for them, something on which there is far less consensus.

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- **Lower** – avoidable cost information is only implemented in charges for franchised services,
- **Mid** – as “lower” but all operators face charges – open access in line with the ratio of fixed to variable charges modelled for intercity services and freight in line with lower bound of freight avoidable costs identified for PR13.
- **Upper** – as above but using upper bound of freight avoidable costs identified from PR13.⁵⁵

The static impact that the change in approach might have on operators is analysed for the set of six stylised operators using a set of charges calculated using average CP5 charges and industry financial data. Further information on this approach is provided in Annex A to the main report. However, the primary objective of this exercise was to gauge for which types of train services the change in approach might have an impact, whether it could be large, and how it might shift the distribution of charges in the sector. We also compared the changes to profit margins to examine whether the shift might affect the viability of certain operators and require additional measures to support the viability of those market segments. In this analysis, we have considered the portion of increases in charges that might need to be passed on to users or funders to maintain half the modelled counterfactual profit margin for the stylised operator. However, that is certainly not to say that such a reduction in profits could either be desirable or sustainable. In the long run, franchised operators can protect their profit margins through the bidding process (it is inconceivable that an operator would ex ante bid a negative profit margin) but operators may simply chose to drop unprofitable services or withdraw completely from the market.

Franchised commuter passenger operators	The impact of avoidable cost charging on any particular operator’s payments to Network Rail would be a function of the methodology chosen and even then would require detailed technical analysis to gauge the impacts for the train services it runs. Any analysis at this stage is highly speculative but previous work on differences in renewals costs by line type, ⁵⁶ while based on marginal rather average costs, may provide a way in to understand some of the key effects. That study indicated that for the “London & South East” (which we assume to align closely with this representative operator group) costs were only three percentage points higher than the network average. Therefore, it is conceivable that on average, franchised commuter passenger operators might not see a major change in charges relating to fixed costs under the avoidable cost approach.
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Under the “lower” scenario, we estimate that this type of operator could maintain half their current profit margin if it is possible to pass on just over half the increase in charges. However, it is possible that in the “mid” and “upper” scenarios, if some charges were displaced to freight, their total charges might even slightly fall.⁵⁷

Overall, we anticipate that there could be a relatively small increase in charges for this group (assuming there is no direct grant to Network Rail), although that might mask significant differences within each operators’ services. Whether or not that would feed through to their bottom line or change their actions, this could depend on the SoW in question. However, franchise contracts are likely to give protection to franchisees for such a large shift in approach within the franchise contract period. At the subsequent retendering process, the updated charges could be reflected in the

⁵⁵ L.E.K. (2013) “Estimating Freight Avoidable Costs Final Report” available on the NR website [here](#).

⁵⁶ Halcrow (2008) “Independent Reporter A: Reporter Mandate – Variable Usage Costs Final Report” available on the ORR website [here](#).

⁵⁷ We note that this effect could also occur in the “lower” scenario if freight operators’ avoidable costs were covered by a direct grant to Network rail, removing them from charges.

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level of financial bids. Therefore, the burden of the charges should ultimately lie with funders.

We note that the modest operator-level change in charges identified for this stylised operator is likely to mask differences in charges within the different train services that an operator runs. In particular, lightly used routes and demanding services such as peak services might face significantly higher charges than those running along the same section at off-peak times. Operators therefore may seek to rebalance their service patterns towards the times of day routes where charges are lower if it is profitable for them to do so. In the current SoW, this is unlikely to be the case. However, in the “Dynamic rail” SoW such effects could be more likely to be achieved.

Franchised regional passenger operators	As for franchised commuter passenger operators, except we assume that avoidable cost charges could be higher than for commuter operators due to less intense usage. Setting the level allocated to franchised passenger operators consistent with full allocation of costs given the small rise for commuter operators above and the fall for intercity discussed below, indicates an increase in charges of around 10 percent (assuming there is no direct grant to Network Rail). This is consistent with the assumption that less intense use of assets would result in higher charges. If the change were to be in line with that indicated above, and we were in a SoW with less protection for franchise holders such as “Dynamic Rail,” we estimate that they could need to pass on approximately 80 percent of this increase in order to maintain even just half their profit margin. However, as explained above, we estimate that much of this impact is likely to rest with funders.
Franchised inter-city passenger operators	As for franchised commuter passenger operators, except we assume that avoidable cost charges would be lower than for the passenger operators above. This is based on the assumption that this stylised operator group mainly runs on “primary” lines where the marginal costs previously modelled were 27 percent lower than the network average. If this difference were to exist for average costs, such a reduction in fixed costs could reduce total charges for this stylised group by around 20 percent, with the move in charges being offset by the increases for other operators. One open access operator expressed the view that the estimate of lower charges for inter-city services and higher charges for regional services was counterintuitive. While detailed analysis would be required to establish avoidable cost charges in each case, with a number of opposing factors at play, at a review of charges workshop held on 17th September 2015 we found that this finding (at least in directional terms) was in line with those of the ongoing Brockley Consulting cost allocation study for Network Rail. We understand that one of the key factors in the disaggregation work is the effect of intensity of use but we do not expect it to capture effects around costs related to any modifications that permit operation at high speed, which would not be made in their absence.
Open access passenger operators	Open access passenger operators do not currently pay FTACs but we assume that they would in the “mid” and “high” scenarios modelled. Given limited information in this area, we make a simplified assumption that the fixed costs for open access could be as high as those for inter-city operators, and model the same ratio of fixed costs to variable costs for this sector as an upper bound. We find that implementing that could be more than enough to wipe out the stylistic operators’ profits, resulting in operators exiting the market if they are unable to pass

Option 1: Fixed charge based on avoidable cost

on charges. For our stylised open access operator, we estimated that they could need to be able to pass on approximately 75 percent of the rise in charges simply to maintain just half of their profit margin. This raises questions about the role of ability to bear charges protection for open access. However, it also raises a questions about the extent to which avoidable cost attribution could place costs onto open access operators, if it is not supported by grant funding.

If they were able to bear the increase in charges modelled, all else being equal, we estimate that the sector could recover approximately half of a percentage point of total sector charges. While this is not obviously a material sum it might have potential to be larger in the “dynamic” and “on-rail comp” SoWs. At a minimum, it might at least provide a mechanism through which open access operators could pay for commercially viable enhancements to their benefit.

Freight operators	As freight operators do not currently pay FTACs, if avoidable cost information were used to set charges for freight, all else being equal, there is likely to be an unambiguous increase in charges prior to consideration of mitigating mechanisms such as:
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- the ability to bear test if the charge is a mark-up; and
- potential offsetting grants if the charge were considered a directly incurred cost.

Freight operators might respond to unmitigated increases in charges by adjusting their routing to where their charges might be lower or by withdrawal from unprofitable markets. However, in this section we focus on potential static impacts to gauge the magnitude of impact that might stimulate such a change in behaviour.

Multi-customer freight is the more price-sensitive of the two freight flows modelled, so it might not be able bear much or any charge. We modelled between 2.2 and 5.2 percent of fixed costs being allocated to the freight industry as a whole based on the level of net freight avoidable costs estimated by L.E.K. prior to PR13. All else being equal, the indicative modelling suggests that the sector could double or triple its share of industry charges but that even the lower bound might be sufficient to wipe out the market segment’s profits many times over. We estimate that in the “mid” scenario the stylised multi-customer freight operators could need to pass on around 80 percent of the increase in charges to customers to maintain just half their profit margin. We estimate that this could increase to approximately 90 percent in the “upper” scenario. Although there is potentially a significant amount of Network Rail’s cost that could be attributed to this sector, our modelling suggests that only a relatively small portion could be translated into charges without some serious impacts on the viability of operators.

While we understand that they are less susceptible to competition from road, bulk operators already face the freight-specific charge and some the freight only line charge and it the extent to which this sector can bear further mark-ups is unclear. Our static modelling indicates that all else being equal, bulk operators could need to pass on similarly high proportions of the charges to their customers to maintain just half their profit margins; approximately 80 percent in the “mid” scenario and around 90 percent in the “upper” scenario. While here we simply examine the static impacts of changes in charges, such significant changes in charges could result in reductions in freight volumes and potentially the withdrawal of some operators from the market.

One freight operator highlighted that in the consideration of freight costs, it is important to take into account Network Rail’s own freight traffic, operated for operational purposes, such that the costs of such usage of the network are not

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mistakenly attributed to the commercial operators in the sector.

Network Rail As a fixed charge, the incentive properties of this option for Network Rail are limited. While Network Rail could be able to take advantage of better information on the network, such information may be available to it in the future independent of whether it is used to set charges.

As with other aspects of charging, we envisage that Network Rail would play a major role in designing, implementing and running the approach on an ongoing basis, with peaks in activity occurring in the run up to each periodic review.

We anticipate that these would primarily be realised as an increase in central support costs. Network Rail's support costs are substantial. Core support costs (excluding group) of £1,860m⁵⁸ were allowed by the ORR for CP5. However, the regulatory and planning aspects of it are a small element of this. It is possible that the cost of implementing avoidable cost could run into a small number of millions of pounds given the requirements to dedicate full-time teams to develop the methodology, consult with stakeholders, collate data, and calculate the charges over a number of years. The set-up period might be the most costly stage but also the most informative.

While the work required to establish and calculate avoidable cost charges is clearly additional to current activities, it is possible that the additional information could allow Network Rail to operate more effectively and even displace some existing activities focussed on improving understanding of assets and costs.

At its July 2015 Charging Workshop, the ORR presented case study evidence that indicated that the benefit of simply having better information on costs could be £200m or higher over the course of a control period, regardless of whether such information were put into charges. While work might be required to examine whether avoidable cost information is the best type of information to unlock such benefits (is information based on allocation of the regulatory asset base of value outside of charging?), the potential scale of benefit indicated might justify serious investment to unlock such significant benefits. However, if that is indeed the case, it is something that should be taken forward independent of charging and is surprising that it has not been pursued on a large scale to date.

Funders While the overall pot allocated through charges is unlikely to change in the short-run due to this charge alone, its allocation between funders might. This could for example occur if ScotRail were found to have lower charges than under the FTAC allocation and consequently require less subsidy through Transport Scotland.

With the potential for such winners and losers at funding level, it is possible that were full cost attribution made available, there might be tension between such potential winners and losers as to whether the information should be used to set charges.

We envisage that avoidable cost charging would remove the current division between England and Wales, and Scotland in terms of how fixed costs are allocated. Currently, English services pay no FTAC for the use of the Scottish network and vice versa. Fixed charges would instead be based upon track usage, not origin of funding.

As noted above, the availability of avoidable cost information is somewhat separate

⁵⁸ Table 5.1, ORR (2013) "Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19" available on the ORR website [here](#).

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to using it for charges so the greater transparency it could provide funders on what they are paying for on behalf of tax payers, and how that might affect their decisions is somewhat out of scope, but could be a key benefit of the approach. It is funders and through the HLOS process that key investment decisions are made. Depending on how it is implemented however, funders might have a new tool with which they could recover commercially viable investment costs from the passengers and freight users that might benefit from it in cases where they have demonstrable willingness to pay.

Passengers and freight users

Fare policy is currently separate to the access charging process. Therefore, greater transparency on the level of costs incurred by the passenger operator they travel with is not likely to be apparent.

The extent to which passengers might benefit will depend on the degree to which Network Rail, operators and funders change their behaviour in response to the charges. The impact of specifically using the avoidable cost information in charges (as opposed to simply having the information available) is directly related to the extent to which operators respond to the charges. In the current SoW, we do not anticipate a material change in their behaviour. This might even be the case under all SoWs for public service obligation services, which are likely to continue to require tightly specified patterns of service.

The charging benefits of this option therefore, are most likely to be realised for commercially viable services. The extent to which a service is commercially viable will to some extent be a function of how avoidable costs are defined (i.e. a service that currently appears to be commercially viable may no longer be considered to be so if avoidable cost charging results in higher charges and vice versa). However, one of the key benefits of avoidable cost charging in the “Dynamic rail” SoW could be that it has the potential to empower operators to pay for commercially viable enhancements, improving the level of service passengers receive.

The potential benefits for freight operators are similar for freight users in terms of in the long run being able to benefit from use of a network that better fulfils their needs. However, the impact on the prices they face is more direct. Oxera (2015) examined the impact of a cost-driven reduction in freight volumes.⁵⁹ That study found that, assuming a cost elasticity of -1.35, a ten percent reduction in freight volumes could result in an annual consumer surplus loss for freight users of £60m for those who continue to use rail and £3m for those that can switch to road.

While avoidable cost charging might give users greater clarity over what is included in their charges, avoidable costs is clearly an avenue through which a greater share of costs could be charged to the freight sector. Avoidable cost charging is unlikely to result in lower costs for these users. For some users at least, this higher level of costs might result in a switch towards transporting their goods by road freight. The ability to do so will be greatest for customers in the multi-customer flow category. The impact in the bulk sector might be greater, with fewer alternatives available to them. This might have an impact on the competitiveness of those users in the industries within which they operate, resulting in lower profits and lower volumes of freight being demanded.

The existence of, and magnitude any such impacts might be tempered by decisions

⁵⁹ Oxera (2015) “What is the contribution of rail to the UK economy?” A report prepared for the RDG. Available on the RDG website [here](#).

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regarding the extent to which attributable costs are put into charges for the freight sector or the extent to which they are offset by grants.

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- There was some consensus on the investigation of avoidable cost information as a route to improving understanding of Network Rail's costs but there was only limited support for using such information in charges, particularly in the current SoW. Despite this, some passenger operators saw this as means to make the FTAC more rational, particularly if combined with the removal of the capacity charge, which was seen to allocate fixed charges in a similarly arbitrary manner.
- Passenger operators expressed the view that it is important to distinguish between informational benefits and those from using avoidable cost information in charges. They saw minimal benefit from avoidable cost charging in the current SoW particularly given the burden of calculating the charges and ensuring that operators without public service contract income would be able to pay the charge and remain financially viable.
- The issue of ensuring the viability of freight operators was shared by all industry participants, with some passenger operators expressing the view that this issue must be explicitly addressed as it is an inevitable requirement. They also expressed the view that it is essential for further work to be done to close down the legal uncertainties of this option either at this stage of policy development or at least before implementation. A particular legal issue for many parties was the status of the charge, a "mark-up," "directly incurred cost" or something else.
- Passenger operators considered it important to address the impact on service sponsors and funders, particularly those associated with regional public service obligation (PSO) contract.
- Open access operators expressed the view that there is a strong link between the existing charges structure and processes for capacity allocation and Network access processes. Existing Open Access operators do not pay FTAC with one rationale being that this reflects the different markets served and the fact that they access to the network in a different way. In particular, Franchised Operators are able to access the whole of the relevant passenger market while the Open Access operator access is controlled by the Not Primarily Abstractive (NPA) test amongst other mechanisms. If Open Access operators were to face an avoidable cost charge, there would need to be a parallel adjustment to the Capacity Allocation process.
- Transport Scotland explained that this option is only significant to Scotland if there is a move away from the current model where all Scottish fixed charges are allocated to the ScotRail franchise.
- Network Rail considers that the current approach that is used to allocate Network Rail's 'fixed' costs is too simplistic; it could be improved to better reflect the actual underlying railway economics. It considers that the informational benefits of this could be powerful, even if it were concluded not to fully reflect this in charges.

ANNEX C ADMINISTERED SCARCITY CHARGE DETAILED ASSESSMENT

Option 4: Administered scarcity charge							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	++	-	+	+	++	+

The purpose of a scarcity charge is to encourage the release of lower value uses from scarce capacity and enable higher value uses to take over that capacity.⁶⁰ Many important parts of the railway network are used to full capacity, and in some cases there are valuable additional uses that are prevented, or required to use inferior timings or routings. An additional variable charge, applied only to 'scarce' parts of the network, could encourage better use of that scarce capacity, e.g. by discouraging low value uses of the network or by encouraging Network Rail to find a way of scheduling more trains.

We have carried out a detailed assessment of an administered, value-based, scarcity charge because it appears to be the most practical form of this type of charge. The alternative to administered is market-determined, but that appeared impractical given the difficulty of devising workable mechanisms consistent with the complexity of railway scheduling. The alternative to value-based is cost-based, but that appeared too complex and less relevant.

A reservation charge, which has also been assessed in more detail, is a different type of charge related to efficient use of network capacity. A reservation charge and administered scarcity charge could both exist in the same charges regime.

The scarcity charge would be an additional variable charge, i.e. levied in addition to the variable usage charge. Our interpretation of European legislation suggests that it permits a scarcity charge, which is not a mark-up, in addition to the cost directly incurred within the charge for the minimum access package. It would therefore not be legally limited by ability to pay. It does not have to be restricted to locations formally declared as congested infrastructure.

The definition of value we are using is the commercial opportunity cost, the net income lost by putting a scarce resource to one use rather than another use that has been excluded. We initially suggested the opportunity cost could reflect full economic value, which would include non-financial socio-economic values. However, our further work suggests that it is more practical and appropriate, at least in the first instance, and particularly in the present state of the world, to use the 'commercial' opportunity cost. There is precedent for such an approach in other industries, and was the basis of earlier studies for ORR on its application, and presents opportunities to keep it simple and practical, through being narrow in application.

To focus on the key issues and minimise potential issues of feasibility and complication, we have envisaged a simple scarcity charge that would apply as a path charge to only the busiest and most commercial corridors, with a high peak charge, a much lower off-peak charge, and no charge at times of day when there is spare capacity. We assume that the path charge would apply to all services passing through the key bottleneck of the path. In this simple vision of the charge, many, or even most, locations in the network, where the infrastructure is used to capacity, would not attract the charge, because such is the level of non-commercial services operating there that capacity would not be said to be the prime constraint on expanding commercial operations. It would not correspond to the technical EU definition of "congested infrastructure."

⁶⁰ What is meant by "value" in this context is discussed later in this section.

Option 4: Administered scarcity charge

Clearly a more detailed scarcity charge could be implemented, charging many more nodes according to their relative scarcities. For example, the definition of opportunity cost could be extended to include social value but would complicate the calculation and application of the charge. Nevertheless, we can note that there are options for a more sophisticated charge if the simple charge works well and is deemed worthy of extension.

We have assessed that in the current SoW such an administered scarcity charge could have positive benefits in incentivising more remunerative use of existing capacity among commercial users of that capacity. Whilst discouraging uses of low commercial value, it would not entirely resolve policy issues in relation to competition between open access and franchised operators for commercially profitable services. This is because it does not address issues relating to abstraction and cross-subsidy of subsidised services.

This charge would also have important effects at the boundary of commercial and subsidised services, where they share the commercially valuable capacity, making funders decide whether the social benefit of their funded service justified paying the premium. Some might consider this an inappropriate way of making trade-offs between commercially beneficial and socially beneficial uses of infrastructure. For services that provide social benefits but are not procured by funders e.g. freight services, they may not be able to access funding to offset the effect of this charge.

In alternative SoWs which introduce greater on-rail competition, or which allow train operators to play a greater role in capacity allocation, this option could have greater positive impact. In SoWs where train operators are more protected from charges, or where funders play a greater role in capacity allocation, it would be less relevant.

Any 'premium' charge has the effect of increasing the price of access and reducing demand. Therefore, if the current capacity charge remained, we would not expect the scarcity charge to be added to the capacity charge, and it would be inappropriate to do so. In locations where both a capacity charge and a scarcity charge applied, the actual charge would be the larger of the two.

A scarcity charge potentially works well with a geographically distinguished variable usage charge (VUC). Previous work by ORR on a geographically disaggregated VUC suggested it would be low in intensively used areas, and thus a countervailing charge representing that intense use would be useful to avoid further concentrating use in those areas. In practice the simple and focused scarcity charge we have envisaged as most practical to implement would only have this countervailing effect in a few locations of particularly high scarcity. Ultimately a more sophisticated scarcity charge would work best with a more granular VUC.

Key characteristics

Description of option

Scarcity costs arise where the presence of a train prevents another valuable train from operating or requires it to take an inferior path. Here we consider a charge, administratively set, which aims to reflect a scarcity value of a path, based upon the opportunity cost of that path. The purpose of the charge would be to create a higher level of respect for scarce rights, and discourage some lower value uses from occupying them. We believe such an approach, if it proves practical, could make some steps in this direction, but it would be unlikely entirely to resolve the issue of excess demand for paths.

An administratively set charge can be contrasted with a market-determined charge, where a market mechanism would reveal the value. A charge (necessarily administered) based upon the opportunity cost can also be contrasted with a charge based upon long-run marginal cost, where the measure of scarcity value is the cost of providing additional capacity, rather than the opportunity cost of that

Option 4: Administered scarcity charge

capacity not being available.⁶¹ We considered these alternatives in the initial list of options, and the administered charge based on opportunity cost was selected for detailed assessment. This is because we believed it was, or at least could be made, more practical than the alternatives. In brief summary, our reasons are as follows.

- **Auctions:** we believe that market mechanisms for path allocation such as auctions are likely to be impractical for train paths – they have not even been implemented for airport slots, for example, which is a simpler and more commercial case.
- **Long run marginal cost:** it is difficult to measure,⁶² and because expansion costs of railways are frequently high and lumpy, the opportunity cost is likely a more relevant measure of scarcity most of the time.

Whilst administratively determined prices are often criticised as being likely to be imperfect measures of value, because administrators are unlikely to be able to predict a market outcome accurately, there are number of potential advantages of the administrative approach to price setting in this context:

- The prices can be adjusted over time to move towards a more desired outcome.
- The prices are much less subject to market volatility, thus facilitating investment more easily.
- One can start with a simple and narrow conception of it, and if that proved to deliver net advantage, one could gradually expand its application and increase its sophistication so long as that appeared to deliver further advantage.

For this reason, we envisage implementing it in a simple way for the present evaluation. If the simple form of it turns out to be feasible and to generate some marginal advantage, one can consider making it more sophisticated.

Explanation of choice of commercial revenue

There are different measures of opportunity cost:

- the opportunity cost to a specific operator, reflecting what it might bid for a slot at auction, if an auction were feasible;
- the net commercial opportunity cost to the industry, reflecting the additional commercial value, taking into account reallocation of passengers and operating costs; or
- the net social opportunity cost to society, reflecting not just financial benefits of revenue and cost, but also social benefits which are considered in transport appraisal, such as journey time benefits, crowding relief, road decongestion and environmental benefits.

We do not find the first of these approaches appropriate in the context of the GB railway industry, because it is not well-defined or inherent to the slot itself. This is because it would depend considerably upon the identity of the operator, their present market situation, and the revenue abstraction opportunities available to them.

The third of these would represent the full opportunity cost to society of the path. However, we suggest it is not suitable for implementation as a scarcity price, at least not initially, and would be

⁶¹ In a market where capacity expansion was available in small increments, and without such long term commitments, then capacity should be expanded to the point where the marginal cost of capacity expansion and the opportunity cost of scarcity are equalised. This is the rationale for considering LRMC and opportunity cost as comparable measures of the same thing.

⁶² You need to decide what the appropriate capacity expansion measure is, which is likely to be very specific to each location, and it appears to be difficult to know what projects are in practice feasible to deliver; then you need to cost it, and it appears to be very difficult to cost railway infrastructure projects.

Option 4: Administered scarcity charge

more relevant in other states of the world. This is because:

- Such a charge would be more complex to assess, and would result in applying the charge to a much greater proportion of paths than the remaining alternative. It would be inconsistent with the practical aims of our, initially simple, charge we have envisaged. These are sophistications that could come later if thought appropriate.
- This approach would be inconsistent with the manner in which funding decisions are currently made in the railway industry. Funding decisions are typically agreed where a cost-benefit ratio is substantially higher than one. Therefore, including the full social cost in the scarcity charge, and therefore in the costs of providing a particular service, would overstate the willingness to pay of society for these social benefits, although this could be dealt with by applying a discount factor to the social benefits reflecting the hurdle cost-benefit ratio.⁶³
- Increasing the marginal cost of provision of funded services, to use infrastructure that was publicly funded, (even though the price paid returns to the public sector), may be politically controversial, and we find it hard to recommend it in the first case. It may become more relevant in a different state of the world where services are subsidised by different mechanisms that facilitate operators to make decisions on how much to provide.

The remaining option is the second approach, which attempts to produce a scarcity charge similar to a price that would be determined by an auction as it reflects only the commercial value. Commercial value, avoids the issues of abstraction that exist in railway competition in GB. It is also well-defined and not context dependent. There are likely to be a relatively small number of paths that have a positive marginal commercial value, which helps to simplify the implementation. It is also similar to the approach taken by ITS (2005)⁶⁴ in its scoping study of scarcity charges for ORR.

In EU legislation, Directive 2012/34 provides that a scarcity charge, can be a charge included in the minimum access charge for the path. Thus we interpret it as a charge that is additional to the variable usage charge (the cost directly incurred), but is not a mark-up based on ability to pay. Nor is there any necessity to declare a location to be congested infrastructure to apply it. This is consistent with how scarcity charges are implemented in the several other countries that apply them.

Rail access charges in several major European countries include an economic scarcity charges in various forms, all administratively determined, as opposed to market determined. From various sources^{65, 66} we find documented scarcity charges in:

- Austria: train-km charge on bottleneck sections;
- France: path reservation charge, charges differing by line type;
- Germany: train-km charge on bottleneck sections, and differing rates by line type;
- Italy: charge for passing a congested node;
- Spain: charge per seat-km on certain lines; and
- Switzerland: charge for passing a congested node, and a path cancellation fee.

We do not assert that these charges have been specifically calculated as an opportunity cost or

⁶³ See for example the general manner of analysis in *A theory of incentives in procurement and regulation*, Laffont, Jean-Jacques; Tirole, Jean, (1993), where a shadow price is attached to public funds, an arithmetically equivalent method.

⁶⁴ Scoping study for scarcity charges, (2005, revised 2006), C Nash, D Johnson, Institute for Transport Studies, University of Leeds, and J Tyler, Passenger Transport Networks, York, report commissioned by ORR.

⁶⁵ European Conference of Ministers of Transport, Charges for the Use of Infrastructure in ECMT Railways, 2005

⁶⁶ Railway Access Charge Systems in Europe, M Vidaud, 10th Swiss Transport Research Conference (2010).

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indeed by any specific method. However, they demonstrate the usage of administratively determined charges applied to represent the scarcity of the capacity. This is precisely what the scarcity charge we envisage here does, but we have also envisaged a specific calculation method which may differ from these European examples.

Administered scarcity charges have also been applied in the UK in other industries. Ofcom applies administered scarcity charges for parts of the radio spectrum. It has also had market determined prices – the Global System for Mobile Communications (GSM) auctions – but more generally applies administered charges because it believes that market mechanisms are impractical or unreliable in most parts of the spectrum, which requires a management process with some parallels to railway scheduling.

Application

To maximise simplicity and feasibility of this option, we envisage that the application could be confined to rail corridors which are dominated by uses of high commercial value e.g. the three main intercity corridors, and possibly some additional corridors if it was found that there was in practice true commercial scarcity on those corridors.

Again for simplicity, we envisage charges would be path charges rather than node charges, but path scarcity would be identified in relation to a key bottleneck or section that acted as the prime constraint on the number of available paths. Services using that critical section, during time periods of scarcity, would attract the charge.⁶⁷ We envisage the charge would not apply – at least initially – in locations where capacity is fully used but there is a substantial presence of funded services, as the substantial presence of such services implies that the capacity is not scarce in a commercial sense, but it may be scarce in another sense.⁶⁸

We would envisage that paths allocated late or on an ad hoc basis would not attract the charge, as such applicants are accepting only what capacity is available after other requests have been satisfied. This exemption would make it easier for freight and charter operations to remain profitable, while not limiting the ability of other operators to obtain paths.

We would envisage potentially several levels of charge for a particular corridor, carefully defined by time period and direction having regard to the specific demand characteristics of the corridor. A typical approach might, for example, have two charge rates for periods of the day where the corridor is used at capacity⁶⁹ but with different relative values – broadly peak and off-peak – and a zero charge for times of day when there is spare capacity on the corridor. We would also envisage the charge would not apply when a path was made available under late or ad hoc arrangements.

In locations where both a capacity charge and a scarcity charge applied, the actual charge would be the larger of the two. This is because we do not think that it is appropriate to charge both ‘premium’

⁶⁷ In a sophisticated approach to scarcity charging, one could have bottleneck or node charges, and a single path might attract several charges. But it would be difficult to value scarcity at such bottlenecks, as complex techniques may be required, as in the electricity industry. By making it a path charge, and as far as possible focusing on a single key bottleneck for that path, we attempt to retain simplicity of application and calculation.

⁶⁸ This test would probably have to be made more precise in a practical implementation.

⁶⁹ It is observable that the number of paths scheduled in the peak on a main intercity line such as WCML or ECML is several more than during the interpeak period. Nevertheless ORR has not required NR to satisfy applications for additional paths in that interpeak period, accepting NR’s view that the timetable is full, for whatever reason NR has given for this. Thus we are bound to accept – as has been argued by stakeholders – that there is scarcity in the off-peak period also, potentially commercially valuable, even if the number of movements is less than during the peak, at least during periods where scheduled paths are at the interpeak plateau level. During periods of the day, typically late evening and early morning, when the demand falls below this plateau level, we would argue that there is not scarcity.

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charges where they would both apply. However in modelling it we have not taken this set-off into account. As we have envisaged it, it seems likely that the scarcity charge, where it would apply, would normally be much larger than the present capacity charge, thus given the size of the uncertainties we believe it is a fair approximation to ignore the set-off effect.

A scarcity charge potentially works well in tandem with a geographically distinguished variable usage charge (VUC). Previous studies on geographic disaggregation have found that the more lightly used parts of the network often, for good reason, have higher variable operating and maintenance costs. Therefore, a geographically disaggregated VUC risks encouraging traffic from lighter used sections towards the more densely used parts of the network.

A scarcity charge, applied in locations where such capacity was in fact scarce, would provide a countervailing incentive to avoid counter-productive traffic transfer. In practice the simple and focused scarcity charge we have envisaged would only have this countervailing effect in a few locations of particularly high scarcity. Ultimately a more sophisticated scarcity charge of greater sophistication would work best with a more granular VUC.

Description of counterfactual

The current regime contains a variable charge to recover short-run marginal wear and tear costs only. Variable charges currently neither capture short-run nor long-run marginal scarcity costs. Furthermore, there is no direct link between the need for enhancements and charging at present. A variable capacity charge exists: but this is related to the fact that additional traffic increases the risk of performance shortfall, and compensates NR, at the margin, for this effect. Franchised operators are protected against changes to track access charges.

Timetabling is managed administratively, and related to the franchising regime and new capacity is predominantly funded by fixed track access charges, the Network Grant and NR's commercial income.

Relevant factors impacting the form and/or the effectiveness of the option

Practical issues relating to the imposition of an opportunity costs based scarcity charge (by reference to the 'Factors' report) include:

- 2.2 EU legislation and 2.3 UK legislation which raise issues requiring clarification about the legal approach to applying a scarcity charge in rail.
- 3.2 The franchising regime. This would limit the impact of any such charge on franchised operators, at least in relation to services that they are required to operate.
- 3.3 A mixed use network. The varying business models of UK operators are not necessarily compatible with a scarcity charge which would not value wider social or environmental benefits, at least in the absence of other complete mechanisms which take them fully into account.
- 4.4 Economic viability – a scarcity charge may have a detrimental impact on smaller operators and freight operators. This could potentially be mitigated if there was a funding source or system within the charging system to reflect social benefits these operators provide which are currently unremunerated.

Implementation

Information requirements	The information requirements for application of the charge, assuming it is implemented in the simple form we discuss, are modest. The design of the charge would identify which paths attract the charge, and then it would suffice to bill those rail operators who are allocated such paths at the relevant rate. The size of the dataset would be small, the charges well-defined, and not based on any detailed track usage. Our view is that this charge would be simple to apply.
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Option 4: Administered scarcity charge

	The calculation of the charge would be very similar, both in its delivery and in the informational requirements to support it, to the calculations that are routinely made in support of franchise specifications. Thus these are calculations of the type that the government routinely procures today.
Drivers	The charge would increase as the commercial value of the use of corridors excluded due to scarcity increase. The charge would be levied on users of identified commercially valuable corridors who occupy capacity in a way that excludes such valuable users. The charge would tend to be much higher at peak times, defined in terms of the times of day which, for that corridor, carry the most valuable traffic.
Calculation principles	First, the valuable corridors and the quantity of available paths need to be determined. The quantity of available paths needs to be understood in practical terms, and may vary by time of day.⁷⁰ Next a standard planning tool such as MOIRA, in tandem with an accepted costing tool, would be used to identify the most valuable use of an additional path on the corridor, if such an additional path was made available. The appropriate increment would probably be one path per hour rather than one single path, in order to be able to identify values of paths averaged across suitable periods of the day, and also since train and personnel costs are probably more suitably considered over the course of a day. The appropriate measure of revenue is revenue of all passenger operators, taking into account abstraction, not a single passenger operator's revenue or train revenue. The DfT holds passenger train operator cost models from franchise bids, and these would be appropriate tools to estimate the marginal cost of additional train movements to service these paths, though probably some judgment on practical diagramming of stock and staff would be required. As noted above, we envisage its use only for paths which are scarce for usage of commercially profitable services. Where the line between "not many" and "many" subsidised services sharing the relevant capacity bottleneck lies is bound to result in some difficult intermediate cases, and probably a uniform test might be required. One possible test would be if all the relevant capacity could potentially be used for commercially valuable services. The scarcity charge would be a supplement above the total charge presently levied, and therefore the continuation or cessation of present capacity charge will considerably affect what is the appropriate magnitude of the scarcity charge.
Practical considerations	Some careful analysis and judgment would be required to determine which are the valuable corridors that should attract the charge, identify the essential bottleneck, and manage practical capacity considerations at different times of day. There is bound to be an element of opinion and lobbying of the body responsible for concluding on it.
Lead time	Once it was determined that such a charge was to be introduced, the lead time for determining its value would be similar to the lengths of time in making existing regulatory price control determinations. As we envisage it, with only a very limited number of corridors attracting the path charge, the practical implementation of the

⁷⁰ As noted above, NR the number of paths in a "full" timetable may vary materially from hour to hour. To the extent that ORR has not required further path applications to be accepted, we have to accept that this can be a "full" timetable.

Option 4: Administered scarcity charge

charge would not be onerous.

Resources required for implementation The main burden of implementation would lie on ORR, in determining where the charge would fall, and calculations of the level of charge. The assistance of NR and input from operators would also be required in indicating relevant pathing issues. Some thought may also be needed on access management of other “lesser bottlenecks” that would not be charged, to determine that track access management methods were done in a way consistent with the charging philosophy.

Performance against criteria								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=
There is no unambiguous material impact of this charging approach on system safety, but charging for the use of scarce capacity might decrease pressure on assets in constrained areas and therefore have some positive benefit on safety. However since we are proposing to apply the charge only to relatively limited areas of the network, it would likely also be small in extent.								
Consistency with law	=	=	=	=	=	=	=	=
Paragraph 4 of Article 31 (directive 34/2012) states: <i>‘The infrastructure charges referred to in paragraph 3 may include a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion.’</i> Some stakeholders have argued to us that law only permits that a scarcity charge may be levied only in locations which have been declared as “congested infrastructure” (Article 47). At present only a handful of (rather unlikely) locations on the GB network meet this test, although a number of others are expected to be added. The Article 47 test requires that access requests have to have been turned down in order declare it as congested infrastructure. In the UK, there are a large number of likely congested areas where operators would not put effort into an access application because the constraints are already widely known, hence are not likely to exhibit an explicit denial of a request. We would however observe, in opposition to this view, that there is no cross-reference between Articles 47 and 31, nor is the defined term “congested infrastructure” used in Article 31. The directive recognises that infrastructure may cease to be congested if scarcity charges apply. Other EC countries have applied scarcity charges widely across their infrastructure. In addition, the recent implementing rules,⁷¹ which define costs that may be considered to be directly incurred, do not specifically mention scarcity charging. The rules are new and therefore untested but may imply that this form of charge cannot be considered to be a direct cost. But this does not necessarily exclude it from being a charge for the minimum infrastructure package (Art 31.3), which is the infrastructure charge cross-referred at Article 31.4. We can observe that several major European countries have been making scarcity charges over an extended period. Nevertheless, further legal analysis (beyond the scope of this study) is required in this area to clarify the scope of application.								

⁷¹ The Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 *on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service*

Option 4: Administered scarcity charge								
Funding of NR efficient costs	=	++	++	--	+	=	+	=
This option would be a new charge through which NR could recover its revenue requirement. Forecast receipts would be matched by a corresponding reduction in fixed charges so overall we do anticipate any impact on NR's aggregate funding. If funds raised from the charge were regarded as a contribution to enhancement costs, then there may be a positive impact on this criterion but this would depend on the value attached to the charge. In SoWs where there is more competition for capacity, this option would have greater impact. Where there is less competition/greater protection the option would deliver little if any added value We note that the overall level of receipts will be a function of the gap between supply and demand and operators' price sensitivity. Where capacity is truly constrained and demand outstrips demand, there could be an increase in overall receipts from variable charges. However, if the charges were poorly targeted and levied on some trains where there were no constraints, any subsequent reductions in demand could result in a net decrease in variable charge receipts.								
Allowance for market conditions	-	-	-	-	=	-	-	-
A scarcity charge levied as a charge could detrimentally affect financial viability of freight by pricing freight usage of valuable corridors off rail. However to the extent that such a charge would only apply in limited locations, and be very high only at peak times, only a relatively small proportion of freight would be affected. They could avoid the charge by operating more flexibly, for example with non-firm rights. The charge would affect open access operators at an apparently high rate, but this would reflect the high value of the capacity they were using. It should have the effect of freeing up more capacity they can profitably apply to use. Many operators require some additional flexibility to manage, for example, seasonal demand or new requirements as they arise. This is particularly the case for certain types of freight. Current access rights make allowance for this through the access rights regime which range from fixed rights through to options to use additional spare capacity. Scarcity charges raise the issue of how this required flexibility in traffic levels would be accommodated. There are ways of managing this issue but these would likely require detailed analysis and charges set on a granular basis. A cruder form of the charge which sought to price many locations which apparently operate at capacity would make this criterion red across all SoW. We have sought to study a simple and practical charge which only identifies the key determinant of corridor capacity, and manages demand other locations administratively to preserve that capacity.								
A single approach for the network as a whole	=	=	=	=	=	=	=	=
This approach, as per the current planning led mechanism, could be applied to all operators irrespective of type.								

Option 4: Administered scarcity charge								
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	=	=	=	=	=	=	=	=
	A scarcity charge levied as a part of the charge for the minimum package of access rights would reduce the size of the fixed cost that needs to be recovered elsewhere. The overall level of contribution would depend on the scale of the charge. We have estimated the amount the charge might recover as lying in the range of £800m to £2,000m. Although this is a wide range, the present capacity charge, which it would likely replace, lies in this range. It does therefore likely succeed in replacing the capacity charge, but not in making a more fundamental contribution than that.							
Efficient whole-system whole -life industry net costs	=	=	=	=	=	=	=	=
	This approach could be beneficial, at least at the margin, in contributing in advance to the costs of future additional capacity. Although as the funding flows in the present railway industry are arranged, more likely it is simply treated as part of the overall funding of Network Rail and has little impact.							
Efficient long run investment decisions	=	+	+	=	=	=	+	=
	This approach would be beneficial, at least at the margins, as the setting of the charge would describe clearly where capacity is truly constrained and expansion would be valuable. But arguably the method of setting the charge is just the same as the existing planning based approach to deciding where expansion would be useful, after all it is an administratively set charge. In a SoW that places greater overall emphasis on efficient use of capacity, this option might have benefit over current arrangements, which rely on historic access rights.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Efficient performance management	=	=	=	=	=	=	=	=
	This approach has no direct impact on the occurrence of disruption.							
Efficient use of network capacity	+	++	++	=	=	=	++	=
	A scarcity charge provides a financial incentive to more carefully consider the capacity required to operate services rather than rely on pre-existing rights that perhaps fail to recognise the potential for improvements to capacity allocation. The effect of this option might be greater in those SoWs where there is greater competition, but would have little or no effect in SoWs where wider protections are given to operators.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	--	--	--	--	--	--	--	--
	A scarcity charge may adversely affect predictability of charges generally as capacity constraints will change over time, and the opportunity cost of those constraints are potentially quite sensitive to traffic levels. This could cause charges to increase rapidly with traffic, and to fluctuate within or between reviews depending on how the charge is administered.							

Option 4: Administered scarcity charge

Simplicity	-	-	-	-	-	-	-	-
	Establishing the basis of the charge for the first time would be time consuming and potentially complex versus the current planning based approach – and the present access planning would still have to continue since the charge would be unlikely to make excess demand go away, nor simplify the task of scheduling trains to get best usage of capacity. There would likely be a contested decision on where the capacity was deemed scarce, exactly how it should be defined, and how much capacity it was wise to schedule. But the administered nature of the charge would make the process more straightforward thereafter, in that the methods would be set up and become easier to replicate thereafter, although changes would be required every time there was a change in the capacity or location of the key determinant of corridor capacity.							
Transparency	+	+	+	+	+	+	+	+
	Current track access arrangements are established in bilateral contracts that are not necessarily publicly available or easy to review. The imposition of a scarcity charge would bring greater transparency to poor use of capacity and result in overall nearer optimal use of the network, at least in areas where poor network use was a constraint upon commercially valuable use of the network.							
Low transaction costs	=	=	=	=	=	=	=	=
	Imposition of scarcity charges would imply a degree of monitoring and management that does not currently exist. Offsetting this would be the benefit of identifying capacity that could be allocated to better commercial value.							
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
NR accountability	=	=	=	=	=	=	=	=
	This option has no direct impact on NR's accountability, any more than any of the capacity charge mechanisms previously employed.							
Non-arbitrary allocation of costs	=	=	=	=	=	=	=	=
	Unlike a reservation charge, a scarcity charge would be imposed on top of other charges i.e. it would be an additional charge on top of the variable usage charge rather than an up-front contribution to costs that would likely be incurred in any event. The charge would be set administratively to recover the proportion of costs considered to represent opportunity costs. We find no compelling reason that it is more or less arbitrary than existing charges.							
Optimal traffic growth	+	++	++	=	+	+	++	=
	A scarcity charge could contribute to all the objectives of this criterion but would be more positive in SoW where there is greater competition since it should free some capacity for use by other operators. Its impact is likely to be inhibited in SoW with additional protections.							

Option 4: Administered scarcity charge								
Aligning industry incentives	+	++	++	=	+	+	++	=
	This option recognises that industry incentives may not be aligned and places weight on industry participants giving up unused access, or access that does not reflect the scarcity costs it imposes. Current planning based approaches seek to achieve the same thing, but the imposition of a mechanism that creates a common basis for discussions and should improve transparency. It will work more effectively in SoWs which have encourage more flexibility and thus responding to those incentives.							
Value for money for funders, taxpayers and users	=	+	+	=	=	=	+	=
	We do not believe that a capacity charge in this form would be expensive to bill and implement. Measurement would be relatively straightforward in comparison to most other charges. It would not require real-time measurement, or complex billing models. Further the number of chargeable events would be relatively small, as it would be a charge per path and applying to a small proportion of paths. The computations to calculate the charges are related to calculations currently routinely made in relation to investment decisions and franchise specifications. A scarcity charge could contribute to all the objectives of this criterion. But the overall scale of impact may be small in the current state of the world, given that capacity is not an issue on many parts of the network, and because freight would likely need to retain a significant degree of flexibility in order to manage inherent fluctuations in demand. The impact would be larger in SoWs which encourage a larger degree of competition, and then mainly on the parts of network where more competition is likely to arise.							
Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	+	++	++	-	+	+	++	+
	In the current SoW an administered scarcity charge as described above, and if legal, could have positive benefits in incentivising better use of existing capacity among commercial users of that capacity. Whilst discouraging low value uses, it would not entirely resolve policy issues in relation to competition between open access and franchised operators for commercially profitable services, since it does not address issues relating to abstraction and cross-subsidy of subsidised services. It would also have important effects at the boundary of commercial and subsidised services, where they share the commercially valuable capacity. It would make funders of subsidised services pay to occupy this commercially valuable capacity, considering therefore more carefully whether the social benefit that this brings justifies that loss of commercial value. Some might consider this an inappropriate way of making trade-offs between commercially beneficial and socially beneficial uses of infrastructure. We can also note that not all sources of social benefits on the railway network are capable of accessing funding to defend them, e.g., freight, as things stand. Our modelling indicates that it could adversely affect freight services. Although, as we envisage it, it would likely only affect a small proportion of freight movements, the size of the charge is likely to be sufficiently large to amount to a material impact. There would be some scope to design it to limit that impact, and for freight operators to take action to reduce the impact. Impact on franchised passenger operators under the current regime are likely to be limited given that current arrangements provide protection from change and also limit the scope to change service levels. But it may encourage funders to consider whether							

Option 4: Administered scarcity charge

their use of scarce capacity gives value for public funds, when they are excluding commercially valuable services.

Assuming adverse impacts could be managed e.g. that freight operators retained the flexibility required etc., the overall impact could be positive but may be small overall in financial terms. The main areas of uncertainty would lie over which parts of the network really do have a high load of valuable commercial services through bottlenecks, as opposed to a high load of taxpayer funder services, and are therefore genuinely scarce in economic terms. More detailed analysis, involving detailed capacity, revenue and cost analysis of specific corridors, would be required to assess where the charge should be introduced and clarify its likely level in different corridors. This may also help make clearer whether the benefits outweigh the disadvantages.

However, in alternative SoWs which introduce greater on-rail competition, or which allow operators to play a greater role in capacity allocation, this option could have greater positive impact. Conversely, in SoW where operators have increased protection from change, or capacity allocation is more strongly driven by funders, the option would have less impact, and maybe overall would not be worth implementing.

Impact on stakeholders

The broad effect of this option is to charge the users of valuable capacity, and incentivise them to consider whether it is of sufficient value to them to pay the charge. For franchised services, in practice it is funders rather than operators who would ultimately feel the effect of the charge in the current SoW. The users of this valuable capacity are mostly intercity operators (franchised and open access). Freight operators and regional passenger operators make some small use. Regional operators are likely to, overall, be net beneficiaries as a result of reductions in other charges. The impact on commuter operators is unclear.

A high level understanding of this charge is that it works most strongly at the boundary between funded services and commercial services, in areas where capacity is particularly commercially valuable.

The desirability of introducing the option is depend on the extent to which it is considered appropriate to influence the allocation of scarce capacity in this way. It will also work to some degree at the boundary where franchised and open access operators compete for access to paths for commercial services. However, it does not resolve the issues related to abstraction and the extent to which it is seen as desirable to raise profits that can be used to cross-subsidise PSO-type services.

Franchised commuter passenger operators	Taking into account an assumed reallocation of FTACs, the overall impact of this charge on the commuter sector is unclear – in some scenarios there is a net reduction in charges to the sector, in others an increase. This is because there are options for how extensive the charge would be, and this particularly affects the commuter sector.
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Some wide variation is also likely in the impact on individual franchised commuter operators, for similar reasons. At one extreme, some would likely not face the charge at all, because they simply do not use the corridors with commercially valuable scarce capacity. Where the other extreme would lie would depend upon precisely which corridors were determined to be scarce and commercially valuable.

At one level, it is clear that some commuter services explicitly take a share of the capacity of commercially valuable intercity corridors, and such path usage can reasonably be expected to be chargeable, though we would expect parallel “slow lines” would not to attract the charge. If that was the extent of it, it would likely be of relatively minor impact on commuter operators, aided by the observation that

Option 4: Administered scarcity charge

the longer distance intercity peaks – which would define peak charge timings – do not always coincide with commuter peaks.

But there are also corridors which are intermediate in characteristic between commercial intercity and longer distance public service commuter, and where even the some commuter services are commercially valuable, and it could be argued that these would merit a scarcity charge – for example the mainlines from Waterloo and Liverpool Street might be considered in this category.

In a sense, this would be the point. Highly commercial paths are identified, and proportionate charges would aim to discourage the use of them. Funders of PSO services may find it appropriate to release paths to commercial uses, and thus avoid the charge.

As a result of these uncertainties, we have scenarios where charges are relatively high and impacting some commuter operators, and other scenarios where they are much less impacting on these operators.

Franchised regional passenger operators	These operators would likely pay only a small amount of these charges. Their usage of intercity corridors is mostly away from the critical bottlenecks on those corridors, and we would anticipate management rather than charging would mostly be used to discourage them from impacting on valuable commercial traffic. Since the operators which would mostly bear this charge would make a material contribution to industry fixed costs, the overall effect on the regional sector, when the FTAC is taken into account, would be a reduction in charge. Nevertheless detailed examination, following detailed definition of the charge, may find cases where an individual operator found itself materially liable for it. It would then be a question for service funders whether they wished to avoid the charge by reducing occupation of the paths.
Franchised inter-city passenger operators	Franchised inter-city operators will bear the main impact of the charge, in terms of total quantity of the charge. They are the operators which substantially make use of the commercially valuable and scarce paths on the network.
Open access passenger operators	Open access operators will likely experience the charge in relation to many of their services. Although this amounts to a relatively small amount of money for the sector as a whole, it is likely to be a material amount in relation to the level of access charges currently paid by open access operators. As a percentage of their present charges paid, it would have the largest impact on them. However, the charge aims to discourage occupation of valuable paths by lower value traffic, and would therefore potentially free additional valuable paths which open access operators could apply for. The difficulty they might have is that the Not Primarily Abstractive test may materially restrain their ability to use those paths.

Option 4: Administered scarcity charge

Freight operators	Our estimates suggest that freight operators would only rarely incur a charge. However, as the charge is relatively large per movement, even during off-peak, it potentially represents a large proportionate increase in access charges for freight operators. It may encourage operators to seek to re-time movements to avoid the charge, or make more use of contingent and spot access rights at those locations to avoid the charge. Our modelling appears to suggest that the charge is more significant for bulk freight movements than multi-customer. This is because bulk freight typically moves shorter distances than multi-customer freight, and thus occupy more paths for a given train-km output. Thus it risks incurring the charge more frequently. In practice it would depend upon detailed pathing considerations which is beyond the scope of our modelling.
NR	This option would introduce a new variable charge. At a periodic review, the expected income from the charge is likely to be set off against fixed charges. Network Rail's total revenue requirement will not be affected. However, this would introduce more variability to network Rail's actual income. Therefore, it should incentivise Network Rail to seek to find more paths to receive the income from the charge, or even to make some small investments to facilitate this. The charge is likely to cause a reallocation of the use of paths rather than reduction in use of paths. In principle, following a capacity expansion, the charge might reduce at the next review. However, this would be done in tandem with reviewing the fixed charge.
Funders	Funders will find that some of their funded services attract the charge. In the case of some less commercial services, they may decide to economise on the use of paths in order to avoid funding operators having to pay it, thus releasing paths for more commercially valuable services.
Passengers and freight users	To the extent that the charge encourages a reallocation of scarce capacity for more commercial services, there will be winners and losers among passengers. Funders of PSO services have the ability to retain capacity for the benefit of less remunerative services if they believe that is on balance in the public interest, but will pay more to do so. Freight customers whose services occupy valuable paths risk either paying more for these services, or having to accept that their freight service provider runs the service on ad hoc or late applications, with greater uncertainty of delivery window.

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- Several industry representatives suggested that socio-economic as well as commercial value should be included in the measure of scarcity value. However, freight and passenger operators raised a some potential risks with the introduction of a scarcity charge:
 - Some operators argued that there was some uncertainty regarding the assumption made in this report that a scarcity charge could be a "mark-up" such that ability to pay would be taken into account in its application. This uncertainty in part come from scarcity not being included as an admissible cost in the implementing regulation 2015/909, which defines costs directly incurred. Some also expressed a

Option 4: Administered scarcity charge

degree of uncertainty regarding the assumption made in this report that under Directive 2012/34, a scarcity charge could apply beyond locations formally declared as congested infrastructure. Both these points of legal uncertainty would need to be clarified ahead of implementing such a charge.

- Using price to encourage reallocation of capacity between funded and commercial services would be politically controversial.
 - The binary nature of the proposed scarcity charge could lead to a high degree of instability as the route flipped between being “full” and having a spare path.
 - It could lead to gaming by a dominant operator filing a route to make it scarce and impose charges on competitors.
 - If the scarcity charge applies to freight and Open Access operators, there would need to be a parallel adjustment to the capacity allocation process to make them freer to obtain paths they are willing to pay for.
 - There would be boundary problems if the charge were to change by a large amount at a sharp time boundary, and difficulties if a path were re-timed to the expensive side of the boundary.
- Network Rail considers that there could be merit in carrying out more work to better understand the full economic value (i.e. societal and commercial) of each train path. They would be concerned about pricing off traffic of high social value if a purely commercial value approach were adopted.
 - Transport Scotland observed that the application of a scarcity charge on the West Coast Main Line (WCML) and the East Coast Main Line (ECML) could result in disproportionately increased service funding costs for Transport Scotland, given the funding treatment of cross-border services and allocation of the FTAC. Transport Scotland has a tightly defined public service specification and does not anticipate changing that policy.
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ANNEX D PATH RESERVATION CHARGE DETAILED ASSESSMENT

Option 7: Path reservation charge							
Overall performance against the RDG Vision in each SoW							
Current Sow	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	+	+	+	=	+	+	+

A reservation charge is non-refundable charge for booking capacity. It is an alternative kind of scarcity charge whose purpose is to discourage users from booking capacity that they do not in practice require. Such a charge might encourage operators to manage their network usage more efficiently and discourage booking capacity beyond what they predict will be required, except to the extent a firm option of being able to run is sufficiently valuable to them to pay the charge.

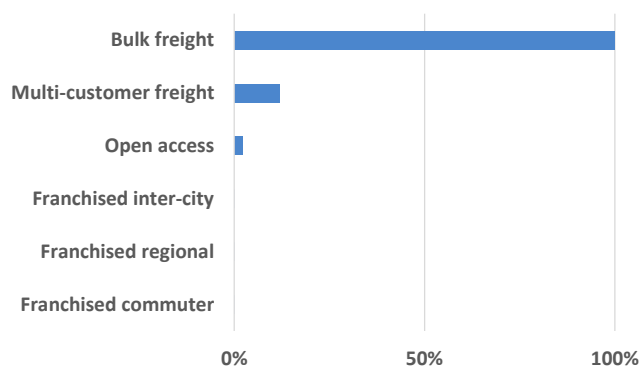
The reservation charge we considered for the purpose of this assessment was a **deposit** (or obligation) based scheme payable only for **firm access rights**. It can be defined equivalently either as a non-returnable deposit which is then set off against charges for paths actually operated, or else as a charge for rights not used. We assume the reservation charge being assessed as a fee **per train km**.

While it is not what EU law would define as a “cost directly incurred,” basing the reservation charge on the expected VUC would be a simple way to calculate a per km charge, which is explained in the *Implementation* section of the detailed assessment template. We have therefore used the VUC as the basis for our modelling and have assumed a separate rate would apply to passenger operators and freight.

This charge most strongly impacts those train operators that have low utilisation levels for their booked capacity, and evidence suggests that this is most significant for train operators running bulk freight services. Other train operators tend to have high levels of utilisation of allocated capacity. The chart below shows the modelled relative impact of the reservation charge on total charges paid

by stylised operators (compared to bulk freight).

Figure D.1 – Modelled relative impact on charges paid by stylised operator (mid scenario)



Source: CEPA modelling

In the current SoW, reservation charges could have some positive benefits in incentivising better use of existing capacity but in some forms could significantly adversely impact freight. Impacts on franchised passenger operators under the current regime are likely to be small given that the current arrangements provide protection from change and limit the scope to change service levels. This form of scarcity management has some precedent given that it is in use on HS1, in France and Germany and is being considered for Crossrail.

Assuming adverse impacts could be managed, such that freight (and potentially other smaller operators) retains the flexibility required, the overall benefit could be positive but may be small. More detailed analysis would be required to assess whether likely benefits outweigh issues such as the transaction costs involved in introducing and managing a reservations system.

In alternative SoWs that introduce greater on-rail competition or which place greater emphasis on the value of capacity this option could have greater positive impact (although it would need to be

Option 7: Path reservation charge

weighed against other options for value based charging). In SoW where operators have increased protection from change, the option would have less impact.

Key characteristics

Description of option

In this option, Network Rail would levy a capacity reservation charge based on capacity that is booked. This could be in the form of an upfront deposit that would not be returned if capacity were unused. Equivalently, it could take the form of an obligation to pay the charge if capacity goes unused, which may mitigate potential cash constraints of paying deposit fees upfront while still providing incentive to book capacity efficiently. This charge would be the same as ORR's 'failure to lose' reservation charge considered in its 2006 charging workshop.⁷²

The charge itself could be calculated based on a per unit rate, for example:

- Charge per train km;
- Charge per train service minute; or
- Charge per gross tonnes train km or gross tonnes train minute.

The charge can then either be applied to units represented in either access rights or timetabled train paths. There is precedent for both in the UK (HS1) and internationally for levying reservation charges, which supports the use of a reservation fee based on per-unit charges and on timetabled train paths. A few cases are summarised further below. Previous work by ORR has also considered the pros and cons of using either timetabled train paths or access rights as the basis for the charge.⁷³

As explained further in 'calculation principles' below, we consider here a **per train km** charge applied to **firm access rights**. It is envisioned as applying to all services with firm track access contracts (e.g. including freight services carrying out work for Network Rail).

International precedent

High Speed 1⁷⁴ HS1 levies such a charge to discourage block booking of capacity that might be used by other operators and to promote competition on the network by encouraging efficient use of capacity. On HS1, the charge is set for train operators at 25% of the applicable investment recovery charge and for freight at 25% of OMRC. The mechanism also provides an incentive to return unused capacity where this capacity is then used by another operator.

SNCF Réseau⁷⁵ SNCF Réseau, the French rail infrastructure manager, levies reservation charges on both passenger and freight services. Reservation charges are applied to all network users who are allocated capacity (i.e. booked timetabled train paths). For freight and passenger services this is levied as a per-km charge applied to the timetabled train path and includes various adjustments (e.g. peak/off-peak). The per-km charge is calibrated to different network segments based on defined rate categories, and additional adjustments are made depending on the network segment (e.g. freight has an additional speed and length based adjustment on conventional lines).

DB Netze⁷⁶ DB Netze, a German rail infrastructure manager, allows operators to classify up to 15% of their booked train paths (in train km) as optional. In cases where optional

⁷² ORR (2006), Structure of Charges Workshop.

⁷³ See for example, ORR Structure of Charges Workshop (2006) slide deck.

⁷⁴ HS1 Freight Access Terms (2015) and HS1 Passenger Access Terms (2015).

⁷⁵ SNCF National Rail Network Statement (2016 timetable), section 6.2.1.

⁷⁶ The Train Path Pricing System 2016 of DB Netze AG.

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paths are not used, or are only partially used, a reservation fee equal to 10% of the path fees is levied. Path fees are on a per-km basis and are calculated using the train path pricing system that captures three components: user-dependent components, service dependent components and other components.

In addition, DB Netze charges a cancellation fee for cancelled paths/portions of train paths. These increase as the time to timetabled service draws nearer. They also offer discounts to the train path fee on sections of the network that are uncongested.

Description of counterfactual

Planning processes in the rail industry such as ORR's Track Access Policy, Route Utilisation Strategies (RUSs) and the Network Code currently guide industry decision making regarding the level, type and pattern of traffic on the GB rail network. They are used as the principal mechanisms for incorporating utilisation of allocated capacity and path reservation/ holding into industry decision making. Currently there are three main types of access rights that are granted to operators, all of which are time-limited as specified in respective contracts:

- **Level 1 rights.** The most specified access right that is firm in respect of quantum, origin and destination, equipment, timing (with Network Rail right to flex), etc. and in some cases routing.
- **Level 2 rights.** Firm rights that entitle the operator to a quantum of service over a particular time period (e.g. day or week). They do not specify timing of service or route.
- **Level 3 rights.** Rights contingent on Network Rail being able to satisfy bids for track capacity. Otherwise can share same service characteristics as level 2.

Part D of the Network Code sets out the rules governing the translation of access rights into timetabled paths and specifies the priority given to different levels of rights for inclusion in the timetable. Level 1 and 2 rights are considered as firm access rights and take priority over all other rights, apart from any rights Network Rail has for Network Services. Otherwise all firm rights are accommodated in the working timetable for which an Access Proposal to exercise those rights has been submitted by the operator. Once all firm access rights have been accommodated, then Level 3 and rights are granted timetabled paths. Part D also specifies the timeline for timetable development and may be an important determinant of how capacity is used. For example, freight operators would need to submit access proposals at least 26 days before the release of the timetable at which point there may still be volatility in demand for their services.

Part J of the Network Code specifies conditions under which Network Rail may request that rights be surrendered and for the transfer of rights from one operator to another. Part D governs Network Rail's approach to timetabling including the priority given to firm and contingent rights in the timetable. Quarterly review meetings are also held between Network Rail and freight operators in which they discuss the reasons why FOCs need to retain unused capacity, timescales for when they will use this capacity and when this will be next reviewed.

Since 2014 Network Rail has also made use of a new system called the F-CDM that allows them to produce quarterly reports on utilisation of scheduled train paths, and therefore captures the 90 day contractual period for using a path, after which Network Rail may challenge the company's retention of the right to that path under Part J of the Network Code. These reports are then used by the Capacity Management Review Group to make decisions on whether or not schedules have strategic value. Paths that are deemed not to have strategic value are then removed from the timetable, while those that do have strategic value are retained by Network Rail as strategic capacity.

Currently there is no explicit price incentive approach to the use of allocated capacity and route allocation, only the planning approaches.

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Relevant factors impacting the form and/or the effectiveness of the option

Practical issues relating to the imposition of a reservation charge (by reference to the factors report) include:

- 4.4 Economic viability – a reservation charge may increase costs for those operators that have need for some degree of flexibility to accommodate seasonal demand etc.
- 4.7 Data Billing etc. – we are advised by Network Rail that there may be issues with updating the current billing system to allow for billing a reservation charge deposit.

Implementation

Information requirements The information required would depend on the complexity of the reservation charge. To apply a simple reservation charge based on access rights the requirements are quite minimal:

- Number of firm access rights allotted.
- Number of firm access rights exercised.
- Units represented by each firm access right.
- Per-unit charge.

The above pieces of information would be required for the simplest type of per-unit reservation charge based on access rights. As seen in the European examples above it is possible to add additional complexity that would bring the reservation charge closer to a scarcity charge, but would require additional information. For example:

- **Time-of-day adjustment.** Some access rights may specify the time of day for services. In such cases it may be possible to make an adjustment if, say, these rights fall at peak or off-peak times. This could be done as a scalar adjustment (i.e. multiplied by a pre-determined value), as is the case in the French regime.
- **Track-type adjustment.** It may be possible to incorporate a degree of differentiation by track type. In theory, track types that are more congested (i.e. more scarce) should have higher reservation charges attached to them. The granularity of track type could be quite high level. For example, the French system has 19 classifications grouped into 4 broad categories (suburban, mainline intercity, high speed lines and other). This would require the classification of Network Rail assets and, to the extent that it is specified in access contracts, the types of track that are reserved under those contracts.
- **Efficient headroom.** If it is deemed appropriate to allow freight to retain spare capacity (i.e. headroom) without being penalised (due to freight's requirement for some degree of flexibility) then it would require one to calculate what the efficient level of headroom is for freight operators. This would likely differ across commodity types.
- **Adjustments for other elements of quality.** In theory a reservation charge could be calibrated to capture additional elements of path or access right quality. Some of the potential adjustments above, such as for peak-services and track type, capture characteristics associated with quality of access rights. This could be extended further depending on the extent to which additional quality elements are specified in track access contracts. For example, if an access contract specified a minimum time buffer between its services and

Option 7: Path reservation charge

other services (to minimise the risk of delays) then this could be captured in an uplift to the reservation charge applied to that right. Generally speaking, the ability to adjust for quality will be greater if access contracts are more specified.

The more detailed information requirements discussed above are examples of how a simple reservation charge can be made to be more refined. In general, these additional elements would bring the reservation charge closer to a scarcity charge. In practice, basing the charge on access rights rather than the timetable may make some of the additional adjustments less feasible as access rights tend to be more flexible in nature.

Drivers

This would be a charge/obligation applied to all operators and would not replace any of the current charges. In practice those that will see an increase in charges will be those who hold the most spare capacity. While there may be several reasons that operators hold spare capacity such as inefficient planning or strategic holdings of rights to limit the capacity of new entrants, one key driver of spare capacity is the requirement for some operators to have flexibility in their services. This is typically understood to be bulk freight carriers as the commodities they transport may be seasonal in demand or subject to short notice periods for loading from sea terminals (e.g. some operators may be informed only the day prior to ships arriving in port).

If additional refinements are captured in the charge, such as time-of-day or track-type adjustments, then it may be possible to subject some more specified access rights (i.e. level 1 rights) to additional adjustments to the extent that their contracts capture relevant information.

Calculation principles

While there are varying degrees of complexity of reservations charges, the key principles behind their calculation are quite simple – operators pay for capacity they have booked but not used.

As discussed above, there are several possibilities of units when specifying the charge, as well as a choice between applying the charge to access rights or timetabled train paths. The key choices are elaborated below.

Choice of units. The use of capacity on the network can be considered to have two dimensions, both in terms of time spent on the network and the length of network used. Therefore the natural choice of metrics would be either train km, train service minutes, or a combination of the two. HS1 passenger services are charged based on train minutes, while freight services are charged based on train km. While a similar split could be made for the network as whole, the application of a time element may carry significant complexities versus the HS1 example due to the relative complexity of Network Rail's network. It would, for example require adjustments to be made for stopping at stations so that stopping services are not unduly prejudiced. Furthermore, operators do not necessarily have control over timing of their trains as Network Rail requires a degree of flexibility timetabling purposes. This issue is even more relevant if applied to access rights. By contrast, train km are relatively simple to apply to both the timetable and access rights. Therefore, basing the charge on train km is likely to be the most feasible option.

Access rights vs booked (timetabled) paths. In its 2006 Charges Workshop ORR

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consider whether to use timetabled paths or access rights as the basis for a reservation charge with the initial preference being for access rights.⁷⁷ There are pros and cons for both access rights and timetabled paths.

Using timetabled paths has precedent internationally and is relatively straightforward to apply by routes as they are clearly defined. However, the timetable includes level three rights/ spot bids for capacity which are inherently more flexible as there is no guarantee of access to the network.⁷⁸ Charging for capacity obtained in this way may be unfair as those routes are not retained as spare capacity, though it may be possible to adjust for these types of access rights. Network Rail also needs to retain some flexibility over routing and timing in developing the timetable and therefore operators may not have control over the length of their route (and therefore their per km reservation charge). In either case operators should not pay the reservation charge if they are unable to use their path due to Network Rail possessions.

Using access rights as the basis for charging is relatively straightforward as well, but has an extra level of detail in that you must define what is meant by 'used' (discussed below). With access rights it is possible to differentiate immediately based on the flexibility of rights as this is clearly set out in access rights contracts. Partial usage of firm access rights (where perhaps half the services are run) would therefore still be subject to the reservation charge. Access Rights for which an Access Proposal was made to Network Rail in the timetabling process, but Network Rail was unable to accommodate in the working timetable should be adjusted for (i.e. not charged).

We consider the most appropriate approach is the use of access rights over timetabled paths as using access rights specifically targets the legal right to track access. It would also not impinge on the flexibility required for Network Rail in creating the timetable, nor on operators' desire for more certainty over routing/timing of services and charges.

Definition of 'used'. We propose basing the reservation charge on usage of firm access rights. There are two possible ways we could define this:

- a) exercising firm access rights by booking timetabled paths; or
- b) exercising the firm access right and actually running the service.

Under option a) operators would have an incentive to exercise their rights even if they were intending on running the actual services, which would exacerbate any potential capacity constraints that exist. Option b) is more directly related to actual usage and therefore preferable as it targets translation of access rights into actual services. We therefore use option b).

Calculation of unit charge. The charge per-km itself does not have to represent costs directly incurred, as reserving capacity does not directly incur costs on Network Rail. However, precedent appears to point to using variable charges as a basis for the per-km reservation charge. One could use current VUC rates and a notional equipment type (and tonnage for freight) to calculate per-km charges.

⁷⁷ ORR (2006), Structure of Charges Workshop.

⁷⁸ FOCs have the ability to bid year round through a rolling spot bid process. Therefore some schedules in the timetable are not attached to specific access rights contracts. However, Network Rail has told us that most FOCs will apply for access rights for most spot bid traffic once they have a Working Timetable path.

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While one could envisage a uniform charge for all operators, our assessment has assumed a separate charge for passenger operators and for freight. For simplicity our modelling has assumed a charge equal to 25% of the VUC divided by the number of train km (separately for passenger and freight services) as a central case.

Calculation of distance. In terms of the train km value used for each right, level one and two access rights would define routing characteristics to different degrees. It may be possible in some cases to specify total route km quite well (e.g. ‘Contract miles’ are specified in column 26 of Schedule 5 of freight track access contracts). However, in some cases, especially where routing is more flexible, an average or minimum distance may need to be used. For example, where access rights specify only origin and destination one could use the shortest likely route possible.

Calculation of total charge. We proposed a simple version of the charge, on a per train km basis applied to unused firm access rights. We do not suggest the addition of any time-of-day or track-type adjustments, but in theory these could be applied simply as scalars.⁷⁹

The calculation is therefore quite simple. For a given unused firm access right i and associated number of kilometres, operator j pays:

$$RC_{i,j} = \text{Unused_firm_right_km}_{i,j} * \text{Charge_per_km}$$

For a single operator j with n_i unused access rights, the total charge over a given period is:

$$RC_j = \sum_{i=1}^{n_i} RC_{i,j}$$

Practical considerations

We describe here some of the practical considerations and, where possible outlines of potential solutions.

- **Adjustments for possessions/ cordon caps.** Paths that are seized by Network Rail will have to be adjusted for as this implies an effective revocation of rights if services are unable to be rerouted. The adjustment becomes less clear with quantum rights. A simple example serves to demonstrate the difficulty with quantum rights: say a freight operator has rights for 10 trains per week and maintenance works mean that the train is unable to operate on 4/7 days in a week. The operator then runs 3/10 of their allotted rights. How many of the unused 7 rights are should be adjusted for given the quantum right covers the whole week?

Adjustments for cordon caps will also have to be made but should be more straight forward as Network Rail specifies the total number of paths it is able to allocate.
- **Partial usage.** Adjusting for partial usage of capacity is a practical issue regardless of whether rights or timetables are used. Operators should only pay for the portion of rights that go unused. This would likely require some dispute mechanism and potentially negotiation with companies.
- **Flexible rights.** Some operators retain a large degree of flexibility in their contracts. Y-paths are one example where operators in practice have the right

⁷⁹ That is, by a predetermined value as in the French system.

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to use one route up to a certain point, then have the choice between two routes. Q-paths are another type of flexible contract that allow operators a certain quantum of services over a time period. These types of access rights may present some difficulties in determining the appropriate level of charge.

- **Updating Network Rail billing system.** An ex post billing system⁸⁰ would need to be developed and implemented. International examples may help in designing the system but it may be costly to update the current system. However, it is likely that Network Rail already collects a large amount of the information required for the calculation of the charge.
- **Efficient headroom allowance.** Some types of customers may have a legitimate claim to holding excess rights. In particular, the efficient holding of rights for bulk freight operators is likely to be higher than what is actually used due to potential seasonality of commodities, short notice at ports, variable demand (e.g. construction materials may be weather-dependent) or the terms of end-user contracts.⁸¹ To some extent, it may be possible to incorporate seasonality into track access contracts themselves, but even so there may be a requirement for further flexibility in track access. Therefore, it may be appropriate to allow commodities some level of 'headroom' (holding of rights in excess of expected usage). The efficient level of headroom would in practice be difficult to determine and the incentives implied by this would need to be considered thoroughly. It may be possible to establish a benchmark level of headroom for bulk freight that has penalties/rewards attached to it.

Also, some flexibility may be socially desirable if, for example, it means that there is more security for freight customers that provide critical services. For example, contracts for supplying Drax coal power station (which supplies circa 7% of GB electricity) may need to be flexible to accommodate variations in demand.

- **Additional charge adjustments.** As mentioned previously the ability to scale the charge for additional factors such as time-of-day and track type may be limited with flexible rights. However, to the extent that rights are more prescriptive it may be possible, and justifiable, to charge a higher reservation charge. Another approach would be to develop a method of varying the reservation charge with the level of certainty embodied in track access contracts. In this case more prescriptive contracts would be more expensive. This would create an incentive for operators to consider trade-offs of cost and certainty while providing more options to holders of firm rights than a uniform charge would.
- **Industry revenue neutrality vs freight revenue neutrality.** The offsetting of this additional charge (such that Network Rail required revenue is met) can be done at either an industry level or at a more granular level, e.g. by operator, type of operator or type of commodity. To the extent that the charge may fall disproportionately on one group it may be a valid consideration whether this group should receive more benefit from the offsetting of other charges.

⁸⁰ That is, a system that calculates the charge after rights have been used or not.

⁸¹ Section 4.3 and 4.4 of freight track access applications is directly related to justifying the holding of any access rights that may be in excess of expected usage. However, it is conceivable that operators may still apply for more than an efficient level of rights.

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- **Rebates for paths used by others.** The HS1 scheme includes a rebate of 75% of the reservation charge if the reserved path is eventually used by another operator. A rebate scheme should be considered for the charge discussed in this assessment as it would potentially soften the impact on some operators. However, basing the charge on access rights may complicate this calculation and allocation of rebates, especially when considering rights that are less specific such as quantum rights.
- **Short term planning of paths.** Operators which need flexibility but are unwilling to pay reservation charges (and therefore not hold firm rights) may be encouraged to plan paths on a more short term basis. From a purely operational sense freight operators may be able to manage more short-term booking of paths as they currently deal with a large amount of short-term train retiming (e.g. we understand that 40-50% of freight trains are retimed/re-rerouted, sometimes at very short notice). However, short-term booking of paths could add to the marginal cost of running a service due to having to retain additional staff to manage paths, contracting drivers at shorter notice and adding risk that paths will be unavailable. In some cases short term planning may not be feasible as some freight operators need to book paths at least 18 weeks in advance in order to avoid paths being taken for maintenance or ensure that they are not left with low quality paths. These result of these impacts could be a significant risk to performance.

Lead time There are a number of factors that would have to be consulted upon before the implementation of a reservation charge. NERA summarised some of these:⁸²

- deciding on the overall approach to be adopted;
- deciding on any adjustments to be made for the charge (e.g. headroom, possessions, cordon caps, ...);
- deciding the level of charge;
- designing the rebate scheme (should one be adopted); and
- defining contractual and legal implementation.

In practice it would also be pragmatic to first develop an indicator of allocated capacity usage and monitor this on an ongoing basis for some time before implementing any charge based on the metric. Simultaneously the billing system could be refitted.

As much of the consultation is likely to be controversial and sufficient time is required for calibrating a metric and refitting the billing system a rough estimate of lead time could be 3-5 years plus any years remaining before the start of the subsequent price control. NERA used a lead time for the scheme envisioned in their paper of 5 years.⁸³

Resources required for implementation NERA estimated the setup costs of the billing system for their version of reservation charge (slightly different to that considered here) to be £450,000 spread over 5 years. The estimated ongoing costs of this approach were estimated to be £95,000 per annum and included costs for updating databases/ ongoing rights reviews and dispute resolution.

⁸² NERA (2007), The Impact of a Reservation Charge, p.31.

⁸³ NERA (2007), The Impact of a Reservation Charge, p33.

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It was also estimated that freight operators would need to hire an extra full time staff for reviewing and monitoring charges and rebates, costing circa £25,000 per annum.

Performance against criteria								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=
	There is no clear/direct impact of this charging approach on system safety. It is likely to lead to a reallocation of capacity with the result that this option will not materially change the status quo.							
Consistency with law	=	=	=	=	=	=	=	=
	Regulation 15(1) of the Railways Infrastructure (Access and Management) Regulations 2005 provides for a capacity reservation charge: 15.—(1) <i>The infrastructure manager may levy an appropriate charge for capacity that is requested but not used, and the imposition of this charge must provide incentives for efficient use of capacity.</i>							
Funding of Network Rail efficient costs	=	+	+	=	=	=	=	=
	If funds raised from the charge were regarded as a contribution to enhancement costs, then there may be some positive impact on this criterion but this would depend on the value attached to the charge. When these were considered previously ORR suggested that the charge would be low. However, there is also a potential benefit in reallocation of/ optimal use of existing capacity with consequential impacts on enhancement costs. In SoW where there is more competition for capacity, this option would have greater impact, although other capacity-based options might be even more beneficial. Where there is less competition/greater protection the option would deliver little if any added value							
Allowance for market conditions	=	=	=	=	=	=	=	=
	Most operators require some degree of flexibility to manage seasonal demand or new requirements as they arise. For example current freight access rights make allowance for this through differing categories of right which range from fixed rights through to options to use additional spare capacity. Reservation charges raise the issue of how this required flexibility in traffic levels would be managed.							
A single approach for the network as a whole	=	=	=	=	=	=	=	=
	This approach, as per the current planning led approach, could be applied to all operators irrespective of type. This is the case on HS1 and in France.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	=	=	=	=	=	=	=	=
	This option has no direct impact on cost recovery.							

Option 7: Path reservation charge								
Efficient whole-system whole -life industry net costs	+	+	+	+	+	+	+	+
	This approach could be beneficial, at least at the margin, in reducing the need to fund additional capacity. The freight industry has recently, under the administrative approach currently in place, released approximately 1,800 access rights (circa 20% of total freight paths). Of these, only 22% were deemed to be useful for other purposes. This process is currently continuing and the remaining 1,600 unused freight paths in the timetable are either currently under review or deemed to have strategic value.⁸⁴ Given a significant proportion of total freight access rights have been returned recently it is unclear whether a reservation charge would be able to achieve additional freeing of useful capacity that would outweigh the costs of implementation. Nonetheless, this example also shows that operators are able to accumulate access rights beyond that which is necessary under the current regime. For example, the recent release of rights may be possible due to operators not updating their holdings of rights in response to falling freight miles (due to running longer trains) that has occurred in the past 10 years. Introducing a financial incentive to manage access rights efficiently would bolster the existing provisions under Part J of the Network Code. The positive effects of this option might be more significant in SoW where there is greater competition.							
Efficient long run investment decisions	=	=	=	=	=	=	+	=
	This approach could be beneficial, at least at the margins, in identifying areas where capacity is truly constrained and ensuring optimal use of the assets before enhancement is considered. As discussed above, recent trends in releasing of access rights by the freight industry suggest that a large proportion of rights that were given up were not 'useful' (approx. 78%) for other purposes. Freight lines are also likely to be less congested in the first place. Therefore impacts under this criterion may be marginal. In a SoW that places greater overall emphasis on efficient use of capacity, this option might have benefit over current arrangements that rely on historic access rights.							
Efficient performance management	=	=	=	=	=	=	=	=
	This option has no direct impact on the occurrence of disruption.							
Efficient use of network capacity	+	+	+	+	=	+	+	+
	A reservation charge provides a financial incentive to more carefully consider the capacity required to operate services rather than rely on pre-existing rights, which are perhaps insufficiently dynamic to reflect ongoing changes to demand patterns. The freight industry has recently, under the administrative approach currently in place, released approximately 1,800 access rights (circa 20% of total freight paths). Of these, only 22% were deemed to be useful for other purposes. This process is currently continuing and the remaining 1,600 unused freight paths in the timetable are either currently under review or deemed to have strategic value. Given a significant proportion of total freight access rights have been returned recently it is unclear whether a reservation charge would be able to achieve additional freeing of useful capacity that would outweigh the costs of implementation. While this may suggest that the existing administrative approach is capable of							

⁸⁴ Source: discussions with freight industry representatives and Network Rail.

Option 7: Path reservation charge

managing access rights, it also shows that operators are able to accumulate access rights beyond that which is necessary under the current regime. For example, the recent release of rights may be possible due to operators not updating their holdings of rights in response to falling freight miles (due to running longer trains) that has occurred in the past 10 years. It is difficult to predict to what extent a reservation charge would lead to a release of useful rights, but it would nonetheless provide a financial incentive for the efficient management of access rights on an ongoing basis. Therefore, it may be more capable than the current administrative regime, which is reactive in nature, at managing capacity.

We have not undertaken additional detailed analysis on the opportunity cost of unused or lightly used access rights and therefore cannot predict the extent to which a reservation charge would free up rights. However, in the example above, while the majority of access rights returned were not useful it is clear that there are some useful rights that are retained in excess of what is needed by operators. Our modelling has not attempted to capture a proportion of unused rights that may be returned. We have calculated that the impact on bulk freight is likely to be the greatest and may be significant enough to incentivize bulk operators to relinquish some additional rights.

The effect of this option might be greater in those SoWs where there is greater competition. The impacts in the 'specified franchises' SoW would be similar to the current SoW as most impacts are felt by freight. In 'Protect freight' the impact of the charge would be diluted by the offsetting effects of additional freight protections.

Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	-	-	-	-	-	-	-	-
	May adversely affect predictability of charges, e.g. for freight which are inherently subject to some degree of volatility e.g. seasonal demand for coal.							
Simplicity	=	=	=	=	=	=	+	=
	While this is the most straightforward of the scarcity related options there is nothing to suggest that it would be simpler to administer than the current arrangements, which appear to be well understood. This option would have the advantage of simplicity in a SoW that places greater emphasis on the value of capacity.							
Transparency	+	+	+	+	+	+	+	+
	Current access arrangements are established in bilateral contracts that are not necessarily publicly available or easy to review. The imposition of a reservation charge would bring greater transparency to use of capacity and may result in overall more optimal use of the network.							
Low transaction costs	-	-	-	-	-	-	-	-
	Imposition of reservation charges would imply a degree of monitoring and management (both by Network Rail and by passenger and freight operators) that does not currently exist and concerns have been expressed by Network Rail about the ability of the current billing system to implement the option of a deposit based system. Offsetting the costs of this would be the benefit of identifying underutilised capacity that could be used more effectively and which might offset some investment costs.							

Option 7: Path reservation charge								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Network Rail accountability	=	=	=	=	=	=	=	=
	Reservation charges would in principle place greater emphasis on Network Rail's management of capacity and its ability to obtain optimal utilisation of the network. Arguably existing efficiency incentives e.g. the efficiency assumed by ORR in its determination of costs, have a similar effect currently in incentivising Network Rail to make best use of existing assets before investing further.							
Non-arbitrary allocation of costs	=	=	=	=	=	=	=	=
	This charge is not related to the opportunity cost of access, from the point of view of users, it is purely an incentive mechanism to discourage operators from booking paths that they do not use. However to the extent that Network Rail loses income when operators fail to show, and booked capacity impinges on the costs of providing that capacity to users, whether they use it or not, it could not be described as an arbitrary allocation of costs.							
Optimal traffic growth	=	+	+	=	=	=	=	=
	A reservation charge should contribute to all the objectives of this criterion but the scale of the benefits may not be great overall given the need to maintain some flexibility and given the lower incentive effect of a deposit based system over a new charge. The option could be more positive in SoW where there is greater competition since it could free capacity for use by other operators.							
Aligning industry incentives	+	+	+	+	+	+	+	+
	This option recognises that industry incentives may not be aligned and places weight on industry participants giving up unused access. Current planning based approaches seek to achieve the same thing but the imposition of a pre-payment mechanism creates a common basis for discussions and should improve transparency.							
Value for money for funders, taxpayers and users	+	+	+	+	+	+	+	+
	A reservation charge should contribute to all the objectives of this criterion but the scale of impact may not be great overall given the need to maintain some flexibility for freight operators and given the lower incentive effect of a deposit based system over a new charge.							
Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	+	+	+	+	=	+	+	+
	In the current SoW, reservation charges could have some positive benefits in incentivising better use of existing capacity but in some forms could significantly adversely impact freight if adverse impacts are not addressed (e.g. through grants or other protections). Impacts on franchised passenger operators under the current regime are likely to be small given that the current arrangements provide protection from change and limit the scope to change service levels. This form of scarcity management has some precedent given that it is in use on HS1, in France and Germany and is being considered for Crossrail. Assuming adverse impacts could be managed such that freight retains the flexibility required, the overall benefit (in terms of more efficient allocation of capacity and							

Option 7: Path reservation charge

management of allocated capacity) could be positive but may be small. More detailed analysis would be required to assess whether likely benefits outweigh issues such as the transaction costs involved in introducing and managing a reservations system.

In alternative SoWs that introduce greater on rail competition or which place greater emphasis on the value of capacity this option could have greater positive impact (although it would need to be weighed against other options for value based charging). In SoW where operators have increased protection from change, the option would have less impact.

There may be scope to augment the administrative mechanisms that govern track access and the release of unused rights. For example, better monitoring of access right utilisation could bolster the effectiveness of rights review meetings as well as help in administering the use-it-or-lose-it provisions in Part J of the Network Code. Indeed, the use of Network Rail's new F-CDM system appears to have allowed several paths to be removed completely from the timetable. However, a purely administrative regime would still lack a financial incentive.

Impact on stakeholders

Overall, we expect the impact on TOCs to be relatively small. FOCs will feel a relatively greater impact but it is still expected to be relatively moderate. Freight users may bear some additional costs to the extent that operators will be able to pass on costs of demand uncertainty/ seasonality (which are a source of low utilisation of allocated capacity). Basing the charge on access rights should not impinge on the flexibility Network Rail needs for the construction of the timetable and should not impact Network Rail's ability to recover costs.

Franchised commuter passenger operators	Franchised operators typically have fairly rigid service level commitments (SLCs) embodied in their franchise contracts and therefore have little room to adjust their behaviour in response to a reservation charge. However, this makes little difference as the reservation charge would not be levied due to the franchisees requirement to fulfil SLCs.
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Evidence suggests that passenger operators are typified by relatively high levels of allocated capacity utilisation. Therefore, reservation charges would have little impact on franchised operators.⁸⁵ If the additional income from the reservation charge is offset against the FTAC (e.g. through the rebalancing of charges assuming Network Rail's revenue requirement is unchanged), franchise operators may in fact pay slightly less in charges (though this is likely to be marginal). However, the financial impact will be nil in existing franchise agreements as franchised operators are held neutral to changes in charges.

The range of sensitivities of allocated capacity utilisation rates included in our model is consequently geared towards the lower end of non-usage. The financial impact is consequently very small and potentially offset by changes in other charges.⁸⁶

Franchised regional passenger operators	Same as above.
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⁸⁵ e.g. NERA (2007), The Impact of a Reservation Charge.

⁸⁶ The charge is assumed to be revenue neutral over the industry as there is no assumed change in Network Rail's revenue requirement. It is not assumed to be revenue neutral for freight operators.

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Franchised inter-city passenger operators

Same as above.

Open access passenger operators

Evidence suggests that passenger operators are typified by relatively high levels of allocated capacity utilisation. Therefore, reservation charges would have little impact on open access operators.⁸⁷

Open access operators are likely to see a relatively small negative financial impact as a result of the reservation charge. However, the main difference to franchises is that open access will be able to better respond to the charge if it does have an impact as they are not bound by the same types of service commitments.

Freight operators

Evidence from the 2007 Freight Route Utilisation Strategy suggests that intermodal freight services, which comprise a large proportion of multi-customer freight services, have high levels of allocated capacity utilisation at around 95%.⁸⁸ More recent evidence from discussions with Network Rail suggest that this trend is largely similar today, though intermodal services to the London Gateway port may have seen lower level of utilisation recently.

Based on the relatively high level of allocated capacity utilisation the negative financial impact is likely to be quite small for these services. However, even small changes to costs in this sector have the potential to have large impacts because demand for these services may be relatively price elastic due to the ability to switch to road. Therefore intermodal shift (to road) may be a concern despite the small financial impacts of a reservation charge.

Bulk freight services are likely to bear the greatest negative financial impact in the rail sector. This is because bulk freight services have much lower rates of allocated capacity utilisation than other types of operators. For example, the table below shows utilisation rates of booked paths (not access rights).⁸⁹

Table 3.9: Path take-up by key commodities 2004/05

Commodity	Take-up
Intermodal	95%
Petroleum	56%
Metals	51%
Coal	45%
Construction	37%
Channel Tunnel	21%

Source: Network Rail Freight RUS (2007)

One of the reasons for this spare capacity is the requirement for bulk freight to retain flexibility due to seasonal/ variable demand. While the table above suggests quite a

⁸⁷ e.g. NERA (2007), The Impact of a Reservation Charge.

⁸⁸ Network Rail (2007), Freight Utilisation Strategy, p26.

⁸⁹ The Network Rail Freight RUS.

Option 7: Path reservation charge

bit of non-utilisation by some commodities, there has in recent years been significant relinquishing of unused rights and timetabled paths by the industry (through the provisions of Part J of the Network Code). Both Network Rail and representatives from FOCs have informed us that since 2014 over 1,800 train paths have been removed from the timetable. Currently, approximately 22% of freight schedules (across all FOCs) in the timetable are unused, capturing both schedules that are yet to be reviewed and those deemed to have strategic value.

Our analysis, which has been based on current utilisation rates and informed by the table above, suggests moderate impacts on bulk freight charges.⁹⁰ The impact is therefore smaller than it would have been prior to the recent release of rights and schedules.

Network Rail	Network Rail would need to update its billing system to accommodate the charge. The costs of doing so would need to be weighed against the potential value of freeing up access rights. The reservation charge should not impact Network Rail's ability to recover costs. The reservation charge would complement Part J of the Network Code that provides the administrative mechanism for reclaiming access rights. The reservation charge may encourage more flexible track access contracts and potentially more spot bids for access. When constructing the timetable a small amount scheduling flexibility can be very useful and potentially valuable. However, more last minute planning of train paths by operators may also make it more difficult for NR to ensure that it retains enough space in the timetable for operators to bid into to meet operators' need for capacity. However, the practical consequences for timetable construction may warrant further consideration.
Funders	A reservation charge should not impact DfT or Transport Scotland directly, though may play a role in future franchise bids as operators build any expected charges into their bids. Since franchises are likely to have a high rate of allocated capacity utilisation (and thus incur minimal reservation charges) there is likely to be little cost passed through to funders due to the protections in franchise agreements. This of course may change depending on the State of the World.
Passengers and freight users	Passengers are unlikely to see a material financial impact as passenger services typically have higher levels of allocated capacity utilisation and therefore will incur fewer charges. Furthermore, in the current SoW a large proportion of passenger fares are regulated and exposure to any increase in costs to passenger operators would be reduced. They may however benefit if useful paths are freed up and additional services (which were previously not able to gain access to the network) are allowed to run. Freight customers may suffer from potentially less flexible FOCs if access rights are returned. However, if other FOCs are able to fill other timetabled paths then there is likely to be little change in the flexibility of services overall. Freight customers may also suffer from increased costs of services as FOCs may try to pass a portion of charges incurred to customers. Small increases in costs may cause some customers

⁹⁰ Our modelling assumes that utilisation rates of Access Rights are broadly similar to utilisation rates for timetabled paths. This will be inaccurate to an extent as the timetable includes spot bids and contingent rights, and it does not capture any rights that are held but not exercised. However, at the time of analysis information on utilisation rates of access rights was unavailable.

Option 7: Path reservation charge

(in particular intermodal customers) to switch some services to road.

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- There was consensus in the industry and Government that a path reservation charge would almost exclusively 'bite' upon freight operators, raising a wide range of concerns that it could be impractical given the nature of the market within which they operate.
- Freight operators require some flexibility in their access due to variability in demand. However, freight operators noted that passenger operators have paths in expectation of demand, whereas freight operators react to demand, which is why freight operators have a lower utilisation rate.
- Reservation charges in other countries (e.g. France) are thought by freight operators to have led to a significant decrease in rail freight volumes and reduction in quality of service.
- Work on the holding and management of freight capacity has been ongoing since 2007. This has contributed to a significant release of access rights by the rail freight sector (information from Network Rail and freight indicate that approximately 20% of access rights have been released since 2014).
- A charge could encourage short-term booking of paths, which would add to operational costs. Short term planning may also pose a significant risk to performance
- The charge would have to be designed to ensure that:
 - customers and operators are not punished for unmanageable variation in demand;
 - there is not incentive for operators to run shorter trains; and
 - small operators and new entrants are not penalised.
- Freight operators noted that with more freight operators in the market there are likely to be more paths required but not used.
- Passenger operators did not expect that this option would have any material impact, as the real issue is capacity allocation and timetable development. Unless freight operators were charged for the paths "reserved" for them in the timetabling process, nothing would actually be changed by the introduction of the charge.
- Freight operators suggested that transaction costs are likely to be far too high for the level of benefit that could be realised.
- Network Rail commented that as the network becomes more 'full' it will become increasingly important that all mechanisms that could improve utilisation are considered. However, there has already been a significant amount of work undertaken by Network Rail and freight operators to determine paths that could be 'given back' for other uses. Network Rail would however be concerned if the charge led to freight operators making greater use of short term planning resources to gain access to the network, in seeking to avoid a reservation charge.

ANNEX E RECALCULATE BENCHMARKS FOR TRAFFIC CHANGES AND REMOVE CAPACITY CHARGE DETAILED ASSESSMENT

Option 15: Recalculate benchmarks for traffic changes and remove capacity charge							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	+	+	+	+	+	+	+

Schedule 8, the performance regime, is in place to provide train operators with compensation for disruptions to their services and therefore to their business. This option is envisaged to update Network Rail's Schedule 8 performance benchmark annually to take account of traffic growth (or decline), as an alternative to the current separate 'capacity charge' which aims to reimburse Network Rail for its traffic-related portion of Schedule 8 compensation payments. The capacity charge's current link to Schedule 8 is not obvious in its name: it is sometimes wrongly assumed to be similar to a 'scarcity charge'. The capacity charge is not understood well by the industry or considered to be cost reflective, and therefore rather than explore opportunities to make the charge more granular or adjust its calculation in any other way, this option envisages removing the charge entirely.

Network Rail's Schedule 8 benchmark is set at the Periodic Review preceding the control period. The Periodic Review also outlines updates to the benchmark each year of the control period to reflect the changes in Network Rail's performance targets. This option proposes that Network Rail's benchmark also includes an annual update to account for the actual increases or decreases in traffic (using the latest year of available data each time), which could allow for the removal of the capacity charge. The capacity charge is currently intended to recover the amount of additional compensation paid out by Network Rail through Schedule 8 due to increases in network traffic making it more difficult for Network Rail to recover services after a delay, and is levied per actual train mile at an ex ante tariff rate set at the Price Review.

There are a range of options for change to address the current issues with the capacity charge, and this option is envisioned with the following key characteristics:

- Annual updates under this option are intended to 'smooth' the effect of traffic growth, as the benchmark would be updated a little each year to take account of the level of traffic.
- The industry's understanding of the charge and its intentions could be improved by better integrating the recovery of Schedule 8 Congestion-Related Reactionary Delay (CRRD) costs into Schedule 8 itself.
- The method of updating the benchmark would ideally be simple and mechanistic, to ease understanding and calculation, therefore also minimising transaction costs.

There are some benefits to this option, mainly ensuring that the Schedule 8 benchmark is more reflective of the appropriate achievable level of performance and the likely improvement in industry understanding that could result. However, there will also be costs involved in the initial calculation of the appropriate adjustment to the benchmark, which would likely require a level of resources comparable to that required to recalibrate the capacity charge at CP5. Subsequent annual updates could be devised as simple mechanical calculations, reducing the complexity and cost of implementation.

This change would reduce the variable charges that operators pay, and hence Network Rail's income from track charges when new capacity is put into operation. This also reduces the marginal cost of running an additional train. The capacity charge reflects, when levied on additional trains (introduced after the start of a Control Period), the marginal performance costs of running additional

Option 15: Recalculate benchmarks for traffic changes and remove capacity charge

services. The charge does not reflect this perfectly as it does not adjust for time periods such as peak and off-peak, only for weekend vs weekday services, so the rate is averaged within those two. It also has a single flat rate across the network for freight and charter operators so does not reflect geographic differences in the marginal performance cost of running additional services. Nonetheless, the capacity charge at present, to some extent, discourages additional services running where it would worsen congestion, even though this is not its primary purpose. Removing the capacity charge might result in some additional trains that might not otherwise have run, which could be considered a less efficient outcome in terms of use of network capacity (the cost to other running trains of the congestion that additional train running will cause may be higher than the benefits the additional train itself will bring).

Without other changes to the regime, we expect that revenue previously recovered through the capacity charge, which is paid by all operators, would instead be recovered through the FTAC, paid only by franchised passenger operators. This would lead to a redistribution of charging income from open access and freight operators to franchised passenger operators, and also some redistribution between franchised operators. This is because the capacity charge is offset against the FTAC at present. This redistribution could also affect the allocation of cost across administrative boundaries, due to the current arrangement of cross-border services between England and Scotland.⁹¹ However, the redistribution across boundaries is likely to be relatively small.

We note that there are options, such as a scarcity charge, which could be implemented alongside this change to the regime to reverse some of the redistribution effects, and also to provide more explicit and targeted incentives around use of capacity than the capacity charge does at present.

Overall, we have rated the impact of this option as slightly positive in many SoWs, as we don't expect impacts to differ materially between SoWs.

Key characteristics

Description of option

NR's Schedule 8 benchmark for each five-year control period is set at the preceding Periodic Review (currently the industry is under CP5, running from 2014-19, which was set at PR13). The benchmark is adjusted each year to take account of the annual changes in performance targets that were set during PR13, without any further updates. This option proposes that NR's benchmark also includes an annual update to account for actual increases or decreases in traffic, which could allow for the removal of the capacity charge.

The capacity charge is intended to recover the amount of additional compensation paid out by NR through Schedule 8 due to network traffic making it more difficult for NR to recover services after a delay, and is levied per actual train km at a tariff rate set at the Price Review. The capacity charge is currently considered an issue within the charging and incentive regime, as its intention is not clearly understood by industry members and there is a broad consensus among participants that it is not fit for the purpose.

There are a range of options for change to address the current issues with the capacity charge, and this option is envisioned with the following key characteristics:

- **Annual updates under this option are intended to 'smooth' the effect of traffic growth, as the benchmark would be updated a little each year to take account of the traffic.** This option envisages that each year's benchmark would use the traffic data for the previous year. Therefore, there will be a small lag between actual traffic growth (or decline) and it being reflected in the

⁹¹ This arrangement means that English franchises pay the capacity charge but not the FTAC for use of the Scottish areas of the network, and vice versa. However Transport Scotland state that this is unbalanced against Scotland.

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benchmark. However, this lag is likely to be small compared to, for example, updating only at each price control and therefore accounting for five years of traffic change in a single update, which might cause a larger lag which would be undesirable.

- **The industry's understanding of the charge and its intentions could be improved by better integrating the recovery of Schedule 8 CRRD costs into Schedule 8 itself.** While this option as envisaged may remove the 'incentive' (marginal cost) side-effect of the current capacity charge, an incentive to not use constrained areas of the network (where the capacity charge is likely to be highest) could be introduced through a separate scarcity charge or avoidable costs approach.
- **The method of updating the benchmark would ideally be simple and mechanistic, to ease understanding and calculation, therefore also minimising transaction costs.** To determine the appropriate increase to the benchmark, the minutes of delay caused by additional traffic on the network (congestion-related reactionary delay, CRRD) would need to be converted into Average Minutes of Lateness (AML)⁹², the measure that the benchmarks are currently set in.⁹³ A mechanistic approach could be similar to the "congestion factor" which updated the freight benchmark for traffic in CP4 (once traffic growth or decline reached a threshold) and CP5 (regardless of the magnitude of traffic change).⁹⁴

The traffic updates to the benchmark would be additional to the current updates which account for increases in performance targets, and therefore the upwards 'trajectory' of NR's expected performance level would increase slower if there is traffic growth, and faster with traffic decline.

This option does not envisage a wash-up to account for differences between the level of traffic used to calculate the benchmark and the actual traffic that year. Depending on the speed of traffic growth (or decline), the benchmark adjustment could cause some over- or under-estimate of the appropriate benchmark adjustment. An incorrect benchmark could mean NR pays out too little or too much compensation. With an annual update to the benchmark any lag should not be significant and therefore our analysis of this option does not assume a wash-up.

This approach differs from the proposal put forward by the Rail Freight Operators' Association (RFOA) for PR13.⁹⁵ RFOA proposed to retain the capacity charge close to its previous form but with a 'baseline' traffic level for freight below which no charge would be applicable. RFOA argued that the impact of implementing this for franchised passenger operators would be minimal since the reduction in capacity charge would feed through to an increase in their Fixed Track Access Charges and therefore even out.⁹⁶ This option does not apply a baseline level of traffic, it envisages that the CRRD from all traffic would be accounted for in the benchmark.

See RDG Phase 2b Report Features: 8.4, 8.5, 8.6, and 8.7.

⁹² AML is calculated by the product of the number of passengers expected to alight at main stations by the punctuality to the nearest minute at those stops.

⁹³ Source: Network Rail performance data, available [here](#).

⁹⁴ The congestion factor is discussed in ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19" pp. 784-785. The equation for the freight benchmark is as below

$$\text{Updated benchmark} = \text{Original benchmark} \times (1 + (\text{traffic growth} \times \text{congestion factor}))$$

This factor increases the benchmark to account for the increased difficulty for a freight operator to meet its benchmark when overall traffic on the network increases.

⁹⁵ RFOA (2013) "Freight Capacity Charge – proposal on methodology", available [here](#).

⁹⁶ Using CP4 data, the split of FTAC across the 'indicative operators' is quite different to the split of the capacity charge, and so while it may be net for franchised operators as a whole, operators will experience a different net impact of such a policy depending on the proportion of commuter, regional, and inter-city trains they operate.

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Description of counterfactual

There is a Schedule 8 benchmark for NR, set at a service group level. This benchmark determines the level of performance that NR is required to meet; if NR performs better than this benchmark, it will receive a bonus payment and if it performs worse than this benchmark it will be required to pay compensation. This benchmark is set for the control period (five years), and is then adjusted each year within the control period in line with NR's performance targets; NR is required to improve its level of performance each year.

NR's benchmark is not updated to account for the impact that traffic growth (or decline) will have on its ability to meet a certain level of performance. All train operators also have a benchmark; passenger operators' benchmarks are not updated for traffic, but freight operators' benchmarks are. In CP4 and CP5 the freight benchmark has had a 'congestion factor'; the benchmark is updated each year by applying the congestion factor to the level of traffic growth and multiplying this by the original (pre-traffic growth, or decline) benchmark.⁹⁷

The capacity charge is a pre-determined charge levied per train mile, to make NR financially neutral to the addition of more traffic to the network.⁹⁸ It recovers the estimated additional Schedule 8 costs from increasing traffic on the network, and is therefore heavily linked to Schedule 8 at present – if estimated Schedule 8 payments increase then the capacity charge must also increase. The payment rates are higher for areas of the network where delays are more likely to have an effect on the operator's long term revenue (as end-users are more discouraged by a higher likelihood of delay). The figure below outlines the approach to calculating the capacity charge taken at CP5. Some industry participants view the capacity charge as an incentive to use the network efficiently i.e. as a form of 'scarcity charge'. While this side effect is recognised by ORR⁹⁹, it should not be considered an 'objective' of the current capacity charge.

Figure E.1: Calculation of capacity charge

- 1 Determine breakdown of CUI and CRRD at CTS level
- 2 Determine relationship between CUI and CRRD (statistical analysis)
- 3 Calculate the tariff: (a) calculate CRRD; (b) Use Sch. 8 rates and delay-lateness ratio to determine Sch. 8 cost per minute of delay to NR; and (3) determine CTS Sch. 8 cost per train-mile and convert to Service Code
- 4 Calculate adjustments: discount for weekends and for freights' flexibility.

CUI: capacity utilisation index, which is calculated per CTS for each 3-hour slot in the day. **CRRD:** Congestion-related reactionary delay. Higher levels of traffic on the network make it more difficult for NR to recover services after a delay, this additional delay is recorded as CRRD. **CTS:** Constant Traffic Section, a high degree of geographical granularity (there are over 3,000 CTSs).

⁹⁷ The congestion factor is discussed in ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19" pp. 784-785. The equation for the freight benchmark is as below

$$\text{Updated benchmark} = \text{Original benchmark} \times (1 + (\text{traffic growth} \times \text{congestion factor}))$$

This factor increases the benchmark to account for the increased difficulty for a freight operator to meet its benchmark when overall traffic on the network increases.

⁹⁸ This is in contract to the volume incentive which aims to encourage NR to assist traffic growth.

⁹⁹ ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19" p.590 (¶16.189).

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Relevant factors impacting the form and/or the effectiveness of the option

Data availability, measurement, and billing: there are unlikely to be any issues with gathering the correct data, however there will be a reasonable amount of calculation to undertake and there may be a period of delay between a year finishing and its data being ready to calculate the following year's charges – there might therefore be a delay to some billing and therefore a time lag between traffic increases and that traffic being reflected in NR's Schedule 8 benchmark. This lag is likely to be between a few weeks and a couple of months. There is some concern that this option would be difficult and costly to implement, however a mechanical calculation such as the 'congestion factor' currently applied to freight could be effective without incurring prohibitive transaction costs; the option is not envisaged as an exact calculation of the impact but rather some which is correct 'on average'.

Implementation

Information requirements The information required to implement this option should not exceed that already available, which includes:

- CRRD data or traffic data, depending on whether the calculation will depend on the actual congestion-related delay or on the growth in traffic. These two are inherently linked however a decision will be required on whether the calculation should use the actual traffic growth or the actual delay attributed to traffic.
- The relationship between delay minutes and the Schedule 8 performance metrics. This is required to update a year's benchmark with the delay data from the previous year.

Drivers This option would remove the capacity charge, which would in turn remove one of the variable components of NR's revenue. NR's total revenue requirement would not change under this option, therefore the reduction in variable revenue would be replaced by an increase in the FTAC. All operators pay the current capacity charge but only franchised passenger operators pay the FTAC, therefore this would represent some redistribution (see the Table below). However, the magnitude of the redistribution would be small. This redistribution impact could be limited further, for example through the introduction of a scarcity charge.

Table E.1: Indicative Operators' shares of the capacity charge and FTAC

Charge		Franchised commuter	Franchised regional	Franchised inter-city	Open access	Multi-customer freight	Bulk freight
		10 operators	9 operators	6 operators	2 operators	4 operators	4 operators
Capacity charge	Share per operator	4%	2%	6%	0.5%	0.1%	0.1%
	Share for operator type	44%	21%	33%	0.9%	0.3%	0.6%
FTAC	Share per operator	3%	5%	4%	-	-	-
	Share for operator type	27%	49%	24%	-	-	-

Source: CEPA analysis using charges data from ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19." These figures assume a Network Grant has been applied.

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Calculation principles	Calculating the increase to Schedule 8 targeted minutes would involve understanding the relationship between traffic and CRRD. The work undertaken in the PR13 process identified a relationship that can also be used for PR18. The main principle of the capacity charge is to neutralise the Schedule 8 impact of increases in traffic, which is the intention of this option.
Practical considerations	This option is unlikely to be more expensive and time-consuming than the current system. It does not need any more data than at present, and the calculation envisioned The implementation of this option need not necessarily be significantly more expensive and time-consuming to implement than the current system, as it would not require
Lead time	The length of time required to undertake adequate modelling or statistical analysis to determine the appropriate relationship between known traffic (or CRRD) and NR's performance would depend on the complexity desired. This option is intended to be a mechanistic and simple calculation, which is broadly correct on average rather than precise and accurate at all times, and therefore a reasonably low level of complexity is required.
Resources required for implementation	The main burden of introducing this option would fall on NR, as it requires more frequent use of TOC data and modelling.

Performance against criteria

Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=
	This option is unlikely to have a negative impact on system safety, as it does not impact NR's ability to recover its revenue requirement. This assumes that the lag caused by using the previous year's traffic for the present year's benchmark does not have a significant effect on NR's revenue.							
Consistency with law	=	=	=	=	=	=	=	=
	We do not anticipate that the removal of the capacity charge and the annual update to the Schedule 8 benchmark to include traffic growth, would have any legal implications. This is not intended as legal advice. The most relevant EU legislation is Directive 2012/34/EU (recast of Directive 2001/14/EC), and in the UK this is largely mirrored in The Railways Infrastructure (Access and Management) Regulations 2005. In particular, it is necessary to have a performance scheme (which can include any of penalties, compensation, and bonuses) which is targeted at minimising disruption and improving the performance of the network, in particular the regime must: • be non-discriminatory across the network; • encourage optimal use of the network and its capacity; • provide sufficient incentives and price signals to participants; • reflect the costs incurred in providing the service There is nothing that implies a factor updating for traffic and congestion related compensation must take a specific form. In CP5 a 'congestion factor' was introduced to update freight operators' benchmarks annually for traffic. In addition, ORR has the power under the Railways Act 1993 to prepare, publish, and							

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vary model clauses for track access agreements. Model clauses are standard clauses that are part of all track access agreements of similar type. In particular, these model clauses set out the charges and incentives.

Funding of NR efficient costs	=	-	-	=	=	=	=	=
	This option might affect the funding of NR's costs if the time lag in benchmark adjustments is large and there is no wash-up. Time lags might arise as the benchmarks are set in advance based on an estimate of traffic and there would be a delay between changes in traffic and updates in the benchmarks. This is likely to have more of an impact in the SoW where there is more dynamic rail or more on-rail competition since greater fluctuations in traffic might be expected here. This is less of an issue in the current system as the capacity charge is levied per actual train mile. If the lag is considered to have a significant effect, then a wash-up might be appropriate. However, it is likely that with annual updates to the benchmark, any errors in traffic growth to small year to merit a wash-up.							
Allowance for market conditions	=	=	=	=	=	=	=	=
	This option would result in freight no longer paying capacity charges, but also receiving less Schedule 8 compensation. The impact of this should be approximately neutral.							
A single approach for the network as a whole	+	+	+	+	+	+	+	+
	Re-calculating NR's benchmarks for traffic changes annually, as is done for the train operators, makes Schedule 8 closer to being 'a single approach for the network as a whole' in its methodological approach to the calculations.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	-	--	--	-	-	-	-	-
	There will be a time lag in this option, as the benchmark would be updated each year to account for the <i>previous</i> year's traffic. This might not allow NR to fully recover its costs if traffic increases (unless there is a wash-up arrangement in place, which is not envisioned in this option). The magnitude of the impact of such a lag on NR revenues would depend on the level of traffic growth. The impact is expected to be negative in comparison to the current system where a charge is levied per actual train mile so a large increase (or decrease) in traffic is automatically accounted for. However, given that the benchmark (under this option) would be updated annually it is unlikely that the magnitude will be large. Therefore this option is graded weakly negative (-) in all SoW apart from 'dynamic railway' and 'on-rail competition' where traffic might fluctuate more and therefore a lag might have a greater impact on NR.							
Efficient whole-system whole-life industry net costs	=	=	=	=	=	=	=	=
	This option should not greatly impact NR's incentives to enable changes to the pattern of service. It might have a potential small positive incentive on train operators to run additional services (if there is not a wash-up) through removing the capacity charge that is explicitly levied per mile travelled, however there might also be a disincentive for NR to allow and encourage growth (without a wash-up).							

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Efficient long run investment decisions	=	=	=	=	=	=	=	=
	This option should not negatively affect this criterion. The traffic update would not take into account improvements to NR's performance, but would rather ensure that the benchmark accurately reflects the level of performance expected of NR given the increase (or decrease) in traffic on the network.							
Efficient performance management	=	=	=	=	=	+	+	=
	This option should provide NR with an increased incentive to manage its unplanned works efficiently. At the start of a year, NR is aware of its Schedule 8 benchmark for that year but only has an estimate of capacity charge revenue (based on traffic estimates). Therefore, this option might improve efficient performance management under all SoW, with a particularly large impact in the two SoW 'dynamic railway' and 'on-rail competition', but less of an impact in the SoW of more highly 'specified franchises' where there might be less flexibility. However, a small reduction in efficient use of network capacity would likely reduce the impact of this incentive, therefore the scoring of most SoW for this criterion is neutral apart from for SoW 'beneficiary pays' and 'capacity allocation' where a small positive impact could exist on balance.							
Efficient use of network capacity	=	=	=	=	=	=	=	=
	It is not clear that this option would have a large effect on this criterion. Some industry participants view the capacity charge as also being to incentivise the efficient use of current network capacity, an effect that would be reduced by replacing the capacity charge as a variable component of train operators' charges. This is because the marginal cost to the operator of running an extra train would be lower. However, it has been reported (RDG Phase 2B report) that the incentive is not strong as many do not understand the charge. Overall, this criterion is unlikely to be heavily affected by this option.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	+	+	+	+	+	+	+	+
	NR knows its Schedule 8 benchmark each year but only has an estimate of capacity charge revenue based on traffic forecasts. Therefore, this option would make NR's net costs more predictable compared to the current regime, assuming that it does not encourage an increase in traffic volatility. This is because the capacity charge is variable. This criterion is graded weakly positive (+) for all SoW.							
Simplicity	+	+	+	+	+	+	+	+
	This option is intended to reduce the complexity of the charging regime overall through removing the separate capacity charge. However, the calculation of the benchmark will become more complicated – although this option is envisaged as a mechanistic calculation which should not create significant complexity in the benchmark. Therefore this option has a weak (+) rather than strong (++) positive impact on this criterion. This would be the same in all SoW.							

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Transparency	+	+	+	+	+	+	+	+
	Absorbing the capacity charge more obviously into Schedule 8 rather than having it as a separate charge will aid understanding and transparency of the Schedule 8 performance regime in all SoW.							
Low transaction costs	-	-	-	-	-	-	-	-
	This option would not require more data than is currently calculated or available under CP5, and should not require more resources than a recalibration of the capacity charge as at CP5. However, updating the benchmark annually to account for traffic would lead to higher transaction costs and therefore all SoW are graded negative (-).							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
NR accountability	+	++	++	+	+	+	+	+
	This option would slightly improve the accountability of NR as it ensures that its Schedule 8 benchmark more accurately reflects its required level of performance. The capacity charge refunds NR for potential delay compensation in advance of any delay actually occurring and regardless of whether the delay and subsequent compensation payments actually occurs. In contrast, increasing the benchmark as proposed by this option will protect NR from any additional compensation it might have to pay should any delay actually happen. This option will have a greater impact in the SoW where there will be greater flexibility to train operators (dynamic railway and on rail competition), therefore these two SoW receive a stronger positive grading (++)							
Non-arbitrary allocation of costs	-	-	-	-	-	-	-	-
	Network Rail has benchmarks on a 'Service Group' basis while the capacity charge is on a 'Service Code' basis (more granular). Therefore replacing capacity charges with updates to the Schedule 8 benchmark might make the allocation of costs less directly reflective of the source of those costs thus making the charge more arbitrary. Network Rail has stated that the capacity charge tariffs at present still "represent an 'average' rate based on the geography over which a service code operates." Therefore, the loss of granularity is unlikely to have a strong impact and this option receives a weakly negative grading (-).¹⁰⁰							
Optimal traffic growth	+	+	+	+	+	+	+	+
	By more regularly updating NR's benchmark to reflect the traffic that NR has to facilitate, this option helps to ensure NR is neutral to new traffic. This includes encouraging the sale of Access Rights to assist open access operators in running services that add extra value on top of franchised passenger services. Conversely, it might also reduce NR's incentive to encourage new traffic if doing so would increase their Schedule 8 costs that year and not be accounted for until the next year. This impact should not be large with an annual benchmark update. However, this option would also lower the marginal cost of running trains (through removing the capacity charge which is levied per train mile) and therefore potentially							

¹⁰⁰ Network Rail (2013) "Capacity Charge: SBPT3272". Part of the supporting documents for CP5 SBP, link [here](#).

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allow for growth to exceed the optimal level, so this criterion has been graded weakly positive (+) for all SoW.

Aligning industry incentives	=	-	-	=	=	=	=	=
Value for money for funders, taxpayers and users	=	=	=	=	=	=	=	=
Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	+	+	+	+	+	+	+	+

This option does not have a significant impact on the alignment of incentives for industry parties to cooperate.

A benchmark without a wash-up would likely reduce NR's incentive to encourage and facilitate new traffic, as NR would face higher potential Schedule 8 costs that year but the traffic increase would not be accounted for in that year's benchmark. Train operators would instead be incentivised to operate more services as the marginal cost of each is reduced. This impact is likely to be small (=) in most SoW, but larger in the two SoW 'dynamic railway' and 'on-rail competition' where rail is more competitive and flexible. These two SoW are therefore graded slightly negative (-). A form of scarcity charge could be introduced to realign incentives in this area, if required.

The increase in transaction costs would negatively affect this criterion. However, there are potential benefits for operators if this option makes the Schedule 8 and surrounding regime clearer and easier to understand.

There are some clear benefits to this option, however there will be costs involved in implementing the option. The initial calculation of the appropriate adjustment to the benchmark to take account of traffic might require large amounts of effort and resources, but the subsequent annual updates would be mechanical calculations which need not be complex.

This option might have a positive impact on the traffic growth, if the lag in updating the benchmark does not have a large impact on NR's ability to recover costs – although it might also encourage train operators to run less efficient services through reducing the marginal cost of running an additional train (by removing the capacity charge).

Overall, the impact is likely to be slightly positive in all SoW.

Impact on stakeholders

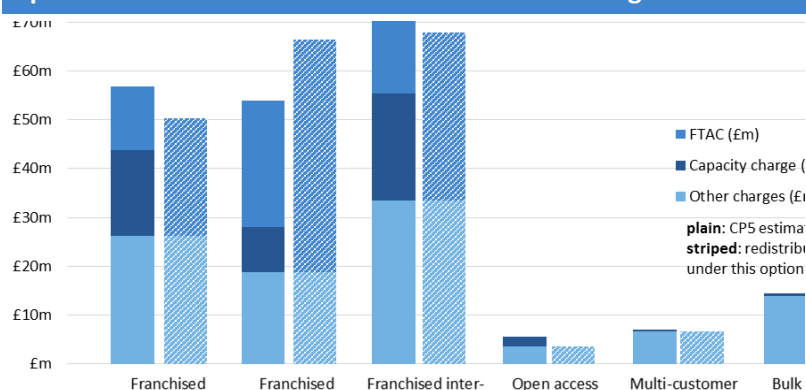
This option removes the capacity charge as a separate aspect of the charging and incentives regime, which is a benefit to most stakeholders as the charge is not particularly well understood across the industry (see RDG Phase 2b Feature 8.7). In particular, the name 'capacity charge' is interpreted by many to indicate that this charge is supposed to be a form of 'scarcity charge'.¹⁰¹

The Figure below demonstrates the absolute change in charges that might be experienced by each operator, if the capacity charge revenue is distributed across the FTAC in the same proportions as the 'current' split of FTAC (in CP5).

Figure E.2: Total charges by indicative operator, current charging (plain) and with this option (striped)

¹⁰¹ For example, see: Rail Freight Operators' Association (RFOA) (2013) "Freight capacity charge – proposal on methodology", a letter to the Head of Economics of ORR, available [here](#).

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Source: CEPA analysis using charges data from ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19." These figures assume a Network Grant has been applied.

All train operators pay the capacity charge on every train mile rather than just trains above a certain benchmark. The capacity charge is a variable component of NR's revenue and of all train operators' costs. The reduction in NR's revenue would be offset through an increase in the FTAC, which is currently payable by the franchised passenger operators. This would represent a transfer of charges from freight and open access operators, towards franchised train operators. The redistribution from non-franchised train operators to franchised operators is minimal, £7.5m of the £400m capacity charge in the model.

However, the redistribution between the franchised operators will be larger given the difference in how the capacity charge and FTAC are split across them. Regional operators' charges would reduce while the others' charges would increase. This redistribution of funds might be undesirable, in which case a form of scarcity charge might be introduced which would re-balance the charges by charging more for use of more congested areas (which would most affect franchised commuter and inter-city operators). The increase in charges for franchised operators would affect the franchise values and feed through to their funders.

Table E.2: Outline of indicative impact of this option of the FTAC and share of charges, charges are per operator within each sector

Operator (N ^o of operators)	capacity charge (£m)	share of industry capacity charge	current FTAC (£m)	Current share of industry FTAC	Total current charges (£m)	Change in total charges (£m)	Change in total charges (%)
Franchised commuter (10)	18	4%	13	3%	57	-7	-12%
Franchised regional (9)	9	2%	26	5%	54	12	23%
Franchised inter-city (6)	22	6%	19	4%	74	-6	-8%
Open access (2)	1.9	0.5%	-	-	6	-1.9	-34%
Multi-customer freight (4)	0.3	0.1%	-	-	7	-0.3	-5%
Bulk freight (4)	0.6	0.1%	-	-	15	-0.6	-4%
Industry total	£400m		£476m		1597		

Source: CEPA analysis using charges data from ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19"

One potential further impact is the Sustained Poor Performance (SPP). SPP allows passenger operators to submit a claim for additional compensation if performance is at least ten percent worse than the benchmark. This is because the calculation-based compensation scheme may not be appropriate for large deviations from the performance target, and might under-compensate

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operators.¹⁰² An increase in the benchmark has the same effect as increasing the SPP threshold: ten percent of the benchmark with a traffic component is equivalent to a higher than ten percent threshold on the benchmark without a traffic component. It is unclear whether this option would require or influence a change in the SPP threshold percentage, particularly as there is some disagreement on an appropriate level. ORR has reduced the threshold in recent control periods, while some have recommended that it increase, including SDG who recommended an increase to 30 percent.¹⁰³

Another consideration with the removal of the capacity charge is that it lowers the marginal cost to train operators of running trains on the network. It may be necessary for ORR's control period assessments and any traffic forecasts to take account of this change to operators' incentives.

Many of the distribution, variable cost, and incentive related concerns regarding this option could be addressed through the introduction of a 'scarcity charge' or 'avoidable costs' charge, which would reintroduce a charge that is levied on all operators and on a per km or per service basis. This option does not currently envisage this and therefore the analysis does not focus on the impact that such an inclusion would have, however it is a potentially appropriate remedy for some of the perceived negative impacts of this option.

This option may lead to an increase in volatility of the charges and incentives regime, as the benchmarks could change annually for traffic while the current regime has a greater degree of upfront predictability as the tariff (per km) is set at the Price Review for the entire control period.

Franchised commuter passenger operators	Franchised commuter passenger operators pay a large amount on the capacity charge, since they operate mostly on constrained areas of the network where the capacity charge is likely to be highest. As they are allocated only a moderate share of the FTAC, the franchised commuter passenger operator's overall charges would decrease.
Franchised regional passenger operators	Franchised regional operators pay less on the capacity charge in comparison to other franchised operators, as they tend to operate in less restricted areas of the network. They also pay a larger share of the FTAC as compared to other operators. Overall, therefore, the franchised regional operators experience the <i>only</i> increase in charges under this option and therefore an increase in their share of the overall industry charges. If this redistribution effect is undesirable an appropriate charge can be implemented, such as a scarcity charge which could be applied to all operators. Further, if a franchised operator is likely to be significantly negatively impacted under this option it may trigger the (low) threshold at which the franchise contract can be renegotiated. It may therefore be necessary to introduce a new component to franchise agreements which allows for changes through this option to be brought into contracts in a mechanistic way.
Franchised inter-city passenger operators	Franchised inter-city passenger operators pay the most (in absolute terms) on the capacity charge, since they operate predominantly on constrained areas of the network where the capacity charge is likely to be highest. As they are allocated the lowest share of the FTAC (out of the franchised operators) but the FTAC is significantly larger than the capacity charge, their overall charges would be lower.

¹⁰² ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19" ¶20.50

¹⁰³ SDG for Network Rail (2013) "Specification for Sustained Poor SPP Arrangements for CP5: Final Report" p.i

Option 15: Recalculate benchmarks for traffic changes and remove capacity charge

Open access passenger operators	The capacity charge represents a large percentage of the open access passenger operators' current charges. As they are unaffected by the corresponding increase in the FTAC, overall their charges would reduce. Smaller operators such as open access operators might also experience an increase in volatility of their Schedule 8 compensation. As the benchmark changes annually to take account of changes in traffic, whether changes in that operator's traffic or that of other operators on the network, the benchmark for Schedule 8 compensation could feasibly change substantially year-on-year, although our expectation is that year on year changes would usually be small. Larger operators would also be subject to changing benchmarks, but the smaller balance sheets of these smaller operators means that they will be less able to 'absorb' such short-notice changes.
Freight operators	Multi-customer freight operators and bulk freight operators do not differ significantly in their capacity charge payments as a percentage of their total charge obligations – they would see a moderate reduction in their charge obligations. They also do not pay the FTAC, therefore the overall impact would be a reduction in charges. However, if this redistribution effect is undesirable an appropriate charge can be implemented, such as a scarcity charge which could be applied to all operators.
NR	The impact of this option on NR depends on how the revenue requirement takes account of the loss of the capacity charge revenue. If the reduction in revenue is redistributed to the FTAC as modelled, there would not be any impact on NR's revenue. The revenue may become more predictable as a variable aspect has been replaced with a fixed aspect. NR will also pay less compensation through the increases to the Schedule 8 benchmark. The net effect on NR's net revenue would likely be neutral, assuming no adjustment to the revenue requirement.
Funders	The removal of the capacity charge, levied on all train operators, would result in an increase in the FTAC, which is currently only payable by franchised train operators¹⁰⁴. When franchises are renewed their value will be adjusted to take account of the change in charges faced by these operators. Therefore, the funders might become responsible for a portion of the 'burden' of this option. If a franchised operator is likely to be significantly negatively impacted under this option it may trigger the (low) threshold at which the franchise contract can be renegotiated. It may therefore be necessary to introduce a new component to franchise agreements which allows for changes through this option to be brought into contracts in a mechanistic way. At present franchised passenger operators bid for the franchise based on their Schedule 4 and 8 assumptions. This option might result in potential franchisees increasing the risk premium included in their bid, if they expect to experience annual volatility in their benchmark (and therefore Schedule 8 compensation). This would lower the franchise values if volatility is expected to be large, however the intention of this option is to smooth changes accounting for changes annually rather than having a 'step-change' at every Price Review. Additionally, it might be possible to remove the need for any additional volatility risk premium by ensuring that changes to the Schedule 8 benchmark would be appropriately reflected in the franchisees' contracts. The revenue requirement, and therefore FTAC, is calculated separately for England & Wales and for Scotland. The Scottish FTAC includes the entire Scottish rail

¹⁰⁴ Noting that the level of the capacity charge paid by other operators is very small in the context of the FTAC

Option 15: Recalculate benchmarks for traffic changes and remove capacity charge

infrastructure, therefore cross-border services from England & Wales franchises do not pay any of the FTAC on the section of their cross-border services that operate in Scotland. Similarly, the Scottish franchised operator is not required to pay FTAC on the sections of their services that operate in England.¹⁰⁵ Transport Scotland stated at PR13 that “the amount of Fixed Charges foregone in each network is not equal, which results in an imbalance in the system,” and a transfer from the capacity charge to the FTAC could worsen any imbalance. Cross-border services from England which were previously paying the capacity charge in Scotland would stop doing so, with the amount instead allocated to the Scottish FTAC (and similarly for Scottish cross-border services in England).¹⁰⁶

Passengers and freight users	Passengers might benefit if there is a positive impact on optimal traffic growth and if the regime being simpler results in a more efficient service. Freight users may have less predictable costs if they are on a flexible contract which allows the freight operator to pass through any reduction in compensation revenue that results from a change in NR’s benchmark.
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Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- Funders and passenger train operators raised concerns that annual adjustments would take time and resources. This option has therefore been envisaged as a simple and mechanistic adjustment which should reduce the transaction costs involved while having the benefit of improving the transparency of the relationship between performance and variations in traffic levels. Network Rail noted that a similar mechanistic approach is already in place for freight operators’ benchmarks, and that seems to reflect the impacts of changes in traffic well without being overly complex.
- The current capacity charge level depends in part on the use of the network by other operators, but the concern raised by the freight sector is that this option would increase that effect since the current capacity charge is levied per train mile actually travelled by the operator. In contrast, this option would adjust Network Rail’s benchmark for all operators in that service group. A further concern raised by passenger operators is that changing Network Rail’s benchmarks may have knock-on effects on TOC benchmarks given that it will adjust the level of delay that is considered ‘efficient’.
- DfT were concerned that by creating more frequent opportunities to change the benchmarks and therefore the terms of the franchised operators contracts, there would be more frequent requests by franchised operators for renegotiation of the contracts. Assuming the impact is sufficient to be a Qualifying Change this would place additional resource requirements on both DfT and the franchised operators. It may therefore be useful to consider whether the mechanistic process employed for the charge could be extended to dealing with impacts on the franchise agreements.
- DfT and Transport Scotland expressed concerns that this option could cause a ‘shift’ in costs to Transport Scotland due to the arrangements that cross-border services currently have in place with regards to the capacity charge and FTAC. Currently, cross-border services pay the FTAC in the operator’s country only, and pay the capacity charge relevant to the route regardless of country. Therefore, removing the capacity charge would remove the element of charges that cross-border services pay to use the infrastructure outside of its own country.

¹⁰⁵ ORR (2013) “Final determination of Network Rail’s outputs and funding for 2014-19” p.639-640

¹⁰⁶ Network Rail (2013) “Periodic Review 2013: Fixed Charges in CP5 – Conclusions” Section 3.5, pp.13-15

ANNEX F RECOVER END-USER COMPENSATION THROUGH THE PERFORMANCE REGIME (SCHEDULE 8) DETAILED ASSESSMENT

Option 18: Recover end-user compensation through the performance regime (Schedule 8)							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	++	+	+	+	+	+

Schedule 8 reimburses train operators for estimated revenue losses as a result of disruptions to its services, given that passengers may choose not to travel in future due to the reputational impact of disruptions to service. This option was selected for detailed assessment given that the performance regime does not provide compensation to train operators that are required to provide delay compensation to their end-users. This option particularly looks at passenger operators as these are required by contract to provide end-user compensation, and also recognises that it might be appropriate to include an element for freight operators.

A key objective of this option is to make the intention of the performance regime clearer to the public, as there is currently a high level of misunderstanding in assuming that the Schedule 8 compensation for passenger operators should be passed onto passengers as delay compensation, rather than its actual intention to compensate train operators for the longer term revenue impact of delay (and some short-term impacts such as replacement buses). Given that passenger compensation is currently undergoing a series of changes, it is an appropriate time to consider how passenger compensation requirements could be incorporated into the performance regime. It is important, at the same time, to consider whether an appropriate end-user compensation mechanism for freight could be implemented given that freight operators often compensate their end-users for delays.

Schedule 8 currently compensates train operators for the longer-term financial impact of disruptions to services. There is no component to reimburse train operators for end-user compensation (i.e. passenger compensation paid through Delay Repay, or freight operators' case-by-case contract); this option proposes introducing such a component in addition to the current Schedule 8 compensation.

This option aims to redistribute the risk associated with end-user delay compensation. Currently in passenger services all of the risk of delay compensation is on the passenger operators, despite each type of passenger operator causing only between 10 and 30 percent of their own delays. While franchised passenger operators do include a 'risk premium' for this into their franchise bid value, they are then at risk for any deviations from their estimate.

This option has several clear benefits. It would be likely to reduce incentives on passenger operators to limit compensation paid to passengers. It also aligns the cost of delays more closely to those who caused them by 'passing through' an element of passenger compensation to the at-fault party. The main concerns relate to its practicality and transaction costs. In particular, the effectiveness of this option relies on passenger and freight operators passing through compensation to their end-users. This might be particularly difficult to measure in freight where explicit compensation payments might be foregone to instead charge customers lower prices to account for the risk of potential delay. There is typically a low claim rate among eligible delayed passengers (no comparable freight data is available), often attributed to a lack of awareness driven by train companies not actively providing passengers with the relevant information. Use of delay claims processes, such as cash refunds and online forms, make it likely that there will be an increase in the rate of claims by those eligible. Therefore, an automatic refund might provide an effective delivery mechanism to ensure that there is not a large disparity between the amount claimed by passengers and the amount passed through Schedule 8 (at a lower level of transaction costs than some manual methods would

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

bring).

There are difficulties associated with applying this option to freight, since there are not standard compensation terms for freight operation, and it could be discriminatory to make use of the varying and confidential terms in contracts. In principle, standard rates could be applied according to some categorisation. But it would also impact upon the economic viability of freight if this resulted in increased payment rates to cover the cost of the scheme – freight operators may prefer to take the risk themselves and pay lower payment rates. Nevertheless, implementing this option will need to ensure that Schedule 8 is not unduly discriminatory against freight: freight should be included in the two-way payments if it is deemed appropriate. This option assumes that it is possible to determine an appropriate mechanistic calculation for freight end-user compensation, however it is not certain that freight would desire the additional complexity that even a simple mechanistic approach would bring when freight operators are currently able to negotiate the issue through their contracts individually with each customer.

While our analysis has showed an overall positive grading of this option, the magnitude is unclear, and further work would be required on reasonable practicality and cost. Train operators might also oppose the added complexity that this might bring to Schedule 8 (see RDG Phase 2b Feature 8.12). This option will, in several areas, have a stronger impact (negative or positive as appropriate) in the SoW where there will be greater flexibility to train operators (Dynamic railway and On-rail competition). However, these extremes have balanced each other out to mean that these SoW are given a small positive grading as with the other SoWs.

Key characteristics

Description of option

This option would involve an additional component of Schedule 8 compensation which would allow train operators to recover end-user compensation (passenger or freight) that they paid out as a result of delays which are attributed to Network Rail or other train operators. This compensation would be in addition to the current Schedule 8 compensation measure, which is intended to allow train companies to recover the long-term financial impact of unplanned service disruption.

The additional compensation would be included as an additional calculation in Schedule 8. This calculation would allow train operators to recover a specified amount of compensation according to the type and severity of delay. For passenger services the amount would also take into account the number of passengers and the value of tickets (as passengers on a single train may have paid very different prices, which affects the compensation they are eligible for).

A simple implementation of this option could involve having a set calculation which determines how much compensation a train operator should receive. However, receiving set compensation to pass through to end-users might create a perverse incentive for operators to avoid passing it on (and retain the compensation). Therefore, for passenger operators this option proposes that:

- for passenger operators which operate automatic refunds (Virgin Trains West Coast¹⁰⁷ and C2C from 2016¹⁰⁸), if they can obtain and share appropriate data on passenger refunds then actual data regarding the number of 'claims' will be used in the calculation; and
- for all other passenger operators, their compensation calculation would assume that the same

¹⁰⁷ Advance tickets for a specific train, delayed more than 30 minutes, are eligible for a refund if the ticket was bought through an account with Virgin Trains online.

BBC News (2015) "Virgin starts automatic compensation for train delays" available [here](#).

¹⁰⁸ Delayed passengers who travelled using a smart card will be refunded for delays of two minutes or more.

C2C (2014) "Passenger's Charter Nov 2014"

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percentage of passengers claimed for eligible delays for the previous year, such that improvements in claimant numbers are taken account of but at a lag.

This dual approach is likely to help to ensure that those operators with the available data receive accurate end-user compensation while those without the data do not have to wait the additional four weeks before the paper-based claims are complete.

This option aims to redistribute the risk associated with end-user delay compensation. Currently in passenger services all of the risk of delay compensation is on the passenger operators, despite each type of passenger operator causing only between 10 and 30 percent of their own delays. While franchised passenger operators do include a 'risk premium' for this into their franchise bid value, they are then at risk for any deviations from their estimate. This option would introduce more attribution of delay and better alignment of financial incentives – as those who cause the delay would be required to cover more of the cost of that delay to the train operator.

This option would not 'solve' the issue of passenger operators creating barriers to paying delayed passengers compensation, and that is not its key objective. However, it would be likely to provide passenger operators in particular with less reason to create such barriers and create the possibility for ORR to place more pressure on them to pay make compensation more routine and proportionate, and maybe on uniform rules. If the end-user compensation is recoverable based on the dual system described above, then operators should have greater incentives to make compensation routine, since doing so should have a positive impact on their reputation and passenger demand.

There is no published data on comparable end-user compensation for freight operators. End-user compensation in freight is part of the freight operators' private contract with its customers. Therefore, to include any component of freight compensation in any 'end-user compensation' recovery mechanism, freight operators would need to work together with ORR to determine an appropriate formula. The assessment of this option assumes that freight operators are included in the end-user compensation mechanism but does not include freight in the modelling due to lack of available data.

See RDG Phase 2b Report Feature 8.12

Description of counterfactual

Schedule 8 has two main components:¹⁰⁹

- an incentive to maintain performance, by aligning the financial incentives to not delay other parties; and
- a compensation mechanism, to reimburse operators for some of the *long-term* financial impact of delays to services above a certain level (some amount of delay will have been included in the assumptions made when bidding for a franchise or route).

Long-term financial impact of delay refers to the impact of poor performance on an operator's long-term revenue, and Schedule 8 aims to reduce the extent to which this is factored into franchise bids with a 'risk premium'.¹¹⁰ The calculation of payment rates for takes account of the Passenger Demand Forecast Handbook (PDFH) values on the responsiveness of long-term passenger demand to service disruption. It is not designed to cover the on-the-day costs of delay, including the compensation paid to delayed passengers.

¹⁰⁹ RDG (2015) "Review of Charges Phase 2b: Assessment of the current charges and incentives regime." Features 8.2 and 8.12

¹¹⁰ The difference between Schedule 8 and passenger compensation is elaborated upon in: ORR (2013) "Final determination of Network Rail's outputs and funding for 2014-19" ¶20.15

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Freight compensation is part of the freight operators' private contracts with their customers, and may take the form of forgone payments rather than explicit compensation. Passenger compensation is a requirement of franchise agreements, and is therefore more transparent. There are currently two passenger compensation schemes in coexistence, the voluntary Delay Repay (which pays from 25% of the ticket price for delays longer than 30 minutes) being more generous than the compulsory minimum set by the National Rail 'Conditions of Carriage' (which pays from 10% of the ticket price for delays longer than 60 minutes).¹¹¹

Relevant factors impacting the form and/or the effectiveness of the option

- Franchising (Factors Report Section 3.2): there is a low threshold of changes to the revenue/ costs of franchisees before they are allowed to request a renegotiation of the franchise. This option might cause franchisees to meet that threshold, incurring additional costs for ORR. Further, that franchises are staggered to start and end at different times would mean that operators may bid in a different amount of 'risk premium' for passenger compensation depending on when their bid process occurred in relation to this option being implemented. However
- Balance of risk and reward for asset-light companies (Factors Report Section 4.5): Asset-light industry participants have little ability to absorb risk, and this option would reduce the risk to an operator of delays by other parties, but would also increase the risk to an operator of its own delays.
- Data availability, measurement, and billing (Factors Report Section 4.7): This option will incur costs in calculating and implementing. In passenger compensation the information should already be available, however the delivery mechanisms may not. In freight

Implementation

Information requirements To implement this option it is necessary to determine the value of compensation each operator would need to recover. For freight this calculation may be complex and much of the information required is commercially sensitive or confidential. For franchised passenger operators the data would be more readily available, and four elements would impact the total value of passenger compensation from a delay:

- the number of passengers on the service;
- the percentage of passengers that will claim;
- the length of the delay;
- the value of their tickets / compensation; and
- the agreed levels of recoverable compensation.

Currently only the length of the delay is recorded for the current Schedule 8 calculations, however with the introduction of automatic refunds the remaining information should become more readily available.

Automatic refunds make collecting the required data easier and faster, as compared to using estimates or waiting for the 28 day claims period to elapse so that the actual figure is known. Estimates are further complicated by the mix of types of ticket, such as first class or standard, and advance, season ticket, or full-price tickets.

If the cost of compensation is distributed in the same way as the current Schedule 8

¹¹¹ For further detail on the differences between the two main schemes, please see the [Transport Focus website](#).

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payments, where the party that causes the delay is responsible for paying the compensation, it would be necessary to know which party caused the delay. This attribution data should already be available through the current Schedule 8, as should the 'monitoring point weightings' which provide estimates of passengers alighting at each (major) station.

Drivers

There are five main components which would impact the size of the compensation that a party is obliged to pay to a passenger operator, and the compensation a party is due from a delay:

- *the number of passengers*, which is assumed to be out of control of the party at fault for the delay – however if the delay in question is due to Network Rail carrying out emergency works it might be possible for it to choose a less busy time of day;
- *the percentage of passengers that will claim*, which is assumed to be partly out of control of the delayed operator although it is able to influence the percentage by making the system more or less difficult;
- *the length of the delay*, which is assumed to be within the control of the party at fault for the delay;
- *the value of the tickets/ compensation per passenger*, which will be affected by the ticket values and also by the compensation scheme that the passenger operator has in place (i.e. Delay Repay or Conditions of Carriage minimums); and
- *the agreed levels of recoverable compensation*, which might differ from the passenger operator's standard or actual levels of compensation paid out, to standardise the option across the network and its operators.

Of these factors, only the value of compensation per passenger assumed to be within the control of the delayed passenger operator, and the *recoverable* level of compensation (as a percentage of ticket value) should be determined in advance to maintain consistency.

This compensation would be additional to the current Schedule 8 compensation, but it may be appropriate to adjust the original Schedule 8 compensation if this option were introduced. One of the considerations in the calculation of the long-term financial impact on passenger operators is the impact on future passenger demand of the negative reputational impact of disruption to services. If more compensation is paid out under this option, as train operators would have less of an incentive to avoid paying passenger compensation, then this 'future demand' aspect could be reduced and the current Schedule 8 compensation might be an overestimate of the actual impact.

Calculation principles

The Figure below demonstrates a potential calculation that could be used to estimate the appropriate amount of passenger compensation to recover.

Figure F.1: Calculation of the passenger compensation to be included in Schedule 8

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There are three factors involved in estimating the amount of passenger compensation that will be paid out for delays, and multiplying these together will provide the estimate

Total ticket value that compensation could be claimed on	Estimate number of passengers on board, and average value of tickets (e.g. on average paid 80% of on-the-day price), using historic data.
Percentage of ticket value to repay to operator	Categorise delay (e.g. 30-60 minutes) to determine how much compensation the operator can recover per passenger (e.g. 50%) – using agreements in place.
Percentage of passengers that will claim compensation	Determine estimate of what percentage of passengers are likely to request compensation based on historic data (last year's average).

It is important not to over-compensate train operators for delay (i.e. compensate for a level of compensation higher than that actually paid out), to avoid creating perverse incentives. This means that there should be some way to ensure that the compensation is being passed onto the end-users; in passenger services this could be through automatic payment ensuring that the amount is instantly paid to passengers, or through using the previous year's claim rate (% of eligible journeys claimed for) when determining the amount the operator should receive.

This compensation would be additional to the current Schedule 8 compensation, but it may be appropriate to adjust the original Schedule 8 compensation if this option were introduced. One of the considerations in the calculation of the long-term financial impact on train operators is the impact on future end-user demand of the negative reputational impact of disruption to services. If more compensation is paid out under this option, as train operators are likely to have less of an incentive to avoid paying end-user compensation, then this 'future demand' aspect could be reduced and the current Schedule 8 compensation might be an overestimate of the actual impact.

Practical considerations	A simple implementation of this option could involve having a set calculation which determines how much compensation a train operator should receive. However, receiving set compensation to pass through to end-users might create a perverse incentive for operators to avoid passing it on (and retain the compensation), while waiting for all passenger operators to be on the automatic refund systems would create a very long lead time. Therefore, for passenger operators this option proposes a dual system, where: • for passenger operators which operate automatic refunds (Virgin Trains West Coast¹¹² from October 2015 and C2C from 2016¹¹³), if they can obtain and share appropriate data on passenger refunds then actual data regarding the number of 'claims' will be used in the calculation; and • for all other passenger operators, their compensation calculation would assume that the same percentage of passengers claimed for eligible delays
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¹¹² Advance tickets for a specific train, delayed more than 30 minutes, are eligible for a refund if the ticket was bought through an account with Virgin Trains online.

BBC News (2015) "Virgin starts automatic compensation for train delays" available [here](#).

¹¹³ Delayed passengers who travelled using a smart card will be refunded for delays of two minutes or more. C2C (2014) "Passenger's Charter Nov 2014"

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for the previous year, such that improvements in claimant numbers are taken account of but at a lag.

The dual approach outlined above is likely to help to ensure that those operators with the available data receive accurate end-user compensation while those without the data do not have to wait the additional four weeks before the paper-based claims are complete.

Lead time	This option also requires an appropriate formulaic approach for recovery of end-user compensation in both freight and passenger services. This would require consultations and iterations, and therefore would have a likely minimum lead time of 18 months before full implementation.
Resources required for implementation	To enable operators to recover compensation from any other operators that have delayed them, it is likely that this option would use a pooling system similar to the current “STAR” model in place for Schedule 8 compensation. This option would use the same delay attribution records and passenger number estimations as in the current Schedule 8 compensation. Additional resources would be required to determine the appropriate compensation in each case, even with a formulaic approach.

Performance against criteria								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=
	This option would increase Schedule 8 costs to Network Rail. This could increase Network Rail’s incentive to invest by increasing the potential cost of delays that might be caused by a lack of investment. Conversely, it could also reduce Network Rail’s incentive to carry out short-term emergency works through increasing the compensation it will have to pay for the disruption. The overall effect is therefore ambiguous, and receives a neutral (=) grading.							
Consistency with law	=	=	=	=	=	=	=	=
	We do not anticipate that introducing an additional ‘end-user compensation’ component to Schedule 8 will have any legal implications. The most relevant EU legislation is Directive 2012/34/EU (recast of Directive 2001/14/EC), and in the UK this is largely mirrored in The Railways Infrastructure (Access and Management) Regulations 2005.¹¹⁴ In particular, it is necessary to have a performance scheme (which can include any of penalties, compensation, and bonuses) which is targeted at minimising disruption and improving the performance of the network, in particular the regime must: • be non-discriminatory across the network; • encourage optimal use of the network and its capacity; • provide sufficient incentives and price signals to participants; • reflect the costs incurred in providing the service There is nothing that implies an additional reimbursement of end-user compensation							

¹¹⁴ We emphasise that this does not constitute legal advice.

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

is prohibited.

In addition, ORR has the power under the Railways Act 1993 to prepare, publish, and vary model clauses for track access agreements. Model clauses are standard clauses that are attached to all track access agreements of similar type. In particular, these model clauses set out the charges and incentives.

Funding of Network efficient costs	-	-	-	-	-	-	-	-
	Under this option, train operators would recover some end-user compensation from Network Rail for all trains which Network Rail has delayed. This applies to <i>all</i> disruptions. This is in contrast with the Schedule 8 compensation, which is a benchmarked regime and therefore train operators are only eligible for compensation if overall performance is worse than the benchmark (and Network Rail is eligible for a reverse 'bonus' if it outperforms its benchmark). This option would therefore represent a small negative impact (-) on the funding of Network Rail's efficient costs; even disruption which is within Network Rail's benchmark would make Network Rail liable to pay for an amount of end-user compensation.							
Allowance for market conditions	=	=	=	=	=	=	=	=
	This option would refund an estimation of compensation provided to end-users, and whether it represents a single approach for the network as whole will depend on the specific form of the calculation that is included in Schedule 8. Passenger operators have committed to join Delay repay, therefore differences are likely to narrow, however freight operators have confidential and privately determined compensation arrangements. However, by implementing a simple mechanistic calculation to determine the appropriate compensation amount, this option should not have a negative impact on this criterion and has been graded neutral (=).							
A single approach for the network as a whole	=	=	=	=	=	=	=	=
	This option would refund an estimation of compensation provided to end-users, and whether it represents a single approach for the network as whole will depend on the specific form of the calculation that is included in Schedule 8. Passenger operators have committed to join Delay repay, therefore differences are likely to narrow, however freight operators have confidential and privately determined compensation arrangements. However, by implementing a simple mechanistic calculation to determine the appropriate compensation amount, this option should not have a negative impact on this criterion and has been graded neutral (=).							
Objectives	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	=	=	=	=	=	=	=	=
	This option should not significantly affect the efficient service costs recovery.							
Efficient whole-system whole-life industry net costs	=	=	=	=	=	=	=	=
	This option should not affect efficient whole system whole life industry net costs.							
Efficient long run investment	+	+	+	+	+	+	+	+
	This option increases Schedule 8 costs to Network Rail. This may increase its investment incentives in all SoW, by increasing the potential cost of delays that might							

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

decisions	be caused by a lack of investment. However, this option could also reduce Network Rail's incentive to carry out works at short notice unless essential, through increasing the cost of doing so. This impact is likely to be small. There is a small risk that Network Rail could focus its investment in the areas which are likely to cost it more on compensation through the train operators having more generous schemes (rather than just because more end-users are delayed). However, any such impact is likely to be small and could be mitigated by implementing a 'cap' for each delay category. Therefore, the overall impact of this option is likely to be positive in all SoW.							
Efficient performance management	+ + + + + + + + This option should incentivise the efficient management of unplanned work through increasing the cost to Network Rail of causing disruption above its benchmarked level, as this regime is directly about Schedule 8. However, it might also have a positive impact on Schedule 4 if Network Rail is incentivised to become more efficient at delivering its planned works (covered by Schedule 4) to reduce the risk of overrunning and being subjected to Schedule 8 and the related compensation payments.							
Efficient use of network capacity	= = = = = = = = This option should not create large distortions to incentives for the allocation and use of available network capacity.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	= = = = = = = = If using a calculation/estimation method, this option does not impact the predictability of the Schedule 8 payments, as the payments can be calculated with a pre-determined formula shortly after the delay has occurred, as at present.							
Simplicity	- - - - - - - - This option will make Schedule 8 slightly more complex and therefore this criterion has been graded slightly negative (-).							
Transparency	= = = = = = = = This option should not have any impact on the transparency of charges.							
Low transaction costs	- - - - - - - - Calculating the compensation amounts would incur transaction costs. However as the network adopts smartcards on a growing basis, automatic refunds will become more readily and widely available. Therefore, the same calculation as used for the automated refunds will be included in the Schedule 8 payments to ensure full recovery of agreed levels of compensation (i.e. if industry agrees on 50% passenger compensation for 30-60 minute delay and an operator pays out 80%, they only recover 50% and absorb the additional 30% themselves, and similarly for freight). Under this scheme, the increase in transaction costs (of implementing this option, assuming automated refunds are funded elsewhere as a separate scheme with its own benefits) is minimised in all SoW. Therefore, this criterion is graded negative (-).							

Option 18: Recover end-user compensation through the performance regime (Schedule 8)								
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Network Rail accountability	++	++	++	++	++	++	++	++
	This option increases Network Rail's accountability through ensuring that it pays a more representative amount of the financial impact that its delays have on the train operators, in all SoW.							
Non-arbitrary allocation of costs	=	=	=	=	=	=	=	=
	This option is unlikely to have an impact on the non-arbitrary allocation of enhancement / services costs.							
Optimal traffic growth	=	=	=	=	=	=	=	=
	This option should have a positive impact on promotion of efficient long run investment decisions, without negative impacts for the promotion of efficient industry costs. The impact on this criterion is therefore likely to be neutral or slight positive, and receives a neutral grading (=).							
Aligning industry incentives	+	++	++	=	+	+	+	+
	The performance regime intends to align industry incentives, through ensuring that the party responsible for the financial impact of a delay is made to reimburse it. Including the short-term costs relating to paying compensation to end-users is likely to further improve this alignment. The overall effect should be positive (+). This impact may be stronger in the 'dynamic railway' and 'on-rail comp' SoW where franchisees are more exposed to risk (++), and less strong in the SoW more highly 'specified franchises' where franchisees are less exposed to risk (=).							
Value for money for funders, taxpayers and users	+	++	++	=	+	+	+	+
	This option could improve the passenger refund process if passenger operators are incentivised to make the claims process easier and more accessible to delayed passengers. Although the operator would incur administrative costs in paying out refunds, an increase in passenger compensation paid out is likely to improve passengers' perception of the industry and in particular of the route or operator on which they experienced a delay but received adequate compensation. This incentive may be larger than in the current system where the passenger operator bears the full cost of the compensation. Similarly this option would improve the system for freight operators and their end-users, as there is currently not a clear across-the-industry This impact may be stronger in the 'dynamic railway' and 'on-rail comp' SoW where franchisees are more exposed to risk (++), and less strong in the SoW more highly 'specified franchises' where franchisees are less exposed to risk (=). All other SoWs received a weaker positive grading (+).							
Summary	+	++	++	+	+	+	+	+
	This option would be likely to have positive impacts on several criteria, in particular value for money, investment incentives, and allocation of costs (in all SoW). However, it would increase transaction costs. The increase in transaction costs would be much lower if automatic refunds are available across the entire rail network. There would need to be a separate mechanism to compensate freight operators for							

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

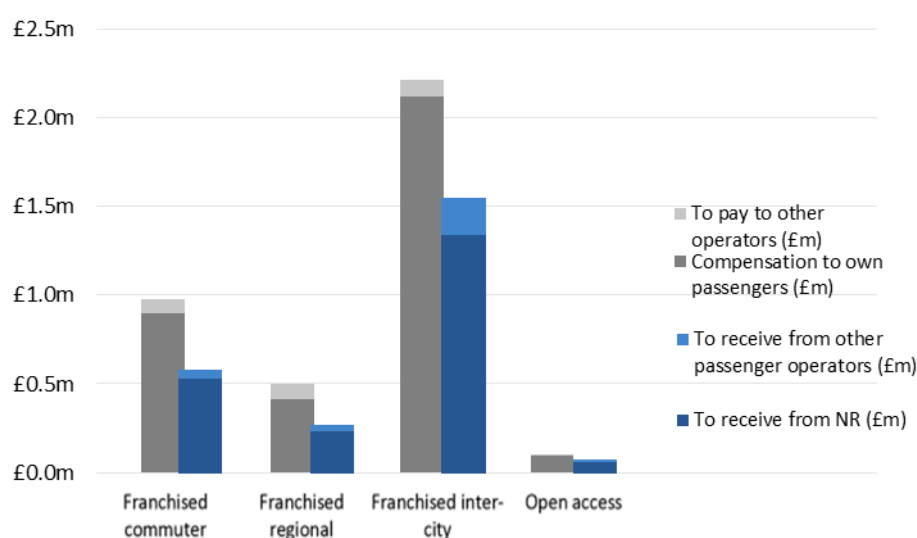
end-user compensation. This would be more complex than the passenger compensation mechanism as the end-users in freight have individual contracts rather than the two broad categories of compensation in passenger compensation. It would likely be necessary to include a component for freight as otherwise there might be an imbalance in the treatment of different operators.

The magnitude of the impact of this option is unclear, although it is likely to be stronger in the 'dynamic railway' and 'on-rail comp' SoW where franchisees are more exposed to risk (++). It is also not clear that train operators would desire the added complexity that this might bring to the compensation payment (See RDG Phase 2b Feature 8.12).

Impact on stakeholders

This option aims to redistribute the risk of delay costs relating to end-user compensation, by requiring those who created the delay to reimburse an amount of end-user compensation. The table below shows how this would impact passenger operators (freight has been excluded from this chart due to lack of data).

Figure F.2: Comparison of expenditure and recovery of passenger compensation under this option, using 2014-15 data



Source: CEPA analysis

The data used in modelling includes:

- passenger compensation paid out by franchised passenger operators in 2014-15 (with an estimate for open access operators based on relative passenger traffic);¹¹⁵
- attribution of delay into, the operator caused its own delay, or it was Network Rail, another passenger operator, or a freight operator.¹¹⁶

We have not modelled any aspect of freight end-user compensation, as the system of freight end-user compensation is more complex than in passenger services where the system is more

¹¹⁵ Department for Transport, via gov.uk (2015) "Compensation paid by Train Operating Companies: Passenger's Charter & Delay/Repay 2009-10 – 2014-15."

¹¹⁶ Network Rail's performance statistics for the year to 22nd August 2015 as published on their website, available [here](#). Network Rail also publishes annual data through the National Rail Trends (NRT) Portal, but that data does not include a 'freight' attribution category.

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

transparent.

The Figure above provides an indication of the net flows that might be expected from implementing this option looking at passenger compensation alone (freight compensation would be included but was not included in the modelling due to lack of data). Passenger operators cause 20-30 percent of their own delays and approximately 10 percent of other passenger operators' delays. As passenger operators will also be able to recover from Network Rail for the 60 percent of delays that they cause, passenger operators are likely to receive more than they pay out under this option. The total passenger compensation paid is likely to rise as compensation schemes become more accessible to passengers and passenger operators (assuming that delays stay the same).

Sixty percent of historic passenger delays are attributed to Network Rail, although a quarter of those were due to external factors (such as weather or fatalities). To the extent that Network Rail are at risk, this option could therefore provide Network Rail with a further incentive to reduce delays, thus aligning its incentives more closely with the passenger operators – this should benefit passenger operators and passengers. It is likely that freight will have a similarly high proportion of its delays attributable to Network Rail, and therefore Network Rail may face the same incentive here. The strength of any incentive is not clear as it depends on the extent to which Network Rail is 'at risk' for the compensation it pays out under this, therefore this incentive should be considered a side effect or secondary impact rather than a key objective.

Franchised commuter passenger operators	Franchised commuter operators are attributed with approximately 30 percent of their own delays, therefore under this option they would recover up to 70 percent of the passenger compensation paid out. As the majority of delays are attributed to Network Rail, even taking into account the amount that commuter operators will have to pay the other passenger operators results in a net 'gain' for franchised commuter passenger operators through this option.
Franchised regional passenger operators	Franchised regional operators face a similar split of delay attribution as franchised commuter passenger operators. However, in 2014-15, regional operators paid out significantly less compensation than commuter operators and inter-city operators. There is a possibility, therefore, that these operators could pay out more to other operators than they receive directly from them. However, as Network Rail accounts for almost 60 percent of delays, franchised regional operators could potentially receive a net gain through this compensation mechanism.
Franchised inter-city passenger operators	Inter-city passenger operators cause a lower percentage of their own delays than other franchised operators, at 20 percent, and also have the highest absolute compensation paid to passengers. Therefore, they may stand to benefit the most in terms of how much of their compensation outlay is recovered through this option.
Open access passenger operators	Open access operators cause only 10 percent of their own delays, with other passenger operators causing 20 percent. Data on the amount of compensation paid by open access passenger operators is not available for analysis, therefore the model assumes that these operators pay out an amount of compensation per train km proportional to the franchised passenger operators. Open access operators do operate passenger compensation schemes and therefore would be eligible to recover through this option.¹¹⁷

¹¹⁷ First Hull Trains operate a system similar to Delay Repay (advertised [here](#)), while Grand Central Rail provides compensation according to the National Rail Conditions of Carriage (advertised [here](#)).

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

	Open access operators are at a higher risk of receiving less than they might be required to pay out to other operators, given their small size as compared to the operators they might be expected to compensate.
Freight operators	Using the published 2014-15 passenger compensation and delay attribution data, freight would be responsible for paying approximately £1m of passenger compensation. This figure is likely to rise as compensation schemes become more accessible to passengers and passenger operators (assuming that delays stay the same). However, this assessment has not been able to take into account the reciprocal compensation to freight.
Network Rail	Under this option, all train operators would recover an amount of end-user compensation from Network Rail for all trains which Network Rail has delayed. This applies to <i>all</i> disruptions. This is in contrast with the Schedule 8 compensation, which is a benchmarked regime and therefore train operators are only eligible for compensation if overall performance is worse than the benchmark (and Network Rail is eligible for a reverse 'bonus' if it outperforms its benchmark). Therefore, even when performing at an 'efficient' level under Schedule 8, Network Rail will be required to pay out under Schedule 8. Network Rail (and other operators causing delays) would be incentivised, through higher payments to other parties, to minimise delays. This would represent higher costs to Network Rail. Network Rail is responsible for the vast majority of delay and would therefore incur the highest costs of any party.
Funders	Network Rail would be liable for the greatest amount of compensation under this scheme, and this cost would likely be passed through to DfT. However, there is a potential opportunity for ORR to use this to create an additional performance incentive to Network Rail. At present, the operators are 'at risk' for the compensation that must be paid out. Franchised passenger operators, for example, therefore build an appropriate risk premium into their franchise bids. Under this option, that risk premium might be lower as the operators would be less at risk, which in the case of franchised passenger operators would increase the franchise value. Franchised passenger operators would stand to gain from this option in the short term, as they have factored passenger compensation into their franchise bids but would under this option become able to recover some of this compensation from Network Rail and other passenger operators. This means that the current franchises would effectively become more valuable than they were at the time of bidding. This option is not proposed as a 'benchmarked' compensation scheme. That is, train operators would recover end-user compensation from Network Rail for all trains which Network Rail has delayed and caused the operator to incur end-user compensation liabilities. This applies to <i>all</i> disruptions, not just those above a certain level.
Passengers and freight users	Passengers should benefit as delayed passenger operators should be more inclined to publicise and make it easier for delayed passengers to claim compensation. A secondary impact is that Network Rail and other operators may be more incentivised to prevent delays to passenger services. Train operators are currently 'at risk' for the compensation that they are obliged to pay to delayed end-users; for franchised operators this is limited as they estimate a

Option 18: Recover end-user compensation through the performance regime (Schedule 8)

certain amount of compensation when determining their franchise bids.

End-user compensation in freight is part of the freight operators' private contract with its customers. Therefore, to include any component of freight compensation in any 'end-user compensation' recovery mechanism, freight operators would need to work together with ORR to determine an appropriate formula. The modelling determined that freight's share of passenger compensation attribution would be approximately £1m if they were required to pay it.

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- There was some consensus on considering this option, as something which might improve the passenger perception of the industry. The intention of the performance regime, passenger operators noted, could be clearer to both industry and passengers.
- It was noted by the freight sector, but applies to both freight and passenger operators, that increasing the costs of delaying a service increases the expected cost of running an additional service if it is assumed that an additional service might at some point delay other operators. However, this is part of the incentive impact that is intended with the redistribution of risk through this option: this option envisages that operators would be at risk for the delays that they cause to other services.
- It would be more difficult to implement this option for freight operators. Freight contracts with their customers are confidential, one-to-one, and likely to vary widely depending on the type of customer (some types of commodity may be more affected by delays to transportation than others). Furthermore, freight operators are able to choose to forgo a compensation clause in a contract to instead charge their customers lower prices to account for the risk of potential delay.
- Franchised passenger operators will have included in their franchise bids a risk premium to reflect the uncertain level of passenger compensation they will need to provide. This option aims to reduce that risk premium in new franchises but given the staggered franchising process there would be a time lag until it was accounted for in all contracts. There could be some transaction costs and transitional issues if ORR tried to implement this option without double-reimbursing franchised operators.
- Passenger operators asked whether this option fits within Schedule 8, or whether it might be better placed as part of a wider review of passenger compensation. They also questioned the extent to which this option would impact Network Rail's incentives to prevent delay, as it is small in magnitude compared to overall business and Schedule 8.

ANNEX G MORE FREQUENT ACS CALCULATION DETAILED ASSESSMENT

Option 19: More frequent ACS calculation							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
+	++	+	+	+	+	+	+

The Access Charge Supplement (ACS) allows Network Rail to recover the amount it is expected to pay out in passenger Schedule 4 compensation over the control period, should it undertake the estimated level of works efficiently. The ACS is set at the start of a price control period based on the estimated volume of engineering works (maintenance and renewals) that will be carried out during that control period and a Schedule 4 unit cost for each type of activity estimated from historical data.

This option was selected for detailed assessment as it addresses some concerns in the industry that Network Rail has tended to delay work relative to the anticipated programme, thus taking fewer possessions than scheduled, and resulting in over-recovery of costs relative to the ACS set at the periodic review.

We envisage that the most likely possibility for implementing this option involves recalculating the ACS annually based on changes in the volume of engineering works planned, as more accurate predictions become available. Our study of this option, as we have envisaged it, suggests that it brings benefits primarily in terms of better reflecting Network Rail's efficient Schedule 4 costs based on the works carried out, and avoiding the risk that Network Rail will benefit from deferring or cancelling maintenance and renewals works. The main downside of the option would appear to be the potential difficulty with concluding whether variations in activity and expenditure volumes in any particular year are efficient, relative to ORR's Final Determination (the ACS is calculated to reflect the efficient level of work that Network Rail must undertake to maintain and renew the network in the control period). However Network Rail has already started reporting in its Regulatory Accounts the amount of financial under/over performance related to variation in the volume of works. This suggests the information necessary for recalculating the ACS on a more frequent basis should be available.

ACS reform potentially reduces the problem of Network Rail's over-recovery of costs in an environment where it under-delivers on the volume of work. This option has a direct impact only on franchised passenger operators as they are the only train operators to pay the ACS at the moment. But in the present SoW any potentially useful effect in reducing operator costs by reducing their risk exposure is limited, because of protection against changes in charges in existing franchise arrangements.

The impact on specific (types of) operator will depend on the extent to which the planned activities set out at the periodic review subsequently change on different routes. Train operators using a route where the planned activity volumes are delivered according to the initial plan would not see their ACS change (at least in relation to operations on that particular route) while operators on a route where a significant portion of activities are being deferred would benefit from a reduction in their ACS during the control period.

To some extent, the benefit that the option brings in terms of better reflecting efficient Schedule 4 costs based on volume of works carried out by Network Rail is counterbalanced by the costs associated with added complexity and volatility of charges within the price control period in the current SoW. However, even if franchised operators are less impacted by this option in this SoW, the option would still result in a better allocation of costs between funders and Network Rail. The proposed option would bring additional benefits in the "Dynamic railway" SoW where franchised passenger operators are exposed to changes in access charges. In that case, a more frequent

Option 19: More frequent ACS calculation

recalculation of the ACS reflecting volume of work actually carried out would reduce the financial risk exposure of passenger operators and potentially have a positive impact on the value for money of franchises and passenger fares.

Key characteristics

Description of option

The proposed option involves improving the accuracy and/or frequency of the ACS calculation to better reflect possessions requirements given the volume of engineering works carried out. This option could involve re-setting the ACS annually based on more accurate forecasts of activity volumes. This would contribute to enhancing the accuracy of the ACS.

There are some concerns that NR has tended to over-recover its passenger Schedule 4 costs through the ACS when planned work is not carried out (as the compensation payments are then lower than the ACS payments), and there has previously been some suggestions that ACS should take account of these work cancellations.

One of the main objectives of the Schedule 4 regime is to incentivise NR to deliver possessions efficiently. This option could also make the Schedule 4 regime more focused on NR's under/out performance due to effective possessions management by removing variations relative to baseline in Schedule 4 costs due to changes in the volume of works delivered.

The total level of actual Schedule 4 compensation paid out by NR is a function of several factors including:

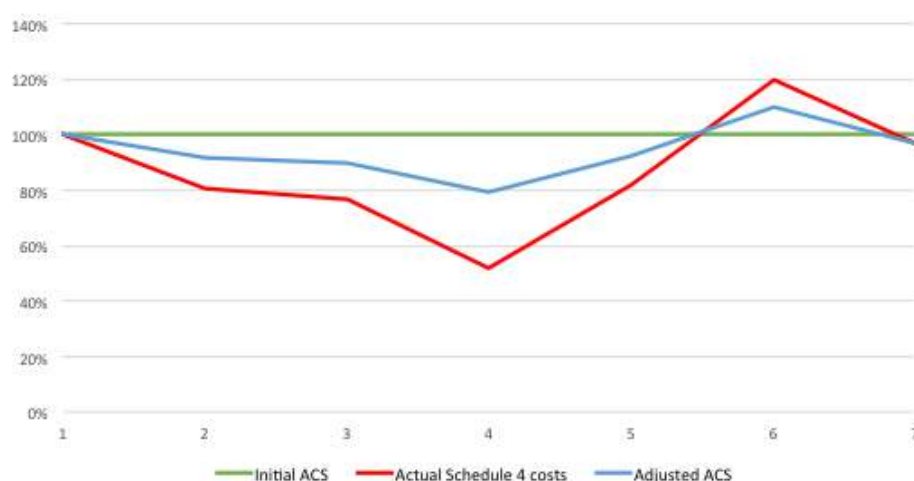
- the volume of upgrade and renewal activity that needs to be carried out - this is largely set out at the start of a control period based on the output specifications and NR's business plan;
- compensation rates (based on estimated costs of disruption such as running replacement buses, revenue loss, etc.) - this is set periodically by ORR; and
- possessions management (e.g. time required to carry out planned works and scheduling works such as to minimise disruption to timetabled services) - this is controlled by NR who can outperform its baseline estimate by improving its performance.

This option refers primarily to adjusting the ACS based on changes in the volume of engineering works carried out, however a more frequent ACS recalculation could also involve resetting compensation rates if material changes in the cost of disruption are identified although this could potentially lead to a significant increase in the costs and effort required to implement this option.

The graph below illustrates the impact of this option by showing a hypothetical variation in actual passenger Schedule 4 costs (red line) relative to the initial ACS set at the periodic review (green line). In the first four years of the control period, actual Schedule 4 costs are below the estimated level while in the last year they are slightly above the estimated level. Under the proposed option the ACS would be adjusted during the control period. The difference between the adjusted ACS line and the initial ACS line represents variations due in the level of work carried out. The difference between the adjusted ACS and the actual Schedule 4 costs represents cost savings due to better possessions management.

Figure E.1: Schedule 4 and ACS costs

Option 19: More frequent ACS calculation



At the CP5 price determination, East Coast proposed that passenger operators should be able to claim back ACS payments for planned work not carried out, on the basis that in CP3 and CP4 NR over-recovered on Schedule 4 payments as they under-delivered on work against the planned schedule of works.

Description of counterfactual

Franchised train operators receive compensation payments each time their services are disrupted due to NR restricting access to the network infrastructure to undertake planned engineering works under Schedule 4 arrangements.

Baseline Schedule 4 costs are recovered through the ACS, which is fixed ex-ante for the entire duration of the price control period. The ACS can be viewed as the equivalent of the Schedule 8 benchmark as it funds Network Rail for a target level of possessions (similar to a free allowance under a benchmark). Therefore, if NR takes more/less possessions than expected, it will under/over recover its actual Schedule 4 costs. The system is designed to be financially neutral for passenger operators if NR delivers its baseline engineering plans efficiently. The ACS covers estimated Schedule 4 costs related to maintenance and renewals activities. Schedule 4 costs that are incurred for enhancements works are not taken into account in setting the access charge supplements and are included in the capital into the costs of those enhancements.

The estimated Scheduled 4 costs are calculated at the periodic review based on planned maintenance and renewals activity volumes and a unit cost per asset type. Activity volumes are estimated at route-level but unit costs per activity are estimated at a national level. For certain asset types (e.g. track renewals, signalling, etc.) activity volumes are defined as a physical measure (e.g. km of track replaced). Other activity volumes, such as maintenance work, are measured in terms of expenditure as a proxy for volume delivered. If the required possessions are above the estimated level, passenger operators receive more compensation in Schedule 4 payments than they pay out through the ACS and vice versa.

Relevant factors impacting the form and/or the effectiveness of the option

- **Franchising regime** – under the current franchised regime, franchised passenger operators are protected against changes in ACS between price control periods therefore this limits the impact of the proposed option.
- **Data availability** – calculating the ACS more frequently will increase data requirements compared to the current ACS regime, and the ability to improve the accuracy of the charge depends heavily on the data available and the costs of collecting any additional data.

Option 19: More frequent ACS calculation

Implementation

Information requirements	The option requires yearly updating of maintenance and renewals activity volumes planned by NR against the plan set out at the periodic review. Most of the information required for this option, such as Schedule 4 unit costs for each type of activity, is calculated at the periodic review and would not need to be recalculated every year. The variables that would need updating on an annual basis are: • Physical activity volumes (e.g. km of track, signalling, switches and crossings replaced) planned over that given year for activity types where such measures are available; • Monetary activity volumes (e.g. expenditure on maintenance, civils renewals, etc.) for the given year where physical volumes are not available/appropriate. Starting with CP5, Network Rail's Regulatory Accounts Statements separate financial performance due to efficient planning of possessions from the impact of deferrals of planned activities.¹¹⁸ This type of analysis could also form the basis for recalculating the ACS.
Drivers	The main driver behind changes in the ACS during the price control period under this option is the variation in the volume of works carried out by NR. As activity volumes are estimated at route-level the change in the ACS for a particular operator will depend on changes in the delivery of planned activities on the routes used by that operator.
Calculation principles	The calculation necessary for this option involves re-running the ACS calculation currently used at the periodic review but with updated activity volumes. The steps generally needed to calculate the ACS involve:¹¹⁹ 1. Estimate Schedule 4 unit costs for different types of activities (e.g. track renewal, signalling renewal, track maintenance) from historical data (for CP5 this was done using 2011/12 data) by dividing the passenger Schedule 4 cost for that activity by the respective volume of work; 2. Multiply the Schedule 4 unit costs for each activity as estimated above by the planned volume of work at route-level for the period covered by the ACS; 3. Adjust the resulting costs by taking account of factors such as improvements needed to meet targets for the passenger Possessions Disruption Index (PDI). The main change in the yearly recalculation of the ACS would be <u>updating the planned volumes of work used in step 2</u> of the calculation process described above. In the least complicated and most practical form, this option would not involve recalculating Schedule 4 unit costs or resetting possession disruption targets. There could be different ways of implementing the proposed option however we envisage the recalculation will involve updating the ACS calculation based on forecasts of the planned activity volumes at the start of each year.
Practical	1. Using forecasts of activity volumes at the start of the year may still lead to some under/over performance if some activities are then deferred however these short

¹¹⁸ Network Rail, *Regulatory Financial Statements: Year ended 31 March 2015*, available [here](#).

¹¹⁹ The methodology used by Network Rail to forecast Schedule 4 costs for the next price control period is described [here](#)

Option 19: More frequent ACS calculation

considerations term forecast should be much more accurate than forecasts developed several years ahead at the periodic review stage.

2. While measuring progress in activity volumes for asset types where a physical measure is available (e.g. track, signalling) would be somewhat more straightforward, measuring activity volumes using financial measures (e.g. expenditure) might be more difficult. This would require determining to what extent lower than expected expenditure, for example, results from deferred activity or lower unit costs.

Lead time The option could be introduced relatively quickly and could be available for implementation at the start of CP6.

Resources required for implementation Most of the effort required for implementing this option falls on NR and ORR. NR will be required to monitor and update maintenance and renewals activity volumes at route-level on a yearly basis. The adjustments for activity deferrals that have been included in the 2014-15 Regulatory Accounts Statements suggest that most, or at least part, of the data collection work required for this option is already being done. Furthermore NR should have a good view of the type and volumes of engineering activities planned for the upcoming year therefore the proposed option should not require extensive additional data or work.

ORR will be required to verify the activity volumes provided by NR and to confirm the ACS recalculation.

Performance against criteria

Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=

The proposed option should have no major impact on system safety, although if it leads to better planned engineering works (by removing the incentive to defer maintenance and renewal activities), it might lead to a better maintained network which would in turn improve safety. However this effect is considered marginal.

Consistency with law	=	=	=	=	=	=	=	=
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Article 35 of Directive 2012/34 establishes that “infrastructure charging schemes shall encourage railway undertakings and the infrastructure manager to minimise disruption and improve the performance of the railway network through a performance scheme. This scheme may include penalties for actions which disrupt the operation of the network, compensation for undertakings which suffer from disruption and bonuses that reward better-than-planned performance.”

In addition, ORR has the power under the Railways Act 1993 to prepare, publish, and vary model clauses for track access agreements. Model clauses are standard clauses that are attached to all track access agreements of similar type. In particular, these model clauses set out the charges and incentives.

The option is consistent with current legislation.

Funding of NR efficient costs	++	++	++	++	++	++	++	++
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The option would still allow funding of NR’s cost for an efficient level of possessions. By adjusting the amount recovered through the ACS annually depending on the volume of works carried out, there is less scope for NR to under/over-recover its efficient Schedule 4 costs.

Option 19: More frequent ACS calculation

Allowance for market conditions	=	++	=	=	=	=	=	=
	Under a franchise regime where franchised passenger operators are protected against changes in access charges, recalculating the ACS annually has little or no impact on the passenger operators' financial performance. Under a SoW where franchised passenger operators are exposed to changes in charges, the proposed option would reduce the financial risk faced by passenger operators. Other operators that do not pay the ACS are not impacted by the proposed option.							
A single approach for the network as a whole	=	=	=	=	=	=	=	=
	The proposed option would apply to all train operators that pay the ACS. There would still be a difference in regimes between train operators that pay ACS (i.e. franchised passenger operators), those that can opt to pay the ACS (open access operators) and those that do not pay the ACS (freight operators). Therefore the impact is considered neutral compared to the current regime.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	++	++	++	++	++	++	++	++
	The option would still allow recovery of NR's cost for an efficient level of possessions, however it would represent an improvement on the current regime given that it should make the amount recovered more accurate (i.e. reduce the potential for over-recovery of Schedule 4 costs by NR as in the present).							
Efficient whole-system whole-life industry net costs	=	=	=	=	=	=	=	=
	The proposed option will not necessarily impact industry net costs. It rather involves a transfer of funds between NR, train operators and funders. For example, on a whole industry basis, ACS savings for train operators are counterbalanced by lower NR income. While the option removes the risk of over-recovery by NR, which currently places additional costs on franchised passenger operators, there is also a risk of under-recovery which could shift costs to NR.							
Efficient long run investment decisions	+	+	+	+	+	+	+	+
	The proposed option might have some positive impact on this criterion through removing NR's incentive to under-deliver work, thus improving incentives for efficient long-run investment decisions.							
Efficient performance management	=	=	=	=	=	=	=	=
	The proposed option refers to adjusting the ACS more frequently to take account of changes in the estimated level of possessions required due to changes in the volume of network upgrades and renewals carried out by NR. If applied appropriately this should not affect the incentives of NR to minimise possessions disruption as NR would still be entitled to any financial benefits arising from outperforming possessions targets through efficient possessions management.							

Option 19: More frequent ACS calculation

Efficient use of network capacity	=	=	=	=	=	=	=	=
	The proposed option might have a small beneficial effect on the efficient use of the network as updating the ACS to better reflect actual work done could encourage NR to better plan its possessions (as the only available way to outperform its Schedule 4 target). However this impact is uncertain and somewhat speculative therefore we have rated this assessment Amber.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	-	-	-	-	-	-	-	-
	Adjusting the ACS annually could result in higher volatility (as work is deferred from one year to another) and would make the regime less predictable compared to having the level fixed ex-ante for the entire price control period. It could, however, also have the effect of smoothing the delivery of planned works over a price control period. There is currently a peak in planned works towards the end of a control period, which may be in part due to NR wanting to save non-essential work until the end of the period to minimise its Schedule 4 liabilities – switching to an annual ACS update could make these peaks much smaller and more frequent.							
Simplicity	-	-	-	-	-	-	-	-
	The annual recalculation of the ACS would add another layer of complexity to the regime, for example due to the need to distinguish between Schedule 4 savings due to efficient planning versus savings due to lower activity volumes.							
Transparency	=	=	=	=	=	=	=	=
	The proposed option does not have a major impact on the transparency of the regime, as the ACS would be derived based on the same set of principles as in the present.							
Low transaction costs	-	=	-	-	-	-	-	-
	The proposed option would lead to an increase in transaction costs particularly as changes in ACS levels would require an adjustment of the financial model used to determine franchise payments. Under a SoW with less franchise protection, such an adjustment would probably not be required thus reducing the transaction costs arising from the proposed option.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
NR accountability	+	+	+	+	+	+	+	+
	The proposed option could be positive in limiting the scope for Schedule 4 under or over recovery due to changes in the volume of work carried out, although it might have limited impact in improving possessions management by NR.							
Non-arbitrary allocation of costs	++	++	++	++	++	++	++	++
	The proposed option would ensure that the level of ACS better reflects actual passenger Schedule 4 costs based on the volume of works carried out. As the ACS adjustment should be done based on variations in the volume of works at route-level then this would also result in a better allocation of Schedule 4 costs among the different passenger operators depending on the amount of works carried out on each route.							

Option 19: More frequent ACS calculation

The impact on franchised passenger operators under the current SoW would be limited however due to the protection from changes in access charges. A positive impact would exist in a SoW where such protection is reduced.

Optimal traffic growth	=	=	=	=	=	=	=	=
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There is no clear impact from the proposed option on incentives for optimal traffic growth.

Aligning industry incentives	+	+	+	+	+	+	+	+
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The impact of the proposed option on this criterion is unclear. It would not affect the current incentive structure for minimising disruption due to the works actually carried out, and franchised passenger operators are mostly protected from changes as the ACS passes through their franchise agreements. However, it might improve the incentives for NR to actually carry out non-essential works to improve the network.

Value for money for funders, taxpayers and users	+	+	+	+	+	+	+	+
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The proposed option does not materially affect incentives for service quality or industry costs. However the ACS recalculation would result in estimated Schedule 4 costs not being passed on to funders when works are not carried out thus potentially resulting in a lower overall funding requirement.

The recalculation could similarly result in an increase in the ACS and therefore the funding requirement if NR activity volumes are above the estimated level. While an upward revision to the ACS is possible, particularly during individual years, recent evidence suggests there is a downside bias regarding variations in NR planned activity volumes which makes an over-recovery of Schedule 4 more likely particularly when considered over an entire price control period.

Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	+	++	+	+	+	+	+	+

The proposed option brings benefits primarily in terms of ensuring that NR's efficient Schedule 4 costs reflect works carried out and NR does not benefit from deferring or cancelling maintenance and renewals works. The main downside of the option is the potential difficulty with measuring activity and expenditure volumes in order to update the ACS annually. NR has however already started reporting in its Regulatory Accounts the amount of financial under/over performance related to variation in the volume of works. This information can serve as a starting point for recalculating the ACS more frequently.

The impact of the proposed option under the current SoW is somewhat limited by the fact that franchised passenger operators have reduced exposure to changes in access charges. To some extent, the benefit that the option brings in terms of better reflecting efficient Schedule 4 costs based on volume of works carried out by NR is counterbalanced by the costs associated with added complexity and volatility of charges within the price control period in the current SoW. However, even if franchised operators are less impacted by this option in this SoW, the option would still result in an improved allocation of costs between funders and NR.

The proposed option would bring additional benefits in a SoW where franchised passenger operators are exposed to changes in access charges. In that case, a more frequent recalculation of the ACS reflecting volume of work actually carried out would

Option 19: More frequent ACS calculation

reduce the financial risk exposure of passenger operators and potentially have a positive impact on passenger fares.

Impact on stakeholders

In the current SoW this option has an impact only on franchised passenger operators as they are the only train operators to pay the ACS at the moment. Recalculating the ACS on an annual basis would reduce the scope for franchised passenger operators to over / underpay relative to Schedule 4 compensation received due to variations in the level of engineering works carried out by NR. Under the current SoW with franchise protection however, the recalculated ACS would be largely passed through to the franchising authority (DfT or Transport Scotland).

It is important to note that the impact on specific (types of) operator will depend on the extent to which the planned activities set out at the periodic review subsequently change on different routes. Train operators using a route where the planned activity volumes are delivered according to the initial plan would not see their ACS change (at least in relation to operations on that particular route) while operators on a route where a significant portion of activities are being deferred would benefit from a reduction in their ACS during the control period.

The proposed option would also reduce the scope for NR to under/over recover its Schedule 4 costs due to variations in the planned volume of works. In recent years NR over-recovery of its Schedule 4 costs has been linked to planned work not carried out. Based on this recent experience NR is likely to lose revenue through this change.

An indicative quantitative analysis has been conducted to inform the assessment in this section. The analysis uses existing industry information to understand the potential impacts of the proposed option under different scenarios.

We have considered the implications under three scenarios depending on the extent to which under/over recovery of passenger Schedule 4 costs is a result of variation in activity volumes:

- **Lower** – a third of passenger Schedule 4 under/over recovery is due to variation in activity volumes;
- **Mid** – based on 2014-15 estimates, around 57% of Schedule 4 under/over recovery is due to variation in activity volumes¹²⁰;
- **Upper** – 75% of passenger Schedule 4 under/over recovery is due to variation in activity volumes.

The quantitative impacts on different types of stakeholders are discussed below. While the estimated impacts are relatively small especially compared to the total amount of charges paid by train operators (impacts observed in the analysis amount to a less than 1% reduction in total charges paid by operators), it has to be noted that these impacts could potentially become more significant if the volume of work not carried out is very large or if a particular operator is disproportionately affected by variations in the volumes of works. Furthermore in a SoW with less franchise protection, the effect on operators' profit margins can be significant, as shown below.

Franchised commuter passenger operators	Our quantitative analysis shows that recalculating the ACS based on the assumed variations in activity volumes would result on average in an annual ACS saving between £0.4m and £0.8m with the mid estimate around £0.6m for this operator type. This means a decrease in the ACS by between 5.5% and 13%. In a SoW with less franchise protection, the potential cost savings for train operators resulting from this option could increase the profit margin of a franchised commuter passenger operator by between 5% - 12%.
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¹²⁰ Network Rail, *Regulatory Financial Statements: Year ended 31 March 2015*, (Statement 5a)

Option 19: More frequent ACS calculation

Franchised regional passenger operators	The quantitative analysis shows that recalculating the ACS based on the assumed variations in activity volumes would result on average in an annual ACS saving between £0.3m and £0.7m with the mid estimate around £0.5m for this type of operator. If these savings were kept by train operators rather than passed through franchise agreements, this would have a positive impact on the profit margin of this type of operator of between 2.5% and 6%.
Franchised inter-city passenger operators	The quantitative analysis shows that recalculating the ACS based on the assumed variations in activity volumes would result on average in an annual ACS saving for this sector between £0.8m and £1.7m with the mid estimate around £1.3m. In terms of profit margins for this operator type, this would result in an increase between 12% - 28%.
Open access passenger operators	As open access operators have not currently opted in to pay the ACS and receive full compensation under the Schedule 4 regime, the impact of the proposed option is negligible. It is possible that the asymmetric downside risk (paying more in ACS than receiving in Schedule 4 compensation) observed historically has been a factor deterring open access operators from opting in to pay the ACS. Addressing this risk may make the ACS regime more attractive to open access operators.
Freight operators	As the ACS regime does not apply to freight operators, the impact of this option is negligible.
NR	The proposed option means that NR would not retain any potential over-recovery of passenger Schedule 4 costs associated with variations in activity volumes. Based on the quantitative analysis undertaken, NR's total income would diminish on average between £11m and £25m per year with the mid estimate around £19m.
Funders	Where franchise agreements mean that train operators' savings from the ACS recalculation are passed on to funders, the impact of this option is represented by a lower funding requirement and is equal to the NR revenue loss presented above. The impact on different funders will depend on the variation in activity volumes on different routes. For example, a higher variation in activity volumes in Scotland would result in a higher adjustment to the ACS charged to ScotRail and consequently a lower support requirement from Transport Scotland.
Passengers and freight users	Any impact on end users is likely to be limited, particularly regarding freight users as freight operators are not affected by this option. Under a SoW with less franchise protection, this option would reduce the risk faced by franchised passenger operators with respect to Schedule 4 costs and could consequently have a positive impact of passenger fares.

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- Stakeholders have generally commented that the benefits of the option for train operators are unlikely to be significant in the current SoW but that under-delivery of planned activity volumes leading to over-recovery of Schedule 4 costs has been an issue in recent years. In particular:
 - Some stakeholders remarked that the difference between the Schedule 4 ACS paid

Option 19: More frequent ACS calculation

and the compensation received was material.

- Open access operators commented that they do not currently see the benefit of paying the ACS in return for full Schedule 4 compensation.
 - Train operators also raised general concerns regarding the benefits of having the ACS and stated the need to establish greater clarity as to its purpose before moving on to assess any reform options.
 - Passenger operators commented that:
 - a more general objectives-driven review of the possessions regime is needed; and
 - the benefits of this option would be counterbalanced by increased complexity and volatility of charges.
 - Network Rail considers that it is important that the ACS reflects the efficient level of compensation Network Rail expects to pay to train operators, as a result of undertaking engineering work to maintain and renew the network.
 - Funders considered that whilst this option addresses a recognised issue and could bring some benefits, a yearly change in the ACS would result in yearly adjustments to franchise payments increasing the negotiating burden between funders and franchised operators.
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ANNEX H REFORM SCHEDULE 4 DISCOUNT STRUCTURE FOR NOTICE PERIOD OF POSSESSION DETAILED ASSESSMENT

Option 22: Reform Schedule 4 discount structure for notice period of possession							
Overall performance against the RDG Vision in each SoW							
Current SoW	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
=	=	=	=	=	=	=	=

This option involves reforming the discount structure applied to Schedule 4 compensation rates paid by Network Rail to passenger train operators for revenue loss due to disruption arising from planned track possessions. The current discounts vary according to how much notice of the possession is given and reflect the existing evidence that there is a lower impact on long-term passenger demand from disruption announced well in advance.

Reforming the structure of discounts aims to address some concerns in the industry that while discounts incentivise early booking of possessions, they can be counterproductive for efficient planning of works and possessions. The discount structure provides incentives to Network Rail to plan and book possessions early, in particular more than 26 weeks in advance, when the largest discount is given. The concern is that the workplan for some of those possessions may not be fully developed at that stage, potentially resulting in inefficient use and late cancellations of possessions. Currently more than 90% of possessions are booked in this timeframe.

The discount structure also makes it costly for Network Rail to re-plan possessions, reducing the incentive for Network Rail to make changes to possession plans after the initial notification, even in cases when it would otherwise be beneficial. This option was also considered as an area where the approach may not have kept up to date with the fact that passengers now have better and more immediate access to information about timetables and impact on services of engineering works.

There are numerous ways in which such an option could be implemented, including increases, as well as reductions, in the discounts, and changes in the notice dates at which the discounts apply. We have examined several options that we envisage cover a range of possibilities for implementing this option. The scenarios considered involve:

- Reducing or removing the discounts – current notification timeframes are kept but early notification discounts are reduced or removed altogether; and
- Reforming notification thresholds and discount rates – notification thresholds are adjusted as well as reducing the discounts applied for early notification.

The viability of the option critically rests on how much difference early notifications make in reducing the disruptive impact of possessions and whether reducing discounts will alter Network Rail's possessions planning processes. An analysis of the impact of planned disruption on passenger demand is currently being undertaken by the Passenger Demand Forecast Council (PDFC) and is expected to conclude in early 2016. A decision on the level of discount factors should incorporate this latest evidence.

Given the current timetabling process, and particularly the requirement to have the timetable, and therefore most possessions agreed by T-12¹²¹ (the Informed Traveller timetable), reducing discounts alone is likely to have only a marginal impact on Network Rail's possessions planning process. Any reduction in discounts, particularly for the earliest timeframe, will increase total Schedule 4 compensation (and also be reflected in a higher ACS). In the current SoW, higher Schedule 4 payments would provide additional revenue to passenger train operators with the higher ACS costs

¹²¹ T-12 refers to 12 weeks before the timetable is operational.

Option 22: Reform Schedule 4 discount structure for notice period of possession

being largely passed on to funders, at least for the duration of existing franchise agreements. In the “Dynamic railway” SoW, with less franchise protection, the higher ACS would be borne by train operators with the overall impact being neutral if Schedule 4 costs are in line with the baseline set at the periodic review. The measure which could potentially provide most benefits involves reconsidering the notification thresholds, for example, by setting a threshold more closely linked to passenger milestones (such as T-12 when advance tickets become available).¹²² These benefits are harder to quantify without a clear view of how Network Rail’s possessions planning would change as a result; however introducing more flexibility by allowing Network Rail to benefit from a discount when possessions are notified in time for T-12 could bring benefits in terms of more efficient planning of possessions without increasing Schedule 4 costs significantly, if discount factors are not significantly reduced.

At the moment there are several ongoing reviews that could have an impact on the Schedule 4 discount structure including: RDG’s Asset, Programme and Supply Chain Management (APSCM) sub-group’s work on how possessions are planned and delivered, Network Rail’s IAP¹²³ and the PDFC’s work on the impact of planned disruption on passenger demand. Any changes to possessions planning and timetabling or new evidence on passenger behaviour arising from these initiatives should be taken into consideration.

Key characteristics

Description of option

This option involves reforming the discount structure applied to Schedule 4 revenue loss compensation rates depending on how much notice of the possession is given. This reform could consist of modifying the discount factors and/or the notification thresholds for which the discounts are applied.

The current discount structure is based on evidence that planned disruption has a lower impact on long-term passenger demand when notified in advance. The current discount structure incentivises NR to book possessions early (more than 26 weeks in advance) and may also lower the incentives for NR to make changes to possession plans after it has notified rail operators of its intention. This may be counterproductive for efficient planning of possessions as possessions may be booked early to benefit from the discount even when work is uncertain resulting in inefficient use or late cancellations of possessions, a concern expressed by train operators at the PR13 price review process.¹²⁴

In addition, if, for example, NR realises after the initial notification that it would be beneficial to lengthen the possession slightly or to rearrange the possession due to the late announcement of a large event that will create heavy passenger demand, the discount scheme at present could discourage such changes in possessions.

Although a reform of the current discount structure could involve increasing as well as reducing the discounts, our assessment focuses on the option of reducing or even removing the discounts altogether as this more clearly addresses the concerns that have been voiced by the industry in terms of the incentives provided to NR. We envisage that increasing the discounts (i.e. lowering Schedule 4 compensation rates) would only be considered if there is new evidence suggesting a lower impact of planned disruption on passenger demand (relative to unplanned disruption) than

¹²² It should be noted that some intercity operators may allow passengers to book tickets up to six months in advance although this is mainly for mid-week services which are less likely to be affected by possessions.

¹²³ The **Industry Access Programme** (IAP) is a Network Rail and industry project looking at how to optimise track access including possessions for maintenance, renewals and enhancement works

¹²⁴ **ORR** (2012) Consultation on Schedules 4 and 8 possessions and performance regimes p.14

Option 22: Reform Schedule 4 discount structure for notice period of possession

has been the case until now.

The issue of early notification discounts was taken into consideration by ORR in its consultation on the Schedule 4 and Schedule 8 regimes going into the CP5 price determination. It concluded that discounts are still appropriate as they reflected the lower marginal revenue loss for train operators when possessions are notified early. ORR also stated that early possessions planning by NR is driven more by internal timelines (such as the need to produce the Engineering Access Statement) rather than Schedule 4 discounts.

Description of counterfactual

Schedule 4 compensation rates for loss of revenue are calculated as a discounted percentage of the Schedule 8 compensation rate that would be applied, to reflect the benefit of providing early notice of a possession and giving train operators and end-users alike more time to make alternative/appropriate arrangements and thus reduce disruption.

Schedule 4 compensation payments also reimburse train operators for the cost of providing bus replacement services however this element of the compensation rate is not subject to notification discounts.

The revenue loss compensation is based on an estimate of the marginal revenue effect (MRE) per passenger journey multiplied by the number of passenger journeys. It is considered that when given enough notification of disruption, passengers are less likely to be put off from travelling by train in the future therefore having a lower negative impact on long-term demand than late notified or unplanned disruption. The amount of discount is determined by factors that vary according to the amount of notice given to passenger operators, and the type of service that is being disrupted.

The discount rates distinguish between Service Groups with a higher or lower “late time multiplier” (reflecting the value passengers place on their journey being on time) using the same ‘late time multiplier’ that is also used for Schedule 8 payments.¹²⁵ A revised range of notification discount factors was set at CP5 to reflect changes in the estimated late time multipliers for each service group.

There are three levels of notice for possessions, and up to four rates of discounts possible within each level. The current notification thresholds are:

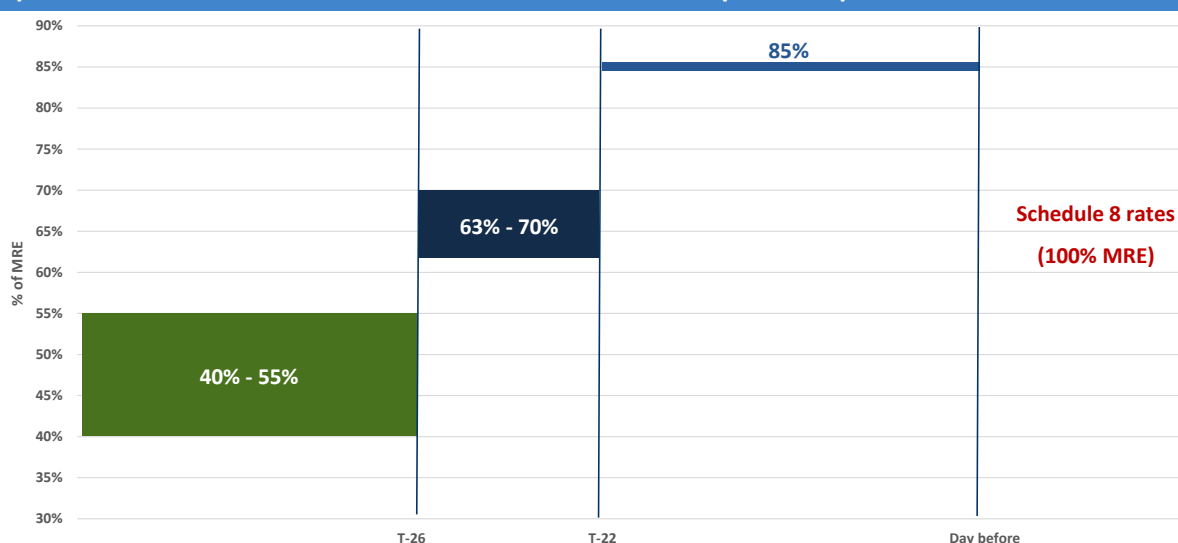
- *26 weeks before operation, with the amount payable between 40% and 55%.* This is by the ‘New Working Timetable’, which is the earliest notification to operators of the next timetable to come into operation, thus the earliest opportunity to inform passengers of upcoming disruption to services.
- *22 weeks in advance, with the amount payable between 63% and 70%.* This is meant to allow consultations with train operators and information finalised in time for inclusion in the ‘Informed Traveller Timetable’ (issued 12 weeks in advance).
- *Before 10pm the previous night, the amount payable is 85% for all Service groups.* This is when the ‘Application Timetable’ is set. Any disruption announced after this will fall under the Schedule 8 regime and have no discount applied.

This notification discount structure is illustrated in the diagram below.

Figure F.1: Notification discount structure

¹²⁵ ORR (2013) Final determination of Network Rail’s outputs and funding for 2014-19 (p.801)

Option 22: Reform Schedule 4 discount structure for notice period of possession



From the start of CP5, train operators can also claim compensation when possessions are cancelled at late notice if costs incurred as a result of this late cancellation are greater than £5,000 (for Type 1 possessions¹²⁶). This provision can also have implications for the proposed option as it may, at least in part, address the concern of the industry that the current notification discount structure incentivises NR to book possessions too early resulting in late cancellations of possessions.

On average, close to or just over 90% of possessions are or have been booked in the earliest discount window (at least 26 weeks in advance) since 2010/11, with the share of possessions booked in the earliest period close to 100% in many periods.

Relevant factors impacting the form and/or the effectiveness of the option

The proposed option is relatively unconstrained by the factors affecting the effectiveness of the incentives regime. There are however some implications stemming from these factors that should be considered:

- **Franchising** (Factors Report Section 3.2) – the proposed option could result in changes in total Schedule 4 costs and thus in the amount that needs to be recovered through the ACS. The franchising regime means that at present franchised passenger operators would be largely unaffected by changes in the ACS.
- **Track Access Arrangements** (Factors Report Section 3.3) and **Industry complexity** (Factors Report Section 4.2) - the mixed use of the network and the number of stakeholders involved mean that agreeing on a suitable possessions timetable may be difficult and there may be disagreement around the amount of compensation that is required by each user.

Implementation

Information requirements	Setting the notification thresholds and discount factors requires information on what the impact on passenger demand of possessions notified in different timeframes is. The calculation of both the MRE and of notification discount factors takes into account the late time (delay) multipliers contained in the Passenger Demand Forecast Handbook (PDFH), which reflect the value passengers place on
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¹²⁶ Type 1 possessions are possessions of less than 60 hours in duration. They account for the majority of possessions.

Option 22: Reform Schedule 4 discount structure for notice period of possession

unscheduled delays relative to scheduled journey time.

The Passenger Demand Forecast Council (PDFC) is currently considering the impact of planned disruption on passenger demand. The result of this study should be a key input in setting future discount factors particularly if it results in changes to the estimated late time multipliers for particular types of services.

Drivers	Since 2010/11, close to or over 90% of possessions have been booked on average in the first discount window (more than 26 weeks in advance). This means that the largest impacts are likely to occur from changes to discount factors applied to this notification threshold. For example, increasing each of the discount factors in the first timeframe by 1% (e.g. from 40% to 41%) leads to an estimated increase in total Schedule 4 revenue loss compensation of 1.7%, while increasing each of the discount factors in the second timeframe by 5% (e.g. from 63% to 68%) leads to a 0.5% increase in total Schedule 4 compensation.
Calculation principles	The notification discounts factors are calculated using the following formula: $\text{Notification discount factor} = \left(p \times \frac{1}{\text{late time multiplier}} \right) + (1 - p)$ where p is the proportion of passengers that are aware of the notified disruption.¹²⁷ The notification discounts applied depend therefore on estimates of how passengers react to delays (late time multiplier). A change to these multipliers or any other evidence arising from the analysis currently conducted by the PDFC should help inform what notification discount factors should be applied for Schedule 4 compensation in the future. The notification discounts factors are expressed as percentage of MRE payable as part of Schedule 8 compensation. The MRE is the estimated revenue loss when passengers suffer unplanned disruption (i.e. this is the payable rate under Schedule 8) and is defined as the long-term revenue lost by the train operator per passenger for each minute of lateness. As it is assumed that planned disruption has a lower effect on passenger demand, the payable rate under Schedule 4 is discounted relative to Schedule 8.
Practical considerations	The possessions planning process is heavily influenced by timetabling requirements reflected in Network Rail's licence conditions. One such condition is that engineering works arrangements are completed and necessary changes made to the timetable at least 12 weeks before the timetable comes into effect (i.e. by the "Informed Traveller" timetable). This gives rise to the Informed Traveller Process with the following timelines: • Disruptive period possessions plan (DPPP) provided by Network Rail at least 28 weeks in advance; • Confirmed period possessions plan (CPPP) issued 26 weeks in advance; and

¹²⁷ This algorithm for the calculation of notification discount factors is based on the observation made by Steer Davies Gleave (SDG) in its 2007 report to ORR that not all passengers are aware of planned disruption even when this is notified well in advance. The formula reflects the fact that for aware passengers the impact of planned disruption is similar to a timetable change while for unaware passengers this is equivalent to unplanned disruption.

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- Consultation with train operators potentially resulting in amendments to the Engineering Access Statement in time for inclusion in the Informed Traveller timetable.

According to the First Capital Connect response to ORR's CP5 Draft Determination, information regarding engineering works needs to be ready from T-16 in order to be made publicly available in industry systems from T-12.¹²⁸ Other industry sources have mentioned T-14 as the critical point for having the timetable ready by T-12.

While it is possible that some of the timelines described above, such as providing the CPPP 26 weeks in advance (i.e. by the maximum discount thresholds), are influenced by the Schedule 4 discount structure, it is also clear that any major changes to this process would be limited by the need to ensure the T-12 deadline is met. This suggests that altering the discount factors alone is likely to have only a limited impact on the way possessions are planned and booked.

A more effective measure might be to reform the notification thresholds as well as the discount factors. Changes to notification thresholds could then result in changes to the timetabling and engineering planning process although this would still need to ensure that engineering works are agreed in advance of T-12.

Lead time	The proposed option could be introduced relatively quickly and ORR could be in a position to adjust the notification discount structure at the next periodic review. As discussed in more detail later on in this assessment some of the impacts of this option are influenced by the provisions of existing franchise agreements. As such there could be a need to consider the timing of the implementation of the option in light of the length of these franchise agreements.
Resources required for implementation	The resources required for implementing the option depend on the type of changes envisaged to the current discount structure. Changing the value of the discounts factors would not impose large costs. More significant changes to the notification discount structure, such as modifying the thresholds, may also lead to (or require) changes to the timetabling and engineering planning process.

Performance against criteria								
Axioms	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
System safety	=	=	=	=	=	=	=	=
The proposed option could have benefits for system safety if it encourages NR to carry out better planned engineering works rather than focus on planning to minimise disruption. As the proposed option is likely to raise the cost of carrying out possessions, it could also have the effect of reducing the incentive at the margins for NR to carry out engineering work. However, we expect any such impacts to be minimal, therefore given an Amber rating under this criterion.								

¹²⁸ First Capital Connect Response to the ORR's Consultation of the Periodic Review 2013: Draft determination of Network Rail's outputs and funding for 2014-19, available [here](#)

Option 22: Reform Schedule 4 discount structure for notice period of possession

Consistency with law	=	=	=	=	=	=	=	=
	The proposed option is consistent with existing legislation.							
Funding of NR efficient costs	=	=	=	=	=	=	=	=
	Removing/reducing discounts would result in an increase in Schedule 4 costs for a given level of possessions. This should not affect NR's recovery of efficient costs assuming any reduction in discounts is reflected in the baseline Schedule 4 costs and the ACS estimated at the start of the price control period. Reducing discounts would also increase the effective average cost of possessions and could potentially increase the amount that NR over-recovers when it is not carrying out the level of possessions estimated at the price control review. However the issue of under/over-recovery of Schedule 4 costs should be dealt with through other means (such as updating the ACS calculation more frequently) therefore it has not affected the rating under this criterion.							
Allowance for market conditions	+	=	+	+	+	+	+	+
	The proposed option could potentially increase revenues for passenger train operators and thus improve their viability when operators are protected against ACS increases through franchise agreements. In the "Dynamic railway" SoW, with less franchise protection, the benefit derived from higher Schedule 4 compensation would be offset by an increase in the ACS. This option would not affect freight operators for example, as they do not receive compensation for possessions notified early.							
A single approach for the network as a whole	=	=	=	=	=	=	=	=
	Similar to current regime. The same regime would apply to all franchised passenger operators but the regime for freight and open access operators would remain different.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Service costs recovery	=	=	=	=	=	=	=	=
	Reducing/removing the discounts would result in (potentially large) increase in Schedule 4 costs. To the extent that the current early notification discounts reflect the lower costs imposed on train operators and passengers, removing these discounts would make Schedule 4 less reflective of the actual costs of disruption. These higher costs for NR would be offset through a higher ACS, therefore while the distribution of the recovery of costs might be affected, the actual recovery should not be subject to a significant change. The assessment under this criterion could become positive if it is assumed that the current discount factors do not accurately reflect the costs to train operators of early-notified possessions - i.e. early and late notified possessions lead to similar revenue losses for train operators.							

Option 22: Reform Schedule 4 discount structure for notice period of possession

Efficient whole-system whole-life industry net costs	-	-	-	-	-	-	-	-
	Current regime may offer incentives to NR to book possessions early even when scope of works might not be clearly defined. It also disincentivises ongoing changes to possessions timetable. This includes instances where a train operator might have made suggestions to improve the possessions plan, but doesn't because it is aware that Network Rail would not be willing to make changes to already booked possessions. Reforming discounts could encourage better planning of engineering works that may result in lower industry net costs. On the other hand, reducing the discount factors will result in higher Schedule 4 costs (with an increase of almost 60% if all discounts for early notification are removed). These costs amount to an extra funding requirement that funders need to cover and as such they would represent an increase in industry costs. This effect is likely to be higher than the impact of better possessions planning therefore results in an overall negative score.							
Efficient long run investment decisions	=	=	=	=	=	=	=	=
	The proposed option does not have a clear impact on network investment incentives, although it would encourage more careful planning on NR's behalf when planning and booking possessions – as there will be a greater financial cost of booking possessions. It also increases the marginal costs of taking possessions and carrying out works therefore it might have a small impact on NR's investment decisions. The impact is too uncertain to merit a negative rating.							
Efficient performance management	+	+	+	+	+	+	+	+
	Reforming discounts could encourage better planning of engineering works, at least at the margins. Incentives to minimise disruption can still be provided through Possession Disruption Index (PDI) targets that go into the calculation of efficient Schedule 4 costs.							
Efficient use of network capacity	+	+	+	+	+	+	+	+
	While other timetabling considerations mean that a major change in the way NR books possessions is unlikely, there could be a marginal effect such that certain possessions are booked in a different manner than they would be under the current discount structure. The proposed option might therefore have a slight positive impact on the efficient use of the network by removing or reducing the incentive for NR to focus on booking possessions early rather than when it is most efficient to do so.							
Judgement criteria	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
Predictability	=	=	=	=	=	=	=	=
	A positive impact on this criterion would occur if the discounts were removed altogether or their number (rather than level) were reduced, since the number of uncertain variables in the calculation would decrease – however this impact is likely to be small.							

Option 22: Reform Schedule 4 discount structure for notice period of possession

Simplicity	+	+	+	+	+	+	+	+
	Removing the discounts would make the charging regime simpler as it would reduce the number of variables that go into the calculation of compensation rates. Also better aligning the discount structure with the timetabling process may make the process more intuitive and easy to understand. Reducing discounts rates or adjusting the thresholds would result in a similar level of complexity to the current regime.							
Transparency	=	=	=	=	=	=	=	=
	Removing the discounts would reduce the number of variables that go into the calculation of compensation rates, however this change would have a minimal impact on this criterion overall.							
Low transaction costs	=	=	=	=	=	=	=	=
	Removing the discounts would result in a simpler possessions regime but it would still require complex calculations of compensation rates. Therefore, the impact on transaction costs is minimal.							
Outputs	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
NR accountability	=	=	=	=	=	=	=	=
	NR would be still be accountable under the Schedule 4 regime for planning and delivering possessions efficiently. There are no clear impacts on NR accountability stemming from the proposed option.							
Non-arbitrary allocation of costs	-	-	-	-	-	-	-	-
	The proposed option could potentially result in large increases in Schedule 4 costs (up to 60%). While NR would be funded for the higher compensation rates through a higher ACS and train operators are likely to receive a net benefit, the higher costs would have to be covered by funders. This could potentially result in a worse allocation of costs compared to the current situation. These higher costs could however be justified if they reflect a higher impact of possessions on passenger demand (and thus higher costs imposed on train operators) than currently estimated.							
Optimal traffic growth	=	=	=	=	=	=	=	=
	The proposed option may have beneficial impacts in terms of encouraging efficient network capacity use if possessions are better planned. However, the impact of this on optimal traffic growth is uncertain and probably minimal.							
Aligning industry incentives	+	+	+	+	+	+	+	+
	The proposed option could incentivise better planning and making better use of possessions, at least at the margin. Incentives for minimising disruption can still be provided through payments for late notifications/ cancellations of possessions as well as through targets for possessions disruption (such as PDI index) that would affect the baseline amount of Schedule 4 costs that can be recovered by NR through ACS. If some incentives for NR to book possessions in time for the T-12 deadline will still be provided there may be a better overall alignment between NR and train operators' interests. Removing discounts altogether would be less likely to provide the right incentives							

Option 22: Reform Schedule 4 discount structure for notice period of possession

given that early notification, particularly before the time when passenger tickets are put on sale, would be less disruptive and have less impact on passenger demand so some incentive for booking possessions before that time would be desirable.

Value for money for funders, taxpayers and users	--	-	--	--	--	--	--	--
The proposed option would result in higher Schedule 4 compensation being paid as the effective price of the average possession would rise. Under the current SoW these higher costs would ultimately have to be borne by funders. Some positive effects could arise from incentivising better planning and making better use of possessions which may result in lower industry costs. Given that possession planning is largely influenced by timetabling processes and licence conditions, major changes in the way possessions are planned are unlikely to take place. Therefore the higher funding requirement is unlikely to bring enough efficiency benefits to create better value for money from the perspective of funders and taxpayers. In a SoW with less franchise protection, the higher Schedule 4 costs would be covered by train operators through a higher ACS. This means the impact on funding requirement should be largely unchanged. However if there is asymmetric risk of train operators paying out more through the ACS than receiving in Schedule 4 compensation than this could reflect in higher risk premiums in franchise bids.								
Summary	Current	Dynamic railway	On-rail comp	Specified franchises	Protect freight	Beneficiary pays	Capacity allocation	Regional powers
	=	=	=	=	=	=	=	=

This option is primarily about rebalancing the focus of incentives from aiming to minimise disruption towards better planning of possessions. The viability of this option critically rests on two aspects:

- 1) how much difference early notification makes in reducing the disruptive impact of possessions; and
- 2) whether removing/reducing discounts will alter NR's possessions planning process.

The answer to the first point requires primarily detailed analysis of the impact of planned disruption on passenger demand and thus train operators' revenue. Such analysis is currently undertaken by PDFC and is expected to conclude in early 2016.

Given the current timetabling process, and particularly the requirement to have most possessions agreed by T-12 (the Informed Traveller timetable), reducing or removing discounts alone is unlikely to have a major impact on the NR possessions planning process, although some marginal impact is possible.

The largest impact however of reducing discounts is likely to be higher Schedule 4 compensation payments. Under the current SoW, higher Schedule 4 payments would provide additional revenue to passenger train operators, some/all of which may flow to funders but the costs (reflected in an increase in the ACS) would be passed on to funders, at least for the duration of existing franchise arrangements.

Furthermore, while reducing the incentive for NR to book possessions early may improve possession planning in some cases, there is also the risk of this providing incentives to NR to delay booking possessions as long as possible. This is particularly the case if financial incentives for notifying possessions early are removed altogether. This could result in lower overall efficiency compared to the current situation, considering that some degree of early notification, particularly before the time when

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passenger tickets are put on sale, is desirable to both passengers and train operators and would have a lower impact on future passenger demand.

The measure which could potentially bring some benefits in the future involves reconsidering the notification thresholds, for example, by setting a threshold for befitting from a discount more closely linked to passenger behaviour (such as T-12 when advance tickets become available). These benefits are harder to quantify without a clear view of how NR's possession booking behaviour would change as a result; however introducing more flexibility by allowing NR to benefit from a discount when possessions are notified in time for T-12 could bring benefits in terms of more efficient planning of possessions and without increasing Schedule 4 costs significantly (if discount factors are not significantly reduced).

There could also be merit in ensuring there is enough flexibility in the regime such that a possession booked early could be amended at no extra cost if there is agreement between NR and the affected train operators. This could help to address current concerns that the notification discount structure makes NR less open to modifying possessions once an early notification has been made.

Impact on stakeholders

The main justification for the current regime of discounts is that the further in advance a train operator is made aware of a possession, the lower the impact of that possession on the train operator's revenues because train operators and end-users can manage disruptions more easily and passengers are less likely to be put off from travelling by rail in the future if they are given early notification.¹²⁹

An indicative quantitative analysis has been conducted to inform the assessment of the proposed option. The analysis uses existing industry information to understand the potential impacts of the proposed option under different scenarios. The analysis was conducted assuming no dynamic changes in the number and distribution of possessions across the different notification timeframes and thus captured solely the financial impact of changes in the compensation rates payable under the Schedule 4 regime. Comments on potential behavioural effects on the way NR books possessions are however included in the discussion.

We have considered the implications under three scenarios. These scenarios consider the financial impact on NR and different types of train operators of implementing alternative discount structures. The scenarios considered involve:

- **Scenario 1: Reducing discounts** – current notification timeframes are kept but notification discounts are reduced by 15% for the earliest timeframe (e.g. payable rate increases from 40% to 55% of MRE) and by 10% for the middle timeframe (e.g. payable rate increases from 65% to 75% of MRE);
- **Scenario 2: Removing discounts** – discounts for early notification of possessions are removed such that 85% of MRE is paid on all possession notifications;
- **Scenario 3: Reform notification thresholds and discount rates** – notification thresholds are adjusted so that the largest discount is given for possessions booked more than 22 weeks in advance and a medium discount is given for possessions booked more than 12 weeks in advance. The notification discount factors are also reduced as per the first scenario analysed.

As notification discounts apply to the passenger Schedule 4 regime, the impact regards franchised and open access passenger operators. Given that the split of possession bookings is roughly similar

¹²⁹ ORR (2013) Final determination of Network Rail's outputs and funding for 2014-19, p.801

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for all service groups (around 90% of possessions are booked more than 26 weeks in advance) the impact of changing the discounts factors on different types of operators is equally similar.

These scenarios are meant to illustrate potential impacts under a range of possible changes to the current notification discount structure. However there are other ways in which reforms could be implemented and therefore the assessment presented here does not represent an exhaustive list of potential impacts. For example, if notification thresholds are reformed but current discount rates are kept in place, the financial impact under our static assessment will be small. Similarly if discounts are increased the impacts presented here are going to be reversed (i.e. total Schedule 4 compensation would decrease). We would however envisage that higher discounts would only result from new evidence showing a lower impact of planned disruption on passenger demand rather than being applied only as an incentive for NR.¹³⁰

At a high-level the main potential impacts under the scenarios considered are:

- **Total Schedule 4 revenue loss compensation paid to passenger train operators for possession disruption would go up** as a result of reducing (or removing) the discounts which means that the amount recovered through the ACS would also increase. Under the current SoW, franchised passenger operators would be held harmless against any change in the ACS which means that the higher Schedule 4 costs would be effectively borne by funders, at least during the duration of existing franchise agreements. The increased Schedule 4 compensation would represent a net increase in revenue for passenger operators which may have to be shared with funders under profit sharing mechanisms depending on the specific provisions of existing franchise agreements. If the franchise protection were removed, the higher compensation that franchised passenger operators would receive would be counter-balanced by an increase in ACS.
- **Reducing the discounts could rebalance NR's possessions planning process** towards ensuring possessions are booked at the right time rather than early to benefit from the discount. As mentioned above, timetabling requirements mean that NR would still need to follow largely the same possession planning process. Therefore this is also likely to be a marginal rather than a large scale effect especially if only changes to discount rates are implemented. Changes to the possessions planning process are more likely to take place if there are wider changes to the notification thresholds.
- **Reducing discounts could also lower the incentive for NR to book possessions early and could result in NR providing late notifications of possessions** that would result in higher costs for train operators and end-users but again this is more likely to be a marginal rather than full scale impact. Given the current timetabling process requirements, we believe a large shift in the way possessions are planned and notified is unlikely therefore the costs imposed on train operators and passengers are likely to be limited. This impact would also be mitigated by the fact that train operators would receive higher compensation for all possessions.

Franchised commuter passenger operators	Reducing discounts (scenario 1) leads to an estimated increase in Schedule 4 compensation paid to a typical franchised commuter passenger operator of 27% (around £2.4m per year).
	Removing discounts (scenario 2) leads to a higher estimated increase in Schedule 4 compensation paid to a typical franchised commuter passenger operator of 59% (approx. £5m per year).

¹³⁰ This is consistent with the SDG recommendation in the 2007 report to ORR that incentives in the notification discount structure should be applied as a penalty for unwanted behaviour by NR (i.e. increase payment rates for late notification) rather than by offering discounts beyond the estimated cost of disruption for early notification.

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Reforming thresholds and discounts (scenario 3) would increase estimated Schedule 4 compensation paid to a typical franchised commuter passenger operator by around 24% (approx. £2m per year).

There would also be similar increases in the ACS to offset these higher compensation payments. In the current SoW with franchise protection, these higher costs may be passed on to funders, therefore the higher compensation would result in a net benefit to passenger operators, at least during the existing franchise agreement. For a typical franchised commuter operator the impact on profit margins would be significant (an increase of between 29% in scenario 3 and up to 70% in scenario 2) although some or all of this may flow back to funders.

Some of this benefit might be offset by higher costs for train operators as a result of later notification of possessions. However we would not expect a large shift in the way possessions are booked to occur therefore any costs are likely to be much lower than the estimated benefits.

In a SoW with less franchise protection, the overall impact on franchised passenger operators would be largely neutral if NR possessions match the level used to set the ACS. If possessions are below the estimated level as has been the case in recent years, there is the risk for passenger operators to receive less in Schedule 4 compensation than they pay through the ACS, with this difference being greater when early notification discounts are reduced.

Franchised
regional
passenger
operators

Reducing discounts (scenario 1) leads to an estimated increase in Schedule 4 compensation paid to a typical franchised regional passenger operator of 25% (around £1m per year).

Removing discounts (scenario 2) leads to an estimated increase in Schedule 4 compensation paid to a typical franchised regional passenger operators of 59% (around £2.4m per year).

Reforming thresholds and discounts (scenario 3) would increase estimated Schedule 4 compensation paid to a typical franchised regional passenger operator by around 20% (approx. £800k per year).

There would also be similar increases in the ACS to offset these higher compensation payments. In the current SoW with franchise protection, these higher costs may be passed on to funders, therefore the higher compensation would result in a net benefit to passenger operators, at least during the existing franchise agreement. For a typical franchised regional passenger operator profit margins would increase from around 7% (in scenario 3) up to 19% (in scenario 2) although some or all of this may flow back to funders.

Some of this benefit might be offset by higher costs for train operators as a result of late notification of possessions. However we would not expect a large shift in the way possessions are booked to occur therefore any costs are likely to be much lower than the estimated benefits.

In a SoW with less franchise protection however the overall impact on franchised passenger operators would be largely neutral if NR possessions match the level used to set the ACS. If possessions are below the estimated level as has been the case in recent years, there is the risk for passenger operators to receive less in Schedule compensation than they pay through the ACS, with the difference being greater when early notification discounts are reduced.

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Franchised inter-city passenger operators	Reducing discounts (scenario 1) leads to an estimated increase in Schedule 4 compensation paid to a typical franchised inter-city passenger operator of 25% (around £4m per year). Removing discounts (scenario 2) leads to an estimated increase in Schedule 4 compensation paid to a typical franchised inter-city passenger operator of 59% (around £9m per year). Reforming thresholds and discounts (scenario 3) would increase estimated Schedule 4 compensation paid to a typical franchised inter-city passenger operator by around 20% (approx. £3m per year). There would also be similar increases in the ACS to offset these higher compensation payments. In the current SoW with franchise protection, these higher costs may be passed on to funders, therefore the higher compensation would result in a net benefit to passenger operators, at least during the existing franchise agreement. The potential benefit in terms of profit margins for this type of train operator would be particularly significant. In scenarios 1 and 3, profit margins for a typical franchised inter-city passenger operator could increase by around 50% while in scenario 2 by over 100% although some or all of this may flow back to funders. Some of this benefit might be offset by higher costs for train operators as a result of late notification of possessions. However as we would not expect a large shift in the way possessions are booked to occur any costs are likely to be much lower than the estimated benefits. In a SoW with less franchise protection however the overall impact on franchised passenger operators would be largely neutral if NR possessions match the level used to set the ACS. If possessions are below the estimated level as has been the case in recent years, there is the risk for passenger operators to receive less in Schedule compensation than they pay through the ACS, with the difference being greater when early notification discounts are reduced.
Open access passenger operators	Reducing discounts (scenario 1) leads to an estimated increase in Schedule 4 compensation paid to a typical open access passenger operator of 25% (around £150k per year). Removing discounts (scenario 2) leads to an estimated increase in Schedule 4 compensation paid to a typical open access passenger operator of 57% (around £350k per year). Reforming thresholds and discounts (scenario 3) would increase estimated Schedule 4 compensation paid to a typical open access passenger operator by around 21% (approx. £130k per year). As open access operators have not opted for paying the ACS they do not receive compensation for Type 1 possessions thus these benefits result from higher compensation paid on Type 2 and 3 possessions. Open access operators would also receive the benefit of increased compensation payments without the additional costs of higher ACS. The positive impact in terms of profit margins for an open access operator would be around 3% in scenario 1 and 3 and around 8% in scenario 2.
Freight	As the notification discounts apply to passenger Schedule 4 compensation and freight operators do not pay an ACS, the direct impact of this option on freight operators is limited. As freight Schedule 4 compensation rates for possessions notified before and after T-12 differ, there could be an impact on freight operators if the proposed option results

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in a significant change in the way NR plans and books possessions. As discussed above, NR's licence conditions regarding the Informed Traveller timetable requirements mean that possessions would still have to be largely agreed before T-12.

NR	The proposed option would have the following estimated impacts on the total passenger Schedule 4 compensation paid by NR: • Reducing discounts (Scenario 1): 26% increase – approx. £54m; • Removing discounts (Scenario 2): 59% increase – approx. £124m; • Reform thresholds and rates (Scenario 3): 21% increase – approx. £45m. NR would however be funded for these higher costs through increases in the ACS. Higher Schedule 4 payments would also increase the potential for under/over recovery if the number of possessions required during a control period is higher/lower than estimated at the periodic review. If actual possessions are lower than the estimated level used to set the ACS, as has generally been the case in recent years, then NR could potentially over-recover a larger amount of Schedule 4 costs. By effectively raising the average cost of taking possessions, the proposed option also increases the savings achieved by NR when not carrying out a possession. A potential side effect of this option would then be that at the margins NR would have higher incentives to postpone or not carry out engineering work.
Funders	The proposed option would result in higher Schedule 4 costs and a higher ACS of the magnitude shown in the section above. In the current SoW these higher ACS costs would be passed on to funders, at least for the duration of existing franchise agreements. These extra costs would be captured in future franchise agreements. In a SoW with less franchise protection these higher costs would be borne by franchised passenger operators offsetting the benefit they receive from higher Schedule 4 compensation. If there is a risk that franchised train operators pay out more in ACS than receive in Schedule 4 compensation then this would be likely to have a knock-on effect on the value of franchise bids resulting in lower value for money franchise agreements.
Passengers and freight users	The direct impacts on passengers of this option are likely to be limited. Any changes to the way NR plans and books possessions could also affect passengers either positively (if NR plans possessions more efficiently resulting in less overall disruption) or negatively (if there is more late notification of possessions). Given that we would expect the vast majority of possessions to still be agreed before the Informed Traveller timetable is published (when most passengers would become aware of train schedules and would be able to buy tickets), any such impacts are likely to be small. Freight users are less likely to be impacted by this option as the impact on freight operators are also limited (see assessment further above).

Summary of industry commentary

Stakeholder comments, reflected where relevant throughout the detailed assessment of this option, included the following points.

- Stakeholders have commented that the most important milestone to be borne in mind when setting discounts is to have possessions reflected in the Informed Traveller timetable (T-12) when tickets are first put on sale. In practice this would mean having possessions agreed prior to that

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deadline in order to allow possessions to be incorporated into the timetable uploaded at T-12.

- Passenger operators noted that it is important to bear in mind that the main reason for Schedule 4 discounts is related to the impact on passengers' willingness to travel and not to incentivise better planning (both possessions and work planning).
 - Passenger operators also stressed the need to have clarity about the purpose of the current regime in order to assess whether a reform option is sensible or not. A more general objectives driven review of the whole performance incentive/compensation arrangements is needed.
 - Network Rail noted that the Notification Discount Factors (both the level of discount and the timing thresholds) must be based on robust evidence of genuine lost future operator revenue at different notice periods. Therefore, further work to review this as part of PR18 appears appropriate. However, the inherent uncertainty for Network Rail in planning a long way ahead of a possession must also be recognised.
 - Transport Scotland noted that the issue of possessions being booked early has been raised multiple times before. Any perverse incentives in the regime should be removed and aligned with the Informed traveller T-12 deadline.
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ANNEX I ASSESSMENT CRITERIA

As explained in Section 2.3, the RDG Vision provides the basis of the assessment criteria used for the initial assessment presented in this report.¹³¹ Table I.1 below, contains the full descriptions of the criteria used. They are presented in this annex for ease of reference when reading the individual detailed assessments in Annexes B to H.

The descriptions provided are drawn from the RDG Vision but, as noted in Section 2.3, four descriptions have been clarified to assist with the process of conducting the initial assessments and to reflect feedback from the industry. In each case, text has been added (identified in the table as underlined text), with no deletions being made.

Table I.1: Assessment criteria

Criterion	Description
Axioms	
System safety	Charges must fund, and should not create incentives to compromise, the safety of the railway system
Consistency with law	The charges and incentives regime should comply with the relevant regulations and laws, <u>including EU and domestic legislation (e.g. Railways Act, and Access and Management Regulations)</u> . This includes consistency with the non-discrimination principle <u>and facilitation of effective competition</u> . <u>Further key elements include legal requirements for transparency, efficiency, minimum charges of direct cost incurred, the EU framework for additional charges, and specific impact tests considered by the ORR such as those on the environment.</u>
Funding of Network Rail efficient costs	Total revenues (access charges plus government support) should allow Network Rail to recover the total efficient costs of providing and improving all services
Allowance for market conditions	Where the charges for a service exceed the costs directly incurred for the provision of that service, any mark-up should recognise pressures from competitive external markets and may only be applied if the market segment concerned can bear the cost. <u>For the avoidance of doubt, and to avoid duplication, any legal requirement related to the allowance for market conditions is considered under this option.</u>
A single approach for the network as a whole	The charges and incentives approach and methodology should apply to the whole network, but may be different for different customers with different characteristics. Different methodological decisions regarding the calculations of charges should not be allowed: methodology and policy decisions should be the same for the whole network. This does not mean that actual charges will be the same.

¹³¹ RDG (Dec 2014) "RDG vision for the charges and incentives regime in the long run" available [here](#) p13-16

Criterion	Description
Objectives	
Service cost recovery	Charges for any service provided by Network Rail should recover at least the efficient costs directly incurred to provide that service. The level at which services are defined will need to be considered
Efficient whole system whole life industry net costs	The charges and incentives regime should incentivise or enable changes in the pattern of service (including in respect of journey times) where the resulting benefits exceed the change in efficient costs directly incurred
Efficient long run investment decisions	The charges and incentives regime should incentivise or enable Network Rail to invest where the long run benefits of the investment exceed its efficient costs
Efficient performance management	The charges and incentives regime should incentivise or enable the efficient management of both planned and unplanned disruptive work
Efficient use of network capacity	The charges and incentives regime should not result in distortionary incentives for the allocation, and should encourage the best use of, available network capacity
Judgement criteria	
Predictability	The regime should avoid undue volatility in the structure and level of charges across multiple control periods, so that operators can predict the future level of charges for a given pattern of operations with a reasonable degree of confidence
Simplicity	All charges to all operators should be easily understood. <u>The regime should be straightforward, transparent, and readily understandable at the point of use by all parts of the industry and broader stakeholders.¹³² It must also be practicable to calculate and apply the charges at the required level of granularity.</u>
Transparency	All charges to all operators should be derived from a clear set of principles. Any deviations from these principles should be clearly identified, and their impact clearly shown.
Low transaction costs	The charges and incentives regime should impose low transaction costs.
Outputs	
Network Rail accountability	A transparent regime will result in Network Rail being accountable to its customers, funders and users in relation to charges and incentives. However, full accountability depends on non-charging structure issues such as institutional and contractual mechanisms, which cannot be reflected in a set of

¹³² RDG (May 2015) "Review of Charges Phase 2b: Assessment of the current charges and incentives regime" available on the RDG website [here](#) p7

Criterion	Description
	objectives that relates to the structure of charges.
Non-arbitrary allocation of costs	If a clear distinction can be made between the base services bought by operators, and the incremental enhancements to those services bought by the DfT, Transport Scotland and other funders, then a charges regime which recovers at least the efficient costs directly incurred to provide any service can generate a non-arbitrary charge for those incremental enhancements. This can result in a non-arbitrary allocation of costs between operators and funders.
Optimal traffic growth	A regime that provides efficient industry costs, efficient long run investment decisions and efficient use of network capacity will incentivise the growth of traffic volumes where the net benefits of doing so are positive.
Aligning industry incentives	Improved efficiency from and greater co-operation (e.g. through alliances) between Network Rail, train operating companies and freight operating companies.
Value for money for funders, taxpayers and users	<u>A regime that facilitates investment and improvements in the customer experience for both passengers and freight users, supporting the trade-offs between competing requirements, and taking into account public funds available.</u>

Key: Underlined text supplements the descriptions provided in the published RDG Vision.

ANNEX J KEY FEATURES OF ALTERNATIVE SoWs

The Phase 2a slide deck,¹³³ contains a description of the characteristics of each SoW. The key features noted for each SoW are reproduced below for ease of reference when reading the assessments in the preceding annexes.¹³⁴

J.1. A more dynamic railway

- More on-rail competition between passenger operators, i.e. increased provision of passenger services by open access operators.
- Low franchise protection from changes in access charges, i.e. franchisees are on risk for changes to a wider range of Network Rail's access charges.
- Increased franchise flexibility as a result of less highly specified franchise agreements, i.e. franchisees have more freedom to adjust service provision, e.g. in reaction to changes in patterns of demand.
- Beneficiary pays approach to fixed costs, i.e. government no longer provides funding of infrastructure via a 'lump sum' direct network grant and instead directs funding to specific projects or to cover specific industry costs.
- Decisions on allocation of network capacity are no longer based largely around the rights reflected in the existing timetable. Instead, allocation may reflect other factors, such as the overall benefits of use.

J.2. On-rail competition via more flexible franchising

- More on-rail competition between franchised passenger operators or from more open access as a result of fewer services being franchised on certain parts of the network.
- Increased franchise flexibility as a result of less highly specified franchise agreements, i.e. franchisees have more freedom to adjust service provision, e.g. in reaction to changes in patterns of demand.

J.3. More highly specified franchises

- Greater franchise protection from changes in the charges and incentives regime, i.e. franchisees are protected from the financial effects of more elements of Network Rail's charges and incentives regime, e.g. the Possessions Regime, Performance Regime and Electric Current for Traction charge.

¹³³ RDG (May 2015) "*Current and potential alternative states of the world*" available [here](#)

¹³⁴ A detailed description of SoWs was also produced in the Phase 3 report on factors impacting the form and/or the effectiveness of charges and incentives.

- Reduced franchise flexibility as a result of more highly specified franchise agreements, such as a management contract, i.e. franchisees have very little freedom to adjust service provision, e.g. in reaction to changes in patterns of demand.

J.4. Freight protection / subsidy

- More financial protection or a direct subsidy for freight operators provided by governments.
- This could either be:
 - Protection from changes to Network Rail's access charges; and/or
 - Direct subsidy from government to freight operators to reflect the positive externalities / societal benefits of freight.

J.5. Beneficiary pays for network capability

- Governments no longer provide a lump sum Network Grant directly to Network Rail to fund a mix of new and existing network capability.
- Instead, funding is directed to specific projects, potentially via the users that benefit most from those schemes (e.g. franchised operators or regional funders). Alternatively, funding is provided directly to Network Rail but for specific elements of existing capability, e.g. governments explicitly fund historic financing costs, or the societal benefits of enhancements to the rail network.

J.6. Change in approach to allocation of network capacity

- Decisions on allocation of network capacity are no longer based largely around the rights reflected in the existing timetable. Instead, allocation may reflect other factors, such as the overall benefits (both railway revenues and societal benefits) generated by a particular use of a train path, e.g. intercity, commuter, freight, possession for maintenance. Or, capacity allocation may respond more quickly to changes in patterns of demand.
- In practice, a more analytical approach would be taken to allocating train paths, compared to the current SoW.
- A change in approach to allocating network capacity should be considered in two SoWs:
 - Current capacity / capability remains; and
 - A significant increase in capacity, resulting from the outputs of the 'Digital Railway' and/or a major enhancement project such as High Speed 2.

J.7. Regional decision making

- More responsibility for decision making (funding, policy, operational) at a regional level. For example, with the provision of local passenger service being procured and funded by regional bodies, e.g. Passenger Transport Executives.
- Governments no longer provide lump sum grants directly to Network Rail to fund a mix of new and existing capability. Instead, funding is directed to specific projects, potentially via the users that benefit most from those schemes (e.g. franchised operators or regional funders), or funding is provided directly to Network Rail but for specific elements of existing capability.