Further development in air traffic management in the area of performance incentives

Final Report
02 November 2017

European Commission DG MOVE, Unit Single European Sky

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D  Overview of RP2 capacity incentive schemes
Executive Summary

Background

The European Commission is seeking to review the impact and effect of revised (2013) Single European Sky (SES) legislation, covered by the charging and performance Regulations on incentives in the Air Traffic Management (ATM) sector, and identify any unintended consequences and lessons to be learned.

The Commission appointed Steer Davies Gleave to review the current incentive schemes with regard to their mechanisms, effectiveness and compliance with the principles set out in the legislation; review incentive schemes used in other regulated sectors with a view to identifying transposable features; assess the contribution of the incentives to the objectives of the Performance and Charging schemes; define best practices/guidance and measurable criteria for incentive schemes; and provide recommendations for future developments of incentive schemes in preparation for Reference Period 3 (RP3).

Methodology

We applied a methodology, including a stakeholder consultation exercise, providing for a thorough review of the implementation of incentives schemes applied in the SES Legislation to date in RP2 and careful consideration of how they should evolve in the future.

Following an inception phase, we approached the work by undertaking a stakeholder consultation, data collection and analysis to describe the current situation and develop ideas for measures for RP3. The ideas were presented and discussed at the study workshop and NSA Coordination Platform (NCP) working group on 21 June 2017, with written feedback also received from stakeholders in July 2017.

Given the nature of the study and the need for discussion of a range of complex issues, we undertook a series of interviews with stakeholders either face-to-face or by telephone. The consultation included the following stakeholder groups:

- Functional Airspace Blocks (FABs);
- Air Navigation Service Providers (ANSPs) and representative bodies;
- National Supervisory Authorities (NSAs);
- Airspace users and representative bodies;
- Professional Staff Organisations;
- the SESAR Joint Undertaking;
- the Performance Review Unit; and
- the Network Manager.

The study also drew on all relevant documents linked to the existing incentives and reviews of implementation during the first year of RP2, including: applicable legislation; initial and final FAB Performance Plans; the Performance Review Body (PRB) Annual Monitoring Report (2015); Unit Rate verification letters; and other relevant PRB and Single Sky Committee (SSC) papers. The study also reviewed incentive mechanisms that have been applied in other regulated industries, with a focus on airports and rail, and some experience from the energy and water industries.

Using a range of sources, including previous studies for the Commission, we defined a manageable number of criteria to use in our assessment of the ideas for future incentives schemes, summarised in the table below.
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### Evaluation criteria

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic efficiency</strong></td>
<td>The scheme should incentivise economically efficient decisions in the planning and use of airspace in the context of SES objectives.</td>
</tr>
<tr>
<td><strong>Intelligibility</strong></td>
<td>The objectives of the incentive are clear and the outcomes easy to measure and monitor related to the targets.</td>
</tr>
<tr>
<td><strong>Acceptable administration costs</strong></td>
<td>Administrative cost to be minimised and proportional to the scheme introduced.</td>
</tr>
<tr>
<td><strong>Credibility with the stakeholder community</strong></td>
<td>Incentives are understood by stakeholders and accepted as encouraging the right behaviours.</td>
</tr>
<tr>
<td><strong>Minimising risks of perverse behaviours emerging</strong></td>
<td>The design of the incentive should avoid perverse behaviours emerging, where possible.</td>
</tr>
</tbody>
</table>

The measures proposed were described using a template that is aligned with that used for the definition of measures in the RP3 Impact Assessment study, to which this work formed an input. This template covered a high level description of the measure, a summary of the changes from the current situation, identified the parties required to take action, the contribution of the measure to the objectives, its scope and coverage, any legislative implications, and key risks.

**Review of RP2 experience**

The specific objectives of the incentives are not described in the performance and charging regulations, which do not identify the behaviours that should be influenced nor provide details on the expected outcomes of implementing the incentives schemes. The objectives of the incentives are described only at a high level as part of the overall objectives of the performance and charging regulations, which aim to support improvements in performance.

As a result, for the majority of cases it appears that incentives have been put in place simply because States/FABs are required by the regulation to have them. A number of them (e.g. Baltic FAB) are very clear about this in their Performance Plans (PP), referencing the regulations in the PP template’s "justification" box. No States/FABs refer to a means of determining whether an incentive has met its objective, although arguably the unsaid objective is meeting the FAB targets.

Through the consultation, it became clear that the process of target-setting and for deriving FAB and corresponding local reference values is not well-understood.

The main issues found by the PRB in its assessment of the RP2 PPs were in the compliance with the incentivisation of en-route ATFM delay, with a number of issues arising with respect to compliance with the legislation and, in some cases, lack of clarity as to how the scheme would be implemented in practice.

A number of issues with the implementation of the incentive schemes were highlighted in the PRB’s assessment of the RP2 Performance Plans and its review of the NSA monitoring reports. The absence of specified objectives meant that many of these issues were focussed on technical aspects of the schemes’ design, with little recourse to the general principles or intent of the intervention.

The table below provides a view on why these issues may have emerged, based on our analysis and engagement with stakeholders.
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<table>
<thead>
<tr>
<th>Theme</th>
<th>Indicative reason</th>
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| FAB-Local level consistency | Complexities in the interaction between FAB-level targets and local level targets:  
• definition of targets and reference values at FAB and local level by NM  
• attribution of FAB outcomes at local level |
| Symmetry | Practicalities of designing a symmetrical scheme where delay targets are close to or equal to zero. |
| Scope | Misalignment between State borders used for regulatory oversight and operations which may cross these. |
| Data assurance | Flexibility afforded for the exclusion of certain delay codes in Regulation not supported by appropriate oversight processes at local level. |

The impact of the incentives in the first year of RP2 (2015) was implemented for the first time in 2017 (n+2), through the inclusion of the bonus or penalty in the unit rate for 2017, which was examined by the European Commission as part of the compliance review of the 2017 unit rates. In this review, it assessed that bonus or penalties resulting from schemes that are seen as non-compliant should be excluded from the 2017 unit rate, affecting nearly all States (except Denmark and the UK). Three States (Sweden, Estonia, Ireland) were identified where the bonus generated had not been calculated based only on actual ATSP revenues, but a larger revenue scope (e.g. charging zone revenue) instead, as a result of differing interpretations of the regulation.

Experience from other industries

Incentives and performance measurement are used extensively in other regulated industries. There are some clear analogies with the experience in the airport and rail industries, and less direct experience from the energy and water industries.

The key lessons to consider are split between principles that have been followed and specific schemes which may have some parallels to application in the ANS industry.

Principles and lessons learned in the design of the schemes

• Specific legislative objectives should be defined.  
• Material revenues at risk are required to influence behaviour.  
• Robust methods of fault attribution are necessary.  
• Capacity and volume incentives work in tandem.  
• Schemes should be tailored to local circumstances.  
• Consumers and service users ought to be involved with the design.  
• A number of stakeholders’ behaviour can be incentivised in the same regime.  
• Potential benefits need to outweigh material additional costs in implementation.  
• Single incentives cannot address both short- and long-term capacity issues.  
• Great care needs to be taken to avoid unexpected outcomes.  
• Complexity may result in a lack of accountability and transparency, and ultimately a withdrawal of the system.

Specific examples of schemes to draw upon

• Legislative objectives: the EU rail legislation contains examples of wording on specific objectives for incentive regimes.  
• Capital and capacity enhancement: the capital trigger scheme in the airport industry, and targeted capital funding incentives in the energy industry address specific issues.  
• Framework but allowing local circumstances: the quality of service regime at EU airports and performance regime in the rail industry.
• Fault attribution processes: the rail industry has developed a very sophisticated system over a number of years.

**Intended and unintended consequences**

The lack of specific objectives makes it difficult to assess the intended consequences of the incentive schemes, however at a headline rate the worsening of delays (in 2016, for the SES area, the en-route ATFM delay per flight increased from 0.76 minutes per flight in 2015 to 0.91 minutes per flight, a degradation of nearly 20%) and the fact that a number of FABs did not meet their targets should be considered. Moreover, a number of stakeholders have identified that the incentives had a minimal impact on changing behaviours.

A number of potential unintended consequences of the incentives were identified during the study, including delay attribution, potential to refuse access to traffic, de-incentivising investment and shielding. However, apart from shielding, the evidence is not strong to demonstrate these consequences have occurred in a material way.

There is no evidence of an impact on safety from the introduction of the incentives.

**Potential next steps for RP2**

Our review of the existing situation and the incentive schemes implemented during RP2 highlighted a number of examples of best practice and issues around which guidance would be useful. Since there exists consensus amongst stakeholders on some issues, as confirmed through the consultation and at the study workshop, it may be possible to address these through guidance for the remainder of RP2. Other issues should be assessed in more detail and addressed in RP3 through changes to legislation.

Guidance for RP2 could focus on the following:

• **Symmetry:** the requirement for symmetry in the incentive schemes breaks down in cases where the local reference value is 0.00 mins delay/flight, based on a history of very low or zero delay, as further improvement is not possible. In such cases, guidance which states that NSAs/ANSPs are exempt from the requirement to have a symmetrical incentive scheme would clarify the situation. The resulting schemes would be penalty-only schemes, and would also avoid the adoption of “artificial” scheme targets that are higher than the reference values simply to satisfy the symmetrical requirement. This guidance would be in line with the requirement that there “shall be no bonuses for performance that is at [...] that expected in performance targets” (CR 391/2013 Article 15b).

• **Guidance on applicable revenues:** Our review of the implementation of the incentives schemes in 2015 highlighted that in three cases the revenues used were not limited to the ATSP, but included other service providers and/or NSA revenues. For the remainder of RP2, guidance to state that “the revenue from air navigation services” (CR 391/2013 Article 15d) is interpreted as the ATSP chargeable unit rate times the TSUs would clarify the eligible revenues.

We note that even where agreement exists in RP2, addressing some issues may in fact conflict with the legislative text.

There may also be some practical steps that the Commission could take to communicate how it will move forward with the existing incentive schemes that have been set up for RP2. For example, it could document the rationale used in its review of unit rate compliance for the 2017 unit rate and how it intends to apply this for the remainder of RP2. For the cases where
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The incentive schemes in RP2 do not make reference to FAB targets, the Commission might focus its review of the application of the incentives at a national level, assessing local contributions to the network supported by the Local Single Sky Implementation (LSSIP) and the Network Manager. Although clarity in this area would be welcome, agreement amongst stakeholders will likely be limited, since some incentive schemes have sought to accommodate the FAB target requirement, despite a recognition that the implementation of FABs has been largely ineffective.

Further, developing an improved understanding of the target-setting process and the links between the union-wide targets and the local reference values could also start now to support RP3. This could also cover the alignment between operational and regulatory data where airspace delegations apply.

**Developing measures for future incentives**

Drawing on the experience of implementation during RP2, any best practice identified, and the range of ideas proposed by stakeholders during the consultation we developed a long-list of ideas for incentives in RP3. At a high level these were:

- **Idea 1**: Retaining current arrangements, but combined with guidance material.
- **Idea 2**: Operationally focussed incentives on known problems.
- **Idea 3**: Adjust incentives according to actual vs planned level of traffic.
- **Idea 4**: Centrally administered system (similar to traffic risk sharing).
- **Idea 5**: Network Manager given responsibility for managing network level delay (specific delay budget and targets defined for their responsibility).
- **Idea 6**: Design of incentives left to NSAs, subject to minimal number of constraints.
- **Idea 7**: Monitoring, publication and naming and shaming of information.
- **Idea 8**: Capital investment targeted through a separate monitoring, trigger and penalties system for targeted capacity-enhancing projects.
- **Idea 9**: Application of penalty only schemes.
- **Idea 10**: Link incentives to measures of supply (actual capacity relative to planned capacity) as measured by three-hour peak (suggested in SSC options paper).
- **Idea 11**: Centrally administered system (individual flight discounts to route charges).
- **Idea 12**: Use separate KPIs for bonuses and penalties.

Based on our review and analysis, we consider that the design of a scheme for RP3 should:

- be very explicit and specific in the objectives and changes in behaviour it is designed to achieve;
- be designed to address known, or anticipated, problems rather than applying the same scheme to every situation;
- recognise that different incentives are required to address different problems (e.g. operational issues or capacity enhancement will require more than one scheme);
- be careful not to mandate schemes where they are not needed;
- use, where possible, reliable sources of data that are not disputed by the industry or subject to gaming;
- recognise that behaviours from different actors in the industry might be incentivised in the regime (ANSPs, NM and airspace users for example);
- draw upon the experience of schemes in RP1 and in other industries which use asymmetric incentives with penalties outweighing bonuses and have a material level of revenue at risk in order to change behaviours; and
recognise that a practical, but appropriate, scheme may require some incremental costs being incurred in data collection and recording.

Shortlisted measures for RP3

The shortlisted measures were developed from ideas that have received material levels of support from stakeholders. The measures, in some cases, combine a number of the ideas presented above.

Measures to be considered further:

- **Measure A (using ideas 2 and 6): Tailored and targeted incentives led by NSA.** This should be targeted at known problems at the ANSP. Where delays or under-provision of capacity are a problem, they should be targeted. But equally, if there is no delay or capacity problem, the NSA should consider focussing on other known problems (e.g. route extension or resilience). A number of NSAs and ANSPs supported these ideas.

- **Measure B (using ideas 4, 9 and 11): Centrally administered delay penalty scheme.** This would require an accurate and agreed approach to delay attribution, managed and administered centrally. An automatic rebate to the individual flight experiencing the delay could be offered by discounting or waiving its route charges. This approach would also be coherent with the approach to compensation to the harmed party under passenger rights legislation. Some AUs and other stakeholders supported these ideas.

- **Measure C (using ideas 8 and 10): Scheme which addresses an under-provision of capacity.** This could be through targeted capital expenditure triggers with penalties for late delivery, or penalties for not delivering the required supply of capacity. A number of stakeholders supported these ideas.

Measure A and Measure B are focussed on influencing short-term operational behaviours, whilst Measure C is primarily focussed on influencing longer-term planning decisions.

The short-term focussed measures A and B are mutually exclusive, however, each of these may be combined with the longer-term focussed measure C. We would suggest that the following combinations are considered as part of the RP3 impact assessment:

- Measure A: Tailored and targeted incentives led by NSA;
- Measure B: Centrally administered delay penalty scheme;
- Measure A (as above) in combination with Measure C: Scheme which addresses an under-provision of capacity; and
- Measure B (as above) in combination with Measure C: Scheme which addresses an under-provision of capacity.
1 Introduction

Background

1.1 The European Commission is seeking to review the impact and effect of revised (2013) Single European Sky (SES) legislation, covered by the charging and performance Regulations on incentives in the Air Traffic Management (ATM) sector, and identify any unintended consequences and lessons to be learned.

1.2 Drawing upon this review, stakeholders' opinions, and experience from other transport industries, the Commission wishes to consider a range of pragmatic measures for further development of incentives in preparation for Reference Period 3.

1.3 The study is primarily focussed on the incentives introduced during Reference Period 2 (2015-2019) for the Capacity Key Performance Area (KPA). The more limited implementation of incentives for the Environment KPA are also reviewed.

Objectives of this study

1.4 As contained in the Commission's task specification the objectives of the study are to:

• review the existing incentive schemes with regard to their mechanisms, effectiveness and compliance with the principles set out in the legislation;
• review incentive schemes used in other regulated sectors with a view to identifying transposable features;
• assess the contribution of the incentives to the objectives of the Performance and Charging schemes;
• define best practices/guidance and measurable criteria for incentive schemes; and
• provide recommendations for future developments of incentive schemes in preparation for RP3.

This report

1.5 This study started in March 2017 and was completed in September 2017. This is the final report produced on 25 September 2017, incorporating the Commission's comments from our discussion on the draft final report on 4 September 2017 and the PRB’s comments relating to incentives dated 16 September 2017. The measures recommended here will be investigated further in the RP3 Impact Assessment.

Organisation of the report

1.6 The remainder of this report is organised as follows:

• Section 2: describes the methods we have used throughout the report;
• Section 3: summarises the legislative background and experience during Reference Period 2;
• Section 4: outlines relevant experience from other industries;
• Section 5: provides a discussion of industry trends, intended and unintended consequences;
• Section 6: findings on the current situation, best practice and areas which require guidance;
• Section 7: provides our evaluation criteria and an long list of ideas for consideration for RP3, which were presented and discussed at the study workshop and NSA Coordination Platform (NCP) working group on 21 June 2017; and
• Section 8: findings with respect to developing future measures and a description of shortlisted measures.

1.7 The report is supported by four appendices covering the questionnaire used in the study, a record of the workshop discussion, potential areas for focussed incentives and an overview of the RP2 capacity incentive schemes.
2 Methodology

Overview

2.1 We have applied a methodology, including a stakeholder consultation exercise, providing for a thorough review of the implementation of incentives schemes applied in the SES Legislation and careful consideration of how they should evolve in the future. Our approach has involved creating a number of working papers by phase which form the basis of the sections of this report.

2.2 Following an inception phase we have approached the work by undertaking a stakeholder consultation, data collection and analysis to describe the current situation and develop ideas for measures for RP3. The ideas were presented and discussed at the study workshop and NSA Coordination Platform (NCP) working group on 21 June 2017, with written feedback also received from stakeholders in July 2017. The remainder of this section describes the approach to consultation, data collection and analysis used throughout the study.

Stakeholder consultation

2.3 We recognised the need for effective engagement with a wide range of operational stakeholders to inform work under all the tasks covered by the study. This required careful planning at the inception stage and effective, ongoing management of contacts throughout the study. The stakeholder consultation was supported by a questionnaire that was developed during the inception phase and which is provided as Appendix A. In the following paragraphs, we outline the design of our programme and list the stakeholders that were included, following discussion with the Commission.

Stakeholder engagement

2.4 Given the nature of the study and the need for discussion of a range of complex issues, we undertook a series of interviews with stakeholders either face-to-face or by telephone.

2.5 We determined the form of the interview in each case as part of the engagement process. Initially, we planned to have eight face-to-face interviews, however due to schedule conflicts only four interviews were carried out in this way, with the remaining interviews carried out over the phone.

2.6 Each stakeholder was first contacted by email in April 2017 which introduced the study and provided the Letter of Introduction from the Commission. Stakeholders were asked if they were willing to take part in the study and, if so, whether they would be available for an interview in May 2017. The majority of stakeholders responded (see next section) and interviews took place throughout the month. Some interviews also took place in early June 2017.
Stakeholder interviews

2.7 We provided a tailored questionnaire to each stakeholder in advance of the face-to-face meetings and telephone interviews, which allowed us to effectively discuss the stakeholder’s overall view of incentives, as well as any specific areas that they wished to discuss in more detail.

2.8 We agreed with the Commission to engage with 22 stakeholders at the inception phase of this study. We successfully engaged with 18 of these stakeholders. Additionally, a further 2 stakeholders approached us requesting to take part in the consultation. The stakeholder interviews that were carried out are summarised in the table below.

Table 2.1: Stakeholders interviewed

<table>
<thead>
<tr>
<th>Stakeholder organisation</th>
<th>Number of interviews</th>
<th>Name</th>
</tr>
</thead>
</table>
| PRU                      | 2                    | Economics: Denis Huet, Cécile Capart  
                            |          | Operations: Rainer Koelle, Bernd Tiemeyer |
| Network Manager          | 1                    | Razvan Bucuroiu |
| IACA                     | 1                    | Guy Battistella |
| IATA                     | 1                    | Peter Curran |
| CANSO working group      | 1                    | Danilo Pisciottu, Peter Simonsson, Maria Willert |
| (performance and financial issues) |          |      |
| SESAR Joint Undertaking  | 1                    | Alain Siebert |
| IFATCA                   | 1                    | Paul Neering, Tom Laursen |
| Representatives of ANSPs (of varying sizes) | 3 ANSPs |  
                            |  | Austrocontrol (Rupert Hörmann)  
                            |  | Hungarocontrol (Kalman Seregelyes)  
                            |  | ENAV (Alessandro Ghilari) |
| Representatives of FABs  | 3                    | Blue Med (Luca Falessi)  
                            |          | FAB CE (Dijana Vondraček)  
                            |          | DK-SE (Allan Hansen Ekstrand) |
| Representatives of NSAs  | 4                    | UK NSA: (Matt Claydon and Bronwyn Fraser)  
                            |          | German NSA: (Bernadette King and Sarah Schneider)  
                            |          | Spanish NSA: Eduardo ABIA LUÑO  
                            |          | Lithuanian NSA: Ruta VAIGAUSKAITE |

Table 2.2: Other stakeholders

<table>
<thead>
<tr>
<th>Stakeholder organisation</th>
<th>Number of interviews</th>
<th>Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASA</td>
<td>1</td>
<td>Luc Tytgat</td>
<td>Interview had been scheduled for 5 July 2017, but was not carried out, as Mr Tytgat was not available in the event. We tried to make alternative arrangements with EASA, including a request for some written comments at its convenience. An input had not been received at the time of drafting this report.</td>
</tr>
<tr>
<td>IAA</td>
<td>-</td>
<td>Paul Brandon</td>
<td>The IAA contacted us requesting to take part in the stakeholder consultation. It has provided a completed questionnaire and feedback following the study workshop.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Stakeholder organisation</th>
<th>Number of interviews</th>
<th>Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4E</td>
<td>-</td>
<td>Choorah Singh, Jonathan Cutuli</td>
<td>After confirming participation, A4E did not respond to our requests for an interview. We agreed with the Commission that we would remain available to engage with A4E, but would not actively pursue further. We engaged with other airspace users (IATA and IACA).</td>
</tr>
<tr>
<td>ACI</td>
<td>-</td>
<td>Panos Spiliotis, Michael Stanton-Geddes</td>
<td>ACI sought to engage actively on this study, however its membership was not sufficiently familiar with the performance scheme and the details of the incentive schemes. ACI was not been able to provide a view.</td>
</tr>
<tr>
<td>DSNA</td>
<td>-</td>
<td>Tiphaine Lemaire</td>
<td>We did not receive a response from DSNA. Given the voluntary involvement of IAA, another ANSP, we agreed with the Commission to not pursue DSNA further.</td>
</tr>
<tr>
<td>ATCEUC</td>
<td>-</td>
<td>Jean-Denis Larrere</td>
<td>ATCEUC contacted us requesting to take part in the stakeholder consultation. It provided a completed questionnaire.</td>
</tr>
</tbody>
</table>

2.9 The figures below provide an overview of the stakeholder consultation planned at the inception phase, and the resulting engagement.

Figure 2.1: Planned and outturn stakeholder engagement

Managing the engagement

2.10 At least two members of the team were present for the majority of meetings, enabling one person to lead the discussion while the other could take notes. A summary of each interview has been produced gathering the notes of all members of the team at the meeting.

2.11 All stakeholders were asked to follow-up with written responses to the questionnaire in addition to their interview, but not all committed to do so given the discussion. Written responses were provided by 12 stakeholders:

- IACA
- IFATCA
- ATCEUC
- FAB CE
- DK-SE FAB
- CANSO
- Austrian control
- Hungarian control
- IAA
- German NSA
- Spanish NSA
- Lithuanian NSA
2.12 All of this stakeholder engagement was managed through an excel-based log, which enabled us to keep track of interviews requested, agreed, scheduled and held and whether or not a written questionnaire response was provided. This was reviewed each week, with follow-up calls made to progress the interview programme as required. Where stakeholders failed to respond to requests for an interview we asked for the Commission to approach them directly.

2.13 The output of this part of the stakeholder consultation was an excel matrix of responses from each stakeholder arranged in the themes of the questionnaire bringing together any written questionnaire responses received and notes from the interviews.

Stakeholder workshop

2.14 In addition to the targeted engagement, an open stakeholder workshop took place on 21 June. This provided an opportunity to report our findings on the current situation and the stakeholder consultation, and discuss the development of future measures for RP3. It also enabled stakeholders to suggest issues and areas for further analysis to be covered during the next phase of work.

2.15 The outline agenda for the workshop was as follows:

- Introduction: Context and subject of the study
- Overview of RP2 and key issues that have arisen through planning and implementation of the incentive schemes
- Discussion on key issues with stakeholders
- Presentation of long-list of ideas for RP3 and reasoning
- Discussion of ideas with stakeholders

2.16 A briefing note was provided to registered stakeholders in advance of the workshop. This summarised the key emerging issues from the initial stakeholder engagement and provided the long-list of proposed ideas for future incentives. The workshop was attended by approximately 60 stakeholders representing over 30 organisations (half of these were NSAs), alongside the European Commission.

2.17 At least half of the workshop was spent in open discussion of the issues and ideas with stakeholders. A record of the discussion is provided in Appendix B. The slides used at the workshop were later shared with attendees, who were invited to share any additional views with us in the two weeks following the workshop. Following the open workshop session, we also attended the first part of the NCP working group, where NSAs were able to further expand on the issues and ideas discussed earlier in the day.

2.18 Feedback following the workshop was received from 11 stakeholders. These views were summarised along with the oral feedback discussed during the workshop and used in the assessment of the ideas used in the suggestions for future measures.

Desktop research

Data Collection

2.19 We have collected all relevant documents linked to the current incentives applied in the SES, and assessments of implementation during the first year of RP2. From the Commission we received:

- Legislation: an exhaustive list of the applicable legislation;
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- Final FAB Performance Plans - the PRB’s assessment (taking into account updates that perhaps were not published);
- Annual Performance Monitoring (2015), reports produced at State, FAB and PRB level which review the first year of application of the RP2 incentives;
- Unit rate verification and letters to Member States and their responses;
- A summary note on outcomes of the PRB stakeholder workshop on proposed principles for incentives; and

2.20 In addition to the inputs provided by the Commission, we have collected information on the application of incentives schemes in other industries through desktop research, focusing on European or local regulators’ websites.

2.21 We have also collected the following information to support the description of the target setting process and the analysis of the operational impacts the incentives may have had:

- Performance Review Report 2015;
- Draft Performance Review Report 2016;
- Traffic statistics and forecasts from STATFOR;
- Network Manager data on operational performance (capacity and environment);
- PRU dashboard;
- Significant Meteorological information (SIGMET) data; and

Review and analysis

2.22 In this report, we have reviewed the following:

- Legislation - through analysis of the text of the Performance and Charging Regulations;
- The capacity target-setting process - providing a description of the process used to derive the EU-wide target and the corresponding local FAB and national reference values;
- Performance Plans (PPs) - providing a description of the incentives schemes designed in the initial PPs, any iterations and the related PRB comments;
- Annual Monitoring reports - combining a description of the implementation of the incentives from the NSA reports, the PRB’s SQS comments and ECO comments, highlighting key themes and issues;
- Unit rate letters and Member State (MS) responses - drawing out the comments relating to the implementation of incentives and any application of a bonus or penalty, highlighting key themes and issues;
- Experience from other industries - combining examples from airports, rail, energy and water industries;
- Industry trends and operational impacts - through quantitative and qualitative analysis of the Performance Review Reports and other industry KPIs and metrics described above;
- The longlist ideas for future incentives presented at the Stakeholder Workshop - based on the feedback provided by stakeholders and in the context of our analysis above to provide a shortlist of future measures for RP3.

2.23 The approach used is described in more detail in each corresponding section below. Our analysis also draws on stakeholders’ opinions expressed and evidence provided, where relevant.
3 Reference Period 2 experience

Introduction

3.1 This section covers the legislative background and experience from implementation of the incentive regimes during RP2, identifying inconsistencies and concerns that are investigated further during the study.

3.2 The task specification required:

A comprehensive description of the current incentive schemes used by all regulated air navigation service providers (ANSPs), highlighting common elements and major differences of the incentives applied in RP2 (and where applicable RP1), and reviewing their consistency with the existing legislation.

3.3 This section describes the legislative requirements of SES on incentives and reviews what was promised in the RP2 Performance Plans, the PRB's comments on these, and the evidence from the first year of implementation, including the implementation in unit rates.

3.4 The section identifies common themes, and where there are FAB or State specific issues. Building on the work undertaken by the Commission and PRU, we also highlight if we consider that the design of incentive schemes introduced in the first year of RP2 is consistent with the legislative framework. Where we identify cases of inconsistency, we provide supporting arguments.

3.5 The five parts that follow provide a review of the following aspects:

- Legislation;
- Target-setting;
- Performance plans;
- Annual monitoring report; and
- Unit rate compliance.

3.6 Findings emerging from this review are summarised in a final part of the section.
**Review of legislation**


3.8 The objectives of the incentives are described at a high level as part of the overall objectives of the performance and charging regulations.

<table>
<thead>
<tr>
<th>The objectives of the incentives are described at a high level in both the performance and charging regulations and aims to support improvements in performance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PR 390/2013 Recital 13)</td>
</tr>
<tr>
<td>Performance plans should describe the measures, such as incentive schemes, aimed at stakeholders to improve performance at all levels.</td>
</tr>
<tr>
<td>(CR 391/2013 Recital 4)</td>
</tr>
<tr>
<td>In accordance with the overall objective of improving the performance of air navigation services, the charging scheme [...] should provide for the establishment of incentive schemes for air navigation service providers to support improvements in the provision of air navigation services [...].</td>
</tr>
</tbody>
</table>

3.9 The approach to financial incentives is determined by both performance and charging regulations.

<table>
<thead>
<tr>
<th>The approach to financial incentives is determined by both the performance and charging regulations and aims to help achieve the performance targets by comparing actual performance to targets agreed in the performance plan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PR 390/2013 Recital 19)</td>
</tr>
<tr>
<td>The implementation of binding performance targets supported by incentives of a financial nature requires an appropriate link with the charging Regulation.</td>
</tr>
<tr>
<td>(PR 390/2013 Article 11(3))</td>
</tr>
<tr>
<td>(i) a description of the incentive mechanisms to be applied on the air navigation service providers concerned to encourage achievement of the targets over the reference period;</td>
</tr>
<tr>
<td>(CR 391/2013 Recital 11)</td>
</tr>
<tr>
<td>Incentives mechanisms to encourage better performance should have regard to the desirability of rewarding or penalising actual performance in relation to performance levels expected when the performance plan was adopted.</td>
</tr>
</tbody>
</table>

3.10 There is no incentive for safety.

<table>
<thead>
<tr>
<th>The legislation specifically prohibits the use of incentives in relation to safety metrics covered by the performance scheme.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PR 390/2013 Recital 13)</td>
</tr>
<tr>
<td>Performance plans should describe the measures, such as incentive schemes, aimed at stakeholders to improve performance at all levels. Due to its overriding nature, safety should not be subject to incentives.</td>
</tr>
</tbody>
</table>

3.11 Financial incentive for cost-efficiency is **built into the traffic** and cost risk sharing mechanism.

<table>
<thead>
<tr>
<th>Financial incentives for cost-efficiency metrics are determined by the traffic and costs risk sharing mechanisms in the revised charging Regulation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PR 390/2013 Article 12)</td>
</tr>
<tr>
<td>2. Incentives on cost-efficiency targets shall be of a financial nature and shall be governed by appropriate provisions set out in Articles 13 and 14 of the charging Regulation. They shall consist of a risk-sharing mechanism at national or functional airspace block level.</td>
</tr>
</tbody>
</table>
3.12 **Financial incentive for capacity KPIs is mandatory.**

Introducing a financial incentive on capacity targets is mandatory and may be complemented by use of corrective measures.

(CR 391/2013 Article 15)

1. Member States shall adopt financial incentives for their air navigation service providers in the key performance area of capacity (...) in accordance with Article 12 of the performance Regulation.

(PR 390/2013 Article 12)

3. Incentives on capacity targets shall be of a financial nature and shall be governed by the provisions of Article 15 of charging Regulation. They may be complemented by incentives of another nature, such as corrective action plans with deadlines and associated measures, decided by national supervisory authorities taking account of local circumstances.

3.13 **Financial incentive for environment KPIs is optional.**

Introducing a financial incentive for environment targets is optional and may be complemented by use of corrective measures.

(CR 391/2013 Article 15)

1. Member States (...) may adopt such financial incentives in the key performance area of environment in accordance with Article 12 of the performance Regulation.

(PR 390/2013 Article 12)

4. Incentives on environment targets may be of a financial nature and shall be governed by the provisions of Article 15 of charging Regulation. They may be complemented by incentives of another nature, such as corrective action plans with deadlines and associated measures, decided by national supervisory authorities taking account of local circumstances.

3.14 **Incentive mechanisms shall be established, known and fixed prior to and over a Reference Period, and shall be transparent, non-discriminatory, proportional and effective.**

The performance Regulation sets out some general principles for States to follow: the incentives scheme should remain fixed during RP2, be transparent and non-discriminatory, be understood by stakeholders ahead of implementation, and involve meeting targets that reflect a high level of performance.

(PR 390/2013 Article 12)

1. The incentive schemes applied by Member States as part of their performance plan shall comply with the following general principles:

(a) they shall be effective and proportional, and shall not be changed during the reference period;

(b) they shall be implemented on a non-discriminatory and transparent basis to support improvements in the performance of service provision;

(c) they shall be part of the regulatory environment known ex ante by all stakeholders and be applicable during the entire reference period;

(d) they shall induce entities subject to target setting to achieve a high level of performance and meet the associated targets.
3.15 Local targets set on additional local KPIs can also be accompanied by appropriate incentive schemes.

States have the possibility to include additional performance indicators and associated targets in their performance plans. These performance indicators may be accompanied by appropriate incentive schemes.  

(PR 390/2013 Article 9(6))

6. For their own performance monitoring and/or as part of the performance plan, Member States may decide to establish performance indicators and associated targets in addition to the key performance areas and key performance indicators referred to in this Article and set out in Section 2 of Annex I. These additional indicators and targets shall support the achievement of the Union-wide targets and the resulting targets at local level. They may for example integrate and describe the civil-military or meteorological dimension of the performance plan, and may be accompanied by appropriate incentive schemes.

3.16 Incentive mechanisms shall be limited to 1% of ANSP revenues (all incentives combined), shall have the level equal for bonus and penalties and shall be recovered in year N+2.

The aggregate level of incentive across all capacity and environment targets is capped at 1% of revenue from ANS services in any one year. The level of incentive shall apply at an equal level for bonuses and penalties, and the unit rate in year n+2 will be adjusted on the basis of actual performance in year n.

(CR 391/2013 Article 15)

(a) the unit rate of year n+2 shall be adjusted to provide for a bonus for exceeding or penalty for under-achievement according to the actual performance level of the air navigation service provider in year n against the relevant target;

(c) The applicable level of bonuses and penalties shall be equal;

(d) the maximum amount of aggregate bonuses and the maximum amount of aggregate penalties shall not exceed 1% of the revenue from air navigation services in year n;

3.17 The annual values of each KPI in the Performance Plan shall be used to calculate the yearly bonuses and penalties...

Targets are to be set for the whole reference period with the same annual values used to set the incentives as those used for monitoring. Since the incentive scheme is intended to induce entities to attain a high level of performance (see paragraph 3.14) there shall be no bonuses for performance that does not surpass the performance targets contained within the performance plan.

(PR 390/2013 Article 11 (3))

(d) Performance targets in each relevant key performance area, set by reference to each key performance indicator, for the entire reference period, with annual values to be used for monitoring and incentive purposes;

(CR 391/2013 Article 15)

(a) the unit rate of year n+2 shall be adjusted to provide for a bonus for exceeding or penalty for under-achievement according to the actual performance level of the air navigation service provider in year n against the relevant target;

(b) the applicable level of bonuses and penalties shall be commensurate with the targets to be reached and the performance achieved. There shall be no bonuses for performance that is at or below that expected in performance targets;

3.18 ... however, the par-value of the incentive can be lower than the capacity target to take account of delays only under direct control of ANSPs.

The target metric used for the financial incentive for capacity may be adjusted to cover only certain delay causes related to ATC capacity.

(CR 391/2013 Article 15)

(g) for the key performance area of capacity, the target levels of performance may be adjusted to cover only delay causes related to ATC capacity, ATC routing, ATC staffing, ATC equipment, airspace management and special event with the codes C, R, S, T, M and P of the ATFCM user manual.
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3.19 Whilst targets are at FAB level, incentives apply to ANSPs concerned.

When targets are set at FAB level, bonuses and targets apply to accountable ANSP. This will require the development of internal FAB allocation rules.

(CR 391/2013 Article 15)

(f) in case of targets at the level of functional airspace blocks, bonuses and penalties shall be applied to the air navigation service providers concerned;

3.20 Bonus and penalties are excluded from traffic risk sharing.

The bonus or penalties awarded under financial incentives do not count towards traffic risk sharing calculations.

(CR 391/2013 Article 13(2))

2. The following costs shall not be submitted to traffic risk-sharing and shall result in an increase or reduction of the determined costs in (a) subsequent year(s) irrespective of traffic evolution:

(a) bonuses or penalties resulting from financial incentive schemes referred to in Article 15

3.21 It is up to the States to apply incentives when market conditions are in place for terminal ANS, CNS, MET or AIS.

Incentives do not have to be implemented for terminal ANS services, CNS, MET and AIS services where market conditions are in place.

(PR 390/2013 Article 23)

Where, in accordance with the procedures laid down in Article 3 of the charging Regulation, it has been established that some or all terminal air navigation services and/or CNS, MET and AIS services of a Member State are subject to market conditions, and the Member State has decided under that Regulation not to calculate determined costs for these services, not to calculate and set terminal charges, and not to apply financial incentives to these services, cost-efficiency targets do not apply to these services.

(CR 391/2013 Article 3(1))

1. Without prejudice to the application of the principles referred to in Articles 14 and 15 of the service provision Regulation and subject to the assessment referred to in paragraph 2, Member States may decide before the start of a reference period or in justified cases during the reference period, that some or all of their terminal air navigation services or CNS, MET and AIS services are subject to market conditions. In such case, the provisions of this Regulation apply, but the Member States concerned may decide with regard to these services:

(a) not to calculate determined costs in accordance with Article 7 of this Regulation;

(b) not to set financial incentives for these services in the key performance areas of capacity and environment in accordance with Article 15 of this Regulation;

and, with regard to terminal air navigation services;
### 3.22 Stakeholder consultation is required before introduction and following implementation.

| The incentives introduced in the performance plan, must have followed stakeholder consultation as determined by the requirements of the amended charging Regulation. | (CR 391/2013 Article 15)  
(e) the performance variation levels and the applicable level of bonuses and penalties shall be determined following the consultation referred to in Article 9 and shall be set by the performance plan; |
| --- | --- |
| Member States are required to consult airspace users’ representatives ahead of RP2 and during RP2 on an annual basis about the incentive scheme, its implementation and the results | (PR 390/2013 Annex II Performance Plan content)  
Description and explanation of the incentive schemes to be applied on air navigation service providers.  
(CR 391/2013 Article 9) |
| Member States shall, in a coordinated manner, at the latest seven months before the start of each reference period, invite the airspace users’ representatives to a consultation on determined costs, planned investments, service unit forecasts, charging policy and resulting unit rates. They shall be assisted by the air navigation service providers. Member States shall, in a transparent manner, establish their national or functional airspace blocks costs in accordance with Article 6 and make available their unit rates to airspace users’ representatives, the Commission and, where applicable, to Eurocontrol.  
During the reference period, Member States shall, on an annual basis and in a coordinated manner, invite the airspace users’ representatives to a consultation on any deviation from the forecast, especially with regard to: |  
(a) actual traffic and costs compared to forecast traffic and determined costs;  
(b) the implementation of the traffic risk-sharing mechanism set out in Article 13;  
(c) the implementation of the cost sharing mechanism set out in Article 14;  
(d) the incentive schemes set out in Article 15; |

### 3.23 NSAs shall collect data, monitor implementation and report annually on incentives.

| Member States and their NSAs need to collect data, monitor and report on the implementation of the incentive schemes. | (CR 391/2013 Article 15)  
Article 15(2): National supervisory authorities shall monitor the proper implementation of these incentive schemes by air navigation service providers.  
Annex VI(2) Member States concerned shall collect and provide a (d) description and explanation of incentives applied to users of air navigation services under Article 15. |
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3.24 A review of the impact of incentives will take place at end of RP2.

At the end of RP2 a review of the impact of incentives and their effectiveness and scope will be undertaken.

(PR 390/2013 Article 25)

25. By the end of each reference period, the Commission shall review the performance scheme, and in particular analyse its impact, effectiveness and scope, taking account of work carried out by ICAO in this field.

(CR 391/2013 Article 21)

21. The review by the Commission of the performance scheme, referred to in Article 24 of the performance Regulation shall include the traffic risk-sharing mechanism set out in Article 13, the cost sharing mechanism set out in Article 14, the incentive schemes established pursuant to Article 15, the modulation of charges pursuant to Article 16, and their impact and effectiveness in achieving the set performance targets.

3.25 The legislative requirements provide a framework for assessing the introduction of FAB and State level incentives in RP2, and for considering any changes or amendments that might be suggested for RP3.

When targets are set at FAB level, bonuses and targets apply to accountable ANSP. This will require the development of internal FAB allocation rules.

(CR 391/2013 Article 15)

(f) in case of targets at the level of functional airspace blocks, bonuses and penalties shall be applied to the air navigation service providers concerned;

Overview of target-setting in the capacity KPA

Background

3.26 The performance scheme regulation (EU) 390/2013 requires targets (both at EU-wide level and local level) to be set for the capacity Key Performance Area (KPA) to improve efficiency across the Single European Sky and to reduce ATM related delays. The Key Performance Indicator (KPI) specified within the regulation is average minutes of ATFM delay per flight during a calendar year. Rather than being a measure of capacity, the KPI is a measure of the impact of a lack of capacity on outcome of ATM performance.

3.27 Airspace users pay for the capacity investment projects of an ANSP through the unit rate, since it includes the depreciation and cost of capital of ANSP investments. Airspace users also incur costs when the quality of the service provided results in sub-optimal operations.

3.28 This trade-off between the cost of providing and increasing the provision of capacity and the cost of delay incurred by the airspace user through a lack of capacity leads to the definition of the ‘economic optimum’ level of delay. This is the point at which the cost of increasing capacity exceeds the economic value of the delay savings.

3.29 At the workshop held in Brussels to consult stakeholders on the incentives study, this economic optimum was briefly discussed. The EU-wide target for capacity – an average of 0.5 minutes of ATFM delay per flight – was highlighted to be higher than the optimum.

3.30 This section explains the ‘economic optimum’, how it was derived and how it was used to support setting the EU-wide target of 0.5 minutes of ATFM delay per flight for RP1 of the performance scheme, which then was maintained for RP2.
Justification for the capacity optimum

3.31 The economic optimum is the point of lowest cost to airspace users, when trading off the cost of ATFM delay and the cost of providing and increasing ANS capacity. Figure 3.1 illustrates how the optimum was determined by EUROCONTROL.

Figure 3.1: Determining the “optimum capacity level”

![Figure 3.1: Determining the “optimum capacity level”](image)

Source: Initial PRC proposals for EU-wide performance targets, Performance Review Commission, EUROCONTROL, 2010

3.32 Simulations were undertaken to estimate the economic optimum using EUROCONTROL tools developed in the capacity planning process. The simulations used operational data collected by the CFMU, ACE reports, and sector capacities provided by ANSPs to obtain a network-wide estimate of the economic optimum. To achieve this, the current and future cost of capacity provision was assessed and compared with the projected cost of delay to identify the level of ATFM delay that would minimise the overall costs incurred by airspace users.

Cost of delay

3.33 The relationship between capacity and delay has been investigated at length by the Performance Review Unit (PRU) of EUROCONTROL. The PRU’s research has shown as that there is an exponential relationship between delay and demand, as shown in Figure 3.2. This explains the exponential shape of the ‘costs of ATFM delay’ graph in Figure 3.1 (right-hand graph).

3.34 The cost of one minute of ATFM delay has been calculated by the University of Westminster\(^1\). This value has been updated a number of times since the original report was published and is used for the calculation of the overall cost of delay estimated within the simulations. The results of the report, note that two key variables are the type of aircraft and the total minutes of delay. Through analysis of these variables, and appropriate weightings, within Europe, the average value of cost of one minute of ATFM delay was determined to be €81 in 2009. This was calculated within the 2010 report.

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\(^1\) Evaluating The True Cost To Airlines Of One Minute Of Airborne Or Ground Delay, University of Westminster, 2004.
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<td>02 November 2017</td>
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</table>

3.35 The second input into the economic optimum is the cost of capacity provision, which depends on the business and investment cycle of the ANSP. Where additional capacity is available through improved matching of capacity to demand, for example through improved rostering, the marginal costs are relatively low. However, if major investments are required then the marginal cost of capacity can be significantly higher.

3.36 Between 1998 and 2008, the elasticity of the real cost of service provision to traffic increase was measured to be 0.7, i.e. if traffic increases by 10% costs increase by 7%. This is higher than both the value of 0.4 observed by the PRU for the years between 2003 and 2008 and the value of 0.3 used by the CAA in determining the price control for NATS.

Calculating the economic optimum

3.37 Although the relationships are well understood, it should be noted that the location of the optimum can deviate if either the marginal cost of delay or the cost of the provision of capacity changes significantly.

3.38 Therefore, in the preparation for RP1 in 2010, the PRU undertook a sensitivity analysis to identify a range of values for the economic optimum based on a cost of ATFM delay of between €40\(^2\) and €62\(^3\) per minute and a cost elasticity of between 0.5 and 1.0.

3.39 Based on the highest and lowest values for each estimate, the analysis generated the following results for the optimum in each of the four scenarios.

---

\(^2\) The value was used to get a lower boundary for ATFM en-route costs in the simulation.

\(^3\) The value corresponds to the ATFM delay costs used in the annual Performance Review Reports which assumes that the average costs of “tactical” delay on the ground (engine off) is close to be zero for the first 15 minutes and €82 per minute, on average, for ATFM delays longer than 15 minutes (€ 2008 prices)
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Table 3.1: System-wide en route delay optimum for the four scenarios

<table>
<thead>
<tr>
<th>Cost of ATFM delay</th>
<th>100% variable</th>
<th>50% variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>62 €/min</td>
<td>0.2 min/flight</td>
<td>0.1 min/flight</td>
</tr>
<tr>
<td>40 €/min</td>
<td>0.2 min/flight</td>
<td>0.2 min/flight</td>
</tr>
</tbody>
</table>

Source: Performance Scheme: Initial EU-wide Targets Proposals. Page 48

3.40 The economic optimum was calculated to be between 0.1 and 0.2 minutes of ATFM delay per flight and was therefore considered to not be highly sensitive to the input values.

3.41 Further analysis showed that the economic optimum is not sensitive to the STATFOR traffic forecasts and the PRU proposed to use 0.2 minutes of ATFM delay per flight as the economic optimum for delay causes within the ANSP’s control.

3.42 In addition, ATFM delay is also generated by causes outside of the capacity planning process of ANSPs, such as weather. The PRU has analysed the historical contribution from weather and non-ANS related en-route ATFM delays (see figure below).

Figure 3.3: Weather and non-ANS related ATFM delays per flight

Source: Performance Scheme: Initial EU-wide Targets Proposals. Page 42

3.43 Based on these results the PRC suggested to add on the additional provision of 0.15 minutes per flight to the optimum target to take account of non-capacity related delays.

3.44 This provided an estimate of the economic optimum of 0.35 minutes of ATFM delay per flight, including all causes of delay.

Justification for the capacity target

3.45 The economic optimum of 0.35 minutes of ATFM delay per flight was considerably lower than the annual delay generated in 2009 (0.96 minutes/flight) and was also lower than the annual EUROCONTROL target (before the performance scheme) of 0.7 minutes of ATFM delay per flight, which was set by the PRC for the summer months of 2009.

3.46 Since EUROCONTROL’s 2009 summer target was determined to be feasible with corrective measures on the ten worst performing ACCs, the PRC therefore proposed to set a target...
between the economic optimum and the 2009 summer target (i.e. between 0.35 and 0.7 mins/flight). The view of Airspace Users was to have a target closer to the optimum, and that of ANSPs and NSAs was to have a target set closer to 0.7 mins/flight. After stakeholder consultation, a target of 0.5 minutes of ATFM delay per flight for 2014 (including all causes of delay) was recommended to the EC by the PRB for RP1.

3.47 The same target of 0.5 minutes/flight was subsequently chosen for RP2. This was justified due to the time taken for capacity improvements to take place, and because ‘0.5 minutes of delay per flight is equivalent to more than 98% of flights not constrained by ATC’\(^4\) which was deemed acceptable by the PRB.

Local targets

3.48 There are two levels of targets: the target at EU-wide level, which defines the target level of performance for European ATM for the KPA, and local targets. These local targets define the performance improvements required at a local level to achieve the EU-wide targets. The local targets to contribute to the EU-wide Capacity target were set at either the national level or FAB level for RP1, and FAB level for RP2.

3.49 The Network Manager provides a set of reference values for the capacity KPI, which define the contribution of local performance to the EU-wide target.

Local Reference Values for the Capacity KPA

3.50 The local reference values for the Capacity KPA are prepared by the Network Manager (NM) in response to the requirements defined in (EU) 390/2013. The reference values were provided by the NM after the adoption of the EU-wide targets and were provided to FABs to support the preparation of performance plans for RP2.

3.51 The Network Manager calculated the local reference values to be the optimum share of delay at a local level to enable the achievement of the Union-wide target.

3.52 The NM stated that the methodology, “has been used for the past 14 years to apportion the share of Eurocontrol Provisional Council or European Union-wide delay targets at local level”.\(^5\)

3.53 The Eurocontrol Capacity Assessment and Planning Guidance material provides some further insight into how delay is apportioned to the local level.

Methodology for calculating local reference values

3.54 The Network Manager uses a model called MECA (Model for Economical Evaluation of Capacities in the ATM system) to breakdown delay and capacity requirements at both ACC and European level.

3.55 For each ACC, MECA calculates a range of capacity profiles along with a corresponding delay breakdown. These profiles are calculated to, “ensure that the European delay target is reached, at the minimum global cost, avoiding the cost of capacity surplus or the cost of a capacity shortfall”.

\(^4\) PRB advice to the Commission in the setting of union-wide performance targets for RP2

\(^5\) NM letter to PRB, dated 29th October 2013 describing the requirements and methods through which the Network Manager provides local reference values for the Capacity and Environment KPA.
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3.56 MECA uses the following inputs:

- The capacity baselines per ACC.
- The forecast demand per ACC – using a range of scenarios based on the STATFOR low to high forecasts and with flights routed either on current routes or shortest available route on the future route network.
- The European delay target – i.e. the level of delay which needs to be achieved at network level\(^6\).
- Cost of delay and the cost of capacity provision (see section above describing the ‘economic optimum’).

3.57 MECA is an iterative process, which calculates delays and increases capacity in different ACCs, firstly increasing capacity at ACCs offering the best return on investment, i.e. those where there is high delay. When the delay target is reached the output of the model provides the capacity profile requirements and the delay breakdown for each ACC\(^7\).

3.58 These local ACC values were amalgamated to create national values and thereafter to create FAB values, for the purposes of setting reference values for the performance scheme.

Reference values and local capacity targets

3.59 The reference values are defined to ensure each FAB contributes sufficiently to the EU-wide targets. Four of the nine FABs were set capacity KPI targets consistent with the reference values for each year of the performance scheme. Additionally, two performance plans defined targets very close to the reference values:

- The UK/Ireland performance plan meets the target in each year except 2015, where there is a 0.01 minutes flight difference.
- The FAB CE performance plan targets marginally\(^8\) worse performance than the reference values for each year other than 2019, for which the target matches the reference values.

3.60 The table below summarises the FAB reference values provided by the Network Manager, the FAB Targets used in the RP2 Performance Plans and the national target used at State level, irrespective of whether an incentive scheme was implemented for capacity.

<table>
<thead>
<tr>
<th></th>
<th>Baltic</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAB reference value</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.22</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>FAB Target</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.22</td>
<td>0.22</td>
<td></td>
</tr>
</tbody>
</table>

6 We believe this is excluding weather and special events outside of the ANSPs control. However, it is not defined explicitly in the capacity planning documentation.

7 The NM concluded that, “the cost of delays and the cost of capacity do not have a big impact on the capacity requirement profiles and on the delay breakdown per ACC...”. As the overall cost of delay grows very sharply when there is a capacity gap, the overall level of delay is the main factor influencing the results.

8 The difference between their reference values and the targets ranges from 0.01 and 0.02 minutes per flight.

9 Orange indicates a local target which is less ambitious than the reference value. Green indicates the local target meets or exceeds the reference values provided by the NM.
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Because there are two ANSPs in Belgium, Germany and the Netherlands, the national ANSP and EUROCONTROL (MUAC), these states did not set a national target.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuania national target</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>Poland national target</td>
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<td>0.23</td>
<td>0.23</td>
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<tr>
<td>BlueMed</td>
<td>FAB reference value</td>
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<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>FAB Target</td>
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<td>0.36</td>
<td>0.37</td>
<td>0.37</td>
<td>0.38</td>
</tr>
<tr>
<td>Cyprus national target</td>
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<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
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<td>Italy national target</td>
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<td>0.10</td>
<td>0.11</td>
<td>0.11</td>
<td>0.11</td>
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<tr>
<td>Malta national target</td>
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<td>0.02</td>
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<tr>
<td>Danube</td>
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<td>0.08</td>
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</tr>
<tr>
<td>Bulgaria national target</td>
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<td>0.05</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
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<tr>
<td>Romania national target</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>DK/SE</td>
<td>FAB reference value</td>
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<td>0.10</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>FAB Target</td>
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<td>0.10</td>
<td>0.10</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>Denmark national target</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>FAB CE</td>
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<tr>
<td>FAB Target</td>
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<td>0.31</td>
<td>0.31</td>
<td>0.30</td>
<td>0.29</td>
</tr>
<tr>
<td>Austria national target</td>
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<td>0.21</td>
<td>0.20</td>
<td>0.19</td>
<td>0.19</td>
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<tr>
<td>Croatia national target</td>
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<td>0.22</td>
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</tr>
<tr>
<td>Czech Republic national target</td>
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<td>0.09</td>
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<tr>
<td>Hungary national target</td>
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<td>0.22</td>
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<td>0.22</td>
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<td>Fabec</td>
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<tr>
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<td>0.49</td>
<td>0.48</td>
<td>0.47</td>
<td>0.43</td>
</tr>
<tr>
<td>Belgium10 /Luxembourg national target</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>France national target</td>
<td>0.37</td>
<td>0.40</td>
<td>0.40</td>
<td>0.39</td>
<td>0.32</td>
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<tr>
<td>Germany national target</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Netherlands national target</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Switzerland national target</td>
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<td>0.22</td>
<td>0.23</td>
<td>0.23</td>
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<tr>
<td>Nefab</td>
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<td>0.12</td>
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<td>0.13</td>
</tr>
<tr>
<td>FAB Target</td>
<td>0.12</td>
<td>0.12</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia national target</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Finland national target</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Latvia national target</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>Norway national target</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>SW FAB reference value</td>
<td>0.30</td>
<td>0.31</td>
<td>0.31</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>FAB Target</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
</tr>
<tr>
<td>Portugal national target</td>
<td>0.19</td>
<td>0.15</td>
<td>0.14</td>
<td>0.14</td>
<td>0.13</td>
</tr>
<tr>
<td>Spain national target</td>
<td>0.30</td>
<td>0.29</td>
<td>0.28</td>
<td>0.27</td>
<td>0.27</td>
</tr>
<tr>
<td>UK/Ireland FAB reference value</td>
<td>0.25</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td>FAB Target</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td>Ireland national target</td>
<td>0.13</td>
<td>0.13</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>United Kingdom national target</td>
<td>0.22</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Source: Network Manager, RP2 Targets, RP2 Performance Plans

3.61 The reference values are also considered to be the optimal distribution of the EU-wide target, as defined by the NM in its calculations of the cost of capacity and the cost of delay. Each FAB has some delay allowance within the reference values even where historical performance has shown that there are no, or negligible delays. For example, both ANSPs within DANUBE FAB have generated minimal delay during RP1 of the performance scheme but the FAB has received a reference value of 0.08 minutes of delay per flight in RP2 between 2015 and 2017, rising to 0.09 minutes of delay per flight in 2018 and 2019.

Table 3.3: Historical en-route ATFM delay performance (min/flights) for DANUBE FAB

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>BULATSA</td>
<td>0.003</td>
<td>0.000</td>
<td>0.000</td>
<td>0.059</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>ROMATSA</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>DANUBE FAB</td>
<td>0.002</td>
<td>0.000</td>
<td>0.001</td>
<td>0.042</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: PRB dashboard for RP1 monitoring [http://www.eurocontrol.int/prudata/dashboard/downloads.html](http://www.eurocontrol.int/prudata/dashboard/downloads.html)

3.62 Role of the reference values in setting incentives

The reference values provided by the NM are used as an input for the preparation of performance plans. The performance plans, and targets at FAB level are expected to provide sufficient contribution to the achievement of the EU-wide target. It is the reference values that define what ‘sufficient’ means and any deviation from these within the performance plan must be justified. The incentive mechanisms are then set relative to the local targets, i.e. those adopted within the performance plan rather than the reference values.
Review of performance plans

Reference Period 1 (2012-2014)

3.63 In Reference Period 1 (2012-2014) there were incentive schemes in Italy, Ireland and the United Kingdom.

Italy

3.64 A capacity incentive was introduced by Italy in its Performance Plan for RP1. The incentive was on the capacity target, expressed in average minutes of ATFM delay per flight. In 2012 there were 0.0 minutes delay per flight meaning ENAV received a maximum possible bonus for its performance of €8 million (as agreed in the final Performance Plan) (i.e. 1.4% of 2012 revenues and above the threshold of 1% set in the amended Regulation). The mechanism does not include any modulation related to the level of traffic throughput.

Ireland

3.65 The Commission for Aviation Regulation introduced an incentive on Terminal ANS delays during its price determination for IAA. The incentive started in January 2012 and the level of penalty was determined by the number of days where the IAA has caused cancellations or delay in excess of 15 minutes. These were determined by the following definition, focussed on staffing and equipment related delays:

3.66 "The IAA will be deemed to have caused a cancellation or delay in excess of 15 minutes if either (a) there is an Air Traffic Flow Management (ATFM) regulation delay of 15 minutes or more reported in the Control Flow Management Unit (CFMU) data for Cork, Dublin or Shannon airports with one of the following causes - "Industrial Action ATC", "ATC Equipment", "ATC staffing" and "ATC Capacity" or (b) an airline provides documentary evidence that shows that its decision to cancel a flight was justified by the reasonable prospect of equipment failure or staffing problems (including industrial action) preventing the IAA from providing adequate aviation terminal services at Cork, Dublin or Shannon airports."

3.67 In 2012, IAA earned €21.5 million from Terminal ANS, meaning that under the incentive definitions, a maximum penalty of €2.15 million was possible. The maximum penalties are greater than those permitted in the revised Regulation and there is also no bonus for performance contained in the scheme. The penalties levied in 2012 were zero (€0) as there were no ATFM delays with the codes "ATC Industrial Action", "ATC Equipment", "ATC Staffing" or "ATC Capacity" in excess of 15 minutes.

United Kingdom

3.68 In RP1 the United Kingdom Civil Aviation Authority (UK CAA) placed several incentives on the NATS en-route business NERL. The maximum level of revenue at risk (for both capacity and flight efficiency (3DI)) was £24 million (2006 prices), some 5% of en-route revenues, and the maximum bonus was £11.7 million covering the capacity and environmental incentive combined, some 2.4% of revenue. (In 2012, the maximum revenue at risk was approximately £29.5 million in nominal prices, some 4.7% of NERL 2012 revenues). As a percentage, this level was significantly higher than that allowed under the revised Regulation.

3.69 The incentive for capacity reflected the results of user consultation and consisted of three measures:

- C2: Average delay: measured by average delay per flight.
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- C3: Impact of delays: weighting longer delays at peak times higher than shorter or off-peak.
- C4: Variability in daily level of delay: based on the number of days set threshold levels are breached.

3.70 The UK also applied an incentive to flight efficiency in RP1, the 3DI. 3DI measures both horizontal as well as vertical inefficiency of flight. The UK CAA set a par value of 24 units, with a dead band of 21 to 27 and a payment rate of £0.2m (2006 prices per unit). The par value was between 1.5 and 2.5 units less than historic performance. The value at risk for this metric was £4.8 million and there was a maximum bonus of £2.4 million (2006 prices), equivalent to £6.0 and £3.0 million respectively in nominal prices. (i.e. 1% and 0.5% of 2012 revenues).


3.71 In the PRB’s assessment of RP2 Performance Plans it reviewed the incentive schemes applying to Capacity and Environment indicators. Subsequently a number of changes were introduced to some of the incentives schemes in addendum as a part of revised Performance Plans which addressed a wider range of issues.

3.72 This section provides an overview of the incentive schemes for RP2. For each of the FABs, the incentive schemes as presented in the initial and revised RP2 Performance Plans are described. We also note the PRB comments on these schemes, with issues classified as one of the following:

- Inconsistent with the regulation;
- Arising from a different interpretation of the regulation; and
- other.

3.73 The section concludes with a summary of the issues encountered. Appendix D provides a summary overview of the capacity incentive schemes used in RP2.

**Baltic FAB**

3.74 The Baltic FAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

**Environment KPA**

3.75 In the initial RP2 PP, non-financial incentives (as per Article 12.4 of the performance Regulation) were outlined for Oro Navigacija and PANSA to reinforce their commitment towards the FAB adopted targets. If there is delayed implementation of free route airspace, corrective action plans will be required.

3.76 No update was provided in the revised RP2 PP.

**Capacity KPA**

3.77 In the initial RP2 PP, financial incentives on en-route delay were applied. Poland and Lithuania presented different schemes.

- Oro Navigacija: Bonuses or penalties shall be 0.1% to -0.2% of revenue from en-route air navigation services.
  - The bonus for 0 minutes of delay shall be 0.1% of revenue.
  - The dead band covers the range 0.0<x<=0.1 min. of delay.
  - Penalties for range 0.1<x<=0.2 min. of delay shall be 0.1% of revenue.
• Penalties for $x>0.2$ min. of delay shall be 0.2% of revenue and additionally, corrective actions plan shall be submitted to NSA.

• PANSA: Bonuses or penalties shall be 0.1% of revenue from en route air navigation services.
  • The maximum amount of aggregate bonus or penalty shall not exceed 0.1% of the revenue from en-route air navigation services in year $n$.
  • The incentives shall not be applied where deviations ranging between $+10\%$ or $-20\%$ of the adopted target value over a calendar year.

3.78 PRB comments on the incentive scheme in Baltic FAB’s initial RP2 PP are provided in the table below.

Table 3.4: Baltic FAB capacity KPA incentive scheme, PRB comments, initial RP2 PP

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The incentive schemes are not symmetrical in defining bonuses and penalties.</td>
<td>The incentive scheme for Poland refers to an adopted target value, without defining if this is the FAB target value or a separate national target value.</td>
</tr>
<tr>
<td></td>
<td>The incentive scheme for Poland has the possibility of receiving bonuses at a faster rate than penalties, for the same differential in performance.</td>
<td>(i) If the target value is the FAB target, the information on bonus/penalty is not consistent with the definition of the deadband;</td>
</tr>
<tr>
<td></td>
<td>The incentive scheme for Lithuania has the possibility for more penalties than bonuses, although the likelihood of producing such performance also has to be considered.</td>
<td>(ii) If the target value refers to a national target (0.26), this target is inconsistent with the FAB target values of 0.21 or 0.22 minutes per flight.</td>
</tr>
<tr>
<td></td>
<td>FAB performance is not a condition of the incentive scheme.</td>
<td></td>
</tr>
</tbody>
</table>

3.79 In the corrigendum to the RP2 PP, Baltic FAB provided updates to its capacity incentive schemes:

• Oro Navigacija:
  • an update to the en-route incentive scheme was not provided.
  • a financial incentive on arrival ATFM delay is included. Maximum bonuses and penalties are 0.1% to 0.2% of revenue from terminal air navigation services. Bonus for 0 min of delay is 0.1% of revenue. Deadband is 0.0–0.1 min of delay. No detail on penalty was provided.

• PANSA:
  • a financial incentive on en-route ATFM delay is included. Maximum bonuses and penalties are 0.1% of revenue from en-route air navigation services.
  • a financial incentive on arrival ATFM delay is included. Maximum bonuses and penalties are 0.1% of revenue from terminal air navigation services. The airports have been divided into three baskets with separate incentive schemes; the third basket has no incentive scheme due to the limited impact that these airports have on the network.
  • A FAB level incentive scheme on en-route delay was included.
  • Applied per actual input by member provider on capacity targets, via delay allocation.
  • Bonuses and penalties shall be paid out in line with actual performance of the member, based on the local incentive scheme parameters.
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- Maximum amount of bonus or penalty should not exceed 0.1% of revenue from en-route air navigation services.

3.80 No PRB comments on the corrigendum to the RP2 PP were available, however we note that PANSAs updated scheme is symmetrical in defining bonuses and penalties, and also that bonuses and penalties would be received at the same rate for the same differential in performance, although the bonus side of the deadband is 0.03 min smaller than the penalty side for 2015 and 0.01 min larger than the penalty side for 2016-2019. Other PRB comments from the initial RP2 PP remain valid.

Table 3.5: Baltic FAB capacity KPA incentive scheme, PRB comments updated with Steer Davies Gleave comments, revised RP2 PP

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>-</td>
<td>✓ FAB performance is now nominally linked to the incentive scheme, although without reference to the FAB target values. Instead delay is allocated to the ANSPs and the schemes are applied using the local reference values. No updates to the incentive scheme for Lithuania provided in the RP2 PP corrigendum. Updates to the incentive scheme for Poland were provided in the RP2 PP corrigendum. ✓ The final schemes are symmetrical in defining bonuses and penalties, and also that bonuses and penalties would be received at the same rate for the same differential in performance, although the bonus side of the deadband for Poland varies from being 0.03 smaller than the penalty side in 2015 to 0.01 larger for the remainder of RP2.</td>
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</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.81 Baltic FAB provided a corrigendum to its RP2 PP but it appears that this was not explicitly assessed by the PRB.

3.82 According to PRB comments, the Baltic FAB’s capacity incentive scheme issues relate primarily to interpretation of the legislation, rather than a fundamental inconsistency with the Regulation. There are some inconsistencies between PANSAs incentive scheme and the FAB capacity target, while the deadband presented is not precisely symmetric, opening the potential for bonus and penalty to be awarded at the same rate for slightly differing levels of performance.

3.83 Baltic FAB is one of six FABs to introduce a non-financial incentive for the environment KPA.

BlueMed FAB

3.84 The BlueMed FAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

Environment KPA

3.85 No incentives have been adopted for the environment KPA, therefore no comments from the PRB in this area.

3.86 No update was provided in the revised RP2 PP.
In the initial RP2 PP, financial incentives on en-route delay were applied for Italy and Cyprus. No incentive scheme for Malta or Greece was provided.

- Italy/ENAV: According to the initial RP2 PP, Italy's capacity incentive scheme:
  - relates to the Capacity KPI "The average minutes of en route ATFM delay per flight";
  - takes into consideration the reference values provided by NM and PRB as adequate contribution specifically: 0.09 min/flight in 2015; 0.10 min/flight in 2016; 0.11 min/flight for the years 2017 to 2019 included;
  - is symmetrical and incremental;
  - takes into account all en-route ATFM delay causes excluding exceptional events;
  - has a maximum level at 1% of the revenue from en route ANS;
  - is proportional to the operational and economic effects on Airspace Users; and
  - a graphic is provided without detailed figures on size of deadband. The bonus or penalty is calculated by multiplying the minutes of delay for each year by the University of Westminster “airline delay cost reference value” of €81.

- Cyprus/DCAC:
  - Financial incentive, with bonus 1% of “ATS turnover” and penalties “as foreseen in Civil Aviation Law”.

PRB comments on the incentive scheme in Blue Med FAB’s initial RP2 PP are provided in the table below.

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
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<tbody>
<tr>
<td>There are no incentive schemes for en-route capacity for either Malta or Greece. When the incentive scheme for Cyprus is compared with Article 12 of the performance Regulation and Article 15 of the charging Regulation:</td>
<td>Neither of the incentive schemes listed use FAB performance as a criterion. There is no evidence to show how the specified annual target values will ensure the FAB target for en-route capacity will be met.</td>
<td>-</td>
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<tr>
<td>• It is neither proportional nor effective;</td>
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<td>• It is not transparent;</td>
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<td></td>
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<tr>
<td>• No information was provided so the regulatory framework is unknown;</td>
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<td></td>
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<tr>
<td>• The capacity targets are not defined. If they relate to the ANSP contribution of 1.5 minutes per flight, they do not foster a high level of performance. When the incentive scheme for Italy is compared with Article 12 of the performance Regulation and Article 15 of the charging Regulation:</td>
<td></td>
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<tr>
<td>• Although the bonus/penalty is symmetrical around a target value, the fixing of the bonus/penalty at €770 000 per 0.01 minutes of flight appears inconsistent with the limit of 1% of ANS revenue.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• It is transparent;</td>
<td></td>
<td></td>
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<tr>
<td>• The regulatory framework is known.</td>
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In the revised RP2 PP, Blue Med FAB provided some updates to the capacity incentive schemes.

- No FAB-wide incentive schemes were provided, and no scheme for Malta or Greece was provided.
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- Cyprus is applying an incentive scheme with penalties/bonus within 1% of ATS turnover.
- Italy has submitted an en-route capacity incentive scheme. Italy’s capacity incentive scheme:
  - relates to the Capacity KPI "The average minutes of en route ATFM delay per flight";
  - takes into consideration the reference values provided by NM and PRB as adequate contribution specifically: 0,09 min/flight in 2015; 0,10 min/flight in 2016; 0,11 min/flight for the years 2017 to 2019 included;
  - is symmetrical and incremental;
  - takes into account all en-route ATFM delay causes excluding exceptional events;
  - has a maximum level at 1% of the revenue from en route ANS; and
  - is proportional to the operational and economic effects on Airspace Users.

3.90 PRB comments on the incentive scheme in Blue Med’s revised RP2 PP and the 2015 Monitoring Report, are provided in the table below.

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>No information on the working of Cyprus’ incentive scheme is provided so it cannot be determined if it is compliant with the SES legislation.</td>
<td>BLUE MED FAB did not present a FAB-wide incentive scheme for en-route capacity performance.</td>
<td></td>
</tr>
<tr>
<td>None of these issues for Cyprus were addressed in the FAB monitoring report for 2015.</td>
<td>The PRB Finding is that a FAB-wide en-route capacity incentive scheme could be asked to be adopted.</td>
<td></td>
</tr>
</tbody>
</table>

Italy’s incentive scheme is based upon a local indicative value (i.e. the only official reference values for RP2 are as published at FAB level) so it is impossible to determine if it fosters high performance, and if it is therefore compliant with the SES legislation.

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<tr>
<td></td>
<td>The BLUEMED 2015 monitoring report contained no information as to how the previously raised compliance issues for Italy had been addressed.</td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.91 There are no incentive schemes for Malta or Greece, which is not in line with the regulatory requirements, yet this is not noted in a PRB finding. The primary PRB finding is that a FAB-wide incentive scheme could be adopted. This is not a requirement of the legislation, but a secondary interpretation of this is that with a FAB incentive scheme in place, bonuses and penalties would be applied at ANSP level, so therefore it may be assumed that a FAB incentive scheme would fulfil the requirement for each MS to have a capacity incentive scheme.

3.92 It is understood that Italy’s use of a “local indicative value” is an issue because there is no link between the values chosen by Italy and the FAB reference values. Italy states in their Revised RP2 PP that their values are provided by the NM and PRB and based on the NOP, LSSIP Italy, and Capacity Plans, implying there are sources for the choice, however no clear link is made.

3.93 No incentives have been adopted for the environment KPA.
Danube FAB

3.94 The Danube FAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

Environment KPA

3.95 In the initial RP2 PP, non-financial incentives (as per Article 12.4 of the performance Regulation) were outlined for BULATSA and ROMATSA to reinforce their commitment towards the FAB adopted targets. If there is delayed implementation, corrective actions will be required.

3.96 No update was provided in the revised RP2 PP.

Capacity KPA

3.97 In the initial RP2 PP, financial incentives on en-route delay were applied.

- Romania/ROMATSA:
  - Considering the target levels for Romania in RP2 (i.e. 0), no bonuses can be applied.
  - The maximum amount of aggregated penalties shall not exceed 0.3% of the revenue from the en-route air navigation services.
  - In order not to penalise the ANSPs for very small deviations from the targets and only reward a significant improvement of performance, deadbands around the targets are established. Since the capacity targets for Romania are zero, a deadband of 0.05 minutes from the national targets has been established.
  - The incentive mechanism is applicable only for delay causes related to ATC capacity, ATC routing, ATC staffing, ATC equipment, airspace management and special event with codes C, R, S, T, M and P of the ATFCM user manual.
  - A similar incentive scheme for terminal ATFM delay is also applied.

- Bulgaria/BULATSA:
  - The maximum amount of aggregated bonus or penalty shall not exceed 0.1% of the revenue from the en-route air navigation services.
  - As the capacity target for Bulgaria is 0.12 minutes per flight for the first three years and 0.14 for the last two years of RP2, any achievement below the target to zero value is positively incentivised.
  - A deadband of 0.05 minutes from the national targets has been established. Any value above the target is penalised as per the table presented in the initial RP2 PP. Whilst the bonus and penalty payments are symmetric, the level of performance associated with these is not.

3.98 PRB comments on the incentive schemes in Danube FAB’s initial RP2 PP are provided in the table below.

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
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<tbody>
<tr>
<td>BULATSA would be paid out approx. 2/3 of the total bonus at a level of capacity performance that is just consistent with the Union-wide capacity target.</td>
<td>The PRB had the following comments on the DANUBE FAB en-route ATFM incentive schemes: The FAB targets are not consistent with the Union-wide capacity requirement, and are therefore</td>
<td>There is no mention of an independent verifiable method of reconciling attributed delay to actual events, which raises the possibility of errors or gaming.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>not considered to be a &quot;high-level of performance&quot;; The incentive schemes are not linked to FAB performance, but are purely local;</td>
<td></td>
</tr>
</tbody>
</table>

3.99 In the **revised RP2 PP**, Danube FAB provided some updates to the capacity incentive schemes.

- **Romania/ROMATSA:**
  - As the capacity targets for Romania are zero, the incentive scheme includes penalties only. "Considering the target levels for RP2 and that no bonuses can be applied, the maximum amount of aggregated penalties shall not exceed 0.3%... of revenue". Deadbands around the targets are established, and with capacity targets for Romania being zero, a deadband of 0.05 minutes from the national targets has been established.

- **Bulgaria/ BULATSA:**
  - BULATSA has historically had zero delay. Further analysis has been undertaken to better balance between the delay and the incentive scheme.
  - Following stakeholder meetings, the incentive scheme redesign includes two major concepts:
    - Further lowering the delay range that results in a financial bonus, bringing them much closer to zero. The clear message is that a strong commitment is at place to support additional improvements in the performance of service provision.
    - Further lowering the financial bonus expressed in terms of percentage of revenue, based on stakeholders' observations and Article 12 of Commission Implementing Regulation (EU) No 390/2013 ("effective and proportional").
  - New scheme is not symmetric in terms of level of bonus and penalty, or the level of performance required to obtain penalty or bonus.
  - The Danube FAB Performance Plan presents an incentive scheme for the national targets on airport arrival ATFM delay for Bulgaria and Romania.

3.100 PRB comments on the incentive scheme in Danube FAB’s revised RP2 PP and the 2015 Monitoring Report, are provided in the table below.

**Table 3.9:** Danube FAB capacity KPA incentive scheme, PRB comments, revised RP2 PP and 2015 Monitoring Report

<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>The PRB made no comment on the updated incentive scheme for Bulgaria and Romania in the revised RP2 PP assessment <strong>Bulgaria:</strong> In the 2015 Monitoring Report, the PRB states that &quot;Following the submission of the revised DANUBE FAB performance plan, in July 2015, several of the listed compliance issues were considered to be resolved. ANSP contributions have been revised, and are now consistent with the FAB reference values (although not consistent with the more ambitious FAB targets). There is no longer any mention of certain delay causes being excluded from the incentive scheme.&quot; • One compliance issue regarding the en route capacity incentive scheme remained: the incentive schemes are not linked to FAB performance.</td>
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<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
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<tbody>
<tr>
<td>• The DANUBE FAB monitoring report did not address the remaining compliance issue.</td>
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<td>• Romania: In the 2015 Monitoring Report, the PRB states that “In the assessment report of the DANUBE FAB RP2 performance plan, the PRB noted that the incentive scheme for Romania is non symmetrical; no bonuses can be accrued, only penalties. Furthermore, the national incentive scheme for Romania and Bulgaria do not consider the overall FAB performance. Neither of these issues were addressed in the FAB monitoring report.”</td>
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Steer Davies Gleave comment

3.101 Danube FAB’s issues appear primarily related to different interpretations of the requirements of the Regulation, rather than a clear inconsistency. In part these issues stem from the particular circumstances of the FAB members – with no delay issues, the FAB assumes that no bonus for improvements can be possible.

3.102 Romania’s incentive scheme does not have an equal level of bonus and penalty, with the stated reason being because they have targets of zero delay, so a bonus is not considered to be appropriate when zero delay is anticipated. It is clear from the PP that Romania understand the legislative requirements but in consultation with their stakeholders have applied a non-symmetric scheme appropriate for their circumstance.

3.103 In their initial RP2 PP, Bulgaria stated that only certain delay causes linked to ATC capacity should be included, but, following comments from the PRB, removed this for the updated incentive scheme in the revised RP2 PP. These exceptions remain in the incentive scheme for Romania, but without an independent means for verifying the delay cause, and no further comment from the PRB on the matter.

3.104 The incentive schemes for both Romania and Bulgaria do not link to FAB performance, so therefore are not in line with the requirements of the regulation (PR 390/2013, Art 12.1(d)) (inducing high performance and meeting the associated targets).

3.105 Danube FAB is one of six FABs to introduce a non-financial incentive for the environment KPA.

Denmark-Sweden FAB

3.106 The Denmark-Sweden FAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

Environment KPA

3.107 In the initial RP2 PP, Naviair and LFV have adopted non-financial incentives on horizontal flight efficiency (as per Article 12.4 of the performance Regulation) to reinforce the commitment towards the adopted targets.

3.108 Environmental reference values will be monitored once a year 2015-2018 and the adopted FAB target once in 2019. If the actual levels achieved exceed the reference values or the target value, the NSA in Sweden and Denmark will require an action plan from the ANSP in question that must include what the ANSP will do to improve the performance and when, and also who is responsible for the action.

3.109 No update was provided in the revised RP2 PP.
3.110 The PRB made no comment on Denmark-Sweden FAB’s environment KPA incentive scheme.

**Capacity KPA**

3.111 In the initial RP2 PP, financial incentives on en-route delay were applied at FAB level:

- The incentive scheme is based on FAB performance;
- The incentive scheme is symmetrical;
- The target value is consistent with the FAB reference value;
- Maximum level of bonus or penalty is 0.75% of revenue;
- The incentive scheme encourages a high level of performance;
- Details on level of performance and associated bonus/penalties is provided in the RP2 PP. The deadband is large, meaning bonus and penalty only paid out for significant issues/performance.

3.112 The PRB had no comments on the capacity incentive scheme presented by Denmark-Sweden FAB.

**Steer Davies Gleave comment**

3.113 DK-SE FAB provided an incentive scheme for both capacity and environment KPAs that was fully compliant with the requirements of the regulation. This makes DK-SE FAB the only FAB to have received no comments from the PRB on their capacity incentive scheme.

3.114 Regarding the incentive scheme for the capacity KPA, DK-SE FAB note in their RP2 PP that “The NSAs in Denmark and Sweden have chosen this model because the performance on the Capacity is very close to being perfect – zero delay.”

3.115 DK-SE FAB is one of six FABs to introduce a non-financial incentive for the environment KPA.

**FABCE**

3.116 FABCE incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

**Environment KPA**

3.117 No incentive schemes related to the environment KPA were presented in the initial RP2 PP.

3.118 No update was provided in the revised RP2 PP.

3.119 The PRB made no comment.

**Capacity KPA**

3.120 In the initial RP2 PP, financial incentives on en-route delay were applied at FAB level:

- The FAB CE incentive mechanism uses three elements that are multiplied together:
  - Bonus/Penalty = FAB PONDER * NATIONAL ANSP ELEMENT * 1% ANSP EN-ROUTE REVENUE
- The “FAB ponder” intends to capture the level of performance at FAB level. Measured based on the distance from the FAB CE target, it gives a relative weight to the national performance.
- The national ANSP element is calculated as percentage deviation of the national outturn delay from the national delay target (positive/negative delta from the target).
- The level of an ANSP’s revenue (1% maximum) is the limit for the bonus and penalty amount. The value of bonuses/penalties depends on the level of the ANSP’s revenues and
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national capacity performance. If the national capacity performance deviation is zero (i.e. capacity en route ATFM delay per flight indicator is the same as the target) then no bonus/penalty will be payable.

3.121 PRB comments on the incentive schemes in FABCE’s initial RP2 PP are provided in the table below.

Table 3.10: FABCE capacity KPA incentive scheme, PRB comments, initial RP2 PP

<table>
<thead>
<tr>
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<tr>
<td>For the same local performance achievement, a specific ANSP could receive a greatly increased bonus if the FAB target is missed by 0.5 minutes instead of 0.01 minutes: clearly this is ineffective and disproportional; There is no clear evidence to show how the different weightings for local and FAB performance foster a high level of performance.</td>
<td>-</td>
<td>FAB performance is merely a weighting, not a trigger; National ANSP targets listed in annex E are inconsistent with those published in the NOP; Explanatory documentation (annex E) does not explain the overly complicated incentive scheme.</td>
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</table>

3.122 In the revised RP2 PP, the FABCE incentive mechanism has been updated:

- It uses three elements that are multiplied together (same as initial RP2 PP):
  - Bonus/Penalty = FAB PONDER * NATIONAL ANSP ELEMENT * 0.5% ANSP EN-ROUTE REVENUE
- Scheme rules are as follows:
  - payment of bonuses and penalties is completely dependent on FAB CE capacity performance deviations (as a main “trigger”) and on national capacity performance.
  - bonuses/penalties will not be paid if capacity performance deviation is zero. If the deviation is positive, only bonuses will be paid and if the deviation is negative, only penalties will be paid.
  - The value of bonuses/penalties depends on the level of the ANSP’s revenues and national capacity performance including the "dead band" of +/- 0.03 minutes per flight (applied universally regardless of ANSP target level).
  - If national capacity performance deviation is zero (Capacity en route ATFM delay per flight indicator is the same as the target), then for a relevant year no bonuses/penalties will be paid.
  - If national capacity performance is in the "dead band" borders of +/- 0.03 minutes per flight from national targets, then no bonus/penalty will be paid.

3.123 PRB comments on the incentive scheme in FABCE’s revised RP2 PP and the 2015 Monitoring Report, are provided in the table below.

Table 3.11: FABCE capacity KPA incentive scheme, PRB comments, revised RP2 PP and 2015 Monitoring Report

<table>
<thead>
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<td>-</td>
<td>No comment in the Revised PP Assessment. In the 2015 Monitoring Report, the PRB notes that: “...the ANSP contribution was not consistent with the FAB targets or the FAB reference value.” No response has been provided by the FAB on this issue.</td>
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</table>
3.124 The updated scheme is an attempt to link national performance to FAB performance, and reward or penalise only those national members who perform outside the deadband and therefore are the primary drivers of the overall FAB result. The incentive scheme is complicated, however, and the initial scheme required a number of edits to address comments made by the PRB.

3.125 In FABCE’s description of the scheme (in both initial and revised RP2 PPs), there is reference to the Regulation and written confirmation that the Regulation has been adhered to. The Regulation’s requirements, therefore, appear to be understood. We consider therefore the issues for FABCE to be of interpretation, an assumption supported by the revisions made in the revised RP2 PP to reflect PRB comments on the initial scheme.

3.126 No incentives have been adopted for the environment KPA.

**Environment KPA**

3.128 ANSPs have been given non-financial incentives in the initial RP2 PP (as per Article 12.4 of the performance Regulation) to reinforce their commitment towards the FAB adopted targets.

- Effects of the incentive, though, are not expected until RP3.
- If the FABEC environment target is not met at the end of the reference period, the FPC (assisted by the NSAC) shall trigger the incentive mechanism, consisting of:
  - i. identifying whether implementation of airspace design improvements planned at FABEC and national level was delayed from original plans, and the areas most concerned;
  - ii. identifying the contribution of airlines to the sub-performance;
  - iii. identifying corrective actions, at FABEC level and/or at local level;
  - iv. requiring an action plan from the ANSPs concerned to address the identified underperformance; and
  - v. setting checkpoints with dates for specific reports in a proportionate manner, assessing the progress made at predetermined intervals.
- Depending on the situation the FPC could take any other appropriate action deemed necessary.

3.129 No update was provided in the revised RP2 PP.

3.130 The PRB made no comment.

**Capacity KPA**

3.131 In the initial RP2 PP, financial incentives on delay were applied:

- The FABEC RP2 PP states that the incentive scheme is based on the delay causes related only to the CRSTMP codes of the ATFCM user manual. This target is set at FABEC level as a ratio (78%) of the FABEC ATFM delay target (all causes).
- There are four steps to the incentive calculation:
  - vi. Determine whether the target is achieved at FABEC level.
vii. the FABEC incentive is defined on the basis of a linear function with a symmetrical dead band +/- 10% around the FABEC CRSTMP target for en route ATFM delay.

viii. determine the extent the individual ANSPs have contributed to the overall FABEC performance (over- or under-performance).

ix. the bonus or penalty is distributed exclusively to those ANSPs who have contributed to the over or under performance.

- Bonus/penalty is capped at 0.5% of revenues.
- The FABEC Performance Plan establishes a terminal incentive scheme for the national target on arrival ATFM delay for Belgium, France, Germany, the Netherlands, and Switzerland. No incentive scheme is presented for Luxembourg.

3.132 PRB comments on the incentive schemes in FABEC’s initial RP2 PP are provided in the table below.

<table>
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<td>-</td>
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<td>The description of the incentive scheme was considered insufficient as it does not present a clear and understandable process that will incentivise a high level of capacity performance. The graphics presented do not correspond with what is written in the text. The scheme proposes to use only the delay codes CRSTMP, an option that is permitted in accordance with the charging Regulation. The FABEC proposes to adjust the FAB target, which reflects all causes of delay, to a CRSTMP target. The CRSTMP target is 78% of the FAB target. However, when the PRB reviewed the FABEC performance during RP1, the value of CRSTMP as 78% of total delay has a 16% deviation in 2012, a 36% deviation in 2013 and a 41% deviation for year to date 2014. A significant aspect of using only selective delay classifications for an incentive scheme is the fact that it is the ANSP itself that determines the reason for the delay classification. The FABEC Performance Plan does not contain any information about establishing an independent and verifiable method of reconciling delay classification against actual events. The FABEC en-route capacity performance scheme is based on the ANSP contribution presented elsewhere in the plan. However, as previously noted in this assessment, the provided ANSPs contribution are neither consistent with the FAB reference values, nor are they consistent with the FAB target proposed in the Performance Plan. The FABEC incentive scheme refers to the use of delay data as reported in the annual monitoring report in accordance with Article 18(4) of the performance Regulation. It is important to confirm that the official data to be used in the calculation of the capacity KPIs shall be provided by the Network Manager, in accordance with the definitions of both Union-wide and local Capacity Key Performance Indicators in Annex I of the performance Regulation.</td>
</tr>
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</table>

3.133 In the revised RP2 PP, FABEC made no changes to the capacity incentive mechanism from that provided in the initial RP2 PP. The PRB, however, updated their comments, as shown in the table below.
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Table 3.13: FABEC capacity KPA incentive scheme, PRB comments, initial RP2 PP and 2015 Monitoring Report

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| -                           | The PRB stated that FABEC is to provide a FAB wide en-route capacity incentive scheme with the following characteristics:  
• All delay reasons considered;  
• Dead-band between FABEC reference values and FABEC Targets;  
• Bonuses paid when FABEC capacity performance is better than respective FABEC reference value;  
• Penalties paid when FABEC capacity performance is worse than proposed FABEC Targets.  
In the 2015 Monitoring Report, the PRB states that compliance issues with the capacity incentive scheme remain. “The compliance issues are: the individual ANSP contributions are not consistent with the required capacity performance and that the proposed target, using CRSTMP codes only, is not consistent with the required capacity performance. Neither of these outstanding compliance issues have been addressed in the FABEC monitoring report.” |       |

Steer Davies Gleave comment

3.134 There do not appear to be issues regarding consistency with or interpretation of the Regulation, although more detail on the scheme is required to confirm this. The PRB’s concerns regarding FABEC’s capacity incentive scheme as provided relate to the structure and definition of the scheme; that ANSP contributions are not consistent with the required performance, nor is the target.

3.135 FABEC is one of six FABs to introduce a non-financial incentive for the environment KPA.

NEFAB

3.136 NEFAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

Environment KPA

3.137 In the initial RP2 PP, ANSPs have been given non-financial incentives (as per Article 12.4 of the performance Regulation) to reinforce their commitment towards the FAB adopted targets.

3.138 If required performance is not delivered, the ANSP in question will be required to submit a corrective action plan with deadlines and associated measures.

3.139 No update was provided in the revised RP2 PP.

3.140 The PRB made no comment on NEFAB’s environment KPA incentive scheme.

Capacity KPA

3.141 In the initial RP2 PP, financial incentives on en-route delay were applied at ANSP level:
• Finland/Finavia. Scheme on en-route ATFM delay covers all years of RP2:
  • Dead band: 0.05 min/flight to 0.08 min/flight
  • 0.02 min/flight or better: Bonus: 1 % of the revenues from air navigation services;
  • 0.03 min/flight: Bonus: 0.5 % of the revenues from air navigation services;
  • 0.04 min/flight: Bonus: 0.2% of the revenues from air navigation services;
  • 0.09 min/flight: Penalty: 0.2 % of the revenues from air navigation services;
  • 0.10 min/flight: Penalty: 0.5 % of the revenues from air navigation services;
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- 0.11 min/flight or worse: Penalty: Penalty: 1% of the revenues from air navigation services.
- Latvia/LGS. Scheme on en-route ATFM delay covers all years of RP2:
  - Target: 0.04 min/flight;
  - 0.00 min/flight or better: Bonus: 1 % of the revenues from air navigation services;
  - 0.01 min/flight: Bonus: 0.7% of the revenues from air navigation services;
  - 0.02 min/flight: Bonus: 0.5% of the revenues from air navigation services;
  - 0.03 min/flight: Bonus: 0.2% of the revenues from air navigation services;
  - 0.05 min/flight: Penalty: 0.2 % of the revenues from air navigation services;
  - 0.06 min/flight: Penalty: 0.5 % of the revenues from air navigation services;
  - 0.07 min/flight or worse: Penalty: 1% of the revenues from air navigation services.
- Norway/Avinor:
  - 2015-2016 Dead band: 0.03 min/flight; – 0.13 min/flight;
  - 2017-2019 Dead band: 0.03 min/flight; – 0.14 min/flight;
    - 2015 - 2016:
      - 0.00 min/flight or better Bonus: 1 % of the revenues from air navigation services;
      - 0.01 min/flight Bonus: 0.5 % of the revenues from air navigation services;
      - 0.02 min/flight Bonus: 0.2% of the revenues from air navigation services;
      - Dead band 0.05 min/flight – 0.13 min/flight
      - 0.14 min/flight Penalty: 0.2 % of the revenues from air navigation services;
      - 0.15 min/flight Penalty: 0.5 % of the revenues from air navigation services;
      - 0.16 min/flight or worse Penalty: 1% of the revenues from air navigation services;
    - 2017 - 2019:
      - 0.00 min/flight or better Bonus: 1 % of the revenues from air navigation services;
      - 0.01 min/flight Bonus: 0.5 % of the revenues from air navigation services;
      - 0.02 min/flight Bonus: 0.2% of the revenues from air navigation services;
      - Dead band 0.05 min/flight – 0.14 min/flight
      - 0.15 min/flight Penalty: 0.2 % of the revenues from air navigation services;
      - 0.16 min/flight Penalty: 0.5 % of the revenues from air navigation services;
      - 0.17 min/flight or worse Penalty: 1% of the revenues from air navigation services.
- Estonia/EANS:
  - 2015-2016 Dead band: 0.05 min/flight; – 0.13 min/flight;
  - 2017-2019 Dead band: 0.05 min/flight; – 0.14 min/flight;
    - 2015-2016:
      - 0.02 min/flight or better: Bonus: 1 % of the revenues from air navigation services;
      - 0.03 min/flight: Bonus: 0.5 % of the revenues from air navigation services;
      - 0.04 min/flight: Bonus: 0.2% of the revenues from air navigation services;
      - 0.14 min/flight: Penalty: 0.2 % of the revenues from air navigation services;
      - 0.15 min/flight: Penalty: 0.5 % of the revenues from air navigation services;
      - 0.16 min/flight or worse: Penalty: Penalty: 1% of the revenues from air navigation services;
    - 2017-2019:
      - 0.02 min/flight or better: Bonus: 1 % of the revenues from air navigation services;
      - 0.03 min/flight: Bonus: 0.5 % of the revenues from air navigation services;
      - 0.04 min/flight: Bonus: 0.2% of the revenues from air navigation services;
      - 0.15 min/flight: Penalty: 0.2 % of the revenues from air navigation services;
      - 0.16 min/flight: Penalty: 0.5 % of the revenues from air navigation services;
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- 0.17 min/flight or worse: Penalty: Penalty: 1% of the revenues from air navigation services.
- The NEFAB Performance Plan also presents incentive schemes for the national targets on arrival ATFM delay for all four States

3.142 PRB comments on the incentive schemes in NEFAB’s initial RP2 PP are provided in the table below.

Table 3.14: NEFAB capacity KPA incentive scheme, PRB comments, initial RP2 PP

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>The incentive schemes are not linked to FAB performance, but are purely local.</td>
<td>A review of FAB targets- towards a more stringent capacity performance would necessitate a review of the par values for the incentive schemes; The incentive scheme for Avinor AS has a gap from 0.03 to 0.05 minutes per flight. The dead-band does not match the formula; For EANS the changes in the scheme covering 2017-2019 are not explained.</td>
</tr>
</tbody>
</table>

3.143 NEFAB did not provide a revised RP2 PP.

Steer Davies Gleave comment

3.144 NEFAB’s capacity incentive schemes are at ANSP level only, and the PRB commented on the lack of FAB-level scheme. Other comments do not highlight any issues of consistency with the Regulation. Other comments relate to more explanation, an error in the formula, and noting the need to revisit the scheme par values if the capacity targets change.

3.145 NEFAB is one of six FABs to introduce a non-financial incentive for the environment KPA.

SW FAB

3.146 The SWFAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.

Environment KPA

3.147 No incentives have been adopted for the environment KPA, therefore no comments from the PRB in this area.

3.148 No update was provided in the revised RP2 PP.

Capacity KPA

3.149 In the initial RP2 PP, a financial incentive on en-route delay is applied at FAB level:

- The incentive mechanism formula at FAB level consists of symmetric linear function, with a dead band around the FAB target.
- The dead-band has a width of 0.02 minutes/flight at each side of the target. It represents around 4% of margin around the target.
- The maximum bonus/penalty is awarded at 0.14 minutes/flight from the target.
- The formula described is applied at FAB level and distributed among the ANSPs.
- When the FAB target is not met: there is no bonus for any ANSP, and only the ANSPs that have not met their individual target are penalised.
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When the FAB target is met: there is no penalty for any ANSP, and only the ANSPs that have met their individual target can receive the bonus.

The maximum bonus/penalty is established at 0.50% of the total en-route income.

The incentive mechanism is applied considering all causes of delay. However, an adjustment is introduced to mitigate the impact when for a given year, the minutes of delay due to causes other than those specified in Article 15.1 (g) of the Charging Regulation, are unusually high (20% higher than the average of the three previous years). In this case, the excess of minutes is discounted from before it is applied in the calculation of the bonus/penalty, against the SW FAB targets.

3.150 PRB comments on the incentive schemes in SWFAB’s initial RP2 PP are provided in the table below.

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FAB targets are not consistent with the Union-wide capacity requirement, and are therefore not considered to be a ‘high-level of performance’. The full bonus would be paid out at a level of capacity performance that is inconsistent with the Union-wide capacity target;</td>
<td>-</td>
<td>Table 4.k in the Performance Plan refers to the FAB reference value although subsequently, only the FAB targets are used; The incentive scheme refers to ATFM delay for all causes but then describes a system for removing certain delays from the performance calculations; There is no mention of an independent verifiable method of reconciling attributed delay to actual events, which raises the possibility of errors or gaming.</td>
</tr>
</tbody>
</table>

3.151 In the revised RP2 PP, the SWFAB incentive mechanism has been modified:

- The incentive shall be calculated as for the SOWEPP FAB target expressed in the KPI metrics (all regulation reasons - Annex 1 of Regulation 390/2013).
- An adjustment is introduced to mitigate the impact when for a given year, the minutes of delay due to causes other than those specified in Article 15.1 (g) of the Charging Regulation (non-ATC causes), are unusually high. When for a given year, the minutes of non-ATC delay are 20% higher than the average of the three previous years, ANSPs can ask the excess of minutes to be discounted from the KPI before its actual value is applied in the calculation of the bonus/penalty, against the SW FAB targets.
- In these cases, ANSPs shall justify the application of this clause appropriately. NSAs shall analyse the situation and decide whether to accept the request from the ANSPs. External independent bodies can be consulted for opinion if NSAs judge it necessary. If the clause is to be applied, airspace users shall be consulted in advance.
- The maximum amount of incentive (bonus or penalty) is set at 0.50% of the en-route actual revenue.
- The formula is asymmetric: it incentivises ANSPs to achieve the target to avoid penalties, while encouraging them to perform beyond the target to win the bonus.
- In the penalty zone above the target, incentives are not applied in cases where performance is very near the target, in order to avoid certain specific problems such as KPI round off issues.
- In the bonus zone below the target, incentives are not applied unless performance is significantly better than the target.
• The SWFAB capacity target is 0.52 min/flight. The deadband ranges from 0.30 to 0.54 min/flight.
• Transition area: the transition area is 0.12 min/flight on both sides. It is the area in which the incentive level is a variable between zero and the maximum value (i.e. the zone in which the incentive formula is a linear function)
• Eligibility:
  • When the FAB target is not met: there is no bonus for any ANSP, and only the ANSPs that have not met their individual target are penalised.
  • When the FAB target is met: there is no penalty for any ANSP, and only the ANSPs that have met their individual target can receive the bonus.

3.152 The PRB made the following recommendation on the capacity incentive scheme presented by SWFAB in their revised RP2 PP:

3.153 PRB comments on the incentive schemes in SWFAB’s initial RP2 PP are provided in the table below.

Table 3.16: SWFAB capacity KPA incentive scheme, PRB comments, initial RP2 PP and 2015 Monitoring Report

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the <strong>2015 Monitoring Report</strong>, the PRB stated: The PRB considers that the original compliance issues have not been addressed and are still valid. The aggregation of the updated local contributions shows an en route capacity performance 10% above the SW FAB targets for each year of the reference period. The PRB has previously flagged that the aggregation of the Spanish and Portuguese national capacity targets was not consistent with the required capacity performance for SW FAB but this issue has not been addressed to date, with aggregated local performance target approximately 10% greater than the FAB-SW target for each year of RP2</td>
<td><strong>PRB findings on revised RP2 PP:</strong> The Commission should invite SW FAB to provide a FAB wide en-route capacity incentive scheme with the following characteristics: (i) All delay reasons considered; (ii) Dead-band between SW FAB reference values and SW FAB Targets. (iii) Bonuses paid when SW FAB capacity performance is better than respective SW FAB reference value; (iv) Penalties paid when SW FAB capacity performance is worse than proposed SW FAB Targets.</td>
<td></td>
</tr>
</tbody>
</table>

*Steer Davies Gleave comment*

3.154 The primary issue with SWFAB’s updated capacity incentive scheme is that the aggregated local contributions are higher than the FAB targets and that SWFAB’s updated scheme is asymmetrical as the target is no longer in the middle of the deadband. This differing interpretation of the Regulation is an intentional effort by SWFAB to ensure bonuses are only paid for exceptional performance.

3.155 There are no issues with inconsistency with the Regulation.

3.156 SWFAB adopted no incentives for the environment KPA.

**UK-IE FAB**

3.157 The UK-IE FAB incentive schemes as presented in the initial and revised RP2 Performance Plans are shown below. Following these we note the PRB comments on these schemes.
Environment KPA

3.158 In the initial RP2 PP, a non-financial incentive has been adopted at FAB level to address underperformance with respect to the FAB environment target. The ANSPs shall be required to report to their respective NSAs in years where these targets are not met setting out:

- The extent to which there remain substantial horizontal flight inefficiencies to be addressed;
- The extent to which there have been any exceptional events or uncontrollable factors and the extent to which these factors have affected the ANSPs ability to meet the target;
- The extent to which achieving additional flight efficiencies would prejudice greater gains elsewhere;
- The scale of flight efficiency benefits (for UK, including vertical trajectories and benefits within 40NM of airports) generated since the start of RP2. For UK, this may include a quantification of savings in fuel burn.

3.159 A financial incentive is applied to the additional environment indicator (3Di metric, based on a linear regression model incorporating flight path inefficiencies in the vertical plane as well as horizontal). The 3Di metric provides an objective measure to which financial incentives can be attached. Chapter 5 of the Supporting Document provides details on par values, width of deadband, and boundaries at which maximum bonus and penalty accrue.

3.160 A financial incentive is applied to the UK’s implementation of a harmonised Transition Altitude (TA) of 18,000ft.

3.161 For the first three years of RP2, NERL will be eligible for a bonus for performance under the 3Di incentive. The bonus or penalty shall not exceed a maximum of 1% of NERL’s en route revenue from user charges for the given year, and will be paid/recovered in year n+2. In 2018 to the end of RP2, NERL’s eligibility to earn bonuses will be contingent on the successful implementation of a harmonised TA of 18,000 ft by the end of Q1 2018. Furthermore, NERL will be liable to pay penalties equal to 1% of its en route revenue from user charges from Q2 2018 and each subsequent year of RP2, until a harmonised TA of 18,000 ft is implemented. If a harmonised TA of 18,000 ft is implemented by the end of Q1 2018, NERL will be subject to the 3Di bonus and penalty mechanism described above in 2018 and 2019.

3.162 PRB comments on the environment incentive schemes in UK-IE FAB’s initial RP2 PP are provided in the table below.

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRB notes that the incentive introduced is not linked to meeting the environment targets, as required by article 12.1.(d)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3.163 UK-IE FAB did not provide a revised RP2 PP.

Capacity KPA

3.164 In the initial RP2 PP, a financial incentive is applied at FAB level (Trigger and Common incentive scheme) and a further two are applied only to NATS (Delay impact score, Excess delay score):
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• Common FAB level scheme (C2):
  • Incentives will be calculated on a calendar year basis and be paid in year n+2;
  • no bonus will be payable to either NERL or the IAA for a relevant year unless the FAB target for that year has been met and similarly no penalty will be payable unless the FAB target for that year has been missed;
  • the calculation of performance will be as for the KPI target for capacity except that it will only be for those causes listed in article 15(g) of the Charging Regulation (ATC capacity, ATC routing, ATC staffing, ATC equipment airspace management and special event).
  • subject to the FAB performance being above or below target, any bonus or penalty will be then applied to each of the en route ANSPs based on their performance. If the total FAB performance score has exceeded the “dead band” in either direction, but only one of the ANSPs has exceeded their local target “dead band”, then only that ANSP will have bonuses or penalties applied at the rates below. If the total FAB score has exceeded the “dead band” in either direction, and both ANSPs have exceeded their local target “dead band”, then each ANSP will have bonuses or penalties applied at the rates above
  • dead-band of -20% to +10% around the par value;
  • there will be a smooth sliding scale with the maximum penalty to be paid where delay is at 150% and a maximum bonus at 40% of the par value
  • Ireland: maximum penalty or bonus under this incentive mechanism for IAA would be no greater than 1% of ANSP en route revenue.
  • UK: maximum penalty or bonus should not be more than 0.25% of ANSP en route revenue (with a further 0.75% being applied to the additional UK capacity incentive measures).
• Further incentives for the UK:
  • Impact Score (C3) - placing greater weight on long delays and departures in the morning and the evening peaks. This has 50% of the total capacity penalty and 75% of the bonus. For this incentive, bonuses will only be paid if the FAB as a whole is also meeting the FAB-wide target and penalties will only be paid if the FAB as a whole is achieving a C2 delay worse than the FAB-wide target.
  • Daily Excess Delay Score (C4) - based on weighted delays exceeding pre-determined thresholds daily. No bonuses would be applicable for this (the maximum bonus for the other two incentives for the UK would however still sum to 1%), recognising that failure against this measure relates to exceptional events and a reasonable user expectation of such events is likely to be zero. The CAA considered linking the incentive to FAB performance but decided not to do so because from a user perspective, the purpose of this metric is to capture particularly bad days even where the ANSP is performing relatively well for the year as a whole.

3.165 PRB comments on the incentive schemes in UK-IE FAB’s initial RP2 PP are provided in the table below.
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Table 3.18: UK-IE FAB capacity KPA incentive scheme, PRB comments, initial RP2 PP

<table>
<thead>
<tr>
<th>Consistency with Regulation</th>
<th>Differing interpretation of Regulation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>The trigger value, C2, is defined [Chapter 4, para 4.33] as a FAB-wide target, however in Figure 4.8 it is shown as two separate ANSP targets. This confuses the issue of when bonuses or penalties will be due;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The trigger value, C2, for 2015 does not meet the required FAB performance level of 0.25 minutes per flight;</td>
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<td></td>
<td></td>
<td>The par value for the IAA (0.14) is less stringent than the ANSP contribution required in 2015 &amp; 2016;</td>
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<td></td>
<td></td>
<td>Figure 4.6 only gives examples of delay classification, it does not give a complete list, and the examples are not binding;</td>
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<tr>
<td></td>
<td></td>
<td>There is no mention of an independent verifiable method of reconciling attributed delay to actual events, which raises the possibility of errors or gaming;</td>
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<tr>
<td></td>
<td></td>
<td>The description of ‘exceptional events’ does not match the definition contained in the performance Regulation, Article 2 paragraph (17);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no evidence to show how the margin for non-ANSP attributable delay was derived, and thus how it is consistent with the other targets in the Performance Plan;</td>
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<tr>
<td></td>
<td></td>
<td>The incentive scheme C4 can be modulated against a change in forecasted traffic. Although it is not explicitly stated in the description of the incentive scheme, it is assumed that this refers to the baseline STATFOR 7-year forecast which is mentioned in section 1.2 of the Performance Plan.</td>
</tr>
</tbody>
</table>

3.166 UK-IE FAB did not provide a revised RP2 PP, and in the 2015 Monitoring Report the PRB noted that there were ‘nil’ compliance issues with the FAB incentive scheme.

*Steer Davies Gleave comment*

3.167 There were no compliance or interpretation issues noted by the PRB on the UK-IE FAB capacity incentive schemes.

3.168 UK-IE FAB was the only FAB to implement a financial incentive for the environment KPI.

**Summary**

*Environment KPA incentive schemes*

3.169 Six FABs have included non-financial incentive schemes for the environment KPA (Baltic, Danube, DK-SE, FABEC, NEFAB, UK-IE). Only one FAB, UK-IE FAB, has included a financial incentive for the environment KPA, and this is applicable to the UK only. The PRB had no comment on the environment incentives in all cases apart from the UK-IE FAB, where the PRB noted that the financial incentive is not linked to meeting the environment targets, as required by Commission Regulation (EU) 390/2013 Article 12.1(d).

*Capacity KPA incentive schemes*

3.170 As a mandatory requirement, the main issues found by the PRB were in the compliance with the incentivisation of en-route ATFM delay, with several issues arising with respect to compliance with the legislation and, in some cases, lack of clarity as to how the scheme would be implemented in practice.

3.171 Only one FAB, DK-SE FAB, provided a capacity scheme that elicited no comment from the PRB.
Regarding consistency with the Regulation, for the most part, the incentive schemes were consistent, with the following exceptions:

- Blue Med had considerable issues, with not all Members having incentive schemes and some incentive schemes unable to be reviewed, or inconsistent with the Regulation.
- For a number of FABs, it was not apparent that the incentive schemes foster a high level of performance;
- In a few cases, schemes were found to be not proportional.

There were a number of issues around interpretation:

- The PRB consider that a FAB level scheme was required to ensure the local schemes supported the FAB targets. A number of FABs provided local schemes only.
- The PRB consider that the regulatory requirement for symmetry applies to both bonus/penalty and the rate at which the bonus/penalty can be accrued. Some FABs, for example, were ‘tougher’ on the bonus side than the penalty, with only a slight dip in performance required for a penalty and significant performance above the target for a bonus, but this was considered asymmetric by the PRB.

There were a number of issues falling in the ‘other’ category:

- On a number of occasions, the PRB considered that FABs did not provide sufficient information to assess the scheme;
- For a number of schemes that included only some delay types, the PRB noted that “There is no mention of an independent verifiable method of reconciling attributed delay to actual events, which raises the possibility of errors or gaming.”
- Article 15(g) of the charging Regulation allows the exclusion of delay causes outside of the control of the ANSP for the calculation of incentives. It is not always clear from the performance plans whether this is applied, and where it is applied the revised target is not always stated explicitly. A number of performance plans use this article to reduce the local target to only include the CRSTMP delay codes.

The FABEC incentive scheme for the capacity KPI is a clear example of an incentive scheme that adjusts the target to include only CRSTMP delay codes and includes a ‘deadband’ in which no penalties or bonus would be payable.

The FABEC performance target including only CRSTMP delay codes is 78% of the local FAB target. This was based on a historical analysis of weather delays. However, the PRB noted\(^{11}\) that, “CRSTMP is approximately equal to 78% of the total delay causes for only three years in the last eight”. In other years the proportion of delay relating to CRSTMP was between 50% and 70% and suggested that, “stakeholders would appreciate justification of how an incentive scheme based on 78% of total delay causes is consistent with the required FAB performance for en-route capacity”.

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\(^{11}\) PRB annual monitoring report 2015 volume 2 national overview
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Table 3.19: Proportion of CRSTMP delay causes for FABEC

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total delay causes (1)</td>
<td>0.93</td>
<td>0.62</td>
<td>2.12</td>
<td>0.74</td>
<td>0.60</td>
<td>0.47</td>
<td>0.56</td>
<td>0.69</td>
</tr>
<tr>
<td>CRSTMP value (2)</td>
<td>0.74</td>
<td>0.49</td>
<td>1.29</td>
<td>0.57</td>
<td>0.39</td>
<td>0.24</td>
<td>0.31</td>
<td>0.48</td>
</tr>
<tr>
<td>Ratio (1)/(2)</td>
<td>80%</td>
<td>80%</td>
<td>58%</td>
<td>77%</td>
<td>65%</td>
<td>51%</td>
<td>55%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Source: PRB annual monitoring reports, Volume 2 national overviews

3.177 The figure below illustrates the relationship between the local capacity target, the incentive scheme CRSTMP-only target, the deadband and maximum bonus/penalty.

**Figure 3.4: FABEC capacity incentive scheme including deadband and adjustment for CRSTMP delay codes**

Source: FABEC RP2 Performance Plan

3.178 Not all performance plans clearly describe how their incentive schemes isolate CRSTMP related delays. For example, the UK-Ireland FAB incentive scheme includes only CRSTMP delay codes but neither the performance plan nor the PRB monitoring report for 2015 describe an adjusted target to exclude delay causes outside of the control of the ANSP.

3.179 Additionally, given the reference values provided by the NM are considered the optimal level attributed to each FAB for each year’s EU-wide target, there is concern from airspace users that the incentive schemes encourage over-performance. ANSPs exceeding the performance specified in the reference values can be considered to have an excess of capacity, which is at an additional cost to the airspace user.

**Review of annual monitoring report**

3.180 In the PRB’s monitoring of performance in 2015, it reviewed the incentive schemes applying to Capacity and Environment indicators. This section provides an overview of the incentive
schemes implemented in 2015. For each of the FABs, the incentive schemes as applied are described. We note the PRB comments on these schemes from SQS review and from the ECO review. We also summarise if an incentive scheme was available for each FAB or ANSP, whether this was applied and whether it resulted in a bonus or penalty being triggered, as an indication of the impact of the available incentive schemes.

3.181 The section concludes with a summary of the issues encountered.

Baltic FAB

3.182 The Baltic FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

Environment KPA

3.183 In its monitoring report, Baltic FAB notes that the FAB level target (1.5%) was not achieved in 2015 (actual 1.6%). A non-financial incentive was provided in the PP for Oro Navigacija but this was not applied “due to the actual result”.

Capacity KPA

3.184 Lithuania and Poland presented separate local financial incentives schemes for en-route capacity, with no reference to FAB performance. Separate incentive schemes for arrival ATFM delay were also presented.

- Oro Navigacija:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 0.01 min delay/flight. Actual achieved: 0.00 min delay/flight.
  - A bonus was applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 was 0.00 min delay/arrival. Actual achieved: 0.00 min delay/arrival.

- PANSA:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 0.26 min delay/flight. Actual achieved: 0.19 min delay/flight, which was lower than the target, but higher than the deadband lower threshold value of 0.15 min delay/flight.
  - The terminal incentive scheme applied at airport level. A bonus was applied at three airports. A penalty was applied at one airport. No bonus or penalty applied at two airports.
  - The terminal target set for 2015 was 0.08 min delay/arrival at EPWA and 0.00 min delay/arrival at other airports. The bonuses applied at airports that achieved 0.00 min delay per arrival. A penalty was applied to one airport that exceeded the 0.00 to 0.04 min delay/arrival deadband. No bonus or penalty applied to two airports within the deadband (including EPWA – deadband 0.00 to 0.16).

3.185 PRB comments on the application of the incentive schemes in Baltic FAB for 2015 are provided in the table below.
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Table 3.20: Baltic FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
</table>
| PANSA      | Although the national target (0.26 minutes per flight) was surpassed, en-route capacity performance in Poland did not merit a bonus since the observed result fell within the deadband.  
Poland’s capacity performance in 2015 surpassed the national target. The PRB welcomes this achievement but reminds Poland that the national target of 0.26 minutes per flight is inconsistent with the FAB target of 0.21.  
Poland did not provide any information on how the compliance issues, related to the Polish national en route capacity incentive scheme, have been addressed.  
The calculation of the en route capacity incentive is in accordance with the published national incentive scheme. | n.a.                                                                                   |
| Terminal   | Poland established a national target on arrival ATFM delay. However, the incentive scheme is non-compliant:  
- The incentive scheme for the basket consisting of EPGD, EPKK, EPKT, EPPO and EPWR presents bonus for 0 min/arr, which is the target and also the historical performance not necessarily incentivizing high performance but business as usual.  
- The dead band for the basket is not symmetrical with respect to the target.  
- The dead band in the incentive scheme for EPWA is in fact 0-0.16 (and not 0-0.08 as stated in the Corrigendum) as no penalties are applied until >0.16 min/arr. | The bonus eligible for payment to PANSA as part of the capacity target incentive mechanism for terminal ANS corresponds to 0.01% of PANSA terminal revenues (based on the ATSP chargeable unit rate in 2015 times the actual TNSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates. |
| Oro Navigacija | Oro Navigacija, having achieved a capacity performance of zero delay for en route traffic within Vilnius FIR, is entitled to a bonus of 0.1% of the revenue from en route air navigation services.  
The PRB notes that although justification was provided for the national target for Lithuania, no information was provided regarding the lack of consideration of FAB performance.  
The awarding of the en route capacity incentive is in accordance with the published national incentive scheme. | The bonus eligible for payment to Oro Navigacija as part of the capacity target incentive mechanism corresponds to 0.1% of Oro Navigacija en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates. |
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Lithuania established a national target on arrival ATFM delay, however the incentive scheme derived is non-compliant for several reasons:
- There are bonuses but penalties are not clearly defined.
- The incentive scheme presents bonus for 0 min/arr, which is the target and also the historical performance not necessarily incentivizing high performance but business as usual.
- The dead band is not symmetrical with respect to the target.

The bonus eligible for payment to Oro Navigacija as part of the capacity target incentive mechanism corresponds to 0.1% of Oro Navigacija terminal revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.

**Steer Davies Gleave comment**

3.186 The PRB has not provided comments on the application of non-financial incentives for the environment KPA in the 2015 PRB Monitoring report. The FAB target for horizontal flight efficiency in 2015 was 1.5% and actual performance was 1.6%. The non-financial incentive scheme provided for monitoring by the NSA and corrective actions to be taken in the case that targets were not achieved. In this case, the incentives were not applied “due to the actual result”, as reported in the NSA Monitoring report. It is not clear what this means, although it may refer to the small difference between the target and actual performance (0.1%).

3.187 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for Baltic FAB, particularly in relation to FAB performance. At the local level, the application of the incentives resulting from performance in 2015 has been in accordance to the national incentive schemes. The bonus for Oro Navigacija has been calculated based on actual ATSP revenues.

3.188 The terminal capacity incentive schemes applicable at local level are also found to be non-compliant. Bonus and penalties have been applied for Oro Navigacija and PANS A in accordance to the national incentive schemes and have been calculated based on actual ATSP revenues.

3.189 The table below summarises the availability and application of incentives for Baltic FAB resulting from activity in 2015.

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Lithuania</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lithuania</td>
</tr>
<tr>
<td>En-route</td>
<td>Provided</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>×</td>
<td>x</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>×</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Terminal</td>
<td>Provided</td>
<td>×</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>×</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
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3.190 The BlueMed FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

*Environment KPA*

3.191 No incentives have been adopted for the environment KPA, therefore no comments from the PRB in this area.

*Capacity KPA*

3.192 In the BlueMed FAB monitoring report, Italy and Cyprus presented separate local financial incentives schemes for en-route capacity, with no reference to FAB performance. Incentive schemes were not presented for Greece and Malta. An incentive scheme for arrival ATFM delay was also presented for Italy – this had not been described in detail in the submission supporting the PP.

- **ENAV**
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 0.09 min delay/flight. Actual achieved: 0.01 min delay/flight.
  - A bonus was applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 was 0.02 min delay/arrival. Actual achieved: 0.004 min delay/arrival.

- **DCA Cyprus**
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 1.5 min delay/flight. Actual achieved: 2.5 min delay/flight, which was higher than the target. The scheme provides for any potential penalties to be applied to be “as foreseen in Civil Aviation Law”. In this case, The NSA reviewed the reasons for the underachievement against the target and verified that the ANSP has been taking corrective measures so as to improve the capacity situation.

3.193 PRB comments on the application of the incentive schemes in BlueMed FAB for 2015 are provided in the table below.

<table>
<thead>
<tr>
<th>KEY:</th>
<th>Provided</th>
<th>Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>scheme provided</td>
<td>scheme applied resulting in bonus or penalty / corrective action</td>
</tr>
<tr>
<td>•</td>
<td>scheme applied without generating a bonus or penalty / corrective action</td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td>scheme not provided</td>
<td>scheme not applied</td>
</tr>
<tr>
<td>×</td>
<td></td>
<td>not applicable</td>
</tr>
</tbody>
</table>

BlueMed FAB
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Table 3.22: BlueMed FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENAV</td>
<td>Italy has calculated a monetary value for each 0.01 minute deviation from the national target, which can be either a bonus or penalty. A maximum cap of 1% of ANSP revenue is applied. The national target was 0.09 minutes per flight and the actual performance was just under 0.01 minutes per flight. The monetary value of €815k per deviation of 0.01 minutes gives €6.52 Million, however the 1% cap of ANSP revenue reduces this to €5.774 Million. The PRB noted several compliance issues relating to the en route capacity incentive schemes proposed in the BlueMed revised PP, some relating directly to Italy: - FAB performance was not a specific criterion - the incentive scheme proposed by Italy uses capacity targets without supporting evidence to show how they are consistent with the required FAB performance, and therefore they could not be considered as fostering a high level of FAB performance. The BlueMed monitoring report contained no information as to how the previous raised compliance issues had been addressed. The awarding of the en route capacity incentive is in accordance with the published national incentive scheme.</td>
<td>The bonus eligible for payment to ENAV as part of the en-route capacity target incentive mechanism corresponds to 1.06% of ENAV en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>Terminal</td>
<td>Italy has revised the national target on arrival ATFM delay in line with the historical performance. The achieved arrival ATFM delay (all causes) is above the target of 0.41 min/arr. due to the performance at Fiumicino, which as Italian NSA reports, might be driven by the disruptions due to the fire in Terminal 3. The incentive scheme is based on the CRSTMP reasons. There is no mention of an independent verifiable method of reconciling delay classification against actual events, which combined with the selective use of certain delay codes, could result in errors or gaming.</td>
<td>The bonuses eligible for payment to ENAV as part of the terminal capacity target incentive mechanism corresponds to 0.3% of ENAV TCZ 1 revenues and 0.3% of TCZ 2 revenues (based on the calculation of the ATSP chargeable unit rate in 2015 times the actual TNSUs). The inclusion of these bonuses in the chargeable cost bases will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>DCA Cyprus</td>
<td>In the assessment report of the BlueMed FAB RP2 PP, the PRB noted that the incentive scheme for Cyprus is non-transparent; it is not proportional or effective, and it does not foster a high-level of capacity performance at either FAB or national level. None of these issues were addressed in the FAB monitoring report. The PRB notes the continuing situation regarding en route capacity performance in Cyprus since 2008. The PRB had previously highlighted the need to resolve the capacity deficit and the need to plan and implement much needed capacity. Nicosia ACC regularly operated with 2-3 sectors open during peak traffic demand instead of the 5 sectors promised in the capacity plans. More than 53% of delays in Cyprus were attributed, by the ANSP, to ATC staffing: an inability to deploy staff to meet the traffic demand. It is difficult to see how the implementation of the national capacity incentive scheme has improved the en route capacity performance during 2015.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
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Steer Davies Gleave comment

3.194 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for BlueMed FAB, particularly in relation to FAB performance. No capacity incentives are provided for Greece or Malta. At the local level in Italy, the application of the incentives resulting from performance in 2015 has been in accordance to the national incentive scheme for ENAV, where the bonus has been calculated based on actual ATSP revenues.

3.195 The non-transparency of the incentive scheme for en-route capacity presented by Cyprus has been highlighted as a result of performance in 2015, when actual delay exceeded targets, but no penalties were generated. Overall, as noted by the PRB, it is difficult to see how the implementation of the national en-route capacity incentive scheme has improved the capacity performance.

3.196 The terminal capacity incentive scheme applicable at local level by Italy was found susceptible to errors or gaming, as a result of the selective use of delay codes and the absence of independently verifiable data. The bonus applied for ENAV is in accordance to the national incentive scheme and has been calculated based on actual ATSP revenues.

3.197 The table below summarises the availability and application of incentives for BlueMed FAB resulting from activity in 2015.

Table 3.23: Availability and application of incentives resulting from performance in 2015, BlueMed FAB

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provided</td>
<td>Italy</td>
<td>Cyprus</td>
</tr>
<tr>
<td>En-route</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Terminal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>✓</td>
</tr>
</tbody>
</table>

KEY:
- Provided scheme applied resulting in bonus or penalty / corrective action
- Applied scheme applied without generating a bonus or penalty / corrective action
- Not provided scheme not applied
- Not applicable

Danube FAB

3.198 The Danube FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.
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Environment KPA

3.199 A non-financial incentive scheme is provided at local level in Romania and Bulgaria in the RP2 PP. In its monitoring report, Danube FAB notes that for ROMATSA actual KEA performance was 1.29% against a target of 1.55%. No comments are provided on the application of the incentive. The monitoring report does not include comments on the environment incentive scheme for BULATSA.

3.200 The PRB monitoring report did not include any comments on the incentives for environment.

Capacity KPA

3.201 In the Danube FAB monitoring report, Romania and Bulgaria presented separate local financial incentives schemes for en-route capacity, with no reference to FAB performance. Separate incentive schemes for arrival ATFM delay were also presented.

- ROMATSA:
  - The Romanian en-route incentive scheme does not include a bonus. A penalty was not applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 0.00 min delay/flight. Actual achieved: less than 0.03 min delay/flight, which is within the 0.05 min delay/flight deadband that was established for the application of a penalty.
  - The Romanian en-route incentive scheme does not include a bonus. A penalty was not applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 was 0.00 min delay/arrival. Actual achieved: 0.00 min delay/arrival, which is within the 0.05 min delay/arrival deadband that was established for the application of a penalty.

- BULATSA:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was within the 0.02-0.05 min delay/flight deadband. Actual achieved: 0.01 min delay/flight. This was attributed to reasons characterised as exceptional events (including weather), so the bonus was applied based on an achieved value of 0.00 min delay/flight.
  - The Bulgarian terminal incentive scheme does not include a bonus. A penalty was not applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 was within the 0.00-0.05 min delay/arrival deadband. Actual achieved: 0.00 min delay/arrival.

3.202 PRB comments on the application of the incentive schemes in Danube FAB for 2015 are provided in the table below.
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Table 3.24: Danube FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROMATSA</td>
<td>Actual value is below the deadband target established in the Performance Plan for the incentive scheme. Romania’s incentive scheme does not include bonuses, only penalties if the performance targets are missed. In the assessment report of the DANUBE FAB RP2 performance plan, the PRB noted that the incentive scheme for Romania is non-symmetrical; no bonuses can be accrued, only penalties. Furthermore, the national incentive scheme for Romania does not consider the overall FAB performance. Neither of these issues were addressed in the FAB monitoring report.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Terminal</td>
<td>Within DANUBE FAB, Romania has established a national target for arrival ATFM delay with a breakdown for both airports. The target is consistent with the observed historical performance and the performance at the beginning of the reference period. The projected air traffic assumptions are framed by a constant target throughout 2015-2019 and kept at 0 min/arrival. The Danube FAB performance plan presents an incentive scheme for the national target on arrival ATFM delay for Romania. The incentive scheme meets the requirements of Article 12 of IR390/2013. In particular, the non-discriminatory and proportional character has been established through a “dead band” catering for pragmatic variations of the achieved performance in respect to a zero-delay target, and, thus, induces performance-oriented behaviour to meet the target.</td>
<td>n.a.</td>
</tr>
<tr>
<td>BULATSA</td>
<td>The PRB noted several compliance issues relating to the en route capacity incentive schemes proposed by DANUBE FAB, in the assessment of the RP2 FAB Performance Plans. Following the submission of the revised DANUBE FAB performance plan, in July 2015, several of the listed compliance issues were considered to be resolved, although one compliance issue regarding the en route capacity incentive scheme remained: - the incentive schemes are not linked to FAB performance. The DANUBE FAB monitoring report did not address the remaining compliance issue. The PRB recognises the capacity performance from Bulgaria in light of the significant increase in traffic, +12%. The PRB notes that Bulgaria did not exclude certain delay codes, as permitted in Article 15 (g) of Regulation 391/2013, in the DANUBE FAB revised performance plan submitted in July 2015. Furthermore, the PRB has determined from the Network Manager that the European Aviation Crisis Coordination Cell (EACCC) was not activated during 2015 which is a fundamental criterion for defining an exceptional event, in accordance with Article 2 (17) of Regulation 390/2013. Therefore, the PRB does not agree that the capacity performance can be considered as zero delay, so in accordance with the published incentive scheme, the bonus for BULATSA should be +0.01% of ENR revenue: 19,339 BGN for 2015, and not 0.02%.</td>
<td>The bonus eligible for payment to BULATSA in relation to the en-route capacity target incentive corresponds to 0.02% of en-route ATSP revenues. The inclusion of this bonus in the chargeable costs will be examined by the European Commission as part of the technical assessment of the 2017 unit rates.</td>
</tr>
</tbody>
</table>
Bulgaria has established a national target on arrival ATFM delay. The target is consistent with the observed historic performance and the performance at the beginning of the reference period. The projected growth of air traffic is framed by a constant target throughout 2015-2019 and kept at 0 min / arrival. The Bulgarian national target on arrival ATFM delay is realistic and consistent with the requirements under IR390/2013, and therefore acceptable. The Danube FAB performance plan presents an incentive scheme for the national target on arrival ATFM delay for Bulgaria. The incentive scheme meets the requirements of Article 12 of IR390/2013. In particular, the non-discriminatory and proportional character has been established through a “dead band” catering for pragmatic variations of the achieved performance in respect to a zero-delay target, and, thus, induces performance-oriented behaviour to meet the target. The incentive scheme is consistent with the principles of Article 15 of IR391/2013. Given the low target (i.e. 0 min/arrival), the threshold for penalties is buffered with a dead band. Though not symmetrical, this approach is acceptable for the given target. The bonuses and penalties are set at 0.1% of the revenue. No adjustment for certain ATFM causes is made.

Steer Davies Gleave comment

3.203 The PRB has not provided comments on the application of non-financial incentives for the environment KPA in the 2015 PRB Monitoring report.

3.204 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for Danube FAB, particularly in relation to FAB performance. At the local level in Romania, the application of the incentives resulting from performance in 2015 has been in accordance to the national incentive scheme for ROMATSA (bonus not available and no penalty applied). In Bulgaria, the application of the incentives resulting from performance in 2015 for BULATSA has been questioned by the PRB with respect to the exclusion of certain delay codes. The bonus applicable for BULATSA has been calculated based on actual ATSP revenues.

3.205 The PRB comments on the terminal capacity incentive schemes applicable at local level by Romania and Bulgaria note that the schemes are compliant and acceptable, despite the absence of symmetry as a result of the 0.00 min delay/arrival. We note that this appears to not be consistent with the comments made on symmetry for the en-route capacity incentive scheme for Romania, for example, and for other FABs.

3.206 The table below summarises the availability and application of incentives for Baltic FAB resulting from activity in 2015.

Table 3.25: Availability and application of incentives resulting from performance in 2015, Danube FAB

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal</td>
<td>Bulgaria has established a national target on arrival ATFM delay. The target is consistent with the observed historic performance and the performance at the beginning of the reference period. The projected growth of air traffic is framed by a constant target throughout 2015-2019 and kept at 0 min / arrival. The Bulgarian national target on arrival ATFM delay is realistic and consistent with the requirements under IR390/2013, and therefore acceptable. The Danube FAB performance plan presents an incentive scheme for the national target on arrival ATFM delay for Bulgaria. The incentive scheme meets the requirements of Article 12 of IR390/2013. In particular, the non-discriminatory and proportional character has been established through a “dead band” catering for pragmatic variations of the achieved performance in respect to a zero-delay target, and, thus, induces performance-oriented behaviour to meet the target. The incentive scheme is consistent with the principles of Article 15 of IR391/2013. Given the low target (i.e. 0 min/arrival), the threshold for penalties is buffered with a dead band. Though not symmetrical, this approach is acceptable for the given target. The bonuses and penalties are set at 0.1% of the revenue. No adjustment for certain ATFM causes is made.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Romania</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>Terminal</td>
<td>Provided</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

KEY:
- Provided
- Applied
✓ scheme provided
• scheme applied resulting in bonus or penalty / corrective action
• scheme applied without generating a bonus or penalty / corrective action
✗ scheme not provided
- scheme not applicable

Denmark-Sweden FAB

3.207 The Denmark-Sweden FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

Environment KPA

3.208 The Denmark-Sweden FAB monitoring report notes that since the FAB has not performed in accordance with the targets, the NSAs should require the ANSPs to take corrective measures, however, because all identified reasons for low performance are out of the control of the ANSPs no corrective measures are suggested.

3.209 The PRB did not provide any comments on the incentive scheme for the environment KPA in its monitoring report.

Capacity KPA

3.210 In its RP2 PP Denmark-Sweden FAB provided financial incentives on en-route capacity at FAB level. A terminal incentive scheme was not provided.

- FAB level:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 was 0.01 min delay/flight. Actual achieved: 0.01 min delay/flight.

3.211 PRB comments on the application of the incentive schemes in Denmark-Sweden FAB for 2015 are provided in the table below.
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Table 3.26: Denmark-Sweden FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark-Sweden FAB level</td>
<td></td>
<td>According to the NSA Monitoring report, the bonus eligible for payment to Sweden from the capacity incentive mechanism has been calculated as 0.25% of the en-route revenues for LFV (1 610 MSEK). It is understood that these 1 610 MSEK represent only the en-route revenues retained by LFV, i.e. excluding the part of revenues linked to the CNS infrastructure used for the en-route services and disposed by the airport operators. The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>En-route</td>
<td>A FAB wide incentive scheme was applicable for en route capacity performance. No compliance issues. The PRB notes the en route capacity performance within the DK SE FAB during 2015, and the positive contribution to the Union-wide target. the PRB also notes that the bonus for en route capacity performance is based upon the revenue from airport ANS providers, as well as en route ANSPs which was not made clear in the DK SE FAB RP2 performance plan (only Naviair and LFV are mentioned in 4.1 of the performance plan).</td>
<td></td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.212 The application of the Denmark-Sweden FAB incentive scheme for en-route capacity is compliant in terms of its structure and mechanism. The PRB has noted that the revenues in scope for the incentive are greater than those indicated in the RP2 PP (it includes airport ANS providers, as well as en-route), which will be examined by the European Commission as part of the compliance review of the 2017 unit rates.

Table 3.27: Availability and application of incentives resulting from performance in 2015, Denmark-Sweden FAB

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
<th>Denmark</th>
<th>Sweden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provided</td>
<td>✓</td>
<td>✓ (derived from FAB)</td>
<td>✓ (derived from FAB)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>✓</td>
<td>✓ (derived from FAB)</td>
<td>✓ (derived from FAB)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provided</td>
<td>✓</td>
<td>✓ (derived from FAB)</td>
<td>✓ (derived from FAB)</td>
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<tr>
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<td>✓ (derived from FAB)</td>
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<td>✓ (derived from FAB)</td>
<td>✓ (derived from FAB)</td>
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</tr>
<tr>
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<td>Applied</td>
<td>✓</td>
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<td>✓ (derived from FAB)</td>
<td></td>
</tr>
</tbody>
</table>

KEY:
- Provided
  - ✓ scheme provided
  - × scheme not provided
  - • scheme applied without generating a bonus or penalty / corrective action
  - ∗ scheme applied resulting in bonus or penalty / corrective action
- Applied
  - ✓ scheme applied
  - × scheme not applied
  - • scheme applied without generating a bonus or penalty / corrective action
  - ∗ scheme applied resulting in bonus or penalty / corrective action
- - not applicable
FABCE

3.213 The FAB CE incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

Environment KPA

3.214 No incentive schemes related to the environment KPA were presented in the RP2 PP.

Capacity KPA

3.215 In its RP2 PP FABCE provided financial incentives on en-route capacity at FAB level, which are also linked to local targets. A terminal incentive scheme was not provided.

- Austrocontrol:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
  - The en-route target set for 2015 at local level was 0.21 min delay/flight. Actual achieved: 0.09 min delay/flight.

- ANS Czech Republic:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
  - The en-route target set for 2015 at local level was 0.09 min delay/flight. Actual achieved: 0.01 min delay/flight.

- Croatia Control:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
  - The en-route target set for 2015 at local level was 0.23 min delay/flight. Actual achieved: 0.54 min delay/flight. The local target was not achieved.

- Hungarocontrol:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
  - The en-route target set for 2015 at local level was 0.06 min delay/flight. Actual achieved: 0.03 min delay/flight. Performance at local level was within the deadband (0.03).

- LPS:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
  - The en-route target set for 2015 at local level was 0.1 min delay/flight. Actual achieved: 0.07 min delay/flight. Performance at local level was within the deadband (0.03).

- Slovenia Control:
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.29 min delay/flight. Actual achieved: 0.21 min delay/flight.
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- The en-route target set for 2015 at local level was 0.21 min delay/flight. Actual achieved: 0.00 min delay/flight.

3.216 PRB comments on the application of the incentive schemes in FABCE for 2015 are provided in the table below.

Table 3.28: FABCE Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austrocontrol</td>
<td>In cases where the FAB capacity performance is better than the FAB target, then only bonuses would be paid – no penalty would apply even if the local ANSP performed worse than the national target. (Vice versa, if FAB capacity performance was worse than the FAB target, then only penalties would be paid - no bonuses even if the local ANSP performed better than the national target.) Compliance issues: the ANSP contribution was not consistent with the FAB targets or the FAB reference value. The FAB CE monitoring report stated that no compliance issues were addressed. The PRB notes that the en route capacity performance in the Vienna FIR during 2015 was 0.06 minutes delay per flight instead of the reported 0.09 minutes. It can only be assumed that the reported figure of 0.09 refers to the airspace within which Austro Control provides en route air traffic services (ATS), but which omits the Austrian Tyrol region. The airspace over Slovenia, where Austro Control provides ATS is also excluded from this calculation. The PRB considers that national targets should be applicable within the national boundaries and not subject to continuous change.</td>
<td>The bonus eligible for payment to Austro Control as part of the capacity target incentive mechanism corresponds to 0.1% of Austro Control en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>ANS CR</td>
<td>Since both the FAB CE target and the national target for en route capacity has been surpassed, the FAB CE en route capacity incentive scheme stipulates the payment of a bonus. The PRB notes that no response was provided to the compliance issue that the aggregation of the national targets, within the FAB, were not consistent with the FAB targets.</td>
<td>The bonus eligible for payment to ANS CR as part of the capacity target incentive mechanism corresponds to 0.1% of ANS CR en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>Croatia Control</td>
<td>Although FAB CE met its en route capacity target, Croatia did not meet its national target. In accordance with the published FAB CE incentive scheme, when the FAB target is met, no penalties are applicable to those ANSPs that fail to meet the local performance targets; no bonuses are applicable either. The PRB notes that no response was provided to the compliance issue that the aggregation of the national targets were not consistent with the FAB targets.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungarocontrol</td>
<td>Both FAB CE as well as national targets have been exceeded but the national element was inside the deadband which is defined as 0.03 min. In cases when the national performance is within the deadband, a FAB CE ANSP is not entitled to a bonus. The PRB notes that no response was provided to the compliance issue that the aggregation of the national targets were not consistent with the FAB targets.</td>
<td>n.a.</td>
</tr>
<tr>
<td>LPS</td>
<td>As above</td>
<td>n.a.</td>
</tr>
<tr>
<td>Slovenia Control</td>
<td>The awarding of the en route capacity incentive is in accordance with the published FAB CE incentive scheme. The PRB notes that no response was provided to the compliance issue that the aggregation of the national targets, within the FAB, were not consistent with the FAB targets.</td>
<td></td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.217 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for FABCE, particularly in relation to FAB performance and the interaction with local targets.

3.218 In the application of the incentive scheme, the PRB notes some issues with the scope of the targets and achieved values used, emerging from the difference between FIR and ACC boundaries as a result of delegated control of certain sectors (e.g. the Austrian Tyrol to DFS). In the case of Austrocontrol, using the delay value achieved in the FIR rather than the ACC, would have resulted in a larger bonus.

3.219 The table below summarises the availability and application of incentives for FABCE resulting from activity in 2015.

Table 3.29: Availability and application of incentives resulting from performance in 2015, FABCE

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>Czech Republic</td>
<td>Croatia</td>
<td>Hungary</td>
<td>Slovakia</td>
<td>Slovenia</td>
</tr>
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<td>×</td>
<td>×</td>
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<td>-</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
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<td>Applied</td>
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<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Austria</td>
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<tr>
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</tr>
<tr>
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<td>Applied</td>
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<td>-</td>
</tr>
</tbody>
</table>

KEY:
- Provided scheme provided
- scheme applied resulting in bonus or penalty / corrective action
- scheme applied without generating a bonus or penalty / corrective action
- scheme not provided
- scheme not applied
- not applicable

FABEC

3.220 The FABEC incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

Environment KPA

3.221 A non-financial incentive scheme is provided for FABEC in the RP2 PP. The incentive mechanism at FABEC level is triggered at the end of the reference period by the Financial and Performance Committee (FPC) in the case where the FABEC environment target, after corrective actions by the ANSPs, is not met. No incentive is applied for the year 2015.

Capacity KPA

3.222 In its RP2 PP FABCE provided financial incentives on en-route capacity at FAB level, which are also linked to local targets. A terminal incentive scheme was also provided at local level for Belgium, France, Germany, the Netherlands, and Switzerland.

3.223 No incentive scheme is presented for Luxembourg.

- Belgocontrol:
  - A penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
  - The en-route target set for 2015 at local level was 0.07 min delay/flight. Actual achieved: 0.14 min delay/flight.
  - A bonus was applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 at national level was 0.11 min delay/arrival. Actual achieved: 0.05 min delay/arrival.
  - The terminal target set for 2015 at EBBR was 0.12 min delay/arrival. Actual achieved: 0.06 min delay/arrival. A bonus was not applied, as this lies within the +/-50% deadband.
  - The terminal target set for 2015 at EBLG was 0.06 min delay/arrival. Actual achieved: 0.00 min delay/arrival. A bonus was applied for EBLG.

- DFS:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
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- The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
- The en-route target set for 2015 at local level was 0.27 min delay/flight. Actual achieved: 0.11 min delay/flight. DFS did not contribute to the FAB underperformance, so no penalty was applicable.
- A bonus was applied as a result of terminal performance in 2015.
- The terminal target set for 2015 at national level was 0.65 min delay/arrival for all causes, and 0.09 min delay/arrival for CRSTMP causes. Actual achieved: 0.33 min delay/arrival for all causes and 0.02 min delay/arrival for CRSTMP causes.

- DSNA:
  - A penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
  - The en-route target set for 2015 at local level was 0.29 min delay/flight. Actual achieved: 0.61 min delay/flight.
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The terminal target set for 2015 at national level was 0.6 min delay/arrival for all causes, and 0.15 min delay/arrival for CRSTMP causes. Actual achieved: 0.34 min delay/arrival for all causes and 0.06 min delay/arrival for CRSTMP causes. The result achieved was within the deadband (0.05-0.25), so a bonus was not applied.

- LVNL:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
  - The en-route target set for 2015 at local level was 0.14 min delay/flight. Actual achieved: 0.06 min delay/flight. LVNL did not contribute to the FAB underperformance, so no penalty was applicable.
  - No bonus or penalty was applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 at national level was 0.5 min delay/arrival for CRSTMP causes. Actual achieved: 0.5 min delay/arrival for CRSTMP causes. The result achieved was equal to the target, so a bonus was not applied.

- MUAC:
  - A penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
  - The en-route target set for 2015 at local level was 0.14 min delay/flight. Actual achieved: 0.23 min delay/flight.

- Skyguide:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at FAB level was 0.37 min delay/flight. Actual achieved: 0.47 min delay/flight.
  - The en-route target set for 2015 at local level was 0.17 min delay/flight. Actual achieved: 0.07 min delay/flight. Skyguide did not contribute to the FAB underperformance, so no penalty was applicable.
  - No bonus or penalty was applied as a result of terminal performance in 2015.
  - The terminal target set for 2015 at national level was 2.18 min delay/arrival for all causes, and 0.43 min delay/arrival for CRSTMP causes. Actual achieved: 2.48 min delay/arrival for all causes and 0.14 min delay/arrival for CRSTMP causes. Due to the
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fact that the all causes delay target was not met, but the CRSTMP was, no bonus or penalty was applied.

3.224 PRB comments on the application of the incentive schemes in FABEC for 2015 are provided in the table below.

Table 3.30: FABEC Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgocontrol</td>
<td>FABEC applied a common en route incentive scheme described in section 4.1 of the FABEC RP2 performance plan dated July 2015. The incentive scheme uses the FAB targets and then applies a ratio of 78% of the FAB targets for the delay causes CRSTMP only, to give a FAB CRSTMP target. A dead-band of +/- 10% of the CRSTMP target is applied to decide if the FAB level was achieved; national / ANSP incentives are determined according to how each ANSP has contributed to the FAB target. The 2015 FABEC underachievement triggers the activation of the Financial common FABEC incentive scheme, generating a malus for 3 FABEC ANSP (Belgocontrol, DSNA, MUAC). An internal FABEC delays classification methodology and validation process were used in order to calculate and approve the individual malus to be paid back to users through reduction of charges in 2017, based on a combination of CRSTMP achievements of individual ANSP and on the total FABEC achievement. The PRB notes several compliance issues: the individual ANSP contributions are not consistent with the required capacity performance and that the proposed target, using CRSTMP codes only, is not consistent with the required capacity performance. Neither of these outstanding compliance issues have been addressed in the FABEC monitoring report.</td>
<td>The penalty eligible for payment to Belgocontrol as part of the capacity target incentive mechanism corresponds to -0.5% of Belgocontrol en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>DFS</td>
<td>No comments were provided by the PRB.</td>
<td>No comments available.</td>
</tr>
<tr>
<td>Terminal</td>
<td>The PRB notes that capacity plans, contained in the NOP 2016-2020, are generally consistent with the expected traffic but do not contain any buffer for to handle any unexpected increases in traffic. Finally, the PRB notes that previously planned FABEC airspace design projects have not been implemented as planned. The PRB notes that these projects were expected to provide capacity benefits for airspace users.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n.a.</td>
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</tbody>
</table>
Within FABEC, the performance plan sets a challenging target with respect to the observed historical performance observed before and at the beginning of the reference period. The projected growth of air traffic is framed by a constant target throughout 2015-2019. The FABEC performance plan presents an incentive scheme for the national target on arrival ATFM delay for Germany. The incentive scheme meets the general principles of Article 12, IR390/2013, and is applied to DFS (=ATSP) for terminal and approach services at the 16 RP2 airports. The target is based on CRSTMP causes.

The bonus eligible for payment to DFS as part of the capacity target incentive mechanism corresponds to 0.4% of DFS terminal revenues (based on the ATSP chargeable unit rate in 2015 times the actual TNSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.

Within FABEC, France has established a constant national target on arrival ATFM delay for the whole reference period which is consistent with the performance at the beginning of the reference period and observed over the past years. While France expanded its list of airports to 60, it is noteworthy that the historical arrival ATFM delay has been primarily accrued at the RP1 airports and it is anticipated that the share of arrival delay for the new entrants will be negligible. The FABEC performance plan establishes an incentive scheme for the national target on arrival ATFM delay for France.

The penalty eligible for payment to DSNA as part of the capacity target incentive mechanism corresponds to -0.2% of DSNA en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.

Overall capacity performance was good with an actual performance of 0.09 ATFM minutes en route delay per flight for all causes of delay. However, the PRB notes that previously planned FABEC airspace design projects have not been implemented as planned. The PRB notes that these projects were expected to provide capacity benefits for airspace users.
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<table>
<thead>
<tr>
<th>ANS P</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUAC</td>
<td>The penalty for EUROCONTROL (MUAC) is applicable because of the performance over the four MUAC States (Belgium, Luxembourg, Germany and the Netherlands). The breakdown of the MUAC penalty per State is: Belgium €243,170; Luxembourg €7,521; Germany €368,993 and the Netherlands €156,701.</td>
<td>No comments available.</td>
</tr>
<tr>
<td>Skyguide</td>
<td>In general Switzerland has provided a very good capacity performance, based on all delays, with rising traffic in 2015. However, the PRB notes that previously planned FABEC airspace design projects have not been implemented as planned. The PRB notes that these projects were expected to provide capacity benefits for airspace users.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.225 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for FABCE, particularly in relation to FAB performance and the interaction with local targets. The adjustment between the delay targets for all causes and the delay for CRSTMP causes is considered acceptable.

3.226 The internal FABEC delays classification methodology and validation process established under the oversight of Financial and Performance Committee (FPC) in order to calculate and approve the individual bonus and penalties applicable was welcomed by the PRB.

3.227 The PRB also noted that previously planned FABEC airspace design projects have not been implemented as planned and that these projects were expected to provide capacity benefits for airspace users.

3.228 The local terminal incentive schemes provided in the FABEC RP2 PP are seen to meet the general principles required under the regulations.

3.229 The table below summarises the availability and application of incentives for FABEC resulting from activity in 2015.

Table 3.31: Availability and application of incentives resulting from performance in 2015, FABEC

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Belgium</td>
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<td>Applied</td>
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<td>x</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
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<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Terminal</th>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Belgium</th>
<th>Germany</th>
<th>France</th>
<th>Netherlands</th>
<th>MUAC</th>
<th>Switzerland</th>
<th>Luxembourg</th>
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</thead>
<tbody>
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<td>Environment</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
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<td>Capacity</td>
<td>Provided</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>-</td>
<td>x</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**KEY:**
- ✔ scheme provided
- • scheme applied resulting in bonus or penalty / corrective action
- ✗ scheme applied without generating a bonus or penalty / corrective action
- ✗ scheme not provided
- • scheme not applied
- - not applicable

**NEFAB**

3.230 The NEFAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

**Environment KPA**

3.231 In the RP2 PP, ANSPs have been given non-financial incentives to reinforce their commitment towards the FAB adopted targets. If required performance is not delivered, the ANSP in question will be required to submit a corrective action plan with deadlines and associated measures. No comments were provided in the NSA monitoring report or by the PRB.

**Capacity KPA**

3.232 NEFAB presented separate local financial incentives schemes for en-route capacity for each state, with no reference to FAB performance. Separate incentive schemes for arrival ATFM delay were also presented.

- **Finavia:**
  - A bonus was applied as a result of en-route performance in 2015.
  - Actual en-route performance achieved: 0.02 min delay/flight, which was below the 0.04-0.09 min delay/flight deadband, resulting in a bonus (the en-route target value was not specified).
  - A bonus was applied as a result of terminal performance in 2015.
  - Actual terminal performance achieved: 0.55 min delay/arrival, with 0.37 attributed to airport factors (runway renovation), 0.17 attributed to weather and the remainder (0.01) attributed to non-ATC events. This effectively makes the actual level of delay achieved 0.00 min delay/arrival, which was below the 0.09-0.15 min delay/flight deadband, allowing a bonus to be applied (the terminal target value was not specified).

- **LGS:**
  - A bonus was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at local level was 0.03 min delay/flight. Actual achieved: 0.00 min delay/flight.
  - A bonus was applied as a result of terminal performance in 2015.
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- The terminal target set for 2015 at local level was 0.03 min delay/arrival. Actual achieved: 0.00 min delay/arrival.
- Avinor:
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - Actual en-route performance achieved: 0.05 min delay/flight, which was within the 0.05-0.13 min delay/flight deadband, so no bonus or penalty was generated (the en-route target value was not specified).
  - No bonus or penalty was applied as a result of terminal performance in 2015.
  - Actual terminal performance achieved: 0.37 min delay/arrival, which was within the 0.30-0.90 min delay/flight deadband, so no bonus or penalty was generated (the terminal target value was not specified).
- EANS:
  - A bonus was applied as a result of en-route performance in 2015.
  - Actual en-route performance achieved: 0.01 min delay/flight, which was below the 0.04-0.14 min delay/flight deadband, resulting in a bonus (the en-route target value was not specified).
  - A penalty was not applied as a result of terminal performance in 2015. A bonus is not available.
  - The terminal target set for 2015 at local level was 0.00 min delay/arrival. Actual achieved: 0.00 min delay/arrival.

3.233 PRB comments on the application of the incentive schemes in NEFAB for 2015 are provided in the table below.

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finavia</td>
<td></td>
<td>The bonus eligible for payment to Finavia as part of the capacity target incentive mechanism corresponds to 1.0% of Finavia en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>Terminal</td>
<td></td>
<td>The NEFAB performance plan establishes a national target on arrival ATFM delay for Finland. The challenging target is set at 50% of the observed average arrival ATFM delay over the last 5 years at the beginning of the reference period. The FAB NE performance plan presents an incentive scheme for the national targets on arrival ATFM delay for Finland.</td>
</tr>
<tr>
<td>ANSP</td>
<td>PRB SQS comment</td>
<td>PRB ECO comment</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>The PRB notes that the incentive schemes are not linked to FAB performance.</td>
<td>The bonus eligible for payment to LGS as part of the capacity target incentive mechanism corresponds to 1.0% of LGS en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>LGS</td>
<td>The awarding of the en route capacity incentive is in accordance with the published national incentive scheme.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The NEFAB performance plan establishes a national target on arrival ATFM delay for Latvia. The plan sets a conservative national target of 0.4 minutes per arrival on arrival ATFM delay which is consistent with the local contribution of Riga (EVRA). The national target is kept constant across RP2 and frames the projected growth of air traffic. The FAB NE performance plan presents an incentive scheme for the national targets on arrival ATFM delay for Latvia.</td>
<td>As part of the compliance review of the 2017 unit rates process, Latvia confirmed that the bonus relating to the terminal capacity target will not be applied.</td>
</tr>
<tr>
<td></td>
<td>The PRB notes that the incentive schemes are not linked to FAB performance. Norway has provided en route capacity performance during 2015 surpassing the national target. The terms of the en route capacity incentive scheme means that Norway does not receive either a bonus, or a penalty, for 2015.</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>The NEFAB performance plan sets a national target on arrival ATFM delay that is consistent with the historical performance observed throughout the past 5 years and forms a lower bound with respect to the recent years. No further breakdown of the target per airport is made inhibiting to identify the contribution of the individual airport. The FAB NE performance plan presents an incentive scheme for the national targets on arrival ATFM delay for Norway. The incentive scheme pads the target with a &quot;dead band&quot; of 0.3 minutes per arrival. The threshold for benefitting from bonuses is set at 50% of the national target on arrival ATFM delay and provides thus a strong incentive to strive for a high-level of performance. Similarly, the threshold for penalties / dead band allows for reasonable variations without activating the penalties immediately. The latter is deemed reasonable, as Norway makes no use of the exemption clause for non-ATC related ATFM delay causes.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

**Terminal**

Avinor

En-route

The PRB notes that the incentive schemes are not linked to FAB performance. Norway has provided en route capacity performance during 2015 surpassing the national target. The terms of the en route capacity incentive scheme means that Norway does not receive either a bonus, or a penalty, for 2015.

n.a.

Terminal

The NEFAB performance plan sets a national target on arrival ATFM delay that is consistent with the historical performance observed throughout the past 5 years and forms a lower bound with respect to the recent years. No further breakdown of the target per airport is made inhibiting to identify the contribution of the individual airport. The FAB NE performance plan presents an incentive scheme for the national targets on arrival ATFM delay for Norway. The incentive scheme pads the target with a "dead band" of 0.3 minutes per arrival. The threshold for benefitting from bonuses is set at 50% of the national target on arrival ATFM delay and provides thus a strong incentive to strive for a high-level of performance. Similarly, the threshold for penalties / dead band allows for reasonable variations without activating the penalties immediately. The latter is deemed reasonable, as Norway makes no use of the exemption clause for non-ATC related ATFM delay causes.

n.a.
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### PRB SQS comment

The PRB notes that the incentive schemes are not linked to FAB performance. The awarding of the en route capacity incentive is in accordance with the published national incentive scheme.

### PRB ECO comment

The bonus eligible for payment to EANS as part of the capacity target incentive mechanism corresponds to 1.3% of EANS en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs). The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.

### Terminal

The NEFAB performance plan establishes a national target on arrival ATFM delay and an associated incentive scheme.

### Steer Davies Gleave comment

3.234 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for NEFAB, particularly in relation to FAB performance and the interaction with local targets. The application of the bonus in Estonia corresponds to 1.3% of EANS en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs), which exceeds the 1% cap set in the regulation.

3.235 The table below summarises the availability and application of incentives for NEFAB resulting from activity in 2015.

#### Table 3.33: Availability and application of incentives resulting from performance in 2015, NEFAB

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Finland</td>
</tr>
<tr>
<td>En-route Environment</td>
<td>Provided</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>•</td>
</tr>
<tr>
<td>Capacity Provided</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Applied</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Terminal Environment</td>
<td>Provided</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity Provided</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Applied</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

#### KEY:

<table>
<thead>
<tr>
<th>Provided</th>
<th>Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>scheme provided</td>
</tr>
<tr>
<td>•</td>
<td>scheme applied without generating a bonus or penalty / corrective action</td>
</tr>
<tr>
<td>x</td>
<td>scheme not provided</td>
</tr>
<tr>
<td>-</td>
<td>not applicable</td>
</tr>
</tbody>
</table>
3.236 The SW FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

**Environment KPA**

3.237 No incentives have been adopted for the environment KPA.

**Capacity KPA**

3.238 In its RP2 PP SW FAB provided financial incentives on en-route capacity at FAB level. A terminal incentive scheme was not provided.

- **FAB Level:**
  - No bonus or penalty was applied as a result of en-route performance in 2015.
  - The en-route target set for 2015 at local level was 0.30 min delay/flight. Actual achieved: 0.46 min delay/flight, which is within the 0.16-0.54 min delay/flight deadband, so a penalty was not triggered.

3.239 PRB comments on the application of the incentive schemes in SW FAB for 2015 are provided in the table below.
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Table 3.34: SW FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW FAB level</td>
<td>The incentive scheme was based on all causes of delays but there were caveats regarding 'unusually high' incidences of certain delays codes activating an exclusion system based on Article 15(g) of Regulation 391/2013. The PRB raised several compliance issues with the July 2015 incentive scheme including: • Incentive scheme does not encourage the entities to achieve a high level of performance; • It does not apply Article 15(g) of the charging regulation in a consistent manner; • There is no mention of a verifiable method of reconciling attributed delay classification to actual events which raises the possibility of errors or gaming. The aggregation of the updated local contributions show an en route capacity performance 10% above the SW FAB targets for each year of the reference period. Furthermore, the incentive scheme is asymmetrical since the target is not in the middle of the dead-band. The SWFAB monitoring report stated that no compliance issues were addressed. The PRB observes that SW-FAB, according to the published incentive scheme, would have incurred penalties in five of the last eight years, with performance in the last three years falling into the defined dead-band. Whilst the PRB appreciates the performance improvement in en-route capacity, it is still mindful that the 2015 target was missed by over 50% and that this incurs an additional cost on airspace users – of approximately €28.5 million. Portugal missed its national target of 0.19 minutes delay per flight by a considerable margin, and Spain missed its national target of 0.30 minutes delay per flight. However, since FAB performance was in the dead-band between 0.16 and 0.54 minutes per flight, no bonus or penalty is due. The PRB has previously flagged that the aggregation of the Spanish and Portuguese national capacity targets were not consistent with the required capacity performance for SW FAB but this issue has not been addressed to date.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.240 According to PRB comments, there remain compliance issues with the incentive scheme for en-route capacity for SW FAB, particularly in relation to FAB performance and the interaction with local targets. The incentive scheme was found susceptible to errors or gaming, as a result of the selective use of delay codes and the absence of independently verifiable data.

Table 3.35: Availability and application of incentives resulting from performance in 2015, SW FAB

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Portugal</td>
<td>Spain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>En-route</td>
<td>Provided</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>✓</td>
<td>✓ (derived from FAB)</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
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### Terminal

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>Applied</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**KEY:**
- ✓ scheme provided
- * scheme applied without generating a bonus or penalty / corrective action
- ✗ scheme not provided
- - not applicable

#### UK-IE FAB

3.241 The UK-IE FAB incentive schemes as applied in the first year of RP2 are shown below. Following these we note the PRB monitoring comments on these schemes.

**Environment KPA**

3.242 A non-financial incentive has been adopted at FAB level to address underperformance with respect to the FAB environment target. No comments are provided in the monitoring report on this.

3.243 A financial incentive is applied to the additional environment indicator (3Di metric, based on a linear regression model incorporating flight path inefficiencies in the vertical plane as well as horizontal). The 3Di metric provides an objective measure to which financial incentives can be attached.

NATS:
- No bonus or penalty was applied as a result of en-route performance in 2015.
- The en-route target set for 2015 at local level was 29.7 units. Actual achieved: 30.1 units which is within deadband, so a penalty was not triggered.

**Capacity KPA**

3.244 Financial incentives for en-route capacity performance applied at FAB level (Trigger and Common incentive scheme) and a further two are applied only to NATS (Delay impact score, Excess delay score).

**FAB Level:**
- A bonus was applied as a result of en-route capacity performance (C2) in 2015.
- The en-route target set for 2015 was 0.25min delay/flight. Actual achieved: 0.08 min delay/flight.

NATS:
- A bonus was applied as a result of en-route performance with respect to the impact incentive (C3) in 2015.
- The en-route impact target set for 2015 was 22.3 (index score). Actual achieved: 5.2.
- No bonus or penalty was applied as a result of en-route performance with respect to the daily excess delay incentive (C4) in 2015.
• The en-route daily excess delay threshold set for 2015 was 2000 (index score). Actual achieved: 14.2.

3.245 PRB comments on the application of the incentive schemes in UK-IE FAB for 2015 are provided in the table below.

Table 3.36: UK-IE FAB Capacity KPA incentive scheme, PRB comments, Monitoring 2015

<table>
<thead>
<tr>
<th>ANSP</th>
<th>PRB SQS comment</th>
<th>PRB ECO comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK-IE FAB level</td>
<td>The PRB notes no compliance issues. The Irish NSA apportioned all of the 1% incentive scheme measure to this particular mechanism. Following appropriate validation, the Irish NSA is satisfied that targets have been met, and the full bonus is payable. Actual 2015 en-Route income has been validated with Eurocontrol income statements and audited 2015 accounts of the ANSP. The bonus is based on 1% of 2015 en-route income of €122,292,318. The bonus is calculated as €1,222,923. The UK NSA decided that the maximum penalty or bonus associated with this metric should be not more than 0.25% of ANSP en route revenue, with a further 0.75% being applied to the additional UK capacity incentive measures. The actual bonus relating to the common FAB en route capacity incentive scheme amounted to £1.6m in 2015 (0.24% of ANSP en route revenue). The awarding of the en route capacity incentive (C2) is in accordance with the published national incentive scheme.</td>
<td>The Irish NSA Monitoring Report states that the bonus has been calculated as 1.0% of the en-route income (122.3 M€). It is understood that these represent the total en-route revenues for Ireland, and not only the revenues retained by the ATSP. When using the ATSP en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs) the bonus corresponds to 1.2% of the ATSP revenues. The inclusion of this bonus in the chargeable cost base will be examined by the European Commission as part of the compliance review of the 2017 unit rates.</td>
</tr>
<tr>
<td>NATS</td>
<td>C3 reflects the relatively high impact of long delays and early delays that have a disproportionate knock-on effect on the punctuality of subsequent flights.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C4 provides an incentive to avoid days where there is a particularly severe disruption which has a disproportionate impact on airline service. Unlike the FAB incentive and C3, this is generally due to some form of system failure rather than any underlying shortfall in ongoing capacity. No bonuses are applicable under C4, recognising that failure against this measure relates to exceptional events and a reasonable user expectation of such events is likely to be zero.</td>
<td></td>
</tr>
</tbody>
</table>

Steer Davies Gleave comment

3.246 There were no compliance or interpretation issues noted by the PRB on the UK-IE FAB capacity incentive schemes.
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3.247 The application of the bonus in Ireland corresponds to 1.2% of IAA en-route revenues (based on the ATSP chargeable unit rate in 2015 times the actual TSUs), which exceeds the 1% cap set in the regulation.

Table 3.37: Availability and application of incentives resulting from performance in 2015, UK-IE FAB

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level</th>
<th>Local level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ireland</td>
<td>UK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provided</td>
<td>Applied</td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>(derived from FAB)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>En-route</td>
<td>Applied</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>(derived from FAB)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Applied</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Terminal</td>
<td>Provided</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Environment</td>
<td>Applied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Applied</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

KEY:
- ✓ scheme provided
- • scheme applied resulting in bonus or penalty / corrective action
- ✓ scheme applied without generating a bonus or penalty / corrective action
- ✓ scheme not provided
- ✓ scheme not applied
- - not applicable

Summary

Environment KPA incentive schemes

3.248 The PRB has not provided comments on the application of non-financial incentives for the environment KPA in the 2015 PRB Monitoring report.

Capacity KPA incentive schemes

3.249 The PRB comments on the application of financial incentives for the capacity KPA as a result of activity in 2015 are summarised below:

- Compliance issues with incentive schemes for en-route capacity, particularly in relation to links with FAB performance. The incentive scheme for Denmark-Sweden FAB and UK-IE FAB were the only schemes to not attract such a comment.
- Compliance issues with incentive schemes, particularly in relation to their symmetry. Symmetry was noted as an issue even in cases where delay targets were close to or equal to zero. With the exception of the terminal capacity incentive schemes applicable at local level by Romania and Bulgaria, where the PRB noted that the schemes are compliant and acceptable, despite the absence of symmetry as a result of the 0.00 min delay/arrival. We note that this appears to not be consistent with the comments made on symmetry for the en-route capacity incentive scheme for Romania, for example, and for other FABs.
- Despite issues with FAB-level compliance, at the local level, the application of the incentives resulting from performance in 2015 has been in accordance to the national incentive schemes.
• Three States (Sweden, Estonia, Ireland) were identified where the bonus generated has not been calculated based only on actual ATSP revenues, but a larger revenue (e.g. charging zone revenue) instead.

• Scope issues in the application of the incentive scheme, emerging from the difference between FIR and ACC boundaries as a result of delegated control of certain sectors (e.g. the Austrian Tyrol to DFS). In the case of Austrocontrol, using the delay value achieved in the FIR rather than the ACC, would have resulted in a larger bonus.

• Data assurance issues that mean incentive schemes may be susceptible to errors or gaming, as a result of the selective use of delay codes and the absence of independently verifiable data. The internal FABEC delays classification methodology and validation process established under the oversight of Financial and Performance Committee (FPC) in order to calculate and approve the individual bonus and penalties applicable was welcomed by the PRB.

• The non-transparency of some incentive schemes make it difficult to see how their implementation has improved the en-route capacity performance of the relevant ANSPs (e.g. Cyprus). In others, the PRB noted that despite the incentive schemes in place, previously planned airspace design projects have not been implemented as planned.

• Where available, the compliance of terminal capacity incentive schemes applicable at local level, as implemented in 2015, was more mixed than those for en-route. The local terminal incentive schemes provided for Danube FAB and FABEC are seen to meet the general principles required under the regulations.

3.250 The table below summarises how many FABs or States/TCZs (local level) incentive schemes were available and whether these were resulted in a bonus or penalty being triggered, as an indication of the impact of the available incentive schemes.

Table 3.38: Availability and application of incentives resulting from performance in 2015, SES-wide

<table>
<thead>
<tr>
<th>KPA</th>
<th>Incentive scheme</th>
<th>FAB level (out of 9)</th>
<th>Local level (out of 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>En-route</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Action</td>
<td>0 (+1 no impact + 3 no comment)</td>
<td>1 (+2 no impact + 15 no comment)</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td>Bonus or penalty</td>
<td>5 (+1 no impact)</td>
<td>15 (+12 no impact + 1 not used)</td>
<td></td>
</tr>
<tr>
<td>Terminal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Provided</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Action</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>Provided</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Bonus or penalty</td>
<td>0</td>
<td>7 (+7 no impact)</td>
<td></td>
</tr>
</tbody>
</table>

3.251 From the above we can summarise that:

• En-route environment incentives have predominantly been provided at the local level, but only resulted in corrective actions in one instance.

• En-route capacity incentives have not been provided at all FABs, in line with the PRB’s comments on compliance with respect to links between FAB performance and local performance.

• En-route capacity incentives have only triggered a bonus or penalty that has been used in calculating the 2017 unit rate in five out of the nine FABs, and half of ANSPs at the local level.
Terminal environment incentives have not been used by any FABs or at any local level.
Terminal capacity incentives have not been used at any FAB, but have been provided at local level for 14 ANSPs, and resulted in a bonus or penalty at half of these.

Review of unit rate compliance

3.252 The impact of the application of incentives in the first year of RP2 (2015) will first be implemented in 2017 (n+2), through the inclusion of the bonus or penalty in the unit rate for 2017.

3.253 Through the monitoring of the implementation of the incentive schemes in 2015, the PRB review identified a number of compliance issues with the schemes, which mean that the inclusion of any bonus or penalty in the chargeable cost base had to be examined by the European Commission as part of the compliance review of the 2017 unit rates. These compliance issues are shown in the review of the performance plans and the monitoring report for 2015 provided in the sections above.

3.254 The table below provides an initial summary of the issues raised by the EC in the letters sent to Member States on the unit rate for 2017. The issues have been summarised by theme:

- Compliance: the incentive scheme from which the bonus or penalty was derived was non-compliant or not provided as required by the Regulation.
- Calculation: where the scheme is compliant, but the bonus generated has not been calculated based only on actual ATSP revenues.
- N.A.: no comment on incentive schemes provided.
- Rejected: disagree with European Commission comment
- : not clear if addressed.

3.255 The table also provides an overview of the Member States’ responses to the EC’s letters, where issues relating to the incentives have been directly addressed.

Table 3.39: Overview European Commission comments from review of 2017 unit rates and corresponding State responses

<table>
<thead>
<tr>
<th>FAB</th>
<th>State/ANSP</th>
<th>EC Comment (by theme)</th>
<th>State response</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>En-route</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baltic</td>
<td>Lithuania</td>
<td>Compliance</td>
<td>Rejected (disagree with assessment of PP corrigendum)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td>Compliance</td>
<td>Rejected (disagree with assessment of PP corrigendum)</td>
<td>-</td>
</tr>
<tr>
<td>BlueMed</td>
<td>Italy</td>
<td>Compliance</td>
<td>Moved to 2018</td>
<td>-</td>
</tr>
<tr>
<td>Cyprus</td>
<td></td>
<td>Compliance</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td></td>
<td>Compliance</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malta</td>
<td></td>
<td>Compliance</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Danube</td>
<td>Romania</td>
<td>Compliance</td>
<td>n.a.</td>
<td>-</td>
</tr>
<tr>
<td>Bulgaria</td>
<td></td>
<td>Compliance</td>
<td>Rejected (disagree with assessment of revised PP)</td>
<td>-</td>
</tr>
<tr>
<td>DK-SE</td>
<td>Denmark</td>
<td>n.a.</td>
<td>Rejected</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td>Compliance</td>
<td>Rejected (consider all providers to be contributing and eligible)</td>
<td>-</td>
</tr>
<tr>
<td>FABCE</td>
<td>Austria</td>
<td>Compliance</td>
<td>Rejected (disagree with PRB data used)</td>
<td>-</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>FAB</th>
<th>State/ANSP</th>
<th>EC Comment (by theme)</th>
<th>State response</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>En-route</td>
<td>Terminal</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Compliance</td>
<td>Compliance</td>
<td>Rejected (disagree with PRB data used)</td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>Compliance</td>
<td>Compliance</td>
<td>Rejected (disagree with PRB data used)</td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>Compliance</td>
<td>Compliance</td>
<td>Rejected (disagree with PRB data used)</td>
<td></td>
</tr>
<tr>
<td>FABEC</td>
<td>Belgium</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rejected (consider targets compliant)</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Compliance</td>
<td>Compliance</td>
<td>Updated PP (30 Jan 2017)</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>Compliance</td>
<td>Compliance</td>
<td>Clarified</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEFAB</td>
<td>Finland</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Latvia</td>
<td>Compliance</td>
<td>Calculation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>n.a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>n.a.</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>Compliance</td>
<td>n.a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW FAB</td>
<td>Portugal</td>
<td>Compliance</td>
<td>Compliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spain</td>
<td>Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK-IE</td>
<td>Ireland</td>
<td>Calculation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UK</td>
<td>n.a.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Steer Davies Gleave analysis

From our review of the above, we observe that there are a number of complexities arising in parallel. These include:

- The fact that the EC’s decisions on the PP targets in 2015, is not equivalent to acceptance of the whole PP, including the incentive mechanisms. As a result, a number of open issues may remain with these where they have not been addressed by NSAs in the first year of RP2 (as noted in the monitoring reports by the PRB), giving rise to the large number or compliance points in the table above.

- The approach taken where compliance issues with the incentive schemes remain has varied. So although the lack of consideration of FAB performance by the incentive schemes is repeatedly highlighted as a prominent compliance issue, this has not necessarily been seen as an obstacle to approving the 2017 unit rate. For example, the Baltic FAB incentive scheme does not have a FAB-level trigger built into it, so is non-compliant in this sense. Nonetheless, an approved FAB capacity target exists and was achieved, meaning that in practice the local level bonuses may be awarded (awarded in Lithuania, not awarded in Poland). It is understood then the unit rate for Lithuania has been approved, despite the design of its incentive scheme having been highlighted in the EC’s letter as not being fully compliant. Conversely, the capacity target for BlueMed has
not been approved, so the above approach could not have applied there (in practice BlueMed did not achieve its non-approved target).

- The approach taken towards bonus and penalties has also varied. Where compliance issues relating to the lack of consideration of FAB performance (consistency between local targets and FAB targets) by the incentive schemes remain, bonuses appear to have not been approved, but penalties have. For example, in FABCE, the bonuses in Austria and Slovenia are requested to be removed on the basis of this compliance issue, however in FABEC, the penalties for Belgium have not been requested to be removed.

Findings

3.257 In this section we draw out the findings from the analysis of the legislative background and experience from implementation of the incentive regimes during RP2.

3.258 Overall, we note that the specific objectives of the incentives are not described in the performance and charging regulations, which do not identify the behaviours that should be influenced nor provide details on the expected outcomes of implementing the incentives schemes. The objectives of the incentives are described only at a high level as part of the overall objectives of the performance and charging regulations, which aim to support improvements in performance.

3.259 As a result, for the majority of cases it appears that incentives have been put in place simply because States/FABs are required by the regulation to have them. A number of them (e.g. Baltic FAB) are very clear about this in their PPs, referencing the regulations in the PP template’s "justification" box. No FABs/States refer to a means of determining whether an incentive has met its objective, although arguably the unsaid objective is meeting the FAB targets.

3.260 The Performance Plan templates do not include a requirement to state the "objective" of the incentive which does not encourage States/FABs to think about this. Many FABs/States (e.g. Blue Med) state that the objective is "continuous improvement" (or similar) which is not specific. Even DK-SE FAB, the only FAB to have no PRB comments on its incentive scheme, does not state any objective.

3.261 A number of issues with the implementation of the incentive schemes have been highlighted through the PRB’s assessment of the RP2 Performance Plans and its review of the NSA monitoring reports. The absence of specified objectives has meant that many of these issues are focussed on technical aspects of the schemes’ design, with little recourse to the general principles or intent of the intervention.

3.262 From our analysis and our engagement with stakeholders, we note that there does not exist clarity over the requirement for terminal environment and capacity incentive schemes.

Environment KPA incentive schemes

3.263 Six FABs have included non-financial incentive schemes for the environment KPA (Baltic, Danube, DK-SE, FABEC, NEFAB, UK-IE). Only one FAB, UK-IE FAB, has included a financial incentive for the environment KPA, and this is applicable to the UK only. The PRB had no comment on the environment incentives in all cases apart from the UK-IE FAB, where the PRB noted that the financial incentive is not linked to meeting the environment targets, as required by Commission Regulation (EU) 390/2013 Article 12.1(d).
The requirements for the optional environment incentives specified in the regulations are not well-defined. As a result, the descriptions of the incentives schemes for the environment KPA are not as detailed as those provided for the capacity KPA, for which the requirements are better specified. The implementation and potential impact of the environment incentives are then not clear. The PRB has not provided comments on the application of non-financial incentives for the environment KPA in the 2015 PRB Monitoring report.

**Capacity KPA incentive schemes**

For this mandatory requirement, the PRB found that there were some gaps between what the legislation specified and what was adopted in the PPs.

The main issues found by the PRB in its assessment of the RP2 PPs were in the compliance with the incentivisation of en-route ATFM delay, with a number of issues arising with respect to compliance with the legislation and, in some cases, lack of clarity as to how the scheme would be implemented in practice.

Regarding consistency with the Regulation, for the most part, the incentive schemes were consistent, with the following exceptions:

- Blue Med had considerable issues, with not all Members having incentive schemes and some incentive schemes unable to be reviewed, or inconsistent with the Regulation.
- For a number of FABs, it was not apparent that the incentive schemes foster a high level of performance;
- In a few cases, schemes were found to be not proportional.

There were a number of issues around interpretation:

- The PRB consider that a FAB level scheme was required to ensure the local schemes supported the FAB targets. A number of FABs provided local schemes only.
- The PRB consider that the regulatory requirement for symmetry applies to both bonus/penalty and the rate at which the bonus/penalty can be accrued. Some FABs, for example, were ‘tougher’ on the bonus side than the penalty, with only a slight dip in performance required for a penalty and significant performance above the target for a bonus, but this was considered asymmetric by the PRB.

There were a number of issues falling in the ‘other’ category:

- On a number of occasions, the PRB considered that FABs did not provide sufficient information to assess the scheme;
- For a number of schemes that included only some delay types, the PRB noted that “There is no mention of an independent verifiable method of reconciling attributed delay to actual events, which raises the possibility of errors or gaming.”
- Article 15(g) of the charging Regulation allows the exclusion of delay causes outside of the control of the ANSP for the calculation of incentives. It is not always clear from the performance plans whether this is applied, and where it is applied the revised target is not always stated explicitly. A number of performance plans use this article to reduce the local target to only include the CRSTMP delay codes.

The compliance issues with the incentives schemes highlighted through the assessment of the PPs largely remained through their application in the first year of RP2 (2015). FABs/States generally did not address the PRB’s comments from the assessment in their NSA monitoring reports. Our review of the monitoring reports indicated that a large number of compliance
issues with incentive schemes for en-route capacity were unchanged, particularly in relation to links with FAB performance. However, despite issues with FAB-level compliance, at the local level, the application of the incentives resulting from performance in 2015 was in accordance with the national incentive schemes.

3.271 A number of other issues also remained:

- Compliance issues with incentive schemes, particularly in relation to their symmetry. Symmetry was noted as an issue even in cases where delay targets were close to or equal to zero.
- Scope issues in the application of the incentive scheme, emerging from the difference between FIR and ACC boundaries as a result of delegated control of certain sectors (e.g. the Austrian Tyrol to DFS).
- Data assurance issues that mean incentive schemes may be susceptible to errors or gaming, as a result of the selective use of delay codes and the absence of independently verifiable data.

3.272 The table below provides a view on why these issues may have emerged, based on our analysis and engagement with stakeholders.

Table 3.40: Emergence of issues with capacity incentives in 2015

<table>
<thead>
<tr>
<th>Theme</th>
<th>Indicative reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAB-Local level consistency</td>
<td>Complexities in the interaction between FAB-level targets and local level targets:</td>
</tr>
<tr>
<td></td>
<td>• definition of targets and reference values at FAB and local level by NM</td>
</tr>
<tr>
<td></td>
<td>• attribution of FAB outcomes at local level</td>
</tr>
<tr>
<td>Symmetry</td>
<td>Practicalities of designing a symmetrical scheme where delay targets are close to or equal to zero.</td>
</tr>
<tr>
<td>Scope</td>
<td>Misalignment between State borders used for regulatory oversight and operations which may cross these.</td>
</tr>
<tr>
<td>Data assurance</td>
<td>Flexibility afforded for the exclusion of certain delay codes in Regulation not supported by appropriate oversight processes at local level.</td>
</tr>
</tbody>
</table>

3.273 The impact of the application of incentives in the first year of RP2 (2015) was implemented for the first time in 2017 (n+2), through the inclusion of the bonus or penalty in the unit rate for 2017, which was examined by the European Commission as part of the compliance review of the 2017 unit rates. In this review, it assessed that bonus or penalties resulting from schemes that are seen as non-compliant should be excluded from the 2017 unit rate, affecting nearly all States (except Denmark and the UK). Three States (Sweden, Estonia, Ireland) were identified where the bonus generated had not been calculated based only on actual ATSP revenues, but a larger revenue (e.g. charging zone revenue) instead, as a result of differing interpretations of the regulation.
4 Experience from other industries

Introduction

4.1 This section summarises performance incentives, with and without financial mechanisms that have been applied in other regulated industries with a focus on the airports and rail industries, with some experience drawn from the energy and water industries. It highlights where the experience may be useful when considering measures in the Air Navigation Services (ANS) industry applied to Single European Sky (SES) States for Reference Period 3 (RP3) for the 2020 to 2024 period.

4.2 The Task specification required:

This phase should also look at pragmatic experiences and lessons learnt from applying financial incentives on quality of services in other regulated sectors (including in transport, for example rail, airports).

4.3 The remainder of this chapter reviews experience in the airports, rail, energy and water industries before drawing conclusions which may be applicable to the ANS sector.

Airports

Background

4.4 Economic regulation, including price controls have been in place at airports for a number of years. This has tended to take two forms: either statutory based independent economic regulation (United Kingdom, Ireland, etc.); or economic regulation associated with the Concession contract let to new private sector owners of the airports (Portugal, France, Greece, etc.).

4.5 As these systems have matured, the regulators have brought in approaches to monitor and incentivise quality of service and investment to provide needed capacity and to maintain or improve quality of service.

4.6 Under European legislation, airport charges and their oversight are governed by Directive 2009/12/EC on airport charges

4.7 Unlike other sectors, the form of price control (if any) and the form of any performance and quality of service incentives are entirely left to the State and National Supervisory Authorities.

4.8 The aim of the Directive is to establish a common framework regulating charges at the largest national airports in the EU and those handling more than 5 million passengers annually. Key features of the framework are:
Examples of performance incentives applied

In the table below we provide examples of the systems applied at airports in Europe, as noted above, these have been developed by National Supervisory Authorities in each Member State. Some of these schemes in the United Kingdom and Ireland have been established for many years. Their objectives are to ensure the quality of service at a price controlled/regulated airports does not deteriorate and that investments promised are delivered. These can be categorised as:

- service quality regimes (SQRs): covering passenger satisfaction, availability of assets to airlines and specific congested pieces of infrastructure; and
- investment triggers or mandatory investment targets.

Table 4.1: Summary of incentives in the airports industry

<table>
<thead>
<tr>
<th>Description</th>
<th>Service quality regime (SQR)</th>
<th>Investment triggers/targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of service provided to passengers and airlines is targeted and incentivised. The precise measures are different by airport but usually include:</td>
<td>Specific, important investment projects identified by airlines as target projects are identified and the timing of the delivery of these projects is put into the regulatory regime. The aim of the regime is to encourage timely and efficient delivery of appropriate key projects. The capital projects are material (in Heathrow’s case above £25 million (£20 million)).</td>
<td></td>
</tr>
<tr>
<td>- passenger satisfaction surveys (e.g. cleanliness, wayfinding, provision of information);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- asset availability measures (e.g. escalators, lifts, airbridges);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- security queue performance (e.g. measuring the length of the queue); and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- specific measures important to the airport (aerodrome congestion).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- For each measure, a target level of performance is identified and a range of approaches taken. Some measures are just published and monitored. For others below or above target performance results in a penalty or</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Service quality regime (SQR)</th>
<th>Investment triggers/targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>bonus, and for some measures just a penalty system is in place.</td>
<td>If the target date is missed a financial penalty is incurred. At Heathrow, the monthly rebate equates to one twelfth of the return on the estimated completed value of the asset.</td>
</tr>
</tbody>
</table>

**Financial incentives**

The revenues at risk cumulatively are significant. However, as this is the result of a large number of measures the portfolio effect means in practice the payments and receipts are much lower. The incentives for the latest price control are listed below in many cases these have changed over time.

UK (maximum penalty 7%, bonus 1.44%), Ireland (maximum penalty 4.5%), France (ADP maximum bonus and penalty 1%, Lyon 0.3% and 0.15% respectively), Portugal (maximum penalty 7.5%).

**Key issues**

In principle, much higher levels of revenue are at risk than in the RP2 performance regime. Much greater use of passenger and airline views and perceptions. The design of the SQRs take into consideration local issues (for example aerodrome congestion at Heathrow).

Requires the collection and publication of a significant amount of data. That data needs to be verified and does lead to material costs of implementation.

Requires a mature and close interaction between the airlines and the regulator to identify the key investment projects to target and use within the trigger mechanism. At Heathrow, this is facilitated through a Constructive Engagement process.

Time and resource consuming, involving oversight by the regulator and an Independent Fund Surveyor, as well as to sign-off the completed capital projects by airlines and airport management sent to the regulator.

**Examples of implementation**

France, Ireland, Portugal, United Kingdom

Aéroports de Paris and London Heathrow

**Criteria for assessment**

4.10 The approach taken to incentivising quality of service at airports is transparent and has credibility with the stakeholder community, having the advantage of involving measures of both airline and passenger perceptions and investment and quality requirements.

4.11 However, the implementation administration costs of delivering this system are significant for all stakeholders, and the system – for service quality incentives – is relatively complex, given the interaction between a large number of parameters that are monitored and subject to penalty and bonus financial transactions.

4.12 The investment triggers, have the benefits of being relatively easy to monitor and therefore demonstrate ex-post.

**Table 4.2: Assessment of incentives in the airports industry**

<table>
<thead>
<tr>
<th>Criteria for assessment</th>
<th>Quality of service regime</th>
<th>Investment triggers/ targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Administration costs (to be minimised)</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Credibility with the stakeholder community</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Transparency</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Criteria for assessment</th>
<th>Quality of service regime</th>
<th>Investment triggers/ targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-discriminatory</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Proportional</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Effective</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>The ability to monitor</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>the outcomes of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>intervention</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Learning points applicable to ANS**

- In general, the revenue at risk is higher (as a % of total revenues) than for the current ANS quality of service regime.
- The objective and the behaviour the incentive is trying to influence is clear.
- The design of the regimes reflects local circumstances – target levels reflect past performance and the identity of targeted indicators (for example where airports have a problem with baggage belts, or aerodrome congestion specific indicators and targets have been designed into the regime).
- Significant involvement of passengers and airlines in both the design and measurement of the regime through consultation and surveys.
- Transition to greater revenues at risk. Most of these schemes started with a smaller level of revenue at risk then transitioned to higher revenues with greater maturity of data collection.
- Material costs to the industry (airports, airlines and NSAs), ultimately paid for by passenger of implementing and monitoring the schemes.

**Rail**

**Background**

4.13 Surface transport modes including rail differ from the airline, ANS and airport industries in a number of ways:

- The industry is largely “bottom-up”, often funded, planned, contracted and operated at the level of a region or urban area, with little commonality between networks.
- With the exception of a number of small historically private railways, and some bus and coach stations, infrastructure is almost invariably publicly-owned and publicly-funded.
- With the exception of some long-distance rail and coach services, all surface transport operations require subsidy, because fares are regulated, because of competition with services on which the fares are regulated, or because even without regulation it would not be possible to recover costs from fares.
- In consequence, investment is rarely commercially viable, and must be specified and subsidised by one or more tiers of government.
- Railway capacity cannot readily be defined or measured, except by whether a particular package of services can be timetabled and operated reliably.

4.14 Within the European Union, two principle items of legislation determine the overall regulatory framework for surface transport and rail:

- Regulation (EC) 1370/2007 on public passenger transport services by rail and by road; and
- Directive 2012/34/EU establishing a single European railway area.
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Regulation (EC) 1370/2007

4.15 A key provision of Regulation (EC) 1370/2007 is the requirement, in Article 3, that “Where a competent authority decides to grant the operator of its choice an exclusive right and/or compensation, of whatever nature, in return for the discharge of public service obligations, it shall do so within the framework of a public service contract.” In other words, operators cannot be subsidised or protected from competition without being given a Public Service Obligation (PSO) which shall be met through a Public Service Contract (PSC).

4.16 The Regulation does not require any separation between the procurer of the transport service, the operator of the transport service, the owner and maintainer of vehicles, or the owner, maintainer or operator of terminal (stops and stations) or on route (roads and track) and terminal infrastructure. It does not prevent transport services from being provided by an authority’s “internal operator”, which in some cities owns, maintains and operates all the assets used to provide all metro, light rail and bus services. It does not require or even mention incentives or a performance regime.

4.17 Nonetheless:

- A wide range of heavy rail, metro, light rail and bus services are procured by authorities through competitive tenders. In the case of heavy rail, making use of the national rail network infrastructure, the Public Service Contract (PSC) may be either directly awarded, or competitively tendered, and with either a public sector rail operator or a private company.
- Many authorities include performance regimes in their PSCs in relation to some or all of the provision of services (punctuality, reliability), vehicles (cleanliness, passenger information, onboard facilities), terminal infrastructure (cleanliness, passenger information), en route infrastructure (compliant maintenance, asset condition) or other facilities and aspects of the service. However, the content and structure of these PSCs varies widely, with few international or even national standard clauses or requirements.

Directive 2012/34/EU

4.18 Uniquely among surface transport modes, rail is required by European Law to ensure that certain defined route and terminal railway infrastructure is managed, and has its capacity allocated, by a body independent of any user of the infrastructure. Directive 91/440/EEC of 1991 imposed an initial requirement for accounting separation between infrastructure and operations, and the requirements for separation have subsequently been strengthened by a number of railway packages: the first package of 2001, the second package of 2004, the third package of 2007. In 2012 the first package, including Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification, was recast in the form of Directive 2012/34/EU. Two elements of Directive 2012/34/EU specify the arrangements for price signals and other incentives between the infrastructure manager and the operators:

- Chapter IV (Articles 26 to 57) deals with levying of charges for the use of railway infrastructure and allocation of railway infrastructure capacity. Within this Chapter, Section 2 (Articles 29 to 37) deals with infrastructure and services charges, including clauses analogous to the provisions for the modulation of ANS charges.
- Article 35 specifies a requirement for a performance scheme.
Article 35 and infrastructure performance schemes

4.19 In practice, Article 35 and associated legislation are extremely brief, with the material text set out in the table below.

### Table 4.3: Regulatory framework for railway infrastructure performance schemes

<table>
<thead>
<tr>
<th>Article</th>
<th>Text</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 35(1)  | 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. | Charging is **required** to incentivise both:  
• minimising disruption; and  
• improving performance. |
|         | 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. | Mechanisms **permitted**:  
• penalties for causing disruption;  
• compensation for disruption; and  
• bonuses for out-performance. |
| 35(2)  | The basic principles of the performance scheme as listed in point 2 of Annex VI shall apply throughout the network. | |
| Annex VI (2) | The performance scheme as referred to in Article 35 shall be based on the following basic principles: | |
| Annex VI (2) (a) | In order to achieve an agreed level of performance and not to endanger the economic viability of a service, the infrastructure manager shall agree with applicants the main parameters of the performance scheme, in particular the value of delays, the thresholds for payments due under the performance scheme relative both to individual train runs and to all train runs of a railway undertaking in a given period of time. | The performance scheme is to be **agreed**, rather than **imposed**. |
| Annex VI (2) (b) | The infrastructure manager shall communicate to the railway undertakings the working timetable, on the basis of which delays will be calculated, at least five days before the train run. The infrastructure manager may apply a shorter notice period in case of force majeure or late alterations of the working timetable. | Specifies the minimum notice at which the working timetable, against which delays will be calculated, shall be issued. |
| Annex VI (2) (c) | All delays shall be attributable to one of the following delay classes and sub-classes: | Lists 9 delay classes and 48 sub-classes, but schemes need not use them all. |
| Annex IV (5) | The network statement referred to in Article 27 shall contain the following information: a section on information about procedures for dispute resolution and appeal relating to matters of access to rail infrastructure and services and to the performance scheme referred to in Article 35. | The infrastructure manager must produce a network statement, which must refer to the performance scheme. |

4.20 In practice, however, while performance schemes are in principle mandatory, and incentives are required, they must be introduced by agreement, delays may remain poorly-attributed or wholly unattributed, penalties and bonuses may be set to zero, and the main parties (the infrastructure manager and the dominant or only passenger operator) may be in common ownership.
4.21 A further issue is that creation of performance schemes on individual national (and in some cases, sub-national) rail networks may not result in a consistent regime for international rail services. Partly in response, in 2005 the UIC launched the European Performance Regime (EPR) project, which in 2009 became a joint project with RailNetEurope (RNE). The EPR’s objective was to design a performance regime that could be used both for international and national traffic, allowing a network to apply a single type of performance regime on its territory if it wished to. We understand that progress to date includes:

- “EPR Handbook 2013”, which describes the four-step process of the performance regime (from data collection to billing/invoicing) and legal aspects, helps potential users of the system to understand quickly what they should put in place to implement it, and what they should expect in terms of both needed resources and possible results.
- Referenced documents such as templates/documents for use in implementation and reports on the results of the Pilot Application (conducted in 2009-2012).
- EPR tool functionalities developed to support the EPR process described in the handbook, make all necessary calculations and deliver any reports needed.

4.22 A key point, however, is that, despite the legislative requirement, performance schemes are neither integrated between all national networks, nor consistent between all national networks, nor even in existence in all national networks, nor effective if penalties and bonuses are zero or are transferred between parties in common ownership.

4.23 In practice the greatest and most consistent development of rail infrastructure performance schemes with the EU has been in Great Britain. Since 1994, Railtrack and its successor Network Rail have been subject to independent economic regulation, with the result that its access, charging and performance regimes have been subject to reviews every five years. The most recent review, PR13, specified the arrangements for the fifth regulatory Control Period from 2014-2019. In contrast, many other rail infrastructure managers set their own charges, with limited or no independent regulatory oversight.

4.24 We therefore discuss in turn below potential incentive mechanisms introduced in the following:

- Railtrack and Network Rail in the UK;
- the London Underground PPP in the UK;
- scarcity charges; and
- capacity analysis and capacity enhancement plans.

**Railtrack and Network Rail in the UK**

**Charges and incentives during Control Period 5 from April 2014**

4.25 In June 2014 the Rail Delivery Group (RDG) produced a “Charges and Incentives user guide”, summarising the current charging structure, which includes the following charges and incentives currently applied in the industry:

- The Capacity Charge; and
- The Schedule 8 performance regime.

**The Schedule 8 performance regime**

4.26 The Schedule 8 performance regime compensates train operators for unplanned service disruption caused by Network Rail and other train operators. There are now separate model
Further development in air traffic management in the area of performance incentives

The regime has three stated objectives:

- to compensate train operators in the event of unplanned service disruption attributed to Network Rail or other train operators;
- to help align incentives between Network Rail and train operators, so the financial impact of poor performance is incurred by the organisation that causes the disruption, rather than the train operator that faces the disruption; and
- to provide appropriate signals so as to drive decision-making by both Network Rail and train operators in relation to performance management; for example investment prioritisation and preparation of business cases for performance improvement schemes.

4.27 Note that the first objective listed is compensation rather than incentivisation, and rates are set so that they fully compensate for loss of revenue, although the second and third objectives are implicitly intended to help create incentives.

4.28 Estimates of the marginal revenue lost for lateness and cancellations are used to calibrate the payments made between Network Rail (the Infrastructure Manager) and the Train Operating Companies (Railway Undertakings):

- Each operator pays Network Rail on a set scale related to the delay it creates, calibrated on a liquidated damages basis of a prior estimate of consequential delays to other operators, rather than an exact attribution of causation.
- Network Rail pays each operator for actual delays caused by itself and other operators. The difference between the fixed damages received from delaying operators and the actual payments to delayed operators incentivises Network Rail to mitigate delays.

4.29 Network Rail's benchmarks are set to determine performance levels, estimated at the lateness which would be observed if Network Rail exactly hit its performance targets. If Network Rail performs better than the benchmark, each train operator makes a payment to Network Rail. If Network Rail performs worse than benchmark, Network Rail makes a payment to each train operator.

4.30 Schedule 8 works well as a compensation regime, but the value of a minute of delay is not published and varies significantly between routes and service groups, as it is intended to compensate the Railway Undertaking for the potential revenue lost. In addition, the current incentives are calibrated on estimated (long term) revenue losses to operators, rather than wider losses to society.

4.31 The regime also requires substantial systems and processes to support it. These include delay investigation/attribution processes and a dispute resolution mechanism. Extensive calibration work is also required:

- when there are major timetable changes, particularly if these increase the interactions between services, meaning that operators should pay Network Rail higher penalties; and
- when Network Rail's regulator, the Office of Rail and Road (ORR), sets new benchmarks for Network Rail's performance in each new Control Period.

4.32 Most rail operators only use, and are exposed to the performance of, a small part of the network, and could be disproportionately affected if performance was good on average, but poor in their area. Performance benchmarks must therefore be cascaded down from overall benchmarks to specific targets for each individual route and service group.
4.33 Network Rail faces increased Schedule 8 liabilities if it accommodates additional traffic and hence rising congestion. The Capacity Charge is designed to offset this, to avoid Network Rail being disincentivised from growing traffic on the network, which could reduce or reverse the effects of the volume incentive. To avoid transaction costs it does this on a “liquidated damages” basis, avoiding case-by-case negotiations, with operators paying a charge to Network Rail intended to offset the average marginal net penalty it bears as a result of additional volume causing more delays. A secondary objective of the charge is to incentivise and send price signals to train operators and funders to make efficient use of network capacity.

4.34 ORR has noted that the Capacity Charge, while regarded by ORR as a “cost directly incurred”, has characteristics similar to that of a congestion charge, reflecting some measure of the increasing marginal cost of congestion on a network. However, the Capacity Charge is fixed over a 5-year Control Period, and applied on the basis of average additional delays over a wide area, rather than an estimate of the additional delays resulting from a specific additional service. This means that it may over-penalise additional services on emptier parts of the network, but not fully reflect delays caused by other additional services which significantly worsen performance.

Other rail performance schemes

4.35 Early introduction of a performance scheme in Great Britain was both necessary, because Railtrack was expected to operate in the private sector from 1996, and possible, because a system for reporting and monitoring trains was already in place. In contrast, the development of the European Performance Regime (EPR) initiated in 2005 did not result in a firm set of deliverables until 2014. Among the issues affecting the development of performance schemes are:

- Does a system exist which is capable of reporting the location of trains with sufficient accuracy to support a performance regime?
- Is it cost-effective to employ the staff needed to attribute delay to different parties?
- Is data available from which to calibrate a regime of penalties and bonuses?
- Even if all these requirements are met, is their collective cost likely to be exceeded by a benefit of improved performance, particularly if all the industry parties are in common ownership and control?

4.36 In 2012 the impact assessment for the proposed Fourth Railway Package examined the development of performance schemes in other Member States. The findings at the time, where stated, are summarised in the table below.

<table>
<thead>
<tr>
<th>Member State</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic, Lithuania, Spain</td>
<td>None</td>
</tr>
<tr>
<td>France</td>
<td>Dummy regime to be introduced in 2013</td>
</tr>
<tr>
<td>Germany</td>
<td>In place but insufficient</td>
</tr>
<tr>
<td>Hungary (note than Hungary has two rail infrastructure managers)</td>
<td>In place but did not create incentives</td>
</tr>
<tr>
<td>Denmark, Netherlands, United Kingdom</td>
<td>In place</td>
</tr>
</tbody>
</table>
In addition, there has also been little development of the performance scheme in Member States such as Belgium and Greece, partly because a single state-owned passenger operator provides all domestic services.

**The London Underground Limited (LUL) Public-Private Partnership (PPP) in the UK**

4.37 In 2002 London Underground Limited put in place contracts by which its assets – infrastructure and trains – would be provided and maintained by three private sector Infrastructure Companies (Infracos) to the public sector operator of the system and provider of services. In essence all assets were provided as a service, with payment for availability and performance, to an operator whose train crew and station staff used them to provide a public transport service. The PPP performance regime was designed, inter alia, to incentivise major capital expenditure through measurement and reward of graduated performance outcomes. The principal metric was total passenger journey time, so the system could be summarised as “more money for fewer minutes”. However, none of the contracts put in place survives, although the reasons for their failure are not necessarily related to the performance regimes.

4.38 In practice, the development of capacity enhancement plans required detailed dialogue between London Underground and the infrastructure companies. While arguably the incentives provided a useful framework for these discussions, it was not possible to rely on the incentives in the contract to deliver a good outcome.

**Scarcity charges**

4.39 European railway law (Article 31 of Directive 2012/34/EU) permits that infrastructure charges “may include a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion”. In principle, this gives infrastructure managers scope to manage demand by setting charges to incentivise operators to avoid congested times and locations. Infrastructure managers in Austria, Belgium, Germany and Sweden have set charges, Norway and Switzerland have made provision for them, and the Czech Republic has (untested and unproven) provisions for capacity to be auctioned if no other means can be found of balancing demand and capacity.

4.40 In practice, however, there is little evidence that the application of scarcity charges has helped either with improving capacity allocation or of incentivising investment. The principal issues are that most peak period services are specified in Public Service Contracts (PSCs) and cannot be withdrawn or retimed; there is no proven means of defining rail capacity, its consumption or levels of congestion; valuing capacity is technically difficult; and trading capacity, which (where it is possible) might in principle provide an estimate of its value, is forbidden.

4.41 The Belgian charge, which incentivises operators to harmonise their speeds to maximise capacity (analogous to landing aircraft flying at equal separation and hence speed), has been reported to have had some effect on freight operators, who have retimed some slow trains to avoid peak periods. All the other remaining charges, which are borne predominantly by operators of PSC passenger services, have been set at notional levels, and we have seen no claims that they either affect operator demand or incentivise capacity provision.

4.42 In the context of ANS provision, we conclude that a capacity charge would act as a modulation of operator charges, rather than as an incentive to the infrastructure or service provider.
Capacity analysis and capacity enhancement plans

4.43 European railway law (Articles 47, 50 and 51 of Directive 2012/34/EU) provides for infrastructure to be declared congested “it is not possible to satisfy requests for infrastructure capacity adequately” and to require the preparation of a capacity analysis and a capacity enhancement plan. However, these administrative requirements do not provide any incentives for the provision of additional capacity, do not create a funding mechanism, and cannot override constraints beyond the control of the infrastructure manager, such as planning and heritage laws. In practice, we understand that there is generally little to drive dissatisfied operators to trigger provisions which increase administrative burden but may not result in any change. A further difficulty is that infrastructure enhancements tailored to a specific current request for capacity may be of no value in relation to future requests or demand.

4.44 In practice infrastructure expansion, which invariably requires subsidy, is more likely to be achieved if either a buyer of PSC rail services or an independent regulator specifies, on the basis of a long-term plan for service patterns, both a requirement and a funding package.

Other incentives related to the provision of services

4.45 The pervasive use of Public Service Contracts (PSCs) for the provision of socially desirable but uncommercial rail services means that many examples exist of a contracting authority including, within the contract, mechanisms to monitor and reward features such as reliability and punctuality and to require certain levels of investment (such as providing new onboard facilities, or new trains, or contracting with the infrastructure manager to provide new capacity).

4.46 PSCs may be either gross cost, in which the procuring authority retains revenue and revenue risk from the services, or net cost, in which the operator bears revenue risk and is, in principle, incentivised to maximise it through service quality.

4.47 In practice, however, many PSCs set fares at levels way below average costs, and even net cost contracts must typically be supported by a performance regime to ensure that there are adequate incentives to deliver quality. Some use a “malus” system of penalties for non-performance, but many use a “bonus/malus” system which also includes bonuses for outperformance. For example:

- In Austria, all local and short-distance rail services and several long-distance services are covered by PSCs: to date, these have been awarded directly and there is no competition. PSCs usually provide for yearly monitoring systems assessing the fulfilment of the quality targets to be met by the railway undertakings. Some include a bonus system with premium payments if the established quality targets have been met or exceeded.
- In Germany, the typical approach of the Passenger Transport Associations is to request tenders for a service specification, including a defined timetable and volume (train-kilometres), vehicle capacity and performance standards. An incentive regime normally applies which allows additional remuneration (bonus) or reduced remuneration (penalty) in relation to the fulfilment of previously defined performance indicators such as punctuality or passenger satisfaction.

4.48 A criticism of some performance contracts is that the payments are mis-calibrated and/or capped at too low a level, either allowing consistent underperformance for a relatively small recurring penalty, or leaving no incentive to further improvement once all the available premium has been earned. Some contracts have scope for the incentive regime to be
recalibrated at regular intervals, but others do not. This can mean that poorly-designed incentives remain “locked-in” for the duration of a PSC, which can legally be up to 22½ years.

4.49 In the context of ANS, we note that these regimes incentivise operators to provide good (but subsidised) service to the final (passenger) customer, rather than to incentivise the rail infrastructure manager.

Examples of performance incentives applied

4.50 The table below summarises the principal incentive mechanisms discussed above.

<table>
<thead>
<tr>
<th>Description</th>
<th>The volume incentive and capacity charge</th>
<th>Performance Regime</th>
<th>London Underground Limited PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Network Rail in the UK is incentivised to grow total traffic volumes “the volume incentive”. To protect it from the consequences of the resulting increased congestion, operators must pay a volume-related charge which compensates it for this “the capacity charge”.</td>
<td>Operators are incentivised on a number of measures including punctuality and reliability. The infrastructure manager is also incentivised to support punctuality and reliability. All delays are monitored and attributed to causes.</td>
<td>Infrastructure providers paid penalties based on the estimated passenger hours. These can take into account delivery of assets including track, signalling, electrification, trains, lifts, escalators and ticket barriers.</td>
</tr>
<tr>
<td>Financial incentives</td>
<td>The levels of charge are significant - the capacity charge payments to Network Rail amount to around €0.5 billion per annum – although as a percentage of turnover this is still small.</td>
<td>Incentives/penalties for out/under-performance are paid by Network Rail, to all operators on the basis of actual delays, and to Network Rail, by all operators on a liquidated damages basis.</td>
<td>Incentives were based on an efficient cost of delivery, with a bonus/malus system for out/under-performance.</td>
</tr>
<tr>
<td>Key issues</td>
<td>The effectiveness of the volume incentive is unclear. The implementation of the capacity charge, effectively to estimate the incremental effect of volume on congestion, is technically complex, and yet is still only applied at an aggregate level.</td>
<td>The regime requires detailed performance monitoring, delay attribution processes and dispute resolution mechanisms. The regime must be recalibrated when there are major timetable changes or for a new regulatory Control Period.</td>
<td>The regime could not in practice operate as conceived because the asset providers had too little scope to make change or improvement independent of the (single) customer operator of the assets.</td>
</tr>
<tr>
<td>Examples of implementation</td>
<td>Unique to Network Rail, UK.</td>
<td>Schemes exist in Denmark, France, Germany, Hungary, the Netherlands and the UK.</td>
<td>Unique to London Underground Limited, UK (2002-2010).</td>
</tr>
</tbody>
</table>
Further development in air traffic management in the area of performance incentives

Criteria for assessment

Table 4.6: Assessment of incentives in the rail industry

<table>
<thead>
<tr>
<th>Criteria for assessment</th>
<th>The volume incentive and capacity charge</th>
<th>Schedule 8 Performance Regime</th>
<th>London Underground Limited PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>✓</td>
<td>✓</td>
<td>- (difficult to implement)</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Administration costs</td>
<td>✓</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>(to be minimised)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credibility with the</td>
<td>Imperfect, but accepted as “the best</td>
<td>Imperfect, but accepted as</td>
<td>x</td>
</tr>
<tr>
<td>stakeholder community</td>
<td>approach yet”</td>
<td>“the best approach yet”</td>
<td></td>
</tr>
<tr>
<td>Transperrpency</td>
<td>x</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Non-discriminatory</td>
<td>✓</td>
<td>✓</td>
<td>N/A: only one user.</td>
</tr>
<tr>
<td>Proportional</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Effective</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Limited: cannot be relied on for</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>timetabling or capacity allocation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>decisions.]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The ability to monitor</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>the outcomes of the intervention</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[OK: volume]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Learning points applicable to ANS

4.51 The performance regimes and incentives in place in the Rail industry are underpinned by objectives described in EU legislation.

4.52 Performance regimes are increasingly well-established in rail and, as noted above, are probably most developed in Great Britain as a result of successive iterations since the mid-1990s. However, they require reliable and auditable systems for recording delays, for investigating and attributing fault, for resolving disputes, and for invoicing and processing payments.

4.53 Some of these processes and systems already exist in ANS, but an incentive mechanism with significant financial penalties will be more demanding, particularly in the fault attribution system, which will need to be transparent, auditable and challengeable. As with rail, processes will be needed for updating and recalibrating the regime in response to material changes, which would probably include the reconfiguration of airspace but might also need to include a changing mix of flight routings and aircraft types and sizes.

4.54 Once a performance regime is in place, a monopoly infrastructure manager has a natural incentive to restrict the supply of capacity, because a lightly-used network is more reliable and resilient. Compensating mechanisms may be needed to deter ANSs from restricting capacity, but the experience of Network Rail’s volume incentive and capacity charge suggests that these may be difficult to design in a way which does not distort incentives, particularly as the use of ANS capacity is much more dynamic than the use of rail capacity.
4.55 We have only identified one credible attempt to incentivise substantial capital investment through a graduated performance incentive regime, the London Underground Limited PPP. In principal this was aligned with an appropriate high-level metric, total customer hours (which could be considered analogous to total airline passenger hours), but in practice it became a framework for discussing capital investment plans and payments rather than an incentive regime.

4.56 Wider experience in the design of rail performance regimes raises a number of further issues:

- Setting performance benchmarks can require complex modelling and must ideally be based on robust time-series data and agreement on what targets can be set and achieved, and over what timescales.
- It may be necessary to define capacity, to measure its consumption, and to identify delays, not only in aggregate but also by locations, or by direction, and by time.
- Great care must to be taken to avoid inadvertently introducing perverse incentives.
- Even with a well-designed performance regime, signals reflecting the interaction of capacity, demand, and the way in which this is managed in the short term, may not prove a suitable basis for planning or investing in capacity for the longer term. This will particularly be the case where demand is volatile or, for example, highly sensitive to restrictions in other airspace.

Energy and water

4.57 Although we assess that there are fewer analogies between the ANS industry and the energy and water industries, as compared to the airports and rail industries, nonetheless we have reviewed the incentives in place to see whether there are any learning points to consider.

4.58 In the energy industry, a number of specific incentives have been designed to address the incentivisation of capital expenditure which may be of interest in the ANS industry:

- Innovation Funding Incentive (IFI): introduced to encourage investments in technological improvements for sustainable development, as these had been declining as a result of other incentives aimed at operating cost efficiencies. Encouraged improvements in supply quality, the environment and safety. Example of an incentive targeted at a specific category of capital expenditure.

- Interruptions Incentive Scheme (IIS): designed to encourage improved quality of service by encouraging the Distribution Network Operators (DNOs) to reduce the incidence and duration of interruptions by rewarding/penalising performance relative to predefined targets. The interruption incentive scheme has symmetric annual rewards and penalties depending on each DNO’s performance against its targets for the number of customers interrupted (CI) and the number of customer minutes lost (CML). The proportion of revenue exposed under the scheme is 1.2 per cent for CI and 1.8 per cent for CML.

- In addition, a discretionary reward scheme was implemented. This scheme made available a reward of up to £1 million per year, which could be awarded to DNOs on the basis of their performance in areas where high levels of performance are less easy to measure. This reward could therefore be awarded for performance demonstrated with respect to priority customer care or activities related to corporate social responsibilities.

- Low Carbon Networks (LCN) Fund: The LCN Fund allowed up to £500m to support projects sponsored by the Distribution Network Operators (DNOs). It has enabled DNOs to explore how their networks can facilitate the take up of low carbon and energy saving initiatives such as electric vehicles, heat pumps, micro and local generation and demand side.
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management. They have also investigated the opportunities that smart meter roll-out provides to network companies. These more innovative approaches will also help to manage the efficient costs associated with delivering the outputs that customers require during the control period.

- Sharing of cost savings between companies and consumers: DNOs beat baseline expenditure assumptions, delivering savings to consumers and earning rewards under the efficiency incentives which share them in the long term on a 50:50 basis. The DNOs spent £15.1bn compared to the baseline assumptions of £16.3bn, a saving of £1.2bn. These savings are shared with consumers resulting in a saving of approximately £660m for consumers over the next 20 years.

Conclusions

4.59 Incentives and performance measurement are used extensively in other regulated industries. There are some clear analogies with the experience in the airport and rail industries, and less direct experience from the energy and water industries.

4.60 The key lessons to consider are split between principles that have been followed and specific schemes which may have some parallels to application in the ANS industry.

Principles and lessons learned in the design of the schemes

- **Specific legislative objectives**: Some of the incentive schemes have their specific objectives described in legislation making clear the behaviours that are trying to be influenced and changes to behaviours targeted as a result of the introduction and design of the incentive.
- **Material revenues at risk**: The incentives generally have a higher revenue at risk than that used in the RP2 ANS approach. This has often involved a transition over time to higher revenues at risk as the scheme has become better understood and data collection has matured.
- **Robust methods of fault attribution**: Increasing revenue at risk will place much greater emphasis on fault attribution (delay attribution for example), this will place greater emphasis on ensuring a robust method exists which can be relied on by stakeholders.
- **Capacity and volume incentives working in tandem**: A capacity incentive works best in tandem with a volume incentive to avoid under-supply. The SES Performance scheme already has the traffic risk sharing mechanism which provides this.
- **Tailor to local circumstances**: Within a framework, enabling the design to reflect and be tailored to local circumstances has been allowed in most systems.
- **Consumer and service users assist with the design**: Involvement of consumers and service users in the design of the incentive regime to help tailor what is most important to them.
- **A number of stakeholders’ behaviour can be incentivised in the same regime**: A number of incentives involve both the service provider and service user being set targets and being monitored and incentivised.
- **Material additional costs in implementation**: Introduction of incentives, and in particular collecting and verifying data can introduce material additional costs to the industry, which are ultimately paid for by consumers. Therefore, the potential benefits need to outweigh these additional costs.
- **Single incentives cannot address both short- and long-term capacity issues**: It is difficult to design a single incentive which addresses both short-term operational performance as well as strategic planning for investment in capacity in the longer-term.
• **Great care needs to be taken to avoid unexpected outcomes**: even with a well-designed performance regime, great care must be taken to avoid inadvertently introducing perverse incentives.

• **Complexity**: where overly complicated regimes have been implemented, it has often resulted in a lack of accountability and transparency, and ultimately a withdrawal of the system. For example, the very sophisticated system introduced for the London Underground contracts.

**Specific examples of schemes to draw upon**

• **Legislative objectives**: the EU rail legislation contains examples of wording on specific objectives for incentive regimes.

• **Capital and capacity enhancement**: the capital trigger scheme in the airport industry, and targeted capital funding incentives in the energy industry to address specific issues.

• **Framework but allowing local circumstances**: the quality of service regime at EU airports and performance regime in the rail industry.

• **Fault attribution processes**: the rail industry has developed a very sophisticated system over a number of years.
5 Intended and unintended consequences

Introduction

5.1 This section covers analysis and evaluation of the implementation of the incentive schemes and identified intended and unintended consequences.

5.2 The task specification required:

A comprehensive analysis of the applied incentive schemes including an evaluation of intended and possibly unintended consequences in regards to the SES objectives. The study should examine the financial and operational aspects of the incentive schemes and consider both local and network behaviours in terms of route design, airspace management, capacity planning, provision of capacity, response to unplanned events; resilience and flexibility.

Overview of operational performance

Traffic situation

5.3 The draft Performance Review Report\(^\text{12}\) (PRR) for 2016 noted that air traffic in Europe continued to increase for the third year in succession, with annual European traffic reaching the levels experienced prior to the economic crisis in 2008. However, this increase was not homogenous across Europe. 25 ANSPs showed a traffic increase in 2016 compared to 2015, whilst 14 ANSPs showed a decline. The draft PRR also noted that “substantial traffic increase in some areas contributed to a decrease in overall service quality”.

Capacity KPIs

5.4 The capacity KPIs within the performance scheme are a measure of the output of the system, determining the:

- en-route air traffic flow management (ATFM) delay generated per flight on average during the calendar year; and
- airport ATFM arrival delay per flight generated on average during the calendar year.

\(^\text{12}\) Draft performance review report (PRR 2016). Eurocontrol.
5.5 For the SES area, in 2016 the en-route ATFM delay per flight increased from 0.76 minutes per flight in 2015 to 0.91 minutes per flight, a degradation of nearly 20%. This performance must be considered alongside traffic growth, which increased by +2.6%, consistent with the baseline STATFOR forecast. However, whilst in line with the STATFOR forecast at the European level, there were considerable variations in traffic growth at state/ANSP level.

5.6 In 2015, en-route capacity KPI targets were met by only four of the nine functional airspace blocks (FABs). Of the remainder, three did not achieve the targets and two FABs did not have plans accepted at the time of the monitoring.

5.7 Performance within the en-route capacity KPI has been worsening since 2013, diverging from the targeted value of 0.5 minutes per flight from 2014 onwards as demonstrated in the figure below.

Figure 5.1: En-route ATFM capacity KPI performance (average European en-route ATFM delay per flight)

![Graph showing en-route ATFM capacity KPI performance from 2012 to 2016.](source: Draft Performance Review Report 2016)

5.8 All forms of delay increased in 2016 compared to 2015, with weather showing a particularly high relative increase (+55% according to the PRR 2016 draft). Approximately half of these delays focussed on Maastricht and centres operated by DFS, the German ANSP.

5.9 In 2016, 69.7% (PRR 2016) of delay was generated by the eleven most constrained ACCs. However, the ranking of constrained ACCs changes over time, which demonstrates the sensitivity of the output-focussed en-route capacity KPI to local operational circumstances.

Environment

5.10 The environment KPA includes one KPI: horizontal en-route flight efficiency. This is split into two targets relating to the horizontal flight efficiency of the:

- Actual flown trajectory (known as KEA); and
- Last filed flight plan (known as KEP).

5.11 Both of these are measured on the basis of route extension, which ought to be minimised.
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5.12 The target for KEA (2.96%) was exceeded in 2015, with a value of 2.80% (shorter route extension). In 2016 targets for KEA (2.87%) were not achieved with an actual flight efficiency of 2.96% (longer route extension).

5.13 The targets for KEP were not achieved in either 2015 nor 2016. However, it should be noted that the KEP metric is considered to primarily relate to airline route-planning choices and be largely outside the control of the ANSPs.

**Intended consequences**

5.14 The specific objectives of the incentives as discussed in earlier chapters is not explicitly stated in the legislation, although the Basic Regulation (550/2004) sets out an overall objective in stating that incentives can be used to, ‘encourage air navigation service providers and/or airspace users to support improvements in the provision of air navigation services such as increased capacity, reduced delays and sustainable development, while maintaining an optimum safety level’.

5.15 Additionally, it is stated that financial incentives may be a useful way to accelerate the introduction of equipment that increases capacity, of rewarding high performance or offsetting the inconvenience of choosing less desirable routings.

5.16 Given the objectives are not well-defined, we list below implicit assumptions from further reading of Implementing Regulations and of Commission Policy that the intended consequences of the incentives were to:

- Encourage ANSPs to keep delay to airspace users at a cost-optimal level through the provision of sufficient capacity to meet demand. Implicit within this is the need for ANSPs to invest to keep capacity aligned with traffic growth and provide sufficient flexibility in operations to meet variations in traffic demand.
- Encourage ANSPs and the Network Manager to optimise the route network to allow airspace users to choose to fly the most efficient routes.
- Encourage ANSPs to service additional traffic where required, whilst sharing some of the additional revenue received with airspace users.

5.17 However, none of these objectives are explicit in the legislation and only the high-level objective in the Basic Regulation exists alongside the general statement made in the Performance Scheme Implementing Regulation of “improving performance in all areas” (390/2013 recital 13).

5.18 There is no incentive within the regulations to encourage airspace users to plan and fly the most efficient routes.

5.19 The following sections provide a view on whether the intended consequences have been achieved for each of the operational KPIs where incentives are included within the legislation.

**Capacity**

5.20 Performance varies broadly by state, with a number of ANSPs striving to match capacity to demand in the face of higher traffic than forecast, particularly in 2016. Examples include Hungary, and Maastricht. At the SES-wide level the provision of capacity has resulted in the Capacity KPI (Average Minutes Delay) failing to reach the performance target, with an upwards trend since 2013.
5.21 Additionally, delay generated by causes outside of the control of the ANSP according to the Implementing Regulation 391/2011 (Article 15) may be excluded from the calculation of delay for the purpose of incentives. This creates an inconsistency between the delay targeted by the incentives, and the EU wide and local delay targets set within the performance plans. It also creates the potential for an unintended behaviour where delay codes might be allocated to weather in cases where weather may not necessarily be the primary cause of the delay. This is discussed in paragraph 6.39.

5.22 Given the allowable delay exclusions from the incentive schemes and the fact that these exclusions have not been implemented consistently across the SES, it is difficult to confirm whether there is a direct causal relationship between incentives and any positive gains in the capacity KPI. It is not possible then to demonstrate that the change in the capacity KPI resulted directly from an incentive or penalty.

Potential positive impacts from incentives

5.23 There are some positive signs within the industry that incentives could support or encourage ANSPs to provide sufficient capacity. NATS for example, has had considerable decreases in delay in recent years, and was also one of only two ANSPs to have financial incentives on their provision of en-route capacity in RP1. NATS’s scheme is multi-layered and places emphasis on long delays which have the most impact on its airspace users.

Figure 5.2: En-route ATFM delay performance for NATS (2015 value is UK Ireland FAB)

5.24 NATS had nearly 5% of revenue at risk during RP1\(^{13}\), which is a much stronger incentive (or penalty) than the 1% currently permitted under the performance scheme. Evidence from the first year of RP2 is insufficient to confirm whether a causal relationship between the different incentive levels and an improvement in the capacity KPI exists.

5.25 ENAV was the other ANSP to have a financial incentive on its capacity target in RP1. During RP1, ENAV’s en-route delay per flight was highest in 2014 (0.19 minutes of en-route ATFM delay per flight), with considerably lower values for 2013 or 2012 (negligible in both years and <<0.01). This may be explained to some degree by the variations in traffic, a reduction of -2.4%

\(^{13}\) It should be noted that 5% of revenue of incentive was placed across a combination of different targets, not just average delay per flight.
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in both 2012 and 2013, before a +2.1% increase to 2014, but traffic levels in 2014 remained below those in 2012, when there was negligible delay.

5.26 In addition, NATS also had a traffic increase consistent with the STATFOR high traffic forecast in 2014 rather than the baseline forecast against which the performance plans, and therefore targets and incentive schemes, were set.

5.27 Both NATS and ENAV improved upon their performance targets for all years of RP1 (table below) by quite a considerable margin.

Table 5.1: Target and actual delay performance during RP1, ENAV and NATS

<table>
<thead>
<tr>
<th></th>
<th>2012 Target</th>
<th>2012 Actual</th>
<th>2013 Target</th>
<th>2013 Actual</th>
<th>2014 Target</th>
<th>2014 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENAV</td>
<td>0.140</td>
<td>0.000</td>
<td>0.140</td>
<td>0.003</td>
<td>0.120</td>
<td>0.019</td>
</tr>
<tr>
<td>NATS</td>
<td>0.218 (0.638)</td>
<td>0.072</td>
<td>0.263</td>
<td>0.125</td>
<td>0.263</td>
<td>0.058</td>
</tr>
</tbody>
</table>

Source: PRB dashboard

Figure 5.3: Traffic growth in 2014 compared to STATFOR forecasts

Source: STATFOR, Performance Review Report

5.28 Due to the limited use of incentive schemes for capacity in RP1, it is difficult to justify the improvements within the capacity KPI as being attributed (or partly attributed) to the use of incentives schemes.

Environment

5.29 There are no financial incentives set for ANSPs’ environmental performance in RP2, with the exception of NATS incentivising the 3Di metric.

5.30 However, 6 out of the 9 FABs, including UK-Ireland FAB, have non-financially incentivised environmental performance.

5.31 The EU-wide horizontal flight efficiency indicator for actual flown trajectory (KEA) was achieved in 2015, but not quite in 2016. From an en-route perspective, airspace users are able to fly routes very close to their preferred routes. This allows market forces to keep KEA performance at targeted levels, i.e. trade-offs between fuel, time/distance and route charges.
5.32 However, the last filed flight plan KEP target was not met and there is still evidence that airspace users are not necessarily planning to fly the shortest routes. This could be for a number of reasons: a lack of awareness that there is a shorter available route; planned deviations for operational reasons (i.e. to avoid an area with flow management restrictions or weather); or to minimise the overall cost index of the flight by planning to fly through an ANSPs airspace with a lower unit rate. ANSPs only have a degree of control over these factors, making well-designed incentive schemes difficult to construct. For example, the charging scheme already creates unintended consequences, such as the incentive to fly longer routes around higher cost airspace, as raised above and discussed further the section addressing unintended consequences.

5.33 NATS is the only ANSP with a financial incentive on their environmental performance, through their 3Di metric. The 3Di metric takes into account a broader range of flight inefficiencies than purely horizontal flight efficiency. In RP1, when 3Di was first incentivised, the target was achieved in the first two of the three years. The value of the metric improved by 2.5% over the three years compared to the target of 3.3%. However, it should be noted that the UK-Ireland FAB did not achieve their KEA target in 2015 (an actual value of 3.47% compared to a target value of 3.36%).

5.34 The evolution of the KEA KPI shows that performance in en-route flight efficiency is close to the targeted levels. There is still further room for improvement within a number of FABs, as demonstrated in the figure below, which would enable the KEA targets to be achieved.

\[ Figure\ 5.4:\ \text{Flight\ efficiency\ at\ national\ and\ FAB\ level\ for\ actual\ and\ planned\ routes\ (2015)}\]

Source: Network Manager, PRU analysis

5.35 In addition to the targets set under the performance scheme, there have been advances in the implementation of operational procedures and technical systems to support more direct routing. Free route airspace is being implemented under the Pilot Common Project, and this is enabling more flights to plan and fly direct routings, hence supporting further gains in flight efficiency.
In summary, due to the limited introduction of environmental financial incentives it is difficult to come to any firm conclusion as to whether the intended consequences of incentive schemes have occurred within this KPA. The impact of non-financial incentives is also difficult to analyse, considering there is only a single data point for each FAB.

**Unintended consequences**

**Description of unintended consequences concept**

Unintended consequences can occur when a policy is designed to achieve a particular result or change in behaviour, but the design is such that it generates incentives that were not expected when it was introduced. Such consequences are a matter of concern where they lead to negative outcomes or additional costs.

A number of possible unintended consequences of the incentive schemes in the current performance and charging implementing regulations are described below. The evidence for these is limited, and the following sections therefore draw on anecdotal evidence and a priori assessments of the potential behaviours that the regulations may encourage.

**Attribution of delay codes**

The charging scheme Regulation (Article 15 g, 391/2011) states that “target levels of performance may be adjusted to cover only delay causes related to ATC capacity, ATC routing, ATC staffing, ATC equipment, airspace management and special event with the codes C, R, S, T, M and P of the ATFCM user manual”. Additionally, therefore, weather-related delays and other delays outside of the control of the ANSP can be removed from the delays contributing to the adjusted target to base incentives upon.

This may be creating a problem with fault attribution and an opportunity for delays to be attributed to an excluded code, rather than the primary delay cause, as this does not count towards the achievement of the incentive. However, the identification of specific evidence for such behaviour is difficult.

At the network level, observations can be made about the level of weather-related delays. In 2016 these increased by +55.4%, continuing an increasing trend between 2013 and 2015. They are similar in value to those observed in 2010, where unusually harsh snow and freezing conditions resulted in high delays. We understand, however, that in 2016 weather-related delays have been more concentrated in the summer months.
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Figure 5.5: En-route delay per flight by classification 2010-2015

Figure 5.6: En-route delay per flight by classification, 2016 vs 2015

5.42 The Network Manager has suggested that weather-related causes of delay were genuine and that there is no evidence of delay codes being misallocated intentionally. However, other commentators have questioned this view, suggesting that the issue should be investigated.
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We note that the seasonal pattern of the recent weather-related delays appears to be different from that recorded in 2010.

5.43 Whilst weather delays are increasing between 2013 and 2015 – and further in 2016 - so are other major sources of delay, namely ER Capacity, ER Staffing and ER special events.

5.44 PRR 2016 noted that Maastricht and airspace, operated by DFS, generated more than half of all weather-related ATFM delay in Europe in 2016 and that this correlated with SIGMETs\(^{14}\) (Significant Meteorological information), suggesting that adverse weather conditions were present on these days in the regions generating the delay and that the delay-coding was correctly attributed.

5.45 It is again difficult to prove a causal link between the weather conditions, delay and the allocation of delay codes. However, we have not found any evidence to suggest systematic misallocation of delay codes.

Refusal to serve additional traffic

5.46 When there is a disruption in one area – for whatever reason – ANSPs in the surrounding areas may be asked by the Network Manager to service additional flights. This brief increase in traffic, often unplanned, is not taken into account by the ANSP, and may generate an increased level of delay (while decreasing the total delay generated by the disruption at network level). Since ANSPs are incentivised for providing sufficient capacity to meet, and improve upon, the target KPI, additional delays created through the re-routing could reduce a bonus (or increase a penalty) for an ANSP being requested to service more flights.

5.47 Therefore, it was raised during the consultations that an ANSP may be unwilling to take the additional traffic because the additional delay would count towards their delay target and effect their eligibility for the incentives based on delay performance.

5.48 The Network Manager suggested that this is not an issue, and that ANSPs are willing to accept additional flights and work for the greater good of the network.

5.49 Additionally, a mechanism to reassign delay from to the primary cause and ANSP is/was available, known as the “post-ops adjustment”. This was noted by the Network Manager during our consultation discussions and was also highlighted in the RP3 options paper delivered to the SSC. The Network Manager suggested that this is no longer used, however other stakeholders have provided mixed feedback regarding whether this process is/was known and whether it is still in operation.

5.50 Within the SSC options paper, a suggestion was made that would remove this possible unexpected consequence, whereby in RP3 there would be a central delay allowance managed by the Network Manager. This would mean that that when an ANSP was asked to take additional traffic for the benefit of the network, any additional delay generated would not contribute towards the delay targets. Instead the delay would be assigned to the central delay allowance.

5.51 We foresee that a number of issues must be investigated before considering such a change in approach:

\(^{14}\) Information advisories informing aircraft of adverse weather such as severe icing, severe turbulence, thunderstorms etc.
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• How is the amount (of the allowance) agreed and managed?
• What are the criteria for deciding whether the allowance should be used and how much?
• What happens once the annual allowance is used up?
• It could potentially mask the real magnitude of the delay generated by the primary cause/ANSP. Careful monitoring would be required to ensure that primary causes of delay are measured and identified to enable them to be addressed, or prevented in the future.
• Awareness of the possibility in generating further unintended consequences.

5.52 The impact of such an measure on ANSPs must be considered. Extracting a proportion of the overall delay target for the Network Manager to allocate will naturally lead to more stringent delay targets for each ANSP. This could potentially penalise ANSPs that have no need to use the facility.

5.53 Furthermore, moderating the contribution from states, for example by taking account of the historical need for such a system could be an option. However, this could potentially be considered as a proxy for reallocating delay codes to the ANSP creating the disruption. Additionally, given that any adjustment will be based on some historical measure it will not necessarily be reflective of the real needs in any given year.

De-incentivising investment

5.54 Traffic levels - at least for many European ANSPs up to 2015 - have remained below the level experienced at the peak in 2008, and the en-route ATFM delay KPI is approximately half of the value experienced in 2008-2010 (then 1.41 and 0.73 in 2015). Despite the exponential relationship between a lack of capacity and delay, this reduction is greater than that of traffic, and is a notable achievement of the industry. However, a possible unexpected consequence of the incentives may have been the hampering of further capacity improvements.

5.55 The design of the incentive schemes could potentially incentivise ANSPs to only just exceed their capacity targets (or lower deadband thresholds) and not to go further than necessary. For example, if an ANSP has the capability to achieve a much lower delay than the target in a given year, it may instead spread the delivery of this much lower delay over several years in order to receive as great a total revenue from incentives as possible for good performance (a bonus in several years rather than just in one).

5.56 Additionally, since ANSPs are incentivised to provide sufficient capacity to reach their delay targets, incentivisation could be seen as a potential factor limiting investment in the provision of capacity in the longer-term. This may occur because if an ANSP has already demonstrated the ability to deliver zero or minimal delay during an RP, their subsequent targets for the following RP are likely to be very low. Therefore, to avoid low targets in order to have the best chance of accessing as much incentive as possible, ANSPs may be encouraged to 'do the minimum' or stall investment. However, if the ANSP is genuinely capacity constrained and is able undertake planned investments to provide sufficient capacity to hit the target then this can be considered an optimal balance between cost and capacity. The issue may then lie within the target setting process since, as long as the targets are being achieved, there should be no issues, but, from a perspective of trying to provide the best service as soon as possible, or if there is latent capacity not being used whilst still generating delay, then this is not cost effective.

5.57 Therefore, this operationally-focussed incentive could be complemented by a different regime of capital investment triggers or additional monitoring to address the need for significant
5.58 As with a number of the unexpected consequences, no clear evidence has been found to show this has been occurring.

**Shielding**

5.59 The regulations and the PRB’s comments on the incentives schemes introduced by the FABs require that there is a link between FAB performance and local performance. This is both in the sense that FAB targets and local reference values ought to be aligned, and also that unless FAB targets are achieved no bonuses can be awarded irrespective of performance at the local level. In this sense, the incentives foster a high level of performance. However, we observe that in some situations the reverse may be true. In FABs where the FAB target is achieved, some ANSPs which may be underperforming are shielded from penalties, as no penalties can be applied on the basis of overall FAB performance. This may occur particularly in FABs where larger states contribute more than smaller ones, meaning that the smaller ones may be shielded.

5.60 There is no evidence of ANSPs in such a situation in 2015 becoming “complacent” and not still trying to minimise delay, even if they were not able to achieve their target. Nevertheless, it is the case that in FABCE, for example, Croatia Control was not penalised for not having met its local target, as overall FAB performance was achieved. We note that the reverse is true for DFS in FABEC.

**The impact of higher than forecast traffic on delay**

5.61 The measure of capacity (output based) penalises those ANSPs that provide a greater input (actual capacity) than planned, but created a greater level of delay than planned because of higher than expected traffic levels.

5.62 During the ex-post analysis of RP1, stakeholders raised this very point. The KPI for capacity, average en-route ATFM delay per flight is an output measure. The targets within the performance scheme do not take account of the actual conditions under which the KPI evolves. For example, an ANSP could service significantly more traffic than planned, and create marginally higher delay per flight therefore not hitting their capacity targets, yet will have provided more actual capacity than was planned.

5.63 This was certainly the case for Hungarocontrol in 2015, whilst Romania and Bulgaria were able to manage significantly more traffic than planned because a shift in the traffic flow in the south-east axis whilst still achieving their delay targets.

5.64 The consultation with stakeholders also noted that the deadband within the incentives for the capacity KPI also creates a secondary target. Where the primary target has been missed, operational staff are still determined for the KPI value to remain within the deadband – perceived as acceptable deviation from the target resulting in neither bonuses or penalties – and hence resulting in better level of service than may have otherwise been achieved. On the other hand, while deadbands protect the ANSP from variability, they do not provide an incentive to improve from the upper to the lower bound of delay.

5.65 We are investigating other examples of this behaviour and also where ANSPs have lower than forecast traffic and received a bonus for achieving their target.
5.66 Flight planning options

The charging Regulation 391/2013 states that charges for ANS are based "according to the latest known flight plan filed by the aircraft concerned for air traffic flow purposes". This change from the previous methodology was to improve cost-relatedness, i.e. the revenue is received by the ANSP providing the service. However, basing the charges on the last filed flight plan has resulted in unintended consequences.

Airspace users can file a longer flight plan around the higher charge zone and then request a new flight path once airborne, taking them on the more direct route but whilst still paying the charges associated with the lower-cost flight plan. This creates a number of issues:

- It reduces cost-relatedness, as the ANSP providing the service does not receive the revenue.
- It reduces predictability:
  - For the ANSPs involved - more challenging to provide the 'right' level of capacity - should they provide capacity for the planned level of traffic or for what they expect based on general flows of traffic? Demand-capacity balancing is a delicate act where planning too much capacity is not cost effective, but too little can cause delays, thereby impacting on the capacity KPI and the potential for ANSPs to receive bonuses.
  - For the wider air transport community - predictability is not only important for airline networks, but also for airports and others involved in the aircraft turnaround process.
  - For newer concepts under SESAR - the concept of SESAR is based on predictable business trajectories - extending the horizon of what radar and local tools allow controllers to manage – i.e. local conflicts and congestion - to include more complex traffic flow issues further ahead. But this will only be possible in a highly predictable environment.
  - For citizens - aircraft arriving in the terminal area of the destination airport earlier than planned can disrupt traffic flows and be asked to enter a holding pattern, or require additional vectoring to fit into the arrival sequence. Inefficiencies at low altitude create additional fuel burn and emissions.

5.67 The SSC options paper highlights a number of options to potentially resolve the shortcomings of the existing legislation.

- Based on actual route - would improve cost relatedness, but may encourage airlines to actually fly the longer routes rather than simply planning them.
- Route independent charging - reduces cost relatedness, but would remove the incentive for airlines to fly longer or plan longer routes. The complexity of the charging mechanism would be increased as the revenue will need to be distributed as per the actual route flown. So ANSPs may receive less revenue than they might anticipate as the charges would be calculated based on the shortest route, adding uncertainty to ANSP revenues.
- Allowing temporary financial compensation for traffic shifts. This would certainly reduce cost-relatedness in the short term, but more importantly must also avoid double charging of airspace users.
- Common unit rates for regions or split of charging zones between upper and lower airspace. This may limit some impacts of charges on route design and utilisation, but may be complex to implement and therefore may be outside of the scope of RP3.
Impact of incentives on safety

5.69 The performance targets for the safety KPA are as follows:

- Safety
  - level of effectiveness of safety management: local targets for each year of the reference period;
  - application of the severity classification based on the Risk Analysis Tool (RAT) methodology: local targets for each year of the reference period (percentage);
  - just culture: local targets for the last year of the reference period.

5.70 Local performance plans (i.e. at FAB level) are required to follow a standard template to reflect the above targets and ANSP incentive schemes are set locally against these.

5.71 It is not clear from review of existing reporting that the incentives have resulted in direct or deliberate neglect of safety. No stakeholders interviewed for the study identified or observed an impact on safety as a result of the introduction of the capacity incentives. However, it is possible that unintended consequences could occur due to the current design of performance indicators. Since there is a limited interdependence between the KPAs and their performance targets, local incentive schemes have tended to be set-up to reflect a similar limited interdependence. In some cases, certain incentives may be set to meet performance targets within one KPA and so in these cases it may be difficult to see the impact on all KPAs. It is difficult to identify if there have been any impacts on Safety from targeting the other KPAs.

5.72 Incentives that are driven to focus on targets within one or two KPAs could have a negative impact on the other KPAs. For example, focus may be to improve airspace design to reflect traffic (capacity KPA) and environmental/noise (environment KPA) demand, with little consideration of the safety KPA. However, senior managers may independently claim an improvement in safety on the basis of improved workload and reduced complexity in normal operations through the new airspace design without initial consideration of the introduced risk that the change may introduce (i.e. risk where there is possible error in the changed operation). In such a circumstance, any introduced risk through the airspace change would be assumed to be addressed through change management process. In practice, there is a lack of evidence that an appropriate change management process is followed before claiming that safety levels have been maintained through the change.

5.73 It is unclear how ANSPs should set incentives to ensure a balanced operational focus to meet the performance targets. This is partially due to fact that the KPAs and associated targets, in themselves, are not integrated. For example, there could be a need to locally identify where there needs to be increase in capacity to meet demand, whilst taking account of local operational, environmental and safety issues such as conflict points and physical boundaries (e.g. airspace boundaries or restrictions due to GA or military operations). Incentives need to allow senior operational managers to focus on key areas of the operation to ensure the appropriate balance of capacity in meeting demands in traffic. This could be to work with other airspace users to increase available airspace when needed and to avoid periods of under-capacity when demand is lower, or to improve conflict points or reduce communication workload through new technology.

5.74 To address this balance, targets need to be more integrated around the notion that the indicators should enable demonstration of how capacity (existing capacity KPA) is meeting
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Traffic and environmental demand (existing capacity and environment KPAs) safely (safety KPA), securely and efficiently (cost-efficiency KPA). For example:

5.75 Traffic demand has increased, for a particular FAB, to the extent that there are often traffic peaks and resulting delays. There is a need to re-design the airspace at FAB level to ensure optimal routes based on PBN, FuA and FRA. The workload is improved in normal operations based on improved situational awareness and removal of conflict points. However, certain routes will need to be adjusted to ensure areas of outstanding natural beauty and urban areas are avoided, which can reduce the improved safety margin and affect the capacity and delay improvements. Additionally, as traffic increases due to the overall improvements, the improved safety margin is reduced even further. Improved route conformance due to PBN could incentivise the FAB to reduce the standard separation between aircraft, which could require conformance monitoring technology in certain complex airspace to maintain the safety margin.

5.76 It can be seen from this example that there is an inter-relationship between all the RP2 KPAs of safety, capacity, environment and cost efficiency. The figure below demonstrates this balancing to meet traffic and environmental demand, whilst accounting for safety and cost efficiency performance.

Figure 5.7: Example of balancing capacity with demand

5.77 Similar examples could be drawn for other local considerations, such as the interaction of airspace with military, GA and RPAS operations. Incentives need to be designed around integrated performance indicators and targets to address real local issues.

Conclusions

5.78 In 2016, for the SES area, the en route ATFM delay per flight increased from 0.76 minutes per flight in 2015 to 0.91 minutes per flight, a degradation of nearly 20%. This performance must be considered alongside traffic growth, which whilst in line with the STATFOR forecast at the SES level, there were considerable variations in traffic growth at state/ANSP level.

\[\text{The PRB White Paper, Version 3.6, 6th June 2016, states that the PRB believes security should be added to the Safety KPA as a key risk issue which requires the development of indicators, reporting measures and target profiles.}\]
5.79 All forms of delay increased in 2016, however a +55% increase in weather causes coded delay is noteworthy.

5.80 The lack of specific objectives makes it difficult to assess the intended consequences, however at a headline rate the worsening of delays and the fact that a number of FABs did not meet their targets should be considered. Moreover, a number of stakeholders have identified that the incentives had a minimal impact on changing behaviours.

5.81 During discussions with stakeholders a number of potential unintended consequences of the incentives, including delay attribution, potential to refuse access to traffic, de-incentivising investment and shielding have been raised. However, apart from shielding, the evidence is not strong to demonstrate these consequences have occurred in a material way.

5.82 For the Environment KPA, apart from the UK’s 3DI measure no financial incentives have been introduced. 6 of the 9 FABs have introduced non-financial incentives. There is limited evidence of intended or unintended consequences from introducing incentives to this KPA. Moreover, it is recognised that both ANSP and airspace users’ behaviours influence the measurement of KEA and KEP measures of horizontal flight efficiency.

5.83 There is no evidence, and no comments have been raised by stakeholders about an impact on safety from the introduction of the incentives.
6 Findings, best practise and guidance (RP2)

Introduction

6.1 This section covers our findings in response to the questions on the current situation that are provided in the task specification and summarises best practice of implementing RP2 incentives and potential areas where guidance materials might be developed to improve current implementation. It draws upon data collected as well as opinions expressed during the stakeholder consultation.

6.2 The task specification required:

Define best practices/guidance and measurable criteria for incentive schemes.

Questions on current situation - answers

6.3 Our answers to the questions, based on the findings emerging from our review of the incentive schemes and their implementation in 2015 and stakeholders’ views, are below.

Financial/economic questions

Q4: Did the establishment of incentive schemes encourage actors to continuously improve or did they encourage actors to lower expectations to obtain better rewards?

6.4 ANSPs and staff representatives state that their approach to delivering a service has not been influenced by the presence of the incentive schemes. Both ANSPs and staff view their role as one of supporting smooth operations, particularly through coordination with the Network Manager, and facilitating growth through problem-solving constraints. Reputational impact of underperformance is seen as a key motivator by ANSPs, staff and some NSAs, particularly when coupled with the opportunity to benefit from attracting more traffic.

6.5 In the case of Hungary, for example, the incentive scheme was described as using a target (0.03 mins delay/flight) that was not in line with historical performance (0.00 mins delay/flight) in order to set a practical target value and satisfy the symmetry requirement. In this sense, the scheme provided a lower expectation, although the ANSP would stress that its aim to achieve no delay remain unchanged (outturn delay for 2015 was in fact increased, as a result of much increased traffic).
Q5: Has there been evidence of other unintended consequences or “gaming” behaviours?

6.6 From a financial perspective, the design of the schemes may allow for gaming behaviours, particularly at very low levels of delay, were small deviations can lead to comparatively big financial impacts.

6.7 In Bulgaria, for example, actual en-route performance achieved was 0.01 min delay/flight in 2015, which was lower than the 0.02-0.05 min delay/flight deadband. Outturn performance was attributed to reasons characterised as exceptional events (including weather), so the bonus was applied based on an achieved value of 0.00 min delay/flight, which effectively doubled its value. The PRB did not agree with the application of this bonus and recommended that the bonus should be calculated on outturn performance without the adjustments included.

6.8 As described in the previous section, in FABs where the FAB target is achieved, some ANSPs which may be underperforming are shielded from penalties, as no penalties can be applied on the basis of overall FAB performance. This may occur particularly in FABs where larger states contribute more than smaller ones, meaning that the smaller ones may be shielded.

6.9 There is no evidence of ANSPs in such a situation in 2015 becoming “complacent” and not still trying to minimise delay, even if they were not able to achieve their target. Nevertheless, it is the case that in FABCE, for example, Croatia Control was not penalised for not having met its local target, as overall FAB performance was achieved. We note that the reverse is true for DFS in FABEC.

6.10 Airspace users highlighted the opportunity for gaming in the interaction between the capacity and cost-efficiency KPAs. They highlighted the example of Italy, where lower-than-forecast traffic meant that the cost-efficiency targets were not achieved, yet a bonus was granted for good capacity performance despite the lower traffic throughput. We also note that the reverse also holds true, where ANSPs stand to gain as much as 4.4% through the traffic risk sharing mechanism whilst they risk losing a maximum of 1% if they miss their capacity target as a result of the increased traffic. We have not identified any evidence that this has been actively pursued by ANSPs.

Q6: What have been the advantages/disadvantages of making financial incentives mandatory?

6.11 Advantages of the mandatory financial incentives include:

- Improved focus on capacity in RP2, compared to RP1, as observed by the PRU; and
- Adoption of a performance culture and entrepreneurial approach in ANSPs.

6.12 Disadvantages of the mandatory financial incentives include:

- The current requirement for symmetry does not work at a local level where delay is close to or equal to zero;
- The degree of variability in the schemes applicable across the SES is seen adding undue complexity at system level, particularly where the local situation did not necessarily warrant the use of incentives; and
- The administrative burden created by having to introduce and monitor schemes in all States, even where no capacity issues were present.
Q9: By setting the financial bonus/penalty at maximum 1% of the revenues are the incentives for the operational KPIs sufficiently “high-powered” to encourage high performance? If not, what would be a more appropriate threshold?

6.13 Stakeholders provided mixed views on whether the 1% revenue cap provides a sufficiently high-powered incentive to drive performance. In general, there was agreement amongst ANSPs and NSAs that 1% was not sufficient to incentivise a step-change in capacity through investment in infrastructure, technology or processes. It was, however, seen as sufficient in fostering a performance culture and commercial, entrepreneurial attitudes and behaviours at ANSPs, particularly if these were linked into individual targets for management. NATS pointed out that 1% represents a large proportion of shareholder return (c. 25% in RP2).

6.14 On the other hand, airspace users would like the cap to be as low as possible, since they see bonuses as double-paying for capacity that has already planned to be delivered. Some FABs adopted caps lower than 1% after consultation with airspace users as a result.

6.15 The size of the cap will depend on what the focus of the incentive schemes is:
- Operational: stakeholders suggested that a higher cap would be required;
- Investment/capex: stakeholders indicated that investments which would support a step-change in capacity might be in the order of 5%-10% of annual revenues;
- Cultural: stakeholders suggested that the 1% cap is sufficient to influence behaviours at this level.

Q10: What is the most appropriate methodology for calculating the 1% revenue threshold?

6.16 As also highlighted by stakeholders, we observe that using the chargeable unit rate (CUR) in 2015 times the actual TSUs to calculate the ATSP revenues has the potential effect of compounding bonuses and penalties, where the CUR already includes an incentive adjustment from year n-2. Other adjustments are also included in the CUR, which may mean it is not the most appropriate basis for this calculation.

6.17 The Determined Unit Cost (DUC) could be used for this calculation, however this would not include any adjustments, so would not provide an appropriate result for eligible ANSP revenues. For instance, we would suggest that starting from the DUC, the following adjustments should be included:
- The VFR exempt adjustment;
- The other revenues adjustment;
- The inflation adjustment; and
- The traffic adjustment resulting from the difference in traffic for costs not subject to traffic risk sharing.
- However, any bonus or penalty should not interact with the other adjustments charged in the unit rate from activity in previous years (i.e. the traffic-risk sharing adjustment and the bonus/penalty adjustment).

Q12: Were other incentive mechanisms used by individual ANSPs

6.18 The UK was the only State to apply more detailed (lower level) KPIs than average ATFM delay. Further incentives for the UK:
- Impact Score (C3) - placing greater weight on long delays and departures in the morning and the evening peaks. This has 50% of the total capacity penalty and 75% of the bonus. For this incentive, bonuses will only be paid if the FAB as a whole is also meeting the FAB-
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wide target and penalties will only be paid if the FAB as a whole is achieving a C1 delay worse than the FAB-wide target.

- Daily Excess Delay Score (C4) - based on weighted delays exceeding pre-determined thresholds on a daily basis. No bonuses would be applicable for this (the maximum bonus for the other two incentives for the UK would however still sum to 1%), recognising that failure against this measure relates to exceptional events and a reasonable user expectation of such events is likely to be zero. The CAA considered linking the incentive to FAB performance but decided not to do so because from a user perspective, the purpose of this metric is to capture particularly bad days even where the ANSP is performing relatively well for the year as a whole.

6.19 The UK was also the only State to apply a financial incentive on the environment KPA using an additional environment indicator (3Di metric, based on a linear regression model incorporating flight path inefficiencies in the vertical plane as well as horizontal). The 3Di metric provides an objective measure to which financial incentives can be attached.

Operational questions

Q1: Has safety been adversely affected through the pursuit of financial incentives?

6.20 It is not clear from review of existing reporting that the incentives have resulted in direct or deliberate neglect of safety. However, it is possible that unintended consequences could occur due to the current set-up of performance indicators. Since there is a limited interdependence between the KPAs and their performance targets, local incentive schemes have tended to be set-up to reflect a similar limited interdependence. In some cases, certain incentives may be set to meet performance targets within one KPA and so in these cases it may be difficult to see the impact on all KPAs. It is difficult to identify if there have been any impacts on safety from targeting the other KPAs.

6.21 Stakeholders did not identify any impacts on safety as a result of the financial incentives on capacity.

Q2: Have incentive schemes encouraged or discouraged collaborative behaviour among ANSPs and between the ANSPs/NM?

6.22 Stakeholders provided a range of views on whether incentives schemes have encouraged collaboration amongst ANSPs and between them and the Network Manager:

- Some suggested that there has been no impact and that the good level of collaboration across the system has been maintained irrespective of the introduction of the incentives; while
- Others indicated that there may have been a small impact (given the good existing levels of collaboration) at FAB-level where FAB targets are in place, so ANSPs have been driven to collaborate even more closely in order to achieve the FAB target trigger.

6.23 In some cases, however, even within FABs, the geographical arrangements render the potential impact of the incentives on collaboration irrelevant, for example, Italy (BlueMed) is impacted much more by Switzerland (FABEC) than by Cyprus (also BlueMed).

Q3: To what extent have incentive schemes affected pre-planned improvements to ATC capacity?

6.24 Although there exists potential for the incentives to impact on pre-planned improvements to ATC capacity through investment – either by prolonging/extending the period over which
improvements may be delivered in order to benefit from a bonus over several years; or by not demonstrating full capability in order to avoid more stringent future targets in the next reference period – our analysis has not found evidence of this occurring in the first years of RP2.

Q5: Has there been evidence of other unintended consequences or “gaming” behaviours?

6.25 At an operational level, our analysis indicates that there is no systematic evidence of gaming behaviours occurring on either of the following key aspects:

- **Attribution of delay causes, particularly weather** – although in 2016 weather delays increased by 55.4%, continuing an increasing trend between 2013 and 2015. These weather-related delays are similar in value to those observed in 2010, where unusually harsh snow and freezing conditions resulted in high delays. Discussions with the Network Manager suggested that it believes that weather delay reasons were genuine and that there was no evidence of delay codes being misallocated intentionally. However, this should be investigated further as a potential issue. We note that the seasonality of the recent weather-related delays appears to be different from the causes recorded in 2010.

- **Refusal of flights to protect performance** – none of the stakeholders consulted, including ANSPs, NSAs, staff representatives and the Network Manager, indicated that this has been a material issue.

Q7: Was a ‘high level of service’ simply ‘business as usual’ or was it linked to financial incentives?

6.26 See also responses to Q4 and Q6 – many stakeholders do not see that the incentives have impacted business as usual, but some do acknowledge that the financial incentives have offered an improved focus compared to RP1 and encouraged a performance culture within ANSPs.

Q8: Were the incentive schemes applied as described in the Performance Plans?

6.27 Yes - Despite issues with FAB-level compliance, at the local level, the application of the incentives resulting from performance in 2015 has been in accordance to the national incentive schemes.

Q11: How are FAB-wide and ANSP-wide incentives translated into individual behaviours? Is there risk associated with operational staff having personal financial incentives when making safety critical decisions?

6.28 As highlighted by some stakeholders, the introduction of the incentives has fostered a performance culture and commercial, entrepreneurial attitudes and behaviours at ANSPs. There are no examples where financial incentives are linked to individual ATCOs’ performance, however, there are cases where the targets and remuneration of management have been associated with the FAB and local incentive mechanisms.

6.29 In a different example, the introduction of the incentive scheme in Hungary, which included a deadband, was considered to have driven improved performance than might otherwise have been achieved. Despite being unable to achieve its target, as a result of increased traffic, the upper bound of the deadband was perceived as an agreeable secondary target (known to the NSA and airspace users), which was acceptable to remain below. This encouraged operational-level behaviours aimed at not generating additional delay by becoming more “creative” in the management of the airspace.
Identifying best practice and areas for guidance

6.30 In this section we describe aspects of the incentive schemes on capacity that have been implemented in RP2 which are considered to be best practice. We then identify areas where guidance would be useful under the existing regime. The description and implementation of the incentive schemes for environment is not sufficiently well detailed for best practice to be identified.

Best practice

6.31 As described in the legislative review section, the objectives of the performance and charging regulations with respect to the incentives are not well-defined, but are simply covered by the high level aims to support improvements in performance. As such, it is not straightforward to assess best practice. The impression for the majority of cases is that incentives are there because States/FABs are required by the regulation to have them. A number of them (e.g. Baltic FAB) are very clear about this in their PPs, referencing the regulations in the PP template’s "justification" box. No FABs/States refer to a means of determining whether an incentive has met its objective, although arguably the unsaid objective is meeting the FAB targets.

6.32 The Performance Plan templates do not include a requirement to state the "objective" of the incentive which does not encourage States/FABs to think about this. Many FABs/States (e.g. Blue Med) state that the objective is "continuous improvement" (or similar) which is not specific. Even DK-SE FAB, the only FAB to have no PRB comments on its incentive scheme, does not state any objective.

6.33 Based on our review of the incentives schemes for RP2 we can highlight the following aspects of best practice:

- **Consultation with airspace users**: Incentive schemes should be designed to comply with regulatory requirements, but should also take into account the spirit of the performance scheme and the views of airspace users. For example, the revenue cap used in the Baltic FAB scheme was agreed after consultation with airspace users.

- **Relating the value of the bonus to the cost of delay and the level of over-performance compared to target**: In principle, this approach would provide a mechanism for sharing the benefits of improved performance with the airspace users for amounts under the revenue cap (1%), avoiding airspace users being charged through the unit rate in n+2 for more than the benefits they realised. For example, the way the bonus is calculated in Italy shares equally the benefit derived from the over-performance with airspace users (bonus = (target delay – actual delay)*(cost of delay)/2 or 1% of ANSP revenues, whichever is lowest). However, it does not necessarily follow that penalties should be shared in the same way.

- **Adoption of deadbands**: There exists inevitable variability around the average targets and reference values that apply at FAB and local levels. The use of deadbands allows for this and avoids undue focus on precisely achieving the target, as well as avoiding the perception that ANSPs or airspace users are being “penalised” for immaterial deviations from the target or rounding. The shape of the deadband also provides flexibility for differentially rewarding or penalising significant improvement and deterioration – for example the scheme in Denmark-Sweden FAB uses a wide deadband, while UK-Ireland FAB uses a -20%/+10% from the par value deadband. As noted previously, stakeholders highlighted that the deadband also creates a secondary target – for example perceived as
acceptable deviation in a higher-than-forecast traffic situation, where the main target is no longer achievable. Operational staff are still determined for the actual value to remain within the deadband, hence resulting in better level of service than may have otherwise been achieved.

- **Not providing a bonus in cases where the local reference value is 0.00 mins delay/flight:** The regulatory requirement for symmetry in the incentive schemes breaks down in cases where the local reference value is 0.00 mins delay/flight, as further improvement is not possible. Simply rewarding the achievement of the target/reference value, rather than efforts to outperform it, is not welcome by stakeholders (for example Romania).

- **Not adopting an artificial local target higher than the reference value where the reference value is close to or equal to 0.00 mins delay/flight:** Linked to the point above. In order to facilitate a symmetrical scheme where both bonuses and penalties are available, local targets and deadbands may be designed using values that are higher than the reference local value if this is effectively 0.00 mins delay/flight.

- **FABEC Financial and Performance Committee (FPC) for validating the allocation of delay:** The PRB commented on a number of schemes that they may be subject to gaming (e.g. BlueMed), given that it is not possible to validate the data used. It welcomed the processes set up in FABEC for the validation of delay coding and allocation.

- **Lower-level KPIs targeting specific events or issues:** The approach used in the UK, which alongside the annual average UK-Ireland FAB target also uses local KPIs that focus on extreme delays, which have significant impacts on airspace users is particularly welcomed by them.

- **Correct delay attribution:** The accurate attribution of delay to the route cause and/or generating ANSP or party is seen as key by stakeholders. For example delays caused by strikes in neighbouring states, or resulting from A-CDM coordination. The post operational delay adjustment facilitated by the Network Manager was welcomed by stakeholders in principle (the process itself could be improved in practice).

**Guidance**

6.34 As illustrated by our review of the incentive schemes in the performance plans and their implementation in 2015, there is a great degree of variability between FABs/States and there are a number of areas where interpretations of the regulations differ between FABs/States and between these and the PRB. There is opportunity then, under the existing regime, to provide guidance which would help improve the coherence of the schemes across the SES, as well as their compliance with the regulatory requirements. Stakeholders would welcome guidance on the following key aspects:

- **Guidance on setting of FAB targets and local reference values:** The process for deriving FAB targets and the corresponding local reference values is not well-understood. It also follows that the relationship between FAB targets and local reference values is not well-understood. The absence of a link in the incentive schemes between local and FAB performance was one of the PRB’s predominant comments. Guidance to support improved understanding in this area could help address the issues highlighted by the PRB.

- **Guidance on the transformation of FAB targets (all causes) and local reference values (all causes) to corresponding values for the in-scope causes, for cases where certain delay causes are excluded from the incentive scheme:** Delay causes deemed to be outside the direct control of the ANSPs are allowed to be excluded from their incentive scheme. This effectively provides alternative target values, as far as the financial incentives are concerned. Guidance could clarify the approach to be used in the transformation of the
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target and reference values (all causes) derived by the Network Manager and those used in the incentive schemes where certain causes are excluded. This would also support improved understanding of how the incentive scheme values contribute to overall local and FAB performance (see previous point). Related to this, the approach to aligning operational (ACC-level) data and regulatory (FIR-level) data could also benefit from clarification, according to stakeholders.

- **Guidance on symmetry:** As also noted above, the regulatory requirement for symmetry in the incentive schemes breaks down in cases where the local reference value is 0.00 mins delay/flight, as further improvement is not possible. Guidance on the approach to be used in such cases would help clarify the approach that NSAs/ANSPs should adopt.

- **Guidance on the requirement for incentives for terminal:** Differing interpretations of whether capacity incentives are mandatory for terminal have emerged. The Commission’s comments in the letters for the compliance review of the 2017 unit rates suggest that a terminal incentive scheme should be provided. Guidance to reinforce this would help make the requirement clear.

- **Guidance for the expected processes for delay allocation validation:** As also noted above, the PRB commented on a number of schemes that may be subject to gaming (e.g. BlueMed), given that it is not possible to validate the data used. It welcomed the processes set up in FABEC for the validation of delay coding and allocation. Guidance which defines approaches for the robust validation of delay coding and allocation would support other FABs in adopting equivalent processes.

- **Guidance on applicable revenues:** Our review of the implementation of the incentives schemes in 2015 highlighted that in three cases the revenues used were not limited to the ATSP, but included other service providers and/or NSA revenues. As also highlighted by stakeholders, we observe that using the chargeable unit rate (CUR) in 2015 times the actual TSUs to calculate the ATSP revenues has the potential effect of compounding bonuses and penalties, where the CUR already includes an incentive adjustment from year n-2. Other adjustments are also included in the CUR, which may mean it is not the most appropriate basis for this calculation.

- **Guidance on indicative schemes to apply:** While the flexibility to focus at a local level is welcomed by stakeholders, the degree of variability in the schemes applicable across the SES is seen adding undue complexity at system level. Further the economic expertise and experience available at ANSPs and NSAs also varies. Some stakeholders would welcome guidance that describes a small number of “template” schemes that could be picked from (and perhaps adapted) to apply at local level.
7 Evaluation criteria and a long list of ideas for consideration

Introduction

7.1 In this section, we describe the evaluation criteria we will use for assessing future incentive regimes for Reference Period 3 before going on to outline a long list of ideas for incentives in RP3. These ideas reflect the experience of implementation during RP2, and the range of ideas proposed by stakeholders during consultation, including at the workshops attended on 21 June 2017. We highlight particular advantages and disadvantages of the schemes in relation to the evaluation criteria described below, but do not express any recommendations or preferences. In the next chapter we develop a short list of measures and further develop the analysis and provide recommendations.

7.2 The mutually exclusive measures to be taken forward to the short-list combine a number of the ideas presented in this section.

7.3 The task specification required:

[...] develop a range of pragmatic [measures] for RP3 that consider the questions raised, with a qualitative and quantitative (where possible) assessment of the pros and cons of implementing such schemes. The proposals should consider the expected behaviours at national / FAB and network level and should be consistent with the overall objectives of the SES performance scheme. Finally, this phase should provide specific recommendations on any additional data to be collected and any legislative changes needed to effectively implement the desirable [measure].

Evaluation criteria for assessing incentive regimes in RP3

7.4 In developing evaluation criteria to be used for incentive regimes in RP3 we have drawn upon a previous study conducted for the Commission, legislative requirements and feedback from experience in RP2 and from the Commission.
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Previous study for the Commission

7.5 In our support to the Commission on Modulation of Charges in 2014-2015, we considered a number of objective tests for the introduction of incentives. The criteria we applied to the measures in that study included a description of their:

- Economic efficiency;
- Intelligibility;
- Administration costs (to be minimised); and
- Credibility with the stakeholder community.

7.6 Revenue neutrality was an additional criterion, but as this is not required for incentives (but is for modulation of charges) this criterion is not applied here.

7.7 Legislative requirements

7.8 The Performance Regulation 390/2013 Article 12 requires incentives to be:

- Transparent;
- Non-discriminatory;
- Proportional; and
- Effective.

7.9 The scheme should remain fixed during RP2, be understood by stakeholders ahead of implementation, and involve meeting targets that reflect a high level of performance.

Commission’s suggestions

7.10 A number of additional suggestions were provided by the Commission as important criteria to consider:

- Requirements for any future impact assessment covering changes to the charges and performance regulations:
  - The ability to monitor the outcomes of the intervention, in relation to specific targets; and
  - The approach to evaluating its effectiveness; and
- What the risks of perverse behaviours emerging are.

Our approach

7.11 We have drawn from the range of sources to come up with a manageable number of criteria to use in our assessment of the long list of ideas as summarised in the table below.

Table 7.1: Summary of evaluation criteria for RP3 measures

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>The scheme should incentivise economically efficient decisions in the planning and use of airspace in the context of SES objectives.</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>The objectives of the incentive are clear and the outcomes easy to measure and monitor related to the targets set.</td>
</tr>
<tr>
<td>Acceptable administration costs</td>
<td>Administrative cost to be minimised and proportional to the scheme introduced.</td>
</tr>
<tr>
<td>Credibility with the stakeholder community</td>
<td>Incentives are understood by stakeholders and accepted as encouraging the right behaviours.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimising risks of perverse behaviours emerging</td>
<td>Through the design of the incentive should avoid perverse behaviours emerging, where possible.</td>
</tr>
</tbody>
</table>

Source: Steer Davies Gleave analysis

Long list of ideas

7.12 In the remainder of this section we first provide a brief description of the ideas, before going into greater detail and describing the ideas in the context of a dimension’s matrix and the key evaluation criteria described in the table above. The ideas should not be seen as mutually exclusive and in principle a number of them could be combined to provide recommended measures for RP3. In the next chapter we develop a short list of mutually exclusive measures for further analysis.

High level description of ideas

- Idea 1: Retaining current arrangements, but combined with guidance material: to improve implementation and permit a practical interpretation of legislation. The guidance materials would draw upon the suggestions made in the previous section.

- Idea 2: Operationally focussed incentives on known problems: e.g. long delays (above 15 minutes’ length) and the difference between performance during weekdays and weekends, peak and off-peak seasons, etc..

- Idea 3: Adjust incentives according to actual vs planned level of traffic: with delay targets reduced if traffic levels are below those planned and vice versa. Recognising the interdependencies between different Key Performance Areas.

- Idea 4: Centrally administered system (similar to traffic risk sharing): standardised and administered in the same way as traffic risk sharing arrangements, pivoted around the delay targets set at FAB and State level and actual levels of delay achieved (all causes). Target could use a measure of optimal delay, which accepts that zero delay implies over-provision of capacity. Fault attribution would be centrally administered.

- Idea 5: NM given responsibility for managing network level delay (specific delay budget and targets defined for their responsibility): provided in tandem with other measures focussed at State/FAB level performance. Designed to address the concern that network level performance is negatively impacted by focus at national level.

- Idea 6: Design of incentives left to NSAs, subject to minimal number of constraints: EU legislation covering the maximum revenue at risk and pre-requisite that incentives are targeted at addressing a real issue in a performance area with their ANSP.

- Idea 7: Monitoring, publication and naming and shaming of information: combined with effective identification and enforcement of implementation of corrective actions. No financial incentives.

- Idea 8: Capital investment targeted through a separate monitoring, trigger and penalties system for targeted capacity enhancing projects: agreed between NM, ANSPs and their airspace users, as needed, to address the capacity problems across the network.

- Idea 9: Application of penalty only schemes: to support the enforcement of the capacity targets. This assumes that the targets are optimised and that exceeding them (overprovision) is not welcomed.

- Idea 10: Link incentives to measures of supply (actual capacity relative to planned capacity) as measured by three-hour peak (suggested in SSC options paper): a measure of
supply offers a more technical KPI which isolates the effect of traffic (which is implicit in a measure of delay). The definition of a supply measure would be necessary.

- **Idea 11: Centrally administered system (individual flight discounts to route charges):** Standardised and linked to the administration of route charges, with discounts applied to individual flights that have experienced delay above a threshold. Delay attribution would be centrally administered.

- **Idea 12: Use separate KPIs for bonuses and penalties:** delay (output metric) for bonuses and supplied capacity (vs plan) for penalties.

**Matrix to describe the ideas developed**

In the matrix below we map the ideas to some key dimensions of the design of the incentives. The dimensions we have used in the table are:

- Guidance versus legislation (or at least more formal administration/enforcement).
- Centralised at EU level or delegated to Member States.
- Linked to financial payments or only other remedies (performance improvement plans, publication of poor performance).
- Focused on specific problems (e.g. long delays, network delays) or more comprehensive (e.g. all delay, subject to fault attribution).
- Designed to influence short to medium term operational planning and decision-making or long term investment.
- Variations on detailed design (e.g. adjustable targets, different thresholds and payment rates, ratchets etc.).
Table 7.2: Summary of long list ideas mapped to key dimensions

<table>
<thead>
<tr>
<th>Ideas</th>
<th>Implementation</th>
<th>Level</th>
<th>Financial payments and/or other remedies</th>
<th>Problem level</th>
<th>Influence which behaviours</th>
<th>Variations of design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea 1: Retaining current arrangements, but combined with guidance material</td>
<td>Legislation and Guidance</td>
<td>EU and local</td>
<td>Financial</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Idea 2: Operationally focussed incentives on known problems</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial</td>
<td>Specific</td>
<td>Operational planning and decision making</td>
<td>Variable design</td>
</tr>
<tr>
<td>Idea 3: Adjust incentives according to actual vs planned level of traffic</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Idea 4: Centrally administered system (similar to the traffic risk sharing)</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Idea 5: NM given responsibility for managing network level delay</td>
<td>Legislation</td>
<td>EU</td>
<td>Financial, Corrective plans</td>
<td>Specific</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Idea 6: Design of incentives left to NSAs subject to minimal number of constraints</td>
<td>Local legislation some central framework</td>
<td>Local</td>
<td>Financial, Corrective plans</td>
<td>Comprehensive and specific</td>
<td>Operational planning and decision making</td>
<td>Variable design</td>
</tr>
<tr>
<td>Idea 7: Monitoring, publication and naming and shaming of information (no financial incentive)</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Corrective plans, publication of poor performance</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Ideas</td>
<td>Implementation</td>
<td>Level</td>
<td>Financial payments and/or other remedies</td>
<td>Problem level</td>
<td>Influence which behaviours</td>
<td>Variations of design</td>
</tr>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td>Idea 8: Capital investment targeted through a separate monitoring,</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial, Corrective plans, publication of poor performance</td>
<td>Specific</td>
<td>Capital investment</td>
<td>Fixed design</td>
</tr>
<tr>
<td>trigger and penalties system for targeted capacity enhancing projects</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Idea 9: Application of penalty only schemes</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial</td>
<td>Comprehensive and specific</td>
<td>Operational planning and decision making</td>
<td>Variable design</td>
</tr>
<tr>
<td>Idea 10: Link incentives to measures of supply (actual capacity relative to planned capacity)</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial, Corrective plans</td>
<td>Comprehensive and specific</td>
<td>Operational planning and decision making</td>
<td>Variable design</td>
</tr>
<tr>
<td>Idea 11: Centrally administered system (individual flight discounts to route charges)</td>
<td>Legislation</td>
<td>EU</td>
<td>Financial</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Fixed design</td>
</tr>
<tr>
<td>Idea 12: Use separate KPIs for bonuses and penalties</td>
<td>Legislation</td>
<td>EU and local</td>
<td>Financial, Corrective plans</td>
<td>Comprehensive</td>
<td>Operational planning and decision making</td>
<td>Variable design</td>
</tr>
</tbody>
</table>
### Detailed description of the long list of ideas with key evaluation criteria

Table 7.3: Summary of long list

<table>
<thead>
<tr>
<th>Idea number and description</th>
<th>Economic efficiency</th>
<th>Intelligibility</th>
<th>Acceptable administrative costs</th>
<th>Credibility with stakeholder community</th>
<th>Minimising risks of perverse behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea 1: Retaining current arrangements, but combined with guidance material</td>
<td></td>
<td>There is a lack of clarity of the objectives of the incentives in RP2. Different measures of delay have led to measurability challenges.</td>
<td>Limited additional costs</td>
<td>RP2 incentives appear to have low levels of credibility with stakeholder community</td>
<td>The behaviours experienced in RP2 would need to be addressed with guidance</td>
</tr>
<tr>
<td>Idea 2: Operationally focussed incentives on known problems</td>
<td>Designed to change specific behaviours to improve economic efficiency</td>
<td>Targeted incentives would be easier for stakeholders to understand. However, the mechanism itself might be more complicated.</td>
<td>Some costs for collecting and monitoring data at mode disaggregated level.</td>
<td>Some encouragement for this concept during consultation meetings. Some stakeholders consider that problems should be identified at the local level.</td>
<td>Would need to be designed into the system. Draw from experience in RP1 voluntary systems. Danger that what does not get incentivised does not get done (general delay target)</td>
</tr>
<tr>
<td>Idea 3: Adjust incentives according to actual vs planned level of traffic</td>
<td>More closely reflect the current economic environment than something that was planned between 1 and 5 years ago.</td>
<td>More complicated than current system. Interaction with traffic risk sharing will be complex. Timing of decision also complex and may lead to gaming Providing a practical way of implementing may be challenging.</td>
<td>Additional costs of monitoring and adjustment.</td>
<td>Some stakeholders in favour.</td>
<td>May lead to perverse behaviours at the margins of the thresholds.</td>
</tr>
<tr>
<td>Idea 4: Centrally administered system (similar to the traffic risk sharing)</td>
<td>If measured on all delays some causes will be beyond the control of the ANSPs.</td>
<td>Simpler to understand than current system, same approach for each ANSP/State.</td>
<td>Some, may need to be more effort on fault attribution processes</td>
<td>Supported by airspace users. Not widely supported by other stakeholders – some support for moving towards a more central delay attribution process.</td>
<td>If measured on all delays, then minimises perverse behaviours. Will be more emphasis on delay attribution which may lead to more disputes.</td>
</tr>
<tr>
<td>Idea number and description</td>
<td>Economic efficiency</td>
<td>Intelligibility</td>
<td>Acceptable administrative costs</td>
<td>Credibility with stakeholder community</td>
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</tr>
<tr>
<td>Idea 5: NM given responsibility for managing network level delay (specific delay budget and targets defined for their responsibility)</td>
<td>Network behaviours addressed unlike in existing system.</td>
<td>Identifying network vs locally controlled delays difficult to do and would require NM involvement.</td>
<td>Some additional organisations in process of administering scheme additional costs.</td>
<td>Some stakeholders support some aspects of this idea, but more clarity around the NM’s role and concepts such as “network delay” required.</td>
<td>Addresses a concern about current RP2 approach neglecting system-wide issues.</td>
</tr>
<tr>
<td>Idea 6: Design of incentives left to NSAs subject to minimal number of constraints</td>
<td>Subject to design, linked to competence and experience of NSAs.</td>
<td>Could be more complex for airspace users if a large number of different systems are developed.</td>
<td>Bespoke costs linked to the design and discussed between stakeholders at local level.</td>
<td>Supported by many stakeholders, but not well supported by airspace users.</td>
<td>States that do not feel they need incentives (where zero delay) will not introduce systems.</td>
</tr>
<tr>
<td>Idea 7: Monitoring, publication and naming and shaming by EU and NSAs of information (no financial incentive)</td>
<td>Not a mechanism for forcing a change in behaviour. Can encourage.</td>
<td>Simple mechanism easy to understand.</td>
<td>Some additional costs with more proactive monitoring and enforcement but less than a centrally administered financial incentive.</td>
<td>Few stakeholders in favour.</td>
<td>No financial incentives mean that corrective actions need to be enforceable otherwise it would be ineffective.</td>
</tr>
<tr>
<td>Idea 8: Capital investment targeted through a separate monitoring, trigger and penalties system for targeted capacity enhancing projects</td>
<td>Relies on ability of regulator and Airspace Users to have a good idea of what is needed and the efficient capital cost of achieving it.</td>
<td>Focussed on capacity enhancement not operational as above therefore more difficult to trace to impacts.</td>
<td>Some additional costs. Challenge of monitoring development of systems vs physical buildings.</td>
<td>Some stakeholders in favour. Not supported by ANSPs.</td>
<td>Could lead to risk of “Gold-Plating” on specified projects but reduction in general investment if returns are uncertain, but needs airspace user involvement in identifying projects they want to include in system</td>
</tr>
<tr>
<td>Idea 9: Application of penalty only schemes</td>
<td>Assumes targets are optimised and exceeding them not necessary.</td>
<td>Simple mechanism easy to understand.</td>
<td>Limited additional costs</td>
<td>Some stakeholders in favour.</td>
<td>Supports enforcement of capacity plans. Guidance to addresses issues seen in RP2 may be needed.</td>
</tr>
</tbody>
</table>
Further development in air traffic management in the area of performance incentives

<table>
<thead>
<tr>
<th>Idea number and description</th>
<th>Economic efficiency</th>
<th>Intelligibility</th>
<th>Acceptable administrative costs</th>
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<td><strong>Idea 10: Link incentives to measures of supply (actual capacity relative to planned capacity)</strong></td>
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</tr>
<tr>
<td></td>
<td>Most directly in control of ANSPs. Would not directly link to the quality of service experienced by users.</td>
<td>Definition of a measure of supply (e.g. capacity represented by a service unit) required.</td>
<td>Some additional costs in designing new measures.</td>
<td>Some stakeholders in favour.</td>
<td>Focus on input (supply) may divert attention from output service delivery (delay). Danger that what does not get incentivised does not get done (general delay target). Potentially limits opportunity for gaming through use of input measures</td>
</tr>
<tr>
<td><strong>Idea 11: Centrally administered system (individual flight discounts to route charges)</strong></td>
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<tr>
<td></td>
<td>Similar to Passenger Rights legislation, which provides direct compensation for delays.</td>
<td>Simple to understand. Challenging to implement and subject to accurate delay attribution and allocation (root cause identification).</td>
<td>Additional costs in developing relevant system and integrating with CRCO.</td>
<td>Some stakeholders in favour.</td>
<td>Knock-on delays risk airspace users being compensated more than once. Correspondingly, ANSPs may be penalised more than once, or more than one ANSP may be penalised.</td>
</tr>
<tr>
<td><strong>Idea 12: Use separate KPIs for bonuses and penalties</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Penalties for not delivering planned capacity supply. Bonuses for meeting/exceeding quality of service (output delay).</td>
<td>Could become complex if there is interaction between the KPIs – with bonuses and penalties potentially awarded at the same time.</td>
<td>Some additional costs in designing new measures.</td>
<td>Some stakeholders in favour.</td>
<td>Potentially limits opportunity for gaming through use of input measures.</td>
</tr>
</tbody>
</table>
Principles to apply to the design of RP3 incentives

7.14 Based on our review and analysis, we consider that the design of a scheme for RP3 should:

- be very explicit and specific in the objectives and changes in behaviour it is designed to achieve;
- be designed to address known, or anticipated, problems rather than applying the same scheme to every situation;
- recognise that different incentives are required to address different problems (e.g. operational issues or capacity enhancement will require more than one scheme);
- be careful not to mandate schemes where they are not needed;
- use, where possible, reliable sources of data that are not disputed by the industry or subject to gaming;
- recognise that behaviours from different actors in the industry might be incentivised in the regime (ANSPs, NM and airspace users for example);
- draw upon the experience of schemes in RP1 and in other industries which use asymmetric incentives with penalties outweighing bonuses and have a material level of revenue at risk in order to change behaviours; and
- recognise that a practical, but appropriate, scheme may require some incremental costs in data collection and recording being incurred.

Conclusions

7.15 The list of ideas and concepts was discussed with the Commission and stakeholders. These discussions are reflected in the choice of measures evaluated further in the next chapter.
8 Measures for future incentives

Introduction

8.1 This section covers the responses to the questions on developing future measures that are provided in the task specification. It then describes development of the short-list of future measures that have been derived from the long-list of ideas presented in Chapter 7, as well as which ideas are not pursued further. It draws on data, stakeholder responses to our questionnaire and stakeholder feedback provided following the workshop.

Questions to be considered in developing future measures

Questions on impacts

Q1: Should any adverse impact on safety be considered when determining the bonus or penalty awarded?

8.2 Our analysis and discussions with stakeholders have not identified any safety impacts emerging from the implementation of capacity incentive schemes in RP2.

8.3 On the other hand, we recognise that penalising underperformance potentially depletes the financial resources available to ANSPs for addressing unforeseen issues, which could conceivably encourage cutting corners in order to break the potentially vicious circle. However, on balance, given the primary importance of providing a safe service to airspace users, we do not see on what basis potential safety impacts could be considered when determining bonus or penalty levels.

8.4 We note that there has been some criticism of the pressure applied through the Cost Efficiency KPA of the Performance Scheme, which may have impacted decisions on investment in equipment and training.

Q5: How can the exclusion of certain delay codes (Article 15(g) Regulation 391/2013) be handled so that airspace users are not doubly penalised by experiencing delays and having to pay ANSPs an additional bonus on top of existing charges?

8.5 As described in Chapter 3, the way in which targets are set are in theory optimised, in which case applying the exclusions and removing the allowance for weather and other causes would mean that the remaining CRSTMP causes are also optimised.

8.6 If this is also true in practice, then it is difficult to provide justification for a bonus on top of existing charges at an overall output level. However, bonuses may still be appropriate at a targeted level, which help ensure that the overall optimum CRSTMP target is achieved.

8.7 However, airspace users only experience total delay. As a result, the curves (see Figure 3.1) used to derive the optimum balance of delay (as experienced by AUs) and capacity provision...
(as supplied by ANSPs) are not fully coherent, meaning that the optimisation argument is problematic.

8.8 An approach for ensuring that that airspace users are not doubly penalised by experiencing delays and having to pay ANSPs an additional bonus may be to use a pair of thresholds for the triggering of a bonus, as illustrated in the figure below.

Figure 8.1: approach for ensuring that that airspace users are not doubly penalised

![Diagram showing ANSP performance improvement, excluded causes, bonus payable, bonus not payable, zero delay, CRSTMP target, all causes target.]

Source: Steer Davies Gleave

8.9 Here, ANSPs only stand to benefit from a bonus when the improvement in performance that they deliver contributes towards reducing the overall delay experienced by airspace users when this is above the overall all causes target. However, the same ANSP performance improvement would not be rewarded when overall delay as experienced by airspace users would not have exceeded the overall all causes target in its absence.

8.10 However, the above is relatively complex. An alternative would be to not allow the exclusions, meaning that ANSPs would be responsible for managing all delay. This may not be perceived as entirely fair as, in the short-term at least, it is not possible for ANSPs to readily respond to externalities such as weather, however, they also stand to benefit when outturn external causes generate less delay than that built into the all causes target. It would be necessary to maintain detailed delay attribution, as this would remain relevant for operational reasons, if not for the application of financial incentives.

8.11 In all cases, rules or guidance on how the value of bonuses relate to the cost of delay could also be provided, to ensure that AUs do not overpay for benefits delivered, and that these are effectively shared with the ANSPs.

Q7: Should incentives be based upon revenue which already includes a partial guarantee for ANSPs to receive a Return on Equity?

8.12 The revenue does contain an element of remuneration for the cost of capital, not just the return on equity, but also the cost of debt and an allowance for depreciation. However, revenue is a simple measure to use. The alternative would be a measure of costs, which is more open to gaming of allocations of costs between sub-categories.

8.13 The more important point is whether the size of the penalty or bonus is sufficient to incentivise the change in behaviour the regulator is wishing to make.
**Q8: Whilst recognising the right of ATC staff to strike, should ATC strike action negate the payment of financial incentives?**

8.14 Throughout this work, we use financial incentives to mean both bonuses and/or penalties. We presume that the application of a penalty should not be blocked by ATC strike action, so consider this question in terms of whether strikes should negate the payment of bonuses.

8.15 In principle, there is no reason that ATC strikes should negate the payment of financial bonuses. The review of the schemes in RP2 and stakeholders’ feedback has not identified that ATCOs’ pay is directly linked to incentives. So, if annual average targets are used and these are met, then a bonus could be offered.

8.16 On the other hand, if more detailed KPIs and targets are used, then strikes may block part or all of a bonus payment. Strikes cause extreme delays, so if extreme delays are part of the incentive mechanism, then automatically, that part of the incentive might be affected.

8.17 The way in which the targets are set and whether exclusions apply is also relevant. If the scheme is limited to CRSTMP delay codes, then strike action would not impact the payment of bonuses or penalties. However, we note that AUs argue that industrial relations are within the long-term control of management and, as such, should not be an allowable exclusion.

**Q11: How can a positive contribution to ameliorate poor performance be recognised?**

8.18 We acknowledge that there are costs involved in bringing about change and an improvement in performance. So where these changes are made, but do not deliver the anticipated improvement or there is a significant lag in improvements being realised, ANSPs risk being penalised for not meeting their targets, in addition to incurring the costs of the investment.

8.19 Adopting an input measure, such as actual versus planned supply of capacity may provide a mechanism for capturing a positive contribution to performance, that may not have been fully reflected in the output delay KPIs. We note that measuring a positive contribution would require the establishment of a baseline starting point, against which the contribution can be scored or quantified.

8.20 The use of more detailed KPIs and targets may provide an alternative approach. The incentive scheme applied in the UK in RP2, for example, uses KPIs which focus on different aspects of performance, which mean that improvement in one or two areas may be captured, where no progress is made on a third.

**Q12: How can airspace users be assured that they are getting value for money and not simply paying extra for ANSPs to do their job?**

8.21 Key in providing this assurance will be developing an improved understanding of the way in which the targets are set. If targets for controlled causes are optimised, then, by definition, overperformance by ANSPs is not value for money. This points to a penalty-only incentive scheme.

8.22 On the other hand, if the targets (particularly if covering all causes – controllable and uncontrollable) are seen as “acceptable”/ “practical” levels of delay, then overperformance could be value for money. The approach used by Italy in RP2 uses a formula that includes the cost of delay in calculating the bonus or penalty, which aims to share the value created by the improved performance between AUs and the ANSP.
The use of more detailed KPIs and targets may be helpful here also, by providing focus on different aspects of performance.

Reducing the complexity across the system may also provide assurance to AUs that the services provided are value for money. AUs were strongly in favour of a centrally administered system. We expand on this in the definition of Measure B in the section below, which includes the idea to provide a more immediate link between performance at a granular (individual flight) level and value for money.

Questions on design

Q2: Should non-symmetric incentives be encouraged?

Non-symmetric incentives should be encouraged, primarily for two reasons:

- For low delay or zero delay targets non-symmetry is necessary, as it is not possible to design a symmetrical incentive scheme; and
- Stakeholders, with the notable exception of ANSPs, indicated support for predominantly penalty focussed schemes.

Non-symmetry could also be used could be used to address AUs’ concerns about value for money.

Q3: Should local targets include a mandatory link to adopted targets at FAB/EU level to ensure alignment with the objectives of the Performance Scheme (e.g. by meeting the FAB target a prerequisite for the award of positive financial incentives at local level)?

The PRB’s interpretation in RP2 saw the FAB target as the “legislative target” that the outcome of the intervention should be focussed on and, as a result, that no bonuses should be awarded at a local level for performance at the local level if the FAB target was not met – with the reverse holding true for penalties.

Also relevant are how the local level targets for the incentives schemes are set. As highlighted previously, there exists an apparent lack of transparency in the way local reference values are calculated by the Network Manager. Some incentives schemes used these values as their targets, yet the PRB commented that it was not clear how these local targets contributed to FAB performance. There remains a lack of understanding amongst stakeholders about whether/how consistency between the targets at various levels (EU-wide, FAB, local/national) is achieved.

We note, as with other aspects of the FAB implementation, that in the absence of operational integration, there does not exist an accountable decision-maker at FAB level who can influence the delivery of FAB performance. However, some stakeholders have suggested that FAB-level targets may have encouraged a degree of cooperation within FABs.

Q4: Similarly, should incentives include a specific link to other parts of the Single European Sky legislation (e.g. deployment of SESAR)?

The SESAR JU stated that it considers that the performance scheme overall, and particularly the targets in the Cost Efficiency KPA, to not be supportive of the ATM Masterplan and the SESAR deployment programs (the Pilot Common Project and subsequent schemes).

We suggest that separate incentives for SESAR adoption should be considered. These should not be wrapped into the Capacity KPA incentives for capacity supply or delay.
Q6: How can it be ensured that errors/gaming in the originating ANSP determining the delay causes do not result in inappropriate penalties or bonuses?

8.32 A degree of centralisation with independent review is required in order to ensure that errors/gaming by individual ANSPs are avoided. In RP2, a centralised approach within FABEC has been seen by the PRB and involved stakeholders as effective in validating the attribution of delay through peer review. A system-wide centralised delay attribution system with independent review would support this further at SES level.

Q9: What are the risks associated with operational staff having personal financial incentives when making safety critical decisions?

8.33 In principle, there would be some risks associated with operational staff, who make safety critical decisions, having personal financial incentives. However, stakeholders did not identify that specific incentives for ATCOs were used by ANSPs in RP2. There were some examples of ATCOs benefiting from overall ANSP-wide performance-based financial incentives, but these were not directly linked to the incentive schemes used in the Capacity KPA. There were some cases (e.g. Hungarocontrol, ENAV) where the ANSP capacity incentives and targets were translated into management-level objectives and targets.

Q10: How can perfect performance, e.g. zero delay, be improved? How to design appropriate incentives in such a case?

8.34 In the case where there is zero delay, this cannot (and does not need to) be improved. Appropriate incentives in such cases may be designed to:

- Focus on specific issues, which may not have a discernible impact on the overall annual average delay – e.g. extreme events or one-off long-delays;
- Penalise underperformance only, to ensure targets are met;
- Focus on other known problems, which may lie outside the Capacity KPA – e.g. route extension (horizontal and/or vertical) or resilience.

Q13: To which extent the Network Manager could play a role to “allocate” the bonus/penalty for ANSPs on the basis of genuine contribution to the network performance in a more dynamic context?

8.35 Stakeholders are clear that the allocation of financial bonuses/penalties for ANSPs through the performance scheme is the European Commission’s responsibility, as regulator. The Commission may be supported by technical expertise from the Network Manager in doing so, but that the Network Manager should not directly hold the authority to reward or penalise other providers.

8.36 If “contribution to the network performance” forms the basis for allocating financial incentives, KPIs for measuring such contribution would need to be defined, communicated and monitored. The application of incentives in a more dynamic context, however, is not an approach that we consider suitable, as this would leave the scheme open to gaming and potential disputes. Incentives are understood to work best when they are well-understood in advance (of a control or reference period) and allow actors to plan appropriately.

8.37 An alternative approach that was discussed as part of the consultation with stakeholders, was that the Network Manager could be allocated a “reserve” of “network delay”, which it could use to offset delay in the system that it assesses to be out of the control of individual ANSPs. In this sense, the Network Manager may influence whether ANSPs achieve their incentive
Further development in air traffic management in the area of performance incentives

scheme targets, indirectly impacting the awarding of bonus/penalties. Stakeholders were unclear how this approach would be practically implemented and how network delay may calculated and attributed. The potential influence that the Network Manager would gain over the awarding of bonus/penalties would also go against the view that this should be the regulators’ responsibility (the EC or NSAs).

**Future measures**

8.38 Following discussions with the Commission at the time of the intermediate report, feedback from stakeholders during the study workshop and NCP, as well as bilateral discussions and written feedback from stakeholders, we assessed the long list of ideas presented in Chapter 7 and shortlisted three measures. The remainder of this section describes the reasons for not pursuing some ideas further before providing a greater description of the shortlisted measures.

**Ideas not pursued further**

*Status quo with guidance (idea 1)*

8.39 As demonstrated by the analysis presented in the early chapters of this document, there have been a number of challenges for States to implement the current legislation. There have been different interpretations of wording between States, and there remain some differences of views between States and the PRB about issues such as the application of capacity incentives to terminal ANS.

8.40 The feedback we have received from stakeholders has included that capacity incentives, as they stand, is not relevant for en-route sectors where there is no, or never has been, a serious delay problem. Moreover, stakeholders are looking for something different to the existing arrangements that works better.

8.41 Using the evaluation criteria identified above, we assess that the status quo, even with added guidance material scores poorly on the following:

- **Intelligibility**: the objectives of the incentives are not clear, and because any objectives are placed at a very high level (“to improve performance”), this means that providing measures to monitor success are difficult.
- **Credibility with the stakeholder community**: the existing incentives are not seen as credible by most stakeholders. While there is some acceptance that providing guidance could improve the situation, the core concepts and approach are not accepted.
- **Minimising risks of perverse behaviours**: as described in the chapters above, some unintended consequences have emerged from the implementation of the existing scheme.

8.42 Therefore, we do not consider that guidance, while retaining the same legislation, will address the issues of implementation identified during the study or stakeholders’ desire to move to an improved system of incentives.

8.43 There is support from stakeholders for provision of guidance to support the implementation of the new scheme of incentives for RP3.
Monitoring scheme (remove financial incentives) (Idea 7)

8.44 There was limited support for the idea of a monitoring scheme from stakeholders. Those who did support it (e.g. Professional Staff Organisations) considered it would provide a substitute for financial incentives.

8.45 In the case that all financial incentives are removed, we expect that a monitoring scheme would remain in place, so this idea is equivalent to a scenario where no ‘intervention’ (i.e. no incentives) are required by the regulations.

8.46 A number of stakeholders argued that with the PRB annual monitoring process and reporting at network, State, ANSP and ACC level already in place, it was not clear that additional monitoring would improve the situation.

8.47 A monitoring scheme would only stand to be truly effective if corrective actions to address issues identified in the process are agreed and enforced. We have concerns about the enforceability of a scheme requiring any corrective actions, as, ultimately, the only binding measure available would be infringements proceedings to States, which can become protracted (2-3 years).

8.48 Using the evaluation criteria identified above, we assess that the monitoring scheme (remove financial incentives) scores poorly on the following:

- **Credibility with the stakeholder community**: the majority of stakeholders assess that there is already a process of detailed monitoring at Network and State level and therefore the idea does not help advance from the existing situation.

8.49 Therefore, based on this analysis and lack of stakeholder support, we decided this idea should not be included in the shortlist of measures to be considered further. The issues encountered with the implementation of incentive schemes in RP2 do not preclude the use of financial incentives altogether in RP3.

Shortlisted measures

8.50 Each of the shortlisted measures is developed from ideas that have received material levels of support from stakeholders. The measures, in some cases, combine a number of the ideas presented in the previous chapter.

8.51 Measures to be considered further:

- **Measure A (using ideas 2 and 6): Tailored and targeted incentives led by NSA**. This should be targeted at known problems at the ANSP. Where delays or under-provision of capacity are a problem, they should be targeted. But equally, if there is no delay or capacity problem, the NSA should consider focusing on other known problems (e.g. route extension or resilience). A number of NSAs and ANSPs supported these ideas.

- **Measure B (using ideas 4, 9 and 11): Centrally administered delay penalty scheme**. This would require an accurate and agreed approach to delay attribution, managed and administered centrally. An automatic rebate to the individual flight experiencing the delay could be offered by discounting or waiving its route charges. This approach would also be coherent with the approach to compensation to the harmed party under passenger rights legislation. Some AUs and other stakeholders supported these ideas.

- **Measure C (using ideas 8 and 10): Scheme which addresses an under-provision of capacity**. This could be through targeted capital expenditure triggers with penalties for
late delivery, or penalties for not delivering the required supply of capacity. A number of stakeholders supported these ideas.

8.52 We see Measures A and B as focussed on improving short-term operational performance, whereas Measure C is more focussed on medium- to long-term planning and provision of adequate capacity. In principle, an operationally focussed scheme could be combined with a long-term planning scheme.

8.53 Below we describe each of the shortlisted measures using a common template. We then assess the measure using the criteria set out in the previous chapter.

_measure A: Tailored and targeted incentives led by NSA_

8.54 The table below provides a detailed description of Measure A: Tailored and targeted incentives led by NSA.

Table 8.1: Measure A description

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>High level description</td>
<td>Tailored and targeted incentives led by NSA, subject to some SES level legislative restrictions. The incentive should be targeted at known operational problems of the State/FIR.</td>
</tr>
<tr>
<td></td>
<td>The scheme would be tailored to the operational outcome ‘problems’ identified in each State or FIR: for example long delays greater than 15 minutes and weekend delays or, if capacity not an issue route extension, resilience or other known problems.</td>
</tr>
<tr>
<td></td>
<td>The design of the incentive would be left to the NSA. There would be a number of limitations placed in SES legislation including:</td>
</tr>
<tr>
<td></td>
<td>• Endorsement of asymmetry.</td>
</tr>
<tr>
<td></td>
<td>• Cap maximum penalties at 3% of ANSP revenues, with maximum bonus of 1% of revenues.</td>
</tr>
<tr>
<td></td>
<td>• Incentives would not be mandatory, but their absence would need to be explained to airspace users.</td>
</tr>
<tr>
<td></td>
<td>• This approach would continue to rely on the n+2 unit rate adjustment mechanism for billing.</td>
</tr>
<tr>
<td>Parties required to take action</td>
<td>A number of stakeholders would be involved in the design of the incentive schemes. Through consultation, AUs could identify what they consider to be the main “problems” in each State, or controlled FIR. Alternatively, the EC or PRB could provide guidance on the issues it would expect NSAs to target, with supporting evidence. These would be provided to the NSA, whose responsibility it would be to design a scheme to incentivise an operational improvement in ANSP behaviour to address known problems. The schemes would be reviewed by the PRB/EC as part of the Performance Plan assessment to ensure that the implementation of the schemes is satisfactory and consistent with the Regulation.</td>
</tr>
<tr>
<td>Contribution to objective(s)</td>
<td>The objective of the incentive scheme would be focussed on improving the operational performance of a known problem. For example, if the focus is on reducing long delays, then this is a measurable KPI, which is related to the core SES capacity performance target of average minutes delay of 0.5 minutes across the SES network.</td>
</tr>
<tr>
<td>Scope and coverage</td>
<td>The focus of the incentives would be on known problems: long delays above 15 minutes, weekend delays when there are no problems during the week, etc. For a number of ANSPs that have no material delays then the incentive could be focussed on another know problem in the airspace they control - for example, route extensions.</td>
</tr>
<tr>
<td>Legislative implications</td>
<td>Changes would be confined to the Implementing Regulations.</td>
</tr>
<tr>
<td>Risks</td>
<td>• Some NSAs may choose to opt out if they believe it will be difficult.</td>
</tr>
</tbody>
</table>
Further development in air traffic management in the area of performance incentives

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>Might lead to the development of 30 different incentive schemes which may be confusing airspace users and complex for the EC to monitor (however limitations set in SES legislation should be applied to limit these risks).</td>
</tr>
</tbody>
</table>

8.55 When examining the evaluation criteria, we would score Measure A on the following basis.

Table 8.2: Measure A assessment

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
<th>Assessment</th>
<th>Score (see key)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>The scheme should incentivise economically efficient decisions in the planning and use of airspace in the context of SES objectives.</td>
<td>Focussed on improving operational decisions, not designed to influence planning and long-term decisions.</td>
<td>+</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>The objectives of the incentive are clear and the outcomes easy to measure and monitor related to the targets set.</td>
<td>Specific problems identified by a KPI linked to Pi in Performance scheme.</td>
<td>+++</td>
</tr>
<tr>
<td>Acceptable administration costs</td>
<td>Administrative cost to be minimised and proportional to the scheme introduced.</td>
<td>As implemented at State/FIR level, there might be a greater administrative burden of oversight for monitoring by airspace users and the EC.</td>
<td>--</td>
</tr>
<tr>
<td>Credibility with the stakeholder community</td>
<td>Incentives are understood by stakeholders and accepted as encouraging the right behaviours.</td>
<td>This needs to be proven. However there has been support from the NSA and ANSP communities. The AU community will need to be convinced.</td>
<td>+</td>
</tr>
<tr>
<td>Minimising risks of perverse behaviours emerging</td>
<td>The design of the incentive should avoid perverse behaviours emerging, where possible.</td>
<td>Needs to be written into the detailed design by NSAs. Danger of less experienced NSAs not being able to anticipate perverse behaviours.</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: Compared to the existing regime: +++ clear improvement; ++ some improvement; + limited improvement; o no change; - limited deterioration; - - some deterioration; - - - clear deterioration

8.56 In Appendix C, we provide an initial analysis for what the focus of targeted schemes may be across the SES.

Measure B: Centrally administered delay penalty scheme

8.57 The table below provides a detailed description of Measure B: Centrally administered delay penalty scheme.

Table 8.3: Measure B description

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>High level description</td>
<td>Centrally administered delay penalty only scheme. Would require an accurate and agreed approach to delay attribution, managed and administered centrally. An automatic rebate to the individual flight experiencing the delay could be offered by discounting or waiving its route charges. This approach would also be coherent with the approach to compensation to the harmed party under passenger rights legislation.</td>
</tr>
<tr>
<td>Summary of changes</td>
<td>• Currently, the approach to delay attribution is determined on a local basis. Only in some cases, for example in FAB EC, has a process been established under the oversight of its Financial and Performance Committee (FPC) to validate delay attribution. A network-wide approach to agreeing delay attribution, which was deemed independent and robust,</td>
</tr>
</tbody>
</table>
### Characteristic | Details
--- | ---
whilst allowing stakeholders to appeal against attribution decisions would need to be developed and agreed.  
- The implementation is likely to require an upgrade of the payments mechanisms system at the CRCO of Eurocontrol to enable the flight with greater than target levels of delay to be provided a rebate as part of the regular (monthly) billing cycle.  
- The level of penalty linked to a level of delay above the targeted level would be automatic and not at the discretion of the ANSP or NSA. The system would be administered centrally with oversight from the Commission and implementation according to set rules through the CRCO.  
- The maximum level of penalty would be established in legislation and might be set at a maximum % of total charges paid per flight.  
- Delays would exclude weather related coding, but include all other coding, including industrial action.

### Parties required to take action
- All stakeholders would need to agree the delay attribution processes.  
- The Commission would need to determine the level of maximum penalty incurred for a flight not meeting the delay per flight in a specified airspace (national, FIR).  
- The CRCO would need to upgrade the payment systems needed to implement the rebates to individual flights incurring higher than target average delay.  
- The Commission following the advice of the NM would set the target level of delay to which penalties would pivot off.

### Contribution to objective(s)
The scheme would provide an incentive for ANSPs to address delays to flights which are higher than the targeted level of delay per flight in a specified airspace (national, FIR). The incentive would encourage the ANSPs to amend operational processes and staffing level to address the issues.

### Scope and coverage
Focus on actual delays experienced by individual flights with an aim of encouraging improvement in operational processes to offer a smooth profile of service provision. Offers direct compensation for airspace users affected, as opposed to postponing these and distributing across the AU community through the unit rate n+2 adjustments.

### Legislative implications
Changes would be confined to the Implementing Regulations.

### Risks
- Some concerns that stakeholders will not agree on a robust method for delay attribution.  
- Some concern that the costs of changing the CRCO system would be considerable, however this needs to be traded off against the potential savings from the requirements to monitor and NSA oversight of individual schemes.  
- As it is focussed on delays, as with the current scheme, there are likely to be large parts of European airspace where the scheme is not relevant and does not influence behaviours.

### 8.58 When examining the evaluation criteria, we would score Measure B on the following basis.

#### Table 8.4: Measure B assessment

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
<th>Assessment</th>
<th>Score (see key)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>The scheme should incentivise economically efficient decisions in the planning and use of airspace in the context of SES objectives.</td>
<td>Focussed on improving operational decisions, not designed to influence planning and long-term decisions.</td>
<td>+</td>
</tr>
</tbody>
</table>

| Intelligibility | The objectives of the incentive are clear and the outcomes easy to measure and monitor related to the targets set. | Once the targets are set, the delay attribution process determined and level of penalty agreed, this should be easy to monitor and measure. The incentive addresses greater than target level of delay on flight affected. The approach is similar to the air passenger rights legislation that with the aviation community is familiar with. | ++ |
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<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
<th>Assessment</th>
<th>Score (see key)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable administration costs</td>
<td>Administrative cost to be minimised and proportional to the scheme introduced.</td>
<td>There are likely to be material implementation costs (delay attribution process and upgrade of the payments system), these will need to be traded off with the savings from the current State-level monitoring and administration of the scheme.</td>
<td>-</td>
</tr>
<tr>
<td>Credibility with the stakeholder community</td>
<td>Incentives are understood by stakeholders and accepted as encouraging the right behaviours.</td>
<td>While supported by some airspace users, the approach was not supported by NSAs and ANSPs.</td>
<td>-</td>
</tr>
<tr>
<td>Minimising risks of perverse behaviours emerging</td>
<td>Through the design of the incentive should avoid perverse behaviours emerging, where possible.</td>
<td>Great emphasis will be placed on the delay attribution process and this may lead to unintended consequences.</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: Compared to the existing regime: +++ clear improvement; ++ some improvement; + limited improvement; o no change; - limited deterioration; - - some deterioration; - - - clear deterioration

*Measure C: Scheme which addresses an under-provision of capacity*

8.59 Ideas 8 and 10, described in the previous chapter, were designed to address the potential supply-side under-provision of capacity. The first idea addressed this through targeted and specified capital expenditure agreed with airspace users, and the other utilised the three-hour measure of capacity provision (supply) monitored by the Network Manager to capture the capability of ANSPs to provide capacity. In the measure described below we have taken this second measure and developed it as it had greater support from the stakeholder community.

8.60 The table below provides a detailed description of Measure C: Scheme which addresses an under-provision of capacity.

**Table 8.5: Measure C description**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>High level description</td>
<td>Link incentives to a measure of supply (actual capacity relative to planned capacity) as measured by three-hour peak (suggested in SSC options paper): a measure of supply offers a more technical KPI which isolates the effect of traffic (which is implicit in a measure of delay).</td>
</tr>
</tbody>
</table>
| Summary of changes | • Planned capacity to be defined through a process between the Commission, Network Manager and ANSP. Capacity set for the duration of the reference period, with a consistent capital programme to support its delivery.  
• Actual capacity supplied measured through the ACC Capacity three-hour peak measure as calculated by the Network Manager through the Declared Sector Capacity or Monitoring Value provided by the ANSP to the NM Operations Centre.  
• If actual capacity delivered below the planned capacity, then a penalty may be applied for every [day] of capacity under-provision. Refund provided to airlines by lower route charges.  
• This approach would continue to rely on the n+2 unit rate adjustment mechanism for billing. Since all AUs contribute to the capital programme through route charges, the whole AU community should be reimbursed (a penalty for the ANSP) through a unit rate adjustment. |
Further development in air traffic management in the area of performance incentives | Final Report

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parties required to take action</td>
<td>Commission with NM and ANSPs to determine the planned level of capacity to be included in the performance plan (the contract). NM to measure the three-hour peak level of supply. Refund mechanism for days of under-provision through the charging mechanisms.</td>
</tr>
<tr>
<td>Contribution to objective(s)</td>
<td>An input rather than an output incentive, it directly addresses the system input of under-supply of capacity, rather than the output/symptom of delay to flights.</td>
</tr>
<tr>
<td>Scope and coverage</td>
<td>Focus on supply of capacity as contracted in the Performance Plan (the regulatory contract). The metric is an input measure rather than an outcome or output measure (which is traditionally the focus of incentive schemes).</td>
</tr>
<tr>
<td>Legislative implications</td>
<td>Changes would be confined to the Implementing Regulations.</td>
</tr>
</tbody>
</table>
| Risks                                 | • Too great an emphasis on planned capacity from the NM process may lead to disagreements with States and ANSPs.   
• Focus on the three-hour peak supply measure could lead to underperformance in other times during the day. |

8.61 When examining the evaluation criteria, we would score Measure C on the following basis.

**Table 8.6: Measure C assessment**

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Approach to assessment</th>
<th>Assessment</th>
<th>Score (see key)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic efficiency</td>
<td>The scheme should incentivise economically efficient decisions in the planning and use of airspace in the context of SES objectives.</td>
<td>Focussed on influence planning and long-term decisions.</td>
<td>++</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>The objectives of the incentive are clear and the outcomes easy to measure and monitor related to the targets set.</td>
<td>The approach to measuring the capacity supplied/declared are established, but would need to be further agreed in the context of financial incentives. A link between capital expenditure and the incremental capacity delivered may need to be proved/illustrated.</td>
<td>+</td>
</tr>
<tr>
<td>Acceptable administration costs</td>
<td>Administrative cost to be minimised and proportional to the scheme introduced.</td>
<td>The scheme should build off existing processes and measures. Some adaption of payments mechanisms to facilitate the refunds would be needed.</td>
<td>-</td>
</tr>
<tr>
<td>Credibility with the stakeholder community</td>
<td>Incentives are understood by stakeholders and accepted as encouraging the right behaviours.</td>
<td>General acceptance that provision of contracted capacity important, however some scepticism as to how easy it is to measure.</td>
<td>O</td>
</tr>
<tr>
<td>Minimising risks of perverse behaviours emerging</td>
<td>Through the design of the incentive should avoid perverse behaviours emerging, where possible.</td>
<td>Might be some perverse behaviours outside the 3-hour peak, which might also mean that overall delays could still be higher than targeted even if the capacity provision is as planned during the 3-hour peak. This might mean that this mechanism would need to be combined with one of Measure A or Measure B.</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: Compared to the existing regime: +++ clear improvement; ++ some improvement; + limited improvement; o no change; - limited deterioration; - - some deterioration; - - - clear deterioration
Other ideas – considerations

8.62 The remaining ideas presented in Chapter 7 received some support from stakeholders, although this was not as strong as that for the ideas developed into the measures above. Further to this, we also identify some concerns relating to the coherence of the ideas with other parts of the performance scheme, their implementation and their intelligibility.

<table>
<thead>
<tr>
<th>Idea</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea 3: Adjust incentives according to actual vs planned level of traffic</td>
<td>Delay targets reduced if traffic levels are below those planned and vice versa. Recognising the interdependencies between different Key Performance Areas.</td>
<td>This idea aims to address the link between delay and traffic, however we assess that it overlaps with the Traffic Risk Sharing (TRS) mechanism. Though TRS ANSPs already receive reduced revenues under a low traffic scenario and additional revenues in a high traffic scenario, while having to achieve the determined capacity targets. In a low traffic scenario then, ANSPs have to achieve their capacity target more efficiently, while in a high traffic scenario they have more revenues available with which to support operational measures to achieve their capacity target. In cases where there are extreme variations in traffic, the alert mechanisms are available for adjusting the determined targets.</td>
</tr>
<tr>
<td>Idea 5: NM given responsibility for managing network level delay (specific delay budget and targets defined for their responsibility)</td>
<td>Provided in tandem with other measures focussed at State/FAB level performance. Designed to address the concern that network-level performance is negatively impacted by focus at national level.</td>
<td>Stakeholders were unclear how this approach would be practically implemented and how network delay may be calculated and attributed. The potential influence that the Network Manager would gain over the awarding of bonus/penalties would also go against the view that this should be the regulators’ responsibility (the EC or NSAs).</td>
</tr>
<tr>
<td>Idea 12: Use separate KPIs for bonuses and penalties</td>
<td>Delay (output metric) for bonuses and supplied capacity (vs plan) for penalties.</td>
<td>We agree with the approach of having different incentives for the supply of capacity and incentives for operational improvements, but we do not agree that these should be one-sided and each use a different signage (i.e. one for bonuses and a different one for penalties). This idea in a way combines approaches for incentives used to influence short- and long-term behaviours, which we consider would be better articulated separately.</td>
</tr>
</tbody>
</table>

8.63 As highlighted previously, most of the issues and ideas explored in this study relate to the en-route capacity KPA, since this is the area where incentives schemes have been implemented most consistently in RP2 and, as a result, where evidence of issues or good practice exists. The requirement for the implementation of incentive schemes for terminal capacity was not clear at the outset of RP2 and has not been covered by all NSAs. Moreover existing reporting for terminal capacity is not as mature as for en-route. The principles with respect to the design of the schemes are seen as common between en-route and terminal, although it is likely that separate mechanisms would be required to reflect the different operational contexts. As part of the focus on developing a gate-to-gate approach, which is an objective for RP3, a first step would be to establish a well-functioning set of incentives for en-route, before then rolling these out to terminal ANS services.
Conclusions on RP3 measures

8.64 Of the shortlisted measures, Measure A and Measure B are focussed on influencing short-term operational behaviours, whilst Measure C is primarily focussed on influencing longer-term planning decisions.

8.65 The ideas used in Measure A are the ones which received the most support from stakeholders and are the ones which are potentially most straightforward to implement. However, we highlight that, in the event, these may result in a wide range of schemes across the SES, which does not address the existing criticism of the schemes developed in RP2.

8.66 The ideas used in Measure B received some support from stakeholders, but may be more technically challenging to implement. However, the resulting scheme would be the simplest and most direct approach to addressing the impacts of delay on AUs and encouraging ANSPs generating these to address them.

8.67 Measure C combines ideas for measuring supply of capacity, an input to the system, rather than delay, which is an output. These received strong support from stakeholders and would rely on existing methods for capturing these inputs.

8.68 The short-term focussed measures A and B are mutually exclusive, however, each of these may be combined with the longer-term focussed measure C. We would suggest that the following combinations are considered as part of the RP3 impact assessment:

- Measure A: Tailored and targeted incentives led by NSA;
- Measure B: Centrally administered delay penalty scheme;
- Measure A (as above) in combination with Measure C: Scheme which addresses an under-provision of capacity; and
- Measure B (as above) in combination with Measure C: Scheme which addresses an under-provision of capacity.

Potential next steps for RP2

8.69 Our review of the existing situation and the incentive schemes implemented during RP2 highlighted a number of examples of best practice and issues around which guidance would be useful (see Chapter 6). Since there exists consensus amongst stakeholders on some issues, as confirmed through the consultation and at the study workshop, it may be possible to address these through guidance for the remainder of RP2. Other issues should be assessed in more detail and addressed in RP3 through changes in legislation.

8.70 Guidance for RP2 could focus on the following:

- **Symmetry:** the requirement for symmetry in the incentive schemes breaks down in cases where the local reference value is 0.00 mins delay/flight, based on a history of very low or zero delay, as further improvement is not possible. In such cases, guidance which states that NSAs/ANSPs are exempt from the requirement to have a symmetrical incentive scheme would clarify the situation. The resulting schemes would be penalty-only schemes, and would also avoid the adoption of “artificial” scheme targets that are higher than the reference values simply to satisfy the symmetrical requirement. This guidance would be in line with the requirement that there “shall be no bonuses for performance that is at [...] that expected in performance targets” (CR 391/2013 Article 15b).

- **Guidance on applicable revenues:** Our review of the implementation of the incentives schemes in 2015 highlighted that in three cases the revenues used were not limited to the
ATSP, but included other service providers and/or NSA revenues. For the remainder of RP2, guidance to state that “the revenue from air navigation services” (CR 391/2013 Article 15d) is interpreted as the ATSP chargeable unit rate times the TSUs would clarify the eligible revenues.

8.71 We note that even where agreement exists in RP2, addressing some issues may in fact conflict with the legislative text.

8.72 There may also be some practical steps that the Commission could take to communicate how it will move forward with the existing incentive schemes that have been set up for RP2. For example, it could document the rationale used in its review of unit rate compliance for the 2017 unit rate and how it intends to apply this for the remainder of RP2. For the cases where the incentive schemes in RP2 do not make reference to FAB targets, the Commission might focus its review of the application of the incentives at a national level, assessing local contributions to the network supported by the Local Single Sky Implementation (LSSIP) and the Network Manager. Although clarity in this area would be welcome, agreement amongst stakeholders will likely be limited, since some incentive schemes have sought to accommodate the FAB target requirement, despite a recognition that the implementation of FABs has been largely ineffective.

8.73 Further, developing an improved understanding of the target-setting process and the links between the union-wide targets and the local reference values could also start now to support RP3. This could also cover the alignment between operational and regulatory data where airspace delegations apply.
A Appendix A: Questionnaire

EC study on further development of the performance framework in the area of incentives

Stakeholder Questionnaire

This questionnaire has been produced on behalf of the European Commission (DG MOVE) and aims to understand the impact and effect of revised (2013) SES legislation, covered by the Charging and Performance Regulations, on incentives in the Air Traffic Management (ATM) sector and identify lessons to be learned, as well as develop measures for future incentives that can be applied from the third reference period (RP3).

The scope of the incentives covered by the study, includes those incentives covering traffic and cost risk sharing, but especially the new incentives for RP2 covering capacity and environment targets.

The consultation includes the following stakeholder groups:

- Functional Airspace Blocks (FABs);
- Air Navigation Service Providers (ANSPs) and representative bodies;
- National Supervisory Authorities (NSAs);
- Airspace users;
- Airport representative bodies;
- ANSP staff representative bodies;
- the SESAR Joint Undertaking;
- the European Aviation Safety Agency (EASA);
- the Performance Review Unit; and
- the Network Manager.

Thank you for agreeing to participate. Your support in developing an improved understanding of the implementation of ANS incentives in Europe is key and most gratefully received.

Contents of this questionnaire

This questionnaire covers the following topics:

a. Experience of Reference Period 2
b. Guidance and best practice to improve implementation
c. Experience from other industries
d. Looking back to RP1 (Italy and UK)
e. Looking forwards to Reference Period 3
f. Any other comments
Please complete all the questions based on the experience of the organisation/sector you represent. We aim to follow up your responses to the questionnaire with an interview to expand on particular points of interest.

**Experience of Reference Period 2**

Based on your experience of implementation in RP2:

1. Which areas of the legislation, covering incentives contained in the performance and charging regulations, do you consider difficult to interpret, or open to different interpretations?
2. What is your response to the comments made by the PRB/Commission on the scheme introduced in your Member State? Have any changes been made to address their comments?
3. What, in your view, are the key issues with implementation of incentives under the performance and charging regulations?
4. What are the impacts (advantages and disadvantages) of mandatory incentives on capacity? Has safety been impacted by introduction of these incentives?
5. Have you encountered examples where unexpected outcomes or perverse behaviours (including gaming) have resulted from the introduction of the new incentives?
6. Do you have examples of local KPIs which have been used to support the incentive schemes?
7. Have company-level incentives been translated to individual staff level targets and incentives?

Please comment on the following key issues:

8. 1% limit on the size of revenues at risk: is this enough to incentivise changes in behaviour or encourage investment, what problems have there been with implementation?
9. Which definition of revenues do you consider the 1% should be applied to ANSP or State?
10. Do you consider that incentives should be symmetric (equal for bonus and penalty) or is there the case for asymmetry?
11. Delay codes used in setting the par value in the capacity incentives: which codes have been excluded and why?
12. FAB to State translation of targets and payments of bonus and penalties: what issues have arisen through implementation?
13. Amended delay attribution process, involving the NM: do you consider this to be a robust method for a scheme with financial bonus and penalties?
14. Has the change in methodology introduced by the NM for delay recording (leading to a lower measurement of delay) caused you difficulties?
15. Translating bonuses and penalties to unit rate values: what issues have arisen through implementation in 2017 (based on the experience of 2015 (n+2))?  

**Guidance and best practice to improve implementation**

16. In which areas would it be helpful for the Commission to draft guidance to clarify current legislation covering incentives (perhaps reflecting Member States’ different interpretation of the text)?
17. Which Member States do you consider to represent best practice for the design and implementation of the incentive scheme?
18. Which Member States do you consider to represent practice which is not consistent with the current legislation? What specific non-compliance have you identified?

Experience from other industries
19. Are there examples of performance incentives in other industries (airports, rail, other utilities, etc.) that you consider the study should review so that lessons can be learned for the SES performance scheme?

Looking back to RP1 (Italy and UK)
20. Comparing your RP1 and RP2 incentive schemes, what have been the impacts and how has this influenced the range of behaviours you can cover and incentivise?

Looking forwards to Reference Period 3
21. Do you have suggestions for new incentives or amendments to existing incentives to be applied in RP3?
   i. If you do have suggestions, what are the intended benefits of the introduction of the incentives and have you thought of any ways of monitoring the success of the implementation of the change?
22. Should the Network Manager play a larger, more active role in the setting and monitoring of operational incentives? If so how do you see it evolving?
23. Do you have suggestions for alternatives to financial incentives that could be applied in RP3?

Any other comments
24. Please provide any other comments or information that you think will be relevant for our study.
B Stakeholder workshop - record of discussion

Stakeholder workshop on incentives – 21 June 2017

Introduction by Maurizio Castelletti, to the workshop and welcoming of the new Chair of the PRB.

Key Issues: Questions 1 & 2

What do you understand the objectives of the incentives under the current arrangements to be? What do you think the objectives should be?

To what extent do you think that existing incentives schemes have driven performance or affected pre-planned capacity improvements?

Peter Curran – IATA:

- Observation that the key issue is that since performance plans are only adopted if deemed to be contributing to performance, he is not sure why there is a need for ANSPs to go beyond the target.
- Additionally, why incentivise something that should be achieved anyway.
- Second point, states that incentives add further complexity to an already complex scheme.
- The incentives are not delivering any discernible impact.

Guy Battistella – AIRE:

- Support the above, and highlighted that the performance scheme was built on a defined 0.5 min/average delay at network level, and the investments needed for that to be achieved are already financially payed for by airspace users, and this incentive provide extra payment.
- The outturn delay in 2015 and 2016, which exceeded the target, has not resulted in any [aggregate-level] penalties.

Allan Ekstrand – DK NSA:

- One size does not fit all. E.g. v difficult to set up an incentives scheme that actively incentivises performance in Denmark (with historically zero delay).

Maurizio Castelletti – EC:

- Shares the views that the objectives of the scheme were not that clearly defined. It was largely viewed by the Commission as a way to penalise ANSPs for not making the target.
• The PPs form a sort of contract over the reference period (5 years) and the incentive schemes were intended to make the PPs more flexible/powerful on a day-to-day basis.

Volker Dick – ATCEUC:
• Has to agree with AIRE and IATA about the added complexity. Noted an example from Maastricht where a demand of 180 flights per hour per sector is sometimes required, which is impossible. Especially considering 60% of these are not flown the way they planned (this does not allow for proper planning, even on a daily basis).
• Bonuses also lead to unsafe situations (aiming for more capacity than the target is unsafe).

Luca Falessi – IT NSA:
• Of the view that incentive schemes have not worked as expected in Italy, and is not sophisticated enough for Capacity. Is of the view that there should be a flat rate based on the European level, incentivising actual capacity not delay.

IATA:
• On effectiveness, no incentives have not worked. Especially as traffic is below forecast and yet still there are incentives - bonuses (based on capacity).

IT NSA:
• Seen as potentially useful for staff.

SDG:
• Clarification that incentives are things to change in behaviours, i.e. not just financially oriented.

Paul Neering – IFATCA:
• Notes that incentives refer to the business, but does not take into account the infrastructure and operational aspects. From that perspective, incentive schemes in RP1 and RP2 have not added anything.

Anthony Eiffe – EI NSA:
• Agreement that incentives are to change behaviour. Separately, if there is already good performance then there should be no incentive. Therefore, they should not be mandatory.

ATCEUC:
• Should change behaviour (again agreement).
• Separate comment that capacity is a combination of delays and the traffic. Delay is not an appropriate KPI.

DK NSA:
• Some places in Europe there have been no changes in behaviour at all due to the performance scheme.
Key Issues: Question 3

How well-understood is the target-setting process? What do you see the role of the Network Manager being in the setting and monitoring of these targets?

IATA:
- Difficult to answer the question, as IATA does not want incentives. Assuming that is the case, there should be no exclusions – weather delays and strikes should still be included as both can be controlled to some extent.

AIRE:
- The fact that there are different measurements for capacity delays in targets and that of incentives opens gaming opportunities. Therefore, all figures should come from the Network Manager.

Sarah Schneider – DE NSA:
- Germany has seen compliance issues addressed by the Commission regarding the use of CRSTMP delay codes for the incentive although the regulation gives the legal basis to do so.

Eduardo Abia – ES NSA:
- There is an independence issue with the NM, in that they hold some accountability (set targets and allocate delay), but are also a service provider.

IT NSA:
- Notes that Italy uses a different method that utilises service units to decide on capacity.
- Incentives should be in place that keep delay down when traffic is higher than planned.
- Highlights that there is no formal measure of capacity: how much “capacity” is one SU?
- Inconsistency/incoherence between NOP and PP.

IATA:
- View of IATA is that through the traffic risk sharing, there should be enough additional revenue to pay for additional capacity. Interdependency of KPAs.

Key Issues: Questions 4 & 5

Where used, has the link to FAB performance encouraged cooperation between ANSPs?

What are the suitable approaches for validating the allocation of delay (especially where certain delay causes are excluded from the incentive scheme e.g. weather) and demonstrating its accuracy?

EI NSA
- UK IR FAB has achieved co-operation through ensuring FAB compliance. E.g. the need to show that the ANSPs are working together in order to avoid penalties for not having a functioning FAB – but not as a result of the incentive scheme.

ATCEUC:
- It is difficult to train a controller.
- Overcapacity is required to provide flexibility to deliver peaks.
AIRE:
• Regarding the 10% threshold (alert mechanism), and how at that point, there is a need to reassess targets. But in RP1, the prepaid/financed investments have not been made.

Dariusz Wojtasik – PL NSA:
• In Poland, there has been an increase of IFR traffic but no increase of the service units. Therefore, there was a lower income despite a necessary capacity improvement. The revenue and traffic are not directly linked.

Ged Boydell – Network Manager:
• Is of the view that the incentive scheme has handcuffed cooperation between ANPS due to an added fear of having further delay. Therefore, this has resulted in a marginal reluctance to take additional traffic [this contradicts the NM view previously received].

Aleodor Francu – RO Eurocontrol:
• Repeats the point about the requirement for flexibility and the time to train controllers when traffic can change rapidly, e.g. the Ukraine crisis. Currently necessary to train 86 controllers, to provide appropriate capacity.

**Key Issues: Questions 6 & 7**

*What are your views on these issues [the unintended consequences]?*

*Have any other unintended consequences emerged? For example, has the achievement of capacity performance targets discouraged ANSPs from accepting more traffic than planned?*

IATA:
• There is a bias in the system since although many targets have been missed, more bonuses have been distributed than penalties (€14m bonuses, and €3m in penalties).
• Open question about whether it is the incentive schemes or simply the target-setting itself that creates some of these issues?

AIRE:
• As of yet, limited discussion on the trade-offs between the KPIs.

IT NSA:
• On the choice of target, should this be the NM or a local NSA decision to encourage good/better performance?
• Don’t agree with FAB incentives and instead the whole thing must be through the charging zone to not penalise some members of the FABs.
Key Issues: Questions 8 & 9

Inclusion of lower-level KPIs in the incentive schemes that focus on specific issues, e.g. extreme delays, significant events or peak periods which have large impacts. Are high-level average output measures or targeted lower-level measures most appropriate?

How do company-level incentives influence decision-making and operational staff? Are company-level incentives being translated to individual staff-level incentives? Is this coherent with the objectives of the incentives? Are there any risks associated?

IATA:

- It is well understood where the issues are (regarding capacity shortages), and does not understand why is there not already a KPI to address that. It should be noted that if stakeholders are serious about addressing the main issues areas, then there needs to be knowledge where to measure and target it. The Network Manager is well-placed to do this.

ATCEUC:

- Reflection on the previous comment by the PL NSA. For a controller, a blip is a blip irrespective of the aircraft size (which affects the revenue). Therefore, should note that the rewarding system for ANSPs is based on the revenue, although from an operational perspective the amount of work is identical (whether GA or an A380).

Network Manager:

- On IATA point above, Maastricht provides a lot of capacity and is good, but first rotation and weekends are areas where the issues are. Short term, the NM is measuring this and therefore it is possible for targets, and this can change ANSP behaviour. However, examples of changes in behaviour exist irrespective of the incentives.

Ideas for RP3

1. Retaining current arrangements, but combined with guidance material
2. Operationally focussed incentives on known problems
3. Adjust incentives according to actual vs planned level of traffic
4. Centrally administered system
5. NM given responsibility for managing network level delay (specific delay budget and targets defined for its responsibility)
6. Design of incentives left to NSAs, subject to minimal number of constraints
7. Monitoring, publication and naming and shaming of information
8. Capital investment targeted through a separate monitoring, trigger and penalties system for targeted capacity enhancing projects

Francesco [] – NM:

- One other method, would be to develop a more sophisticated model between variables, traffic risk sharing, alert mechanisms, incentives.
- Alternatively, create an area only acted upon by incentives and not by traffic risk sharing.

ATCEUC:

- When talking about naming and shaming, this does not reflect well on the staff, and goes against the model of safety regarding just culture. Also, cannot see in the list of ideas any
reflection on how to address changing traffic (referring to the alternative than planned flight routes).

DK NSA:
- Agreement towards idea 2. Is there a way, whereby if a flight is delayed they specifically would not have to pay. i.e. identification of which flights are being delayed and those that are not?

NM:
- The identification is possible, though would require investment.
- However there is the complication of how the delay on that specific plane has been altered by other influencing factors (e.g. the NM ATFM).

AIRE:
- Point on idea 5: Beyond that proposal, personal view is that there is a need for a centrally managed system with the referee being the NM. Further, AIRE agrees with all of the ideas presented, however cannot see the difference between what is in the current legislation and what is proposed.

IATA:
- Let’s say idea 9, is to define what the objective is for RP3, and not to have an incentive but to hit the capacity target. If they are kept, there is no need for bonuses, simply coherent performance plans and penalties.
- It agrees with there being a need for lower level KPIs too.

Eric de Vries – NL NSA:
- To note that the basics in Performance Scheme are not perfect. E.g. The capacity KPI, as discussed earlier. Asks whether beyond the ideas presented the Commission are considering having no incentives for RP3.

SDG:
- Clarification on penalties alone also being an incentivisation mechanism, we’re not simply talking about bonuses.

IATA:
- Confirms that by “no incentive” it meant no bonus.

EI NSA:
- As recognised by all stakeholders, NSAs are in the best position to address incentives, KPIs, etc, due to the local knowledge. Should be repeated that no mandatory incentives are necessary. Further, regarding the ideas presented, the NSA is well positioned for option 6.

Bronwyn Fraser – UK NSA:
- There is merit in recognising that incentives could go beyond a single reference period. This may help, as many of the projects that improve capacity significantly take longer than 5 years (or happen to take place across RPs). i.e. there is an issue with mismatched timescales of regulation and investment plans.
• As a second point, the UK agrees with EI on non-mandatory incentives. For example, NATS view the incentive schemes set up by the CAA alone are considerably better than those governed by the Performance scheme ones (which are constricting). Under idea 6, the framework should not weaken NSAs.

IT NSA:
• The capacity KPI is a political view and not the technical view. i.e. Capacity is not delay but how many IFR flights can be administered. The PS should therefore target the capacity of a service unit, which can be effectively monitored. (Capacity is a technical KPI, where delay is a political KPI).
• Delays are the result of the interaction of capacity and traffic.

Stephane Lafourcade – FR NSA:
• Currently in the incentive scheme, there is a missing element taking into account the provided capacity. There is capacity planning based simply on the traffic forecast, but separately also on the ACC. For example, there may be a case where there is only 2/3% change in total flights (nationally), however this cause to 20% increase in traffic in a specific sector in certain situations. NSAs should therefore be able include an additional parameter to take this into account, which is linked to the intrinsic capacity.

ES NSA:
• With regard to delays, flow regulation (creating delays) should be acknowledged as a good and safe approach.
• On idea 5, there are issues because of the adjustments on ANSPs capacity data, carried out by the NM, e.g. when an ANSP makes their targets but still gets penalised due to adjustments. Problem of too many influencing factors on delay, and if we try to remove the issues there may be a realisation that this is impossible find out that we cannot.
• Therefore, the incentive schemes should be made simple, consistent and understandable with common agreed goals, that provide for options which can be altered by NSAs on a local level. Additionally, if the responsibility is given to NSAs, there needs to be some Commission direction (ideas 4+6).

Maria Willert – CANSO:
• CANSO is not strictly against financial incentive schemes, and does see a usefulness to them, however it is acknowledged it should be looked at on a local requirement level (idea 6). Idea numbers 2 and 3 are also supported. Finally, CANSO is available to help and develop ideas if wanted.

Ged Boydell – Network Manager:
• On idea 5, the objective is network collaboration. When things do go wrong, it is important that ANSPs are not want to be handcuffed by the performance scheme.
• Collaboration where capacity is not available should be secondary objective/target.

IATA:
• For RP3, IATA would rather a more simple, less complex (not patchwork – i.e. lots of different local approaches) incentive system, since it is the network capacity and not local capacity that is important (against idea 6).
• An ANSP should not be incentivised to provide more capacity than necessary – why go beyond target?

Dijana Vondraček – HR NSA:

• Drafted the FABCE incentive scheme – supports idea 6. Since incentives are the tool in the performance scheme were NSAs have an influence on ANSPs (like there is for the common requirements).
• NSAs have limited influence on capacity, since it is an ANSP-NM conversation.
• There also should not be FAB level targets, as only the local level can be influenced in practice.
• As an additional idea, incentives could be combined with all KPIs.
• Further, appropriate guidance material with a clear picture will be needed – template schemes welcome.

AIRE:

• Network level is the priority, but the implementation may be local.

Maurizio Castelletti – EC:

• The key question now for the Commission is why is there a need to incentivise extra performance, otherwise there is an argument for scrapping them.

IT NSA:

• By further incentivising, you can help to adjust the general culture and philosophy of an ANSP towards being performance driven.
• There is a supply-side point that relates to capacity provision and a behavioural point that relates to the generation of delay.
• Need to be clear whether the target is an “optimum” or not. Italy sees the target as the max allowable delay, not the optimum [so there is a benefit in exceeding it (performing better)].
• Monitoring would need something concrete to monitor on an ongoing basis, not just something that can be measured ex-post.

Ana Gomez-Pineda – ES NSA:

• To note that it was the ANSPs not NSAs that were asking for symmetrical incentives (service providers obviously welcomed bonuses, and airspace users wanted penalties – NSA’s sit in middle).

Kevin Grant – PRU:

• There is considerable talk about optimum delay. The actual value is 0.3, however 0.5 min is the result when including weather and other allowance to accommodate system changes.

EI NSA:

• Agreement with ideas 2, 3 and 6. But should allow exemptions – ANSPs should not be penalised for things that are out of their control.
• One size fits all approach not appropriate and FAB targets do not work.
• Incentives should be asymmetrical, but with the upside in fact towards the bonus side to reward that effort, and in particular recognise that even if a target is not reached, since there is cost involved in trying. There should be a grading/scoring system to mark this.

NL NSA:
• Bonus not awarded for achieving target, but for surpassing it. But in any case, bonuses were only introduced as a result of the regulatory requirement for symmetry.

Maurizio Castelletti – EC:
• There could be a reason to compensate additional CAPEX needed for capacity, however it is hard to demonstrate and quantify the results.

IATA:
• The focus should be on whether overprovision is needed in RP3.

Ruta Vaigauskaitė – LT NSA:
• Agreement that all incentive schemes should be optional. They should involve trilateral consultation between ANSP-NSA-AUs.

Danilo Pisciottu – CANSO:
• Agreement that one size does not fit all.
• What does network level delay mean? How does attribution to the network versus an ANSP work?

FR NSA:
• On Maurizio’s comment on CAPEX, and its link to capacity. The link between CAPEX and delay figures is hard to define, partly as the delay is not just affected by the ANSP (weather, strikes, traffic flow shifts).
• Therefore if another link is made to actual capacity (as discussed earlier and which covers a number of factors: rostering in ops, airspace design, tech) then you do have a way to quantify improvements from CAPEX and provide some justification for a bonus.

Maurizio Castelletti – EC:
• Any desire from airspace users for idea 6 using only penalties?

IATA:
• No – an EU-level scheme is needed.

NL NSA:
• There are more actors involved. Having only penalties on the ANPS is not necessarily fair. Perhaps, there should be penalties for airspace users for not flying the planned flight plan.

Jean-Denis Larrere – ATCEUC:
• There is also some responsibility on airlines for delays. E.g. If all flights want to fly at FL 360 or 380, and there is no spare capacity, airlines refuse to fly alternative flight levels with capacity (330 or 350) and instead accept the delay.
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- Regulation should not be imposed on the customer.
- Disagreement with ATCEUC since it is well known airlines wish to fly at 360 and therefore the ANSP should prepare for that.

**NSA comments from NCP WG**

**UK NSA**
- Highlighted KPA and KPI interdependencies
- The delivery of capex can/should be monitored and influenced

**FI NSA:**
- Incentive scheme not effective – in fact keen to cancel it – since it is not realistic given zero delay. And they don’t want to adopt suboptimal targets in order to facilitate the scheme.

**ES NSA:**
- The Regulation translates to a “formula of parameters” linked to income. The flexibility of the text is welcome, but the core/basis should be more clearly stated/be more specific (traffic, capex, bottlenecks, cooperation with NM...)

**LT NSA:**
- Root causes of delays ought to be identified: operational, technical, cultural.
- Reiterated point that the NM and ANSPs cooperate as strategic partners, and the NSAs have no visibility
- Would welcome use of penalties only, focussed on operational level issues and performance culture.
- AUs consultation and involvement should be maintained/encouraged
- European league tables welcome. Incentives don’t have to be financial – other options available.

**FR NSA:**
- FAB dimension good since it encouraged engagement and cooperation. RP3 mix of FAB and state level collaboration.
- Lower level KPIs welcome
- Good incentives Good targets. Needs to be realistic.
- Bottom-up knowledge provided by NSAs during target-setting

**IT NSA:**
- Use separate KPIs for bonuses and penalties. E.g. Bonuses for output delay, and penalties for supply capacity.
C Potential focus areas for targeted incentives

Background

C.1 The performance Scheme regulation (EU) 390/2013 requires financial incentives, to be placed on ANSPs for their contribution towards achieving the EU-wide Capacity Performance Target. This EU-wide target is broken down to a FAB target, which must be achieved within the relevant reference period. The longer-term objective of the performance scheme is to achieve and maintain a price optimal EU-wide ATFM delay. This was determined by the PRU in 2011 to be approximately 0.35 minutes of total ATFM delay/flight (for all causes).

C.2 EUROCONTROL’s annual Performance Review Report (PRR) analyses the performance of ANSPs throughout Europe. Within this analysis, the PRR describes the operational challenges faced by the ANSPs operating the ACCs that are generating high levels of delay – also known as the most constraining ACCs. These are defined as ACCs generating more than one minute of en-route ATFM delay per flight for more than 30 days in a year.

C.3 The PRRs in 2015 and 2016 show that these most constraining ACCs contribute a considerable proportion of the delay in comparison to the traffic controlled:

- 2016 - 69.8% of the total ATFM delays, for 26.3% of total flight hours
- 2015 - 58.1% of the total ATFM delays, for 14.5% of total flight hours.

C.4 In 2009, the ten most constrained ACCs accounted for 74% of all en-route ATFM delay, but only 23% of the total flight hours controlled. Simulations during the target setting process for RP1 in 2010 demonstrated that reducing the ATFM delay generated by the ten most constrained ACCs in 2009 to 0.34 minutes of delay per flight would reduce the EU wide en-route ATFM delay to 0.5 minutes per flight. Reducing this further to 0.21 minutes of delay per flight for the most constrained ACCs would reduce the EU wide en-route ATFM delay to 0.4 minutes per flight.

C.5 It is clear that focussing on reducing delay at the most constrained ACCs could have a significant impact on achieving the EU-wide capacity performance target.

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16 Performance Revue Report 2015
17 Performance Revue Report 2016
18 This was chosen for the simulations because it is the targeted level of ATFM en route delay for the en route part of NATS in the price control proposal for Control Period 3 which ran from 2011 to 2014.
Targeting incentives at specific problem areas (in particular within the most constrained ACCs) was discussed at the stakeholder workshop on options for the future of the incentives schemes within the performance and charging scheme regulations on the 21st June 2017. A number of stakeholders were of the opinion that some form of targeted incentives would be beneficial.

The following sections highlight the operational issues experienced by the most constrained ACCs:

- Which are the most constrained ACCs?
- Review of specific capacity issues
- Seasonal capacity
- Sector limitation
- Weekend/weekday performance
- ‘First rotation’ delays
- System implementation and training
- Industrial action and weather
- Considerations
- Balance between capacity provision and cost efficiency
- Interrelations between actors
- Extraordinary delays
- An overview of the performance of the most constrained ACCs from the 2016 PRR is provided at the end of this Appendix section.

Which are the most constrained ACCs?

The 2016 PRR identifies the most constrained ACCs of that year and describes the causes of the capacity constraint. This list of constrained ACCs varies year-on-year, with some ACCs appearing during a specific short-term operational issue, such as implementing a new ATM system, while others are identified as having longer-term operational challenges to overcome and appear more often in the list.

Brest, Barcelona, Canarias and Nicosia have been identified in at least three of the last four PRRs. Whilst Prestwick ACC has only been included in the 2016 PRR, largely due to delays generated by the implementation of, and associated training for, the new iTEC ATM system introduced in June 2016.

It is also worth noting that ‘shielding’ or ‘masking’ of delays can occur when two neighbouring ACCs have capacity related issues. The ATFM process means that delay is assigned to the ACC generating the most delay (most penalising). This can lead to one of ACCs delay ‘shielding’ or ‘masking’ the operational performance of a neighbour. This means that list may not be exhaustive, and there may be more highly constrained ACCs than identified within the PRR, which would only become apparent as the identified bottlenecks are removed.

The table below shows the identified most constrained ACCs from PRR 2016, including their contribution to total European ATFM delay and the most significant causes of delay.
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Table C.1: The contributions of the most constrained ACCs to total AFM delay in 2016

<table>
<thead>
<tr>
<th>ACC</th>
<th>ANSP</th>
<th>Share of total en-route ATFM delay in 2016</th>
<th>Significant causes of delay</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barcelona</td>
<td>ENAIRE</td>
<td>4.7%</td>
<td>Capacity</td>
<td>Traffic +8.4% from 2015, with significant capacity issues experienced in the Summer</td>
</tr>
<tr>
<td>Bordeaux</td>
<td>DSNA</td>
<td>7.3%</td>
<td>Capacity/Industrial action</td>
<td>Industrial action in Jan, summer capacity shortages and weather phenomena between May &amp; Sept.</td>
</tr>
<tr>
<td>Brest</td>
<td>DSNA</td>
<td>20.1%</td>
<td>Capacity</td>
<td>Delays due to implementation of ERATO system, Industrial action Mar-Jun, and lack of summer capacity</td>
</tr>
<tr>
<td>Brussels</td>
<td>Belgocontrol</td>
<td>3.3%</td>
<td>Staffing</td>
<td>75% of ATFM delays were attributed to staffing reasons despite stable traffic growth</td>
</tr>
<tr>
<td>Canarias</td>
<td>ENAIRE</td>
<td>1.3%</td>
<td>Capacity</td>
<td>Traffic +10.3% from 2015 – considerably above the predicted values. Weekend operations and runway orientation were the main justifications</td>
</tr>
<tr>
<td>Karlsruhe</td>
<td>DFS</td>
<td>7.3%</td>
<td>Weather</td>
<td>Weather phenomena caused majority of delays between Mar&amp;Jul</td>
</tr>
<tr>
<td>Maastricht</td>
<td>Combination</td>
<td>11.4%</td>
<td>Weather</td>
<td>En-route weather phenomena during May to August was much greater than in previous years</td>
</tr>
<tr>
<td>Marseille</td>
<td>DSNA</td>
<td>5.4%</td>
<td>Capacity/</td>
<td>Industrial action Jan-Jun was the main cause, with capacity a serious issue in the summer</td>
</tr>
<tr>
<td>Nicosia</td>
<td>DCAC Cyprus</td>
<td>2.4%</td>
<td>Industrial action</td>
<td>Promised availability of 6 ATC sectors at peak, but max was 5. Additionally there was an inability to open all 5 due to staffing issues</td>
</tr>
<tr>
<td>Warsaw</td>
<td>PANSA</td>
<td>3.4%</td>
<td>Staffing</td>
<td>7.2% increase in traffic led to significant staff shortages in the summer</td>
</tr>
</tbody>
</table>


C.12 The majority of delay in the most constrained ACCs is attributed to either capacity or staffing (see figure below).
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Figure C.1: Evolution of en-route/airport ATFM delay per flight and Total en-route ATFM delay by reported cause, 2016


C.13 The following sections highlight specific capacity-related issues that have been identified. The most constrained ACCs in the 2016 PRR provide concrete examples of where these specific capacity issues have been reported and had a significant impact on European ATFM delay performance.

**Specific Capacity Issues**

**Seasonal capacity**

C.14 Traffic variability can affect performance and seasonal variation is observed mostly in the holiday destinations in southern Europe and the neighbouring ACCs.

C.15 This is reflected in the data from the most constrained ACCs, where many experienced record traffic during these summer months. Such traffic variability can lead to increased en-route delays in this period. The main causes identified within the most constrained ACCs, were issues with available capacity and staffing. In particular, capacity was the key issue for DSNA, ENAIRE and MUAC, while DFS and PANSA attributed more delays in the summer to staffing.

C.16 For many ACCs in Europe, significant capacity increases are required before and during RP3 to prevent increasing levels of delay. The ACCs requiring significant capacity increases include: Nicosia ACC (>30%), Skopje (25-30%), Brest and Athens (20-25%) with many others requiring 10-20% capacity increases between 2016 and 2019 (see figure below).
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**Figure C.2: Summer capacity increases required in 2019 compared to that of 2016**

![Summer Capacity Increases Required 2019 vs 2016](image)


**C.17** This highlights the importance of focusing on capacity increases and the scale of the issue regarding capacity provision particularly in the summer months.

**C.18** Barcelona, for example, is highlighted as requiring an additional 15-20% capacity by 2019. It also has one of the most notable summer peaks, with the summer delays synchronised with the increase in traffic over the summer.

**Figure C.3: Synchronisation between demand and delay in Barcelona ACC in 2016**

![Monthly en-route ATFM delay and traffic](image)

Source: PRU analysis

**C.19** The performance in Barcelona is partly due to the failure to address required increases in capacity that have been identified by the NM in the NOP since 2012.
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**Sector Limitation**

C.20 Brest ACC is highlighted as requiring an additional 20-25% capacity in summer 2019 compared to summer 2016. This was demonstrated in 2016 with the delay generated by traffic increases over the summer period. The traffic growth was not as large as in other constrained ACCs, however on further analysis the increased delay was partly attributed to not opening the maximum number of sectors on days where large amounts of delay were generated.

C.21 A similar experience was noted between July and September in Nicosia and Warsaw. In both cases the delays were attributed to staffing.

C.22 In these cases, it appears that performance improvements would be possible with increased accessibility to the maximum planned available capacity in periods of high traffic.

**Weekend/Weekday Performance**

C.23 The NOP in 2016 noted distinctions between ACCs’ ability to cope with summer traffic in the weekdays and weekends. Specifically, it was stated that “Several ANSPs did not deliver additional capacity for the well-known holiday traffic flows, particularly at weekends and when traffic growth or strategic re-routing is identified in good time”.

C.24 A major influencing factor on weekend and weekday delay performance was a significant increase in summer traffic over the weekend, as was identified in Athens & Macedonia (PRR 2015), Barcelona and Maastricht. In the majority cases the delay cause remained similar – inadequate staffing to enable the opening of all available sectors, or inadequate sector opening schemes\(^ {19}\).

C.25 It should however be noted that Barcelona ACC, having generated greater weekend delays in 2015, improved and produced no weekend capacity shortages in 2016\(^ {20}\).

**First Rotation Delays**

C.26 Reactionary delays provide a considerable contribution to the overall levels of delay in Europe. They occur when an initial delay to a flight results in the aircraft arriving late at its destination, leading to the subsequent flight to also be delayed. Reactionary delay can accumulate during the course of the day as flights are unable to recover to their original schedule. The earlier in the day a delay occurs the greater the potential is to generate greater levels of reactionary delay.

C.27 Delays during the busy morning peak or the ‘first rotation’ can have a considerable impact on the day’s operations.

\(^ {19}\) Network Operations Plan 2015

\(^ {20}\) Network Operations Plan 2016
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Figure C.4: Delay causes during the day

![Figure C.4: Delay causes during the day](image)


C.28 The Network Operations Plan for 2017\(^{21}\) identified first rotation delays as one of the NM’s network performance objectives and targets, with a target to “reduce by 10% first rotation delays (related to capacity and staffing) for at least one airport/ACC of the ones with significant network impact each year”.

C.29 Whilst ATFM delay is a clear contributor to delays (5-8%) during the morning peak, the contribution is far outweighed by the airlines (~40%) and airport-related delay (15-20%). Clearly, reducing the ATFM contribution to the first rotation delays would be beneficial, however, given the weight of delays from airlines and airports, further analysis would be required to assess whether there are specific locations contributing to first rotation delays and their impact to identify whether this would benefit from a targeted incentive.

System implementation and training

C.30 A number of ACCs have been identified as the most constrained within one year, but not others. This is often due to one-off circumstances generating significant delays for a portion of the year. Typically this occurs immediately after the implementation of, and associated training for, a new system or process that has a distinct effect on the operations of the ANSP.

C.31 Within the 2016 PRR, this was the case for both Prestwick ACC and Brest ACC, where new ATM systems, (iTEC) and ERATO (a Mid-Term Conflict Detection system) respectively, were implemented. In both of these cases, considerable delay was observed in the months immediately after implementation.

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In 2014, the same was noted in Warsaw during the implementation of the new Pegasus ATM system\(^{22}\). Typically, these delays are reported within the PRR as ‘other delays’ (see end of this Appendix section).

These systems are being implemented to improve the service, and often to specifically improve capacity. The capacity of the service is, however, reduced during implementation to ensure safe implementation of the system. Therefore, care should be taken when considering incentives for such causes of delay to continue to support the safe implementation of new investments and to avoid deterring such investments.

### Weather and Industrial Action

Another significant contribution to delays is attributed to weather phenomena and industrial action. In the French ACCs industrial action caused a large peak in delay during the first half of 2016, especially in March. Whilst weather phenomena were the main causes of delay in Karlsruhe (Germany) and Maastricht ACCs in 2016.

A topic of discussion amongst stakeholders is whether industrial action and weather related delays are actively outside of the control of the ANSPs. At the incentives study workshop, it was the view of airspace users that adequate investment should be able to mitigate the delay effects of some weather phenomena (e.g. through CAT III implementation), and prevention of industrial action should be a priority for ANSPs and within the control of management in the long-term.

Although weather and industrial action accounts for a significant amount of the total ATFM delay in Europe, there remains disagreement around the extent to which these can be controlled by ANSPs and hence can be the subject of incentives.

### Other considerations

#### Balance between capacity provision and cost efficiency

The local capacity targets (although not necessarily incentive scheme targets in RP2) for the capacity KPI are set to achieve an acceptable balance between the cost of capacity provision and the cost of delay. This is derived from the costs of providing capacity, the cost of delays to airspace users and is calculated by the Network Manager based on STATFOR traffic forecasts. ANSPs are then expected to plan to provide sufficient capacity to meet the delay targets whilst also meeting the cost efficiency targets within the performance scheme.

Delay can increase when traffic is much higher than the forecasted. ANSPs currently receive additional revenue, through traffic risk sharing, which can be used to support additional capacity provision. However, it is not always possible for an ANSP to increase capacity in such a flexible manner and it may require a longer planning cycle – generally 3-5 years – to be able to fully accommodate the increased capacity requirement.

If planning is to take account of the possibility of these situations, and provide sufficient capacity to handle traffic above the forecast, this would result in lower ATCO productivity and lower cost efficiency if the additional traffic does not materialise, which makes the trade-off between capacity provision and cost efficiency a delicate balancing act.

\(^{22}\) Performance Review Report 2014
Interrelations with other actors

C.40 Currently the incentives are focused on the ANSP through the en-route ATFM delays. However, in certain circumstances there are direct relations with other actors.

C.41 For example, in the Canarias ACC operated by ENAIRE, summer peaks in delay were not evident, with traffic remaining regular throughout the year. Instead the capacity attributed delays occurred throughout the year uniformly. The most notable periods of delay, 79% of all en-route ATFM delays in the ACC, occur on the weekends. This is further exacerbated on Saturdays, when 69% of all delays occur.

C.42 The reasoning behind this delay is related to the location and type of runway exits for different orientations of operations. Therefore, when the runway is being operated in a southerly direction, the runway capacity is insufficient for the higher weekend traffic. Therefore the attributed en-route delay is at least partly generated by inadequate airport infrastructure.

Extraordinary delays

C.43 The PRRs and the performance scheme KPI for capacity focus on the delay per flight per calendar year. However, it should be noted that this can have a smoothing effect over ‘one-off’ large delays. In these situations, the severe disruption can have a disproportionate impact on airline service. In order to minimise this behaviour, the UK CAA incentivises NATS in the prevention of these disruptions (high delays), by providing penalties when the “Daily Excess Delay Score” (based on weighted delays) exceeds pre-determined thresholds on a daily basis. This was first proposed in RP1, and continued into RP2 since ‘the Airline community is also supportive of the retention of the rare daily excess delay measure from RP1, which provides incentive to avoid individual days of severe disruption.’. It should be noted however that bonuses were removed from RP2.

C.44 These significant delays are generally due to some form of system failure rather than any underlying shortfall in ongoing capacity, and are rare. In 2011 and 2012 there were hardly any such incidents, however in 2013 it was dominated by excessive ATFM delays\textsuperscript{23}. This was not picked up in the relevant PRR.

C.45 Such events can have a significant impact on performance and are difficult to predict. The level of delay generated is often related to the resilience of the ANSP, i.e. their ability to recover from the incident.

\textsuperscript{23} UK-IRE RP2 performance plan
Overview of performance of the most constrained ACCs in the 2016 PRR

Barcelona

**Barcelona ACC en-route performance overview (2016)**

- 4.7% of total en-route ATFM delay in 2016
- 49 days of en-route ATFM delay >1 min. (+12d)
- 2.9% of flights ATFM delayed (+0.2% vs. 2015)
- 282 days of generated en-route ATFM delay (+39d)
- 43% higher traffic in peak week (vs. avg. week)

**Evolution of hourly throughput**

- 8.4% growth vs. 2015 (Forecast: H 9.9% - B 7.7% - L 5.8%)
- 17.0 min delay per delayed flight (-0.8min)
- 40.6 million Euro. est. delay costs (+5.6m)
- 5.3 interactions per flight hour (complexity avg: 6.9)

*Figure 3-16: Barcelona ACC en-route performance overview (2016)*
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Brest

Brest ACC en-route performance overview (2016)

20.1% of total en-route ATFM delay in 2016
166 days of en-route ATFM delay >1 min. (+39d)
8.9% of flights ATFM delayed (+1.9% vs. 2015)
1207 days of generated en-route ATFM delay (+300d)
28% higher traffic in peak week (vs. avg. week)

6.3% growth vs. 2015 (Forecast: H 6.6% - B 5.2% - L 3.8%)
Ø 19.7 min delay per delayed flight (- 0.3min)
€ 173.8 million Euro est. delay costs (+43m)
7.1 interactions per flight hour (complexity avg: 6.9)

Figure 3-11: Brest ACC en-route performance overview (2016)
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Bordeaux

Bordeaux ACC en-route performance overview (2016)

- 7.3% of total en-route ATFM delay in 2016
- 61 days of en-route ATFM delay > 1 min. (+46d)
- 3.6% of flights ATFM delayed (+2.2% vs. 2015)
- 441 days of generated en-route ATFM delay (+238d)
- 29% higher traffic in peak week (vs. avg. week)
- 5.4% growth vs. 2015 (Forecast: H 4.7% - B 2.2% - L 1.8%)
- 19.3 min delay per delayed flight (-4.9 min)
- €63.3 million Euro est. delay costs (+34m)
- 7.4 interactions per flight hour (complexity avg: 6.9)

Source: PRU analysis

Figure 3-12: Bordeaux ACC en-route performance overview (2016)
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Brussels

Brussels ACC en-route performance overview (2016)

- 3.3% of total en-route ATFM delay in 2016
- 54 days of en-route ATFM delay >1 min. (+ 47d)
- 3.0% of flights ATFM delayed (+2.4% vs. 2015)
- 200 days of generated en-route ATFM delay (+144d)
- 19% higher traffic in peak week (vs. avg. week)

0.2% growth vs. 2015 (Forecast: H 4.6% - B 3.5% - L 2.5%)

16.5 min delay per delayed flight (- 6.2min)

28.8 million Euro est. delay costs (+20m)

10.6 interactions per flight hour (complexity avg: 6.9)

Evolution of hourly throughput

2008: 135 Flows per hour
2016: 135 Flows per hour
2015: 90 Flows per hour

Figure 3-15: Brussels ACC en-route performance overview (2016)
Canarias

**Canarias ACC en-route performance overview (2016)**

- 1.3% of total en-route ATFM delay in 2016
- 36 days of en-route ATFM delay >1 min. (+11d)
- 1.8% of flights ATFM delayed (+0.8% vs. 2015)
- 81 days of generated en-route ATFM delay (+37d)
- 18% higher traffic in peak week (vs. avg. week)

- 10.3% growth vs. 2015 (Forecast: H 8.0% - B 6.1% - L 4.1%)
- 20.6 min delay per delayed flight (-5.3min)
- 11.7 million Euro est. delay costs (+4.4m)
- 2.0 interactions per flight hour (complexity avg: 6.9)

**Monthly en-route ATFM delay and traffic**

**Evolution of hourly throughput**

*Source: PFU analysis*
Karlsruhe UAC en-route performance overview (2016)

- 7.3% of total en-route ATFM delay in 2016
- 34 days of en-route ATFM delay > 1 min. (+21d)
- 2.4% of flights ATFM delayed (+1.3% vs. 2015)
- 437 days of generated en-route ATFM delay (+222d)
- 17% higher traffic in peak week (vs. avg. week)

- 3.6% growth vs. 2015 (Forecast: H 3.1% - B 1.3% - L 0.4%)
- 14.7 min delay per delayed flight (-1.1 min)
- 63.0 million Euro est. delay costs (+32.0m)
- 11.4 interactions per flight hour (complexity avg: 6.9)

Source: MRU analysis
Maastricht UAC en-route performance overview (2016)

- 11.4% of total en-route ATF delay in 2016
- 39 days of en-route ATF delay >1 min. (+13d)
- 3.7% of flights ATF delayed (+1.4% vs. 2015)
- 686 days of generated en-route ATF delay (+279d)
- 14% higher traffic in peak week (vs. avg. week)

4.3% growth vs. 2015 (Forecast: H 3.5% - B 2.4% - L 1.4%)

15.1 min delay per delayed flight (+0.2min)

98.7 million Euro estimated delay costs (+40.2m)

10.8 interactions per flight hour (complexity avg. 6.9)

Figure 3-17: Maastricht UAC en-route performance overview (2016)
Marseille

Marseille ACC en-route performance overview (2016)

- 5.4% of total en-route ATFM delay in 2016
- 32 days of en-route ATFM delay > 1 min. (+20d)
- 1.8% of flights ATFM delayed (+1.0% vs. 2015)
- 324 days of generated en-route ATFM delay (+188d)
- 34% higher traffic in peak week (vs. avg. week)

- 4.7% growth vs. 2015 (Forecast: H 3.7% - B 2.3% - L 0.8%)
- 24.9 min delay per delayed flight (+0.0 min)
- 46.6 million Euro est. delay costs (+27m)
- 6.3 interactions per flight hour (complexity avg: 6.9)

Figure 3-13: Marseille ACC en-route performance overview (2016)
Nicosia

**Nicosia ACC en-route performance overview (2016)**

- 2.4% of total en-route ATFM delay in 2016
- 72 days of en-route ATFM delay >1 min. (-119d)
- 3.7% of flights ATFM delayed (-3.2% vs. 2015)
- 142 days of generated en-route ATFM delay (-405d)
- 28% higher traffic in peak week (vs. avg. week)

- 0.7% growth vs. 2015 (Forecast: H 2.4% - B 0.5% - L -1.3%)
- 17.1 min delay per delayed flight (~3.6min)
- €20.4 million Euro est. delay costs (~58m)
- 2.8 interactions per flight hour (complexity avg. 6.9)

![Graph showing monthly en-route ATFM delay and traffic](image)

*Figure 3-14: Nicosia ACC en-route performance overview (2016)*
Warsaw

Warsaw ACC en-route performance overview (2016)

- 3.4% of total en-route ATFM delay in 2016
- 39 days of en-route ATFM delay >1 min. (+35d)
- 2.8% of flights ATFM delayed (+1.5% vs. 2015)
- 203 days of generated en-route ATFM delay (+114d)
- 25% higher traffic in peak week (vs. avg. week)
- 7.2% growth vs. 2015 (Forecast: H 2.9% - B 1.3% - L 0.2%)
- 15.0 min delay per delayed flight (+0.0min)
- 29.2 million Euro est. delay costs (+16.4m)
- 3.9 interactions per flight hour (complexity avg: 6.9)

Figure 3-19: Warsaw ACC en-route performance overview (2016)
D Overview of RP2 capacity incentive schemes
Baltic FAB Incentives

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ANSP Targets:

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**Poland**

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*No adjustment for CRSTMP
## BlueMed FAB Incentives

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### ANSP Targets:

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### Incentive Schemes:

- **Malta**: Malta has no incentive scheme applied
- **Greece**: Greece has no incentive scheme applied
- **Cyprus**: A non-transparent incentive scheme is in place
- **Italy**: A monetary value for each 0.01 minute deviation from national target is assigned. Limited reward/penalty at 1% of ANSP revenue. No deadband. In 2015, value was €815,000 per 0.01 minute deviation.

---

### Incentive Calculation:

The calculation of the incentive (bonus or penalty) is based on the costs of ATFM delay for Airspace Users in a gate-to-gate perspective. This calculation takes into consideration the projected minutes of ATFM delay for each year of RP2 multiplied by €81 (university of Westminster - “European airline delay cost reference values”) and allocation half of the economic effect to ENAV as a bonus, in case of over-performance, or as a penalty, in case of under-performance. This calculation provides an economic value of more than 1.5mln € each 0.01min/flt.
## Danube FAB Incentives

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**ANSP Targets:**

### Bulgaria

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*No adjustment for CRSTMP

** The 2015 PRB monitoring report shows the local target for 2019 to be higher than the deadband

### Romania

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** Whilst PP states that delay codes other than CRSTMP are excluded, it does not define that adjustment

** ** The 2015 PRB monitoring report shows the local target for 2019 to be higher than the deadband

---

[Graphs showing performance incentives for Bulgaria and Romania]
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### Denmark-Sweden FAB Incentives

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*No adjustment for CRSTMP

**There is ambiguity in where the deadband ends and the penalties/bonuses are applied - deadband ends at 0.02min/flight and bonuses are applied from 0.01min/flight for example.
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### FAB CE Incentives

#### NM FAB reference value

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</table>

Incentive scheme outline:

A deadband of +/- 0.03 minutes per flight is applied to each ANSP target.

**Bonus/Penalty formula = FAB PONDER x NATIONAL ANSP ELEMENT X 1% ANSP EN-ROUTE REVENUE**

- **FAB PONDER** - Percentage deviation of FAB delay from FAB target. Uses a stepped curve [example shown below] (specific curve for each target provided in annex E-1)
- **NATIONAL ANSP ELEMENT** - Percentage deviation of national delay from national target (therefore successful ANSP can be rewarded even if FAB doesn’t reach target)
- **ANSP EN-ROUTE REVENUE** - Maximum penalty/benefit is therefore capped at 1%

As dependant on FAB performance and local performance, hard to quantify maximum bonus/penalty levels

#### ANSP Targets:

<table>
<thead>
<tr>
<th>ANSP</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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*Due to the impact of transition of BiH airspace for the summer season after the transition as a part of risk mitigation measures and based on initial safety considerations there is a possibility of introducing regulations for inbound and outbound traffic from BiH airspace. Delays resulting from those regulations shall be specially coded as not to be considered under the incentive scheme*
**FABEC Incentives**

<table>
<thead>
<tr>
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<tr>
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*Target adjusted for CRSTMP is 78% of Local Target

**ANSP Targets:**

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The incentive calculation is executed in a four steps approach:

In the first step it has to be determined whether the target is achieved at FABEC level, while in the second step the FABEC incentive is defined on the basis of a linear function with a symmetrical dead band +/- 10% around the FABEC CRSTMP target for en route ATFM delay. In a third step it will be determined to what extent the individual ANSPs have contributed to the overall FABEC performance (over or under-performance). In the fourth step, the incentive (bonus or penalty) is distributed exclusively to those ANSPs who have contributed to the over or under performance.
Further development in air traffic management in the area of performance incentives

**NE FAB Incentives**

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**ANSP Targets:**

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### Norway

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<th>2019</th>
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<tr>
<td>Maximum bonus achieved</td>
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<td>Bonus threshold**</td>
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<td>0.08</td>
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<td>0.08</td>
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<tr>
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<td>0.13</td>
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<td>0.17</td>
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### Estonia

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<th>2018</th>
<th>2019</th>
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<tr>
<td>Maximum bonus achieved</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
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<td>0.16</td>
<td>0.17</td>
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</tr>
</tbody>
</table>

* No adjustment for CRSTMP

**Ambiguities about where deadband ends and benefits/penalties are applied - deadband ends at 0.05min/flight, bonuses applied at 0.04min/flight for example
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SouthWest FAB Incentives

<table>
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<tr>
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</table>

* Whilst PP states that delay codes other than CRSTMP are excluded, it does not define that adjustment. The excess delay due to causes other than CRSTMP are discounted if they are more than 20% greater than the average of the previous three years

**No information on maximum bonus/penalty applied, in the monitoring report

ANSP Targets:

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When the FAB target is not met: there is no bonus for any ANSP, and only the ANSPs that have not met their individual target are penalised.

When the FAB target is met: there is no penalty for any ANSP, and only the ANSPs that have met their individual target can receive the bonus.
UK-Ireland FAB Incentives

<table>
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<tr>
<th></th>
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ANSP Targets:

**Ireland**

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**UK**

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</tbody>
</table>

* Whilst PP states that delay codes other than CRSTMP are excluded, it does not define that adjustment

No bonus payable to either NERL or the IAA for a relevant year unless the FAB target for that year had been met and similarly no penalty would be payable unless the FAB target for that year had been missed. Subject to the FAB performance being above or below target, any bonus or penalty would be then applied to each of the en route ANSPs based on their performance.
## CONTROL INFORMATION

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<th>Prepared by</th>
<th>Prepared for</th>
</tr>
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<tbody>
<tr>
<td>Steer Davies Gleave</td>
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</tr>
<tr>
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<td>Unit E3</td>
</tr>
<tr>
<td>London SE1 9PD</td>
<td>Rue de Mot 24, 1040 Brussels</td>
</tr>
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<td>Belgium</td>
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<tr>
<th>Author/originator</th>
<th>Reviewer/approver</th>
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<tr>
<td>Stefan Kouris</td>
<td>Stephen Wainwright</td>
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<th>Other contributors</th>
<th>Distribution</th>
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<tr>
<td>Stephen Wainwright</td>
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<td>Rosie Nolan</td>
<td>SDG: Project team</td>
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<td>Simon Ellis</td>
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<td>Helios</td>
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<td>08 August 2017</td>
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