

Performance Review Body Advice on the Union-wide target ranges for RP4

September 2023

REMARKS FROM THE CHAIR

In preparing its advice for RP4 target ranges, the PRB is well-aware of the shortcomings relating to some of the KPIs adopted in RP3. However, as there are no currently agreed changes to the KPIs to be used in RP4, the PRB is preparing its RP4 target ranges report on the basis of the existing KPIs.

This report proposes target ranges for RP4 which runs from 2025 until the end of 2029. In preparing this report, the PRB took the opportunity to reflect on the ambitions set out in its RP3 target ranges report, the set RP3 targets and observed performance of ANSPs, and on the challenging events during RP3. In particular, the PRB has considered the impact of the COVID-19 pandemic and Russia's war of aggression against Ukraine on the performance of ANSPs during RP3 when setting priorities for the next reference period. In relation to the latter point, it is not possible to predict when hostilities will cease, therefore the target ranges have been set based on the current status. However, this should not be interpreted as a prediction on the part of the PRB of any future evolution of the hostilities in Ukraine.

PRB Observations: Many of the points highlighted by the PRB in its 2018 RP3 target ranges report remain as pertinent now as they did then. It is disappointing that the necessary changes were not delivered in the intervening period and it remains surprising that the traffic downturn did not enable an improvement of environmental performance. Points that the PRB then considered crucial still remain. In 2018, the PRB highlighted that some ACCs were providing insufficient capacity to manage the growing levels of traffic, leading to high levels of delays that impaired the performance of the entire network. The PRB also noted that ANSPs needed to invest in operations, staff and technology to meet the requirements of growing traffic. As we approach the end of RP3, traffic continues to increase post pandemic but, while there is considerable variation between Member States, on a Union-wide basis traffic levels remain some 17% below 2019 levels. In its latest monitoring report, the PRB made clear that the bottlenecks caused by some ACCs in the core of Europe continue to cause delays well in excess of the capacity targets set for RP3. This is despite, in some specific cases, deviations from the cost efficiency targets being granted to enable the investment required to achieve capacity targets.

PRB priorities: Safety, of course, remains the first priority and the PRB will continue to promote targets for safety management that support this priority. A meaningful response to climate change has become a similarly important objective. The EU's commitment to reduce greenhouse gas emissions by 55% by 2030 (Fit for 55) and to be carbon neutral by 2050 highlights the absolute need for all sectors to effectively contribute. The PRB proposes to prioritise the achievement of ambitious targets for the environment Key Performance Area. However, this will not be achieved in isolation because there are interdependencies between environment, capacity and cost that need to be considered in their globality when setting target ranges. The PRB's recent study into the interdependency between capacity and environment Key Performance Areas represents a good start in quantifying the impact of capacity shortfalls and hence delays on additional flight distances. The environmental performance targets can only be achieved if investment and flexible staffing programmes are delivered to facilitate fuel optimum routes and sufficient capacity to minimise delays and avoid re-routings. The associated costs need to be taken into consideration when setting the cost efficiency target range.

As set out in this report, the PRB proposes a balanced and demanding set of targets to minimise excess distance flown and its impact on the environment, supported by adequate staffing and investment to eliminate endemic capacity shortfalls, with sufficient funds to deliver these improvements and provide a more cost-effective service to airspace users. To be effective, these priorities should be supported by meaningful incentives that have a material impact in order to improve performance.



Cathy Mannion, PRB Chair

TABLE OF CONTENTS

1	INTRODUCTION	4
2	PRB APPROACH TO SETTING TARGET RANGES FOR RP4	5
2.1	<i>PRB objectives for RP4</i>	5
2.2	<i>PRB key principles</i>	6
3	TRAFFIC FORECAST	7
3.1	<i>STATFOR forecast.....</i>	7
3.2	<i>IFR movements forecast.....</i>	7
3.3	<i>En route service units forecast.....</i>	8
4	CONTRIBUTION OF CP1.....	9
4.1	<i>Expected benefits considered in the target ranges</i>	9
5	SAFETY	10
5.1	<i>Introduction to the safety KPA</i>	10
5.2	<i>Analysis of the safety KPA</i>	10
5.3	<i>Safety targets advice.....</i>	12
6	ENVIRONMENT	14
6.1	<i>Introduction to the environment KPA.....</i>	14
6.2	<i>Analysis of the environment KPA.....</i>	14
6.3	<i>Environment target ranges advice</i>	15
7	CAPACITY.....	19
7.1	<i>Introduction to the capacity KPA.....</i>	19
7.2	<i>Analysis of the capacity KPA</i>	19
7.3	<i>Capacity target ranges advice.....</i>	20
8	COST-EFFICIENCY.....	23
8.1	<i>Introduction to the cost-efficiency KPA</i>	23
8.2	<i>Analysis of the cost-efficiency KPA.....</i>	23
8.3	<i>Cost-efficiency target ranges advice</i>	24
9	PRB ADVICE ON RP4 TARGET RANGES.....	28

1 INTRODUCTION

- 1 Under Commission Implementing Regulation (EU) 2019/317 (herein referred to as the Regulation), the assistance to the Commission when setting the Union-wide performance target ranges is one of the primary tasks of the Performance Review Body (PRB). The legal basis for the setting of the Union-wide performance targets is defined in Article 9 of the Regulation:
 - At the latest 19 months before the start of the reference period (i.e. end of May 2023), the national supervisory authorities (NSAs) should provide initial cost data and information about traffic forecasts.
 - At the latest 15 months before the start of the reference period (i.e. end of September 2023), the Commission shall publish indicative target ranges for the Union-wide performance targets.
 - Stakeholders shall be consulted on these target ranges.
 - At the latest seven months before the start of the reference period (i.e. end of May 2024), the Commission shall adopt the Union-wide performance targets.
- 2 This report is the PRB advice on the Union-wide target ranges for fourth reference period (RP4, 2025-2029) which provides the evidence considered, the analyses carried out, and the rationale related to the setting of the target ranges of each key performance area (KPA) for RP4.
- 3 The stakeholders' consultation will follow the publication of this report, and the PRB will consider the output of this consultation in developing its advice on the Union-wide targets for RP4.
- 4 The PRB advice on the target ranges for RP4 main report (this document) is complemented by four annexes:
 - Annex I – Detailed analysis per KPA;
 - Annex II – Academic study on cost-efficiency;
 - Annex III – Impact of Russia's war of aggression on horizontal flight efficiency; and
 - Annex IV – Common Project 1 performance impact.
- 5 For the advice on the target ranges for RP4, the PRB used data provided by Member States (i.e. monitoring data and initial cost data), Eurocontrol (Aviation Intelligence Unit (AIU) and Statistic and Forecast Service (STATFOR)), the Network Manager, the European Union Aviation Safety Agency (EASA), and the SESAR Deployment Manager (SDM).¹
- 6 The PRB closely collaborated with EASA regarding the safety KPA and with the Network Manager regarding the capacity and environment KPAs. The PRB relied on academics for the estimation of the cost efficiency (Annex II) used as part of the evidence for the cost-efficiency KPA, on Eurocontrol for the estimation of the impact on KEA of the Russia's war of aggression against Ukraine (Annex III), and on the SDM for the analysis of the common project benefits for RP4 (Annex IV).

¹ Detailed references to the source of the data are included in this document.

2 PRB APPROACH TO SETTING TARGET RANGES FOR RP4

7 During the third reference period (RP3, 2020-2024) the aviation industry has been deeply impacted by the traffic volatility due to the COVID-19 pandemic, the strong rebound of air travel, and Russia's war of aggression against Ukraine. Even though the path to recovery of Union-wide traffic by now is more predictable, uncertainties remain on air traffic flows in the Union airspace due to the consequences of Russia's war of aggression against Ukraine. Moreover, high inflation rates and the probability of a recession impacting air travel demand cast uncertainty on the aviation market. As in previous target setting activities, the PRB relied on the traffic forecast published by Eurocontrol.

8 The actual data from 2020 to 2022 indicate that some of the problems ANSPs experienced in RP2 from air traffic management planning and operations have remained. Delays were above the targets and environmental performance did not comply with the targets (extension of routes remained). The picture was different during 2020 but this was the year of peak impact of the pandemic when the traffic level was uncharacteristically low. The following can be concluded:

- **Safety:** Considering the developments up to 2022 and the planning of the ANSPs and the Network Manager, the RP3 safety targets should be reached by 2024. This is on the basis that ANSPs continue to improve their performance as planned, and that their maturity does not degrade.
- **Environment:** Union-wide targets were only achieved in 2020, when the traffic downturn led to enough capacity enabling airspace users to fly more efficient routes, contributing to an improvement of KEA. Following this, performance deteriorated, and the targets were missed year-on-year. This indicates that the periods of low traffic were not used as an opportunity to improve airspace availability to prepare for the traffic rebound, to offer more direct routes, to remove route restrictions, or to improve en route to terminal interfaces. In 2022, a shift in trajectories due to Russia's war of aggression against Ukraine, combined with a stronger traffic recovery than the previous year and capacity disruption resulted in

significant flight trajectory extensions and the highest year on year deterioration in KEA in ten years. While the target ranges for RP4 will factor in some of those impacts, Member States must adapt to the situation and address underlying inefficiencies in their airspace and the lack of capacity forcing airspace users to reroute from flight optimum trajectories.

- **Capacity:** In the first years of RP3, the downturn of traffic caused an oversupply of capacity. ANSPs were expected to be able to meet more ambitious delay targets. However, ANSPs are currently falling behind schedule with the implementation of new ATM (air traffic management) systems and other capacity enhancement measures, as well as their plans to recruit and train additional air traffic controllers, leading the PRB to be highly concerned about likely capacity shortfalls during RP4. In this regard, the PRB encourages ANSPs to resolve ATC (air traffic control) capacity and staffing issues by the end of RP3.
- **Cost-efficiency:** In 2020 and 2021 ANSPs were able to only adjust partially their costs in response to the traffic downturn. The cost-efficiency targets up to 2022 have been exceeded at Union-wide level. ANSPs were able to manage more traffic than forecast, at lower cost than planned. This indicates that more stringent targets would have been realistic and achievable.

2.1 PRB objectives for RP4

9 The target setting process has the ultimate purpose of improving performance at a Union-wide and local level. The PRB objectives to be reached by the end of RP4, which are the pillars of the advice on the target ranges, are the following:

- **Safety** remains of paramount importance, to take account of the impacts from other KPAs, to control the impact from widespread changes to ATM functional systems, and to progress regulatory compliance. This approach continues in RP4.
- **Environment** is the priority for RP4 in line with the EU's green agenda. ANSPs need to greatly improve in terms of environment. Reducing

CO₂ emissions is a top priority for the European Union and society as a whole. ANSPs must offer the best level of capacity aiming at reducing excess flight trajectories and enabling emission reductions to reach a higher level of environmental efficiency by the end of 2029. For the coming reference period, the PRB considers the environment KPA as the top priority, and advises for ambitious but achievable target ranges.

- Environmental performance, traffic recovery and growth need to be sustained by better **capacity performance**. Member States must provide the required capacity to minimise the impact on airspace users in terms of delays, and on society in terms of avoidable CO₂ emissions.
- **Cost levels** must support the delivery of safety, environment, and capacity performance improvements, while remaining at an efficient level.

2.2 PRB key principles

10 The PRB key principles in advising the Commission on the target setting process for RP4 are the following:

- **Independence:** The PRB is independent from any financial, corporate, or political interests. All PRB members are independent experts, with decisions taken by the PRB as whole. The PRB is also supported by an independent support team dedicated permanently and exclusively to the PRB.
- **Analytical rigour:** The evidence presented in this document is based on thorough analysis. The PRB has involved EASA and the Network Manager to contribute to and validate the analysis carried out. The PRB has also involved Eurocontrol in the estimation of the impact on KEA of the war in Ukraine, and leading academics for the assessment of the level of efficiency of air navigation service providers.

- **Consultation:** The PRB is committed to consulting with stakeholders as much as possible within the target setting process and will consider all stakeholder comments received in the consultation process.
- **Achievable ambition:** The PRB recognises that the stakeholder community may have diverging views on targets for RP4. The PRB commits to analysing evidence carefully in a balanced approach so that targets are ambitious, but importantly, achievable and sustainable.
- **Interdependencies:** The PRB recognises the existence of direct and indirect interdependencies between key performance areas, especially between capacity and environment. In proposing the target ranges, the PRB accounted for such interdependencies both quantitatively and qualitatively.
- **Outcome-oriented targets:** While the targets proposed by the PRB will recommend the outcome for Union-wide performance, it is the Member States and their ANSPs who will define how to achieve these targets.

3 TRAFFIC FORECAST

- IFR movements and en route service units are forecast to increase from 2024 to 2029.
- The increase of IFR movements and en route service units during RP4 is forecast to be relatively homogeneous across Member States and slower than experienced in the past.
- Several Member States will not reach the levels of 2019 IFR movements and service units by the end of RP4.

3.1 STATFOR forecast

- The latest available traffic forecast has been published by Eurocontrol on 31st March 2023. The STATFOR seven-year forecast 2023-2029 is based on the most recent traffic trends and considers as inputs the most up-to-date forecasts of economic growth, population, low-cost market share growth, load factors, future events, future high-speed rail network as well as future airport capacities. The methodology applied by Eurocontrol reverted to that used pre-pandemic, meaning that the uncertainty in the forecast is expressed by different scenarios (i.e. low, base, and high).
- The differences between the scenarios forecast are symmetric for both IFR movements and service unit forecasts. The differences between the values of the scenarios are reaching in 2029 +/-10% for IFR movements forecast and +/-12% for service units forecast.
- As defined by the Regulation, the STATFOR base forecast is the basis for the target setting process and preparation of the performance plans. Therefore, the analysis carried-out in this section is focused on the base scenario forecast.
- The next publication of the STATFOR forecast is planned for autumn 2023. The updated figures will be considered in the PRB advise on the targets for RP4.

3.2 IFR movements forecast

- The Union-wide IFR movements are forecast to be 10.6M in 2029. These amounts will be the highest managed by the system to-date. The 2019 levels (10M), the previous highest recorded level, is expected to be reached by 2025 and in 2029 the Union-wide IFR movements is forecast to be 6.1% higher than in 2019 (Figure 1).
- The rate of increase will be mostly concentrated in the remaining years of RP3: +11% and +6.2% year-on-year in 2023 and in 2024, respectively. From 2024 onwards, the Union-wide increase is

forecast to be relatively slower, being on average +1.5% per year (from 2024 to 2029). By comparison, the average increase for 2014-2019 was +2.8%. In RP4, Member States will be expected to manage a steady but relatively slow increase of traffic.

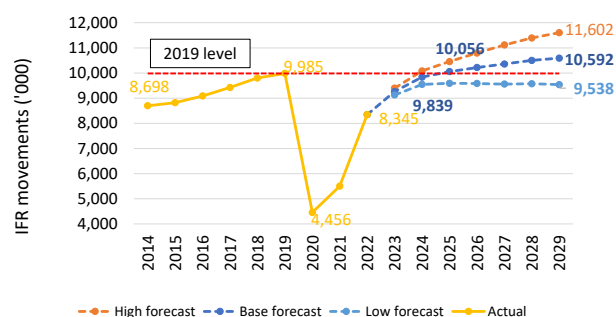


Figure 1 – Union-wide IFR movements actuals from 2014 to 2022, and STATFOR March 2023 forecast from 2023 to 2029 (source: PRB elaboration on STATFOR forecast).

- When analysed at Member State level, the situation is more varied. On their base forecast, eight Member States are forecast to not reach the 2019 level of IFR movements by the end of 2029 (Czech Republic, Denmark, Estonia, Finland, Latvia, Lithuania, Poland, and Sweden), while all other Member States are forecast to reach 2019 levels no later than in the early years of RP4.
- When analysing the average increase of traffic from 2024 to 2029, Member States are forecast to have an average increase of around 1.7%. Only three Member States deviate significantly from the average: Norway with traffic that is forecast to remain almost flat during RP4 (+0.3%), and Malta and Cyprus showing the greatest growth (+2.5% and 3.0%). However, these are relatively small differences than were experienced in the past. By comparison, 2014-2019 recorded wider traffic disparities between Member States. The average Member State growth during RP2 was +3.9%, with the extremes being Norway (-0.9%) and Croatia (+6.6%).

3.3 En route service units forecast

- 19 The Union-wide en route service units are forecast to be 143M in 2029. As for the IFR movements, these amounts will be the highest ever managed by the system to-date. The 2019 levels (125M), the highest recorded to date, will be reached before the start of RP4 (in 2024). In 2029, the Union-wide service units are forecast to be +14% higher than in 2019 (Figure 2).
- 20 As for expected IFR movements, the rate of increase of the service units is forecast to be concentrated in the remainder of RP3: +11% and +7.3% year-on-year in 2023 and in 2024, respectively. From 2024 onwards, the increase is forecast to be relatively slow, at an average +2.0% per year (from 2024 to 2029). By comparison, during the years 2014-2019 the average increase was +4.2%.

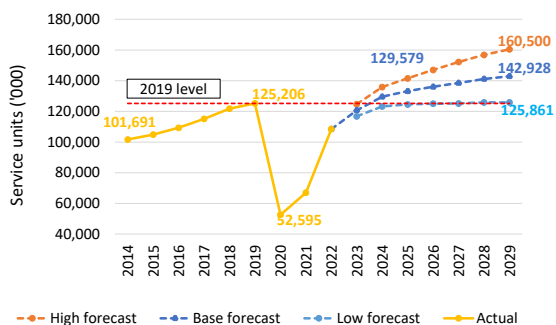


Figure 2 – Union-wide en route service units actuals from 2012 to 2022, and STATFOR March 2023 forecast from 2023 to 2029 (source: PRB elaboration on STATFOR forecast).

- 21 When analysed at the Member State level, 11 Member States are forecast to not reach the 2019 level of service units by the end of 2029 (Czech Republic, Denmark, Estonia, Finland, Latvia, Lithuania, Malta, the Netherlands, Poland, Slovakia, and Sweden).² The majority of the other Member States are forecast to reach 2019 levels before the end of RP3, or in the first year of RP4.
- 22 When analysing the evolution of traffic from 2024 to 2029, Member States are forecast to have an average increase of around +1.9%. The increase in traffic is homogeneous across all the Member States, being within 1p.p. (percentage point) around the average (between +1.2% in Norway, Denmark, and the Netherlands, and +3.0% in Cyprus). By comparison, for 2014-2019, the average Member State growth was +4.6%, with the extremes being Norway (+1.9%) and Bulgaria (+8.0%).

² Malta, Slovakia, and the Netherlands are almost reaching the 2019 values in 2029.

4 CONTRIBUTION OF CP1

- 23 Commission Implementing Regulation (EU) 2021/116 on the establishment of the Common Project One (CP1) supporting the implementation of the European ATM Master Plan aims to accelerate the digitalisation of European ATM towards a more efficient and technologically advanced industry. The deployment of such technologies translates into projects providing tangible and quantifiable benefits to European ATM.
- 24 The SESAR deployment manager (SDM) is responsible for the coordination of the implementation of the most essential operational improvements through the concept of Common Projects. A Common Project is an extraction from the European ATM Master Plan, based on mature SESAR solutions to be deployed in a synchronized and timely manner across Europe (as defined in Commission Implementing Regulation 2021/116). Whilst the European ATM Master Plan is non-binding, the Common Project binds the Member States and their operational stakeholders.
- 25 The CP1 Regulation introduced a fixed implementation deadline for all its ATM functionalities, which is set as 31st December 2027; this date is within the timeframe (2025-2029) of RP4. Therefore, it is expected that the full potential of CP1 will be materialised during the next reference period, especially in terms of operational and performance benefits. The benefits on the key performance areas are forecast and monitored by the SDM. The PRB has considered these benefits in its RP4 target ranges proposal. More details are included in the Annex developed by the SDM (Annex IV of this report).

4.1 *Expected benefits considered in the target ranges*

- 26 The deployment of new technology monitored by the SDM provides a wide range of benefits, which are quantified for each year and for each implementing entity. Benefits are quantified by the SDM across several KPIs covering environment, capacity, operational efficiency, and cost-efficiency. For the purpose of the target setting process, the PRB considered two KPIs relating to environment and capacity: En route fuel savings and en route ATFM delay savings. These two KPIs are the most related to the performance and charging scheme KPIs, on which the targets are based. As

benefits are calculated by the SDM against a no-action scenario, it is not possible to factor them directly into the target ranges.

- 27 The European Route Network Improvement Plan (ERNIP) considers the flight efficiency improvements stemming from approximately 340 packages of airspace proposals scheduled for implementation for the Summer seasons 2022 – 2030. The projects within the ERNIP include the majority of projects that will be implemented under CP1, which are being coordinated by the SDM. As the benefits of CP1 are a subset of the ERNIP measures, the PRB has considered the benefits from the ERNIP when proposing target ranges to avoid double counting. The implementation of these proposals has the potential to significantly improve flight efficiency. By considering the improvements as described in the ERNIP, the PRB indirectly factors into the target ranges the benefit expected from CP1 for the environment key performance area.
- 28 The projects included in CP1 and overseen by the SDM are (or should be) part of the capacity improvement measures planned by ANSPs (for projects which are implemented at an ANSP/ACC level). The Network Manager also considers the impact of these measures when preparing the Network Operations Plan (NOP). Moreover, there may be additional benefits over and above those included in the NOP due to network effects and implementation actions taken by other stakeholders (e.g. airspace users). For the purpose of the capacity target ranges, the measures included in the NOP are considered within the timeframe of the current edition of the NOP (2023-2027). Therefore, in relation to the capacity target ranges, the benefits estimated by the SDM are factored in as indirect evidence when determining the level of ambition for RP4.

5 SAFETY

- All the ANSPs and the Network Manager are expected to achieve RP3 targets by the end of RP3.
- Safety performance needs to continue to improve over RP4.
- Targets are advised to be a minimum level of maturity D in safety risk management, and C for the other EoSM Management Objectives.

5.1 Introduction to the safety KPA

29 Safety within the performance and charging scheme serves two roles:

- Safety as a key performance area (KPA) to monitor and drive further improvements in safety performance; and
- Safety as a control mechanism to address impacts foreseen from targets set on the other KPAs: Environment, capacity, and cost-efficiency.

30 As set out in the Regulation, the safety KPI is the minimum level of the effectiveness of safety management (EoSM) to be achieved by air navigation service providers certified to provide air traffic services. The KPI measures an ANSP's ability to implement and manage an effective safety management system (SMS) by measuring the level of implementation (maturity) of the following safety Management Objectives (MOs):

- Safety culture;
- Safety policy and objectives;
- Safety risk management;
- Safety assurance; and
- Safety promotion.

The level of maturity for each of these Management Objectives is defined from level A to level D (D being the best).

31 For the purpose of target setting, the Union-wide EoSM targets are set for the final year of the reference period (2029), with ANSPs required to provide intermediate levels for each year of the reference period. The targets for the safety KPI have been developed by the PRB in close cooperation with EASA, as per Article 6 and 9 of the Regulation.

RP4 Safety KPI

32 In January 2022, the European Commission has requested EASA to develop, together with the relevant stakeholders, a potential set of Safety (key) performance indicators (S(K)PIs) for RP4. The technical report was published at the end of April

2023 and included a proposal for the continuation of the EoSM as the sole safety KPI. The EASA working group proposed to:

- Revise the current EoSM questionnaire to better address the challenges expected during RP4, and to allow for any potential negative impact on safety from other KPAs.
- Update the EoSM Management Objectives based on the CANSO Standard of Excellence (SoE) in safety management. As for RP3, the related questionnaire has been revised to reflect the modern safety management approaches.
- Create two versions of the EoSM questionnaire to reflect the applicability to both ANSPs and the Network Manager. This differentiation is needed to recognise the differing roles and responsibilities of these two respondent groups.
- Base the Network Manager EoSM questionnaire on a sub-set of the EoSM questionnaire applicable to the ANSPs.
- Align the verification mechanism with the EASA Management System Assessment Tool to compare the results reported via the EoSM questionnaires and the intelligence gathered by EASA through their oversight.

33 The revised EoSM questionnaire is expected to be available late 2023.

5.2 Analysis of the safety KPA

RP2 evolution

34 The EoSM targets for RP2 were set at level C for safety culture, and at level D for all the other safety Management Objectives. As shown in Figure 3 (next page), 28 out of 31 ANSPs achieved the RP2 targets. The Network Manager also achieved its RP2 targets.

35 The results show that safety targets were realistic and achievable. For some Management

Objectives (e.g safety culture) it transpired that the targets were not challenging enough; having already been reached by the majority of the ANSPs during the first year of the reference period. Given that the majority of the ANSPs achieved the RP2 targets, the EoS M needed to be updated to continue the improvement of safety management in RP3.

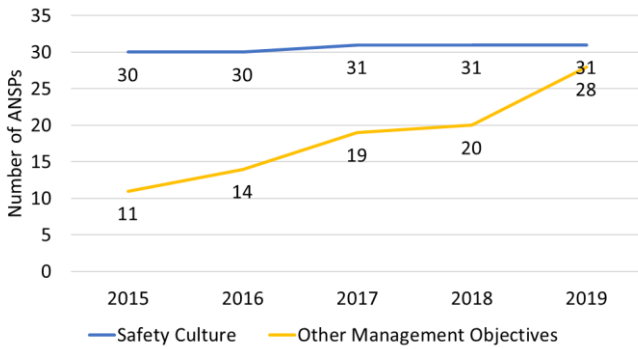


Figure 3 – Number of ANSPs achieving the Management Objectives during RP2 (source: PRB elaboration).

RP3 evolution to date (2022)

- 36 The Regulation (i.e. for RP3) retained the safety key performance indicator from RP2: The Effectiveness of Safety Management (EoS M) of air navigation service providers. The EoS M questionnaire was substantially modified between RP2 and RP3 (among other changes) to align it with the CANSO Standard of Excellence (SoE- v.2), and to ensure consistency with the Commission Implementing Regulation (EU) 2017/373 (common requirements Regulation).
- 37 The EoS M targets for RP3 were set at level D for safety risk management, and at level C for all the other safety Management Objectives. The targets were set to be achieved by the end of RP3, expecting ANSPs to show a gradual improvement over RP3 to achieve the targets in 2024, at the latest.
- 38 The revised Union-wide targets for RP3, following the exceptional measures Regulation, did not modify the safety targets originally set for the reference period.³ Despite the impact of the COVID-19 pandemic, the PRB still considered the targets achievable and relevant for RP3. Safety remained the highest priority. The ANSPs were expected to maintain high attention to safety management

ensuring to adapt and scale depending on the specific situation.

- 39 Figure 4 shows the maturity levels planned by the ANSPs over RP3, and the achievement level in the first three years of RP3. While ANSPs were expected to achieve the target for safety risk management late during RP3, they are ahead of their plans with 18 ANSPs already reaching the RP3 target in 2022 (out of 36). For other Management Objectives, the achieved maturity levels follow closely the expected evolution over RP3, with 23 ANSPs that planning to achieve the RP3 target in 2020, and with two ANSPs planning to reach the target during the last year of RP3.

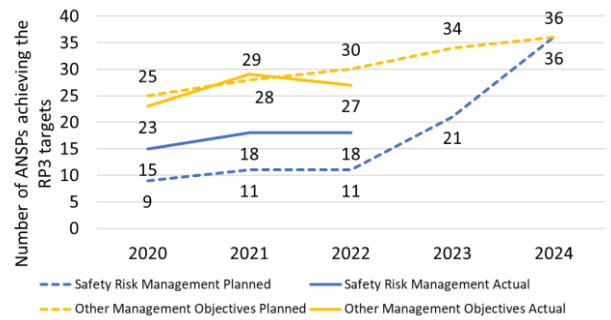


Figure 4 - Planned and actual number of ANSPs achieving the EoS M targets during RP3 (source: PRB elaboration).

RP3 outlook (2023-2024)

- 40 None of the ANSPs are currently much behind achieving the RP3 targets: All ANSPs not yet on target are one maturity level below, and most ANSPs only need to improve on two or three questions to meet the targets. The main area for improvement is safety risk management, with eight ANSPs needing to improve on all three questions under the Management Objective. 11 ANSPs need to improve on safety risk management while already reaching the target relating to the other Management Objectives.
- 41 With the developments seen up to 2022, combined with the planning of the ANSPs, the PRB forecast that all ANSPs will achieve the RP3 targets by 2024.⁴ EoS M targets for RP4 should be set on the assumption that the RP3 targets will be achieved by all the ANSPs.

³ Commission Implementing Regulation (EU) 2020/1627 of 3 November 2020 on exceptional measures for the third reference period (2020-2024) of the Single European Sky performance and charging scheme due to the COVID-19 pandemic.

⁴ It remains the risk that few ANSPs might not achieve the targets, as just failing one small part of one question under a given Management Objectives will cause the ANSP to miss the target on the minimum level of maturity.

42 The Network Manager has performed as planned over RP3 and is expected to reach its safety targets by the end of RP3.

5.3 Safety targets advice

43 It has been proposed that the EoSM questionnaire will be based on the revised CANSO SoE (revision from February 2023). The updated CANSO questionnaire is organised by different objectives. These objectives can be linked to the five Management Objectives of the EoSM, including also transversal objectives related to interdependencies.

44 To assess the level change between the revised CANSO SoE and the RP3 EoSM, the PRB and EASA have jointly performed a comparative analysis, also considering potential adjustments coming from the PRB/EASA priorities. This is used to determine the expected level of maturity ANSPs would achieve at the end of RP3. The assessment concluded that the revised CANSO SoE is incrementally more challenging than the RP3 EoSM questionnaire, therefore:

- An average ANSP is assumed to start RP4 one level lower than when ending RP3. Hence: (i) For other Management Objectives, ANSPs would start on level B even if already satisfying several of the conditions to reach level C; (ii) for safety risk management, ANSPs would start on level C, provided the ANSPs have ensured compliance with Regulation (EU) No 2017/373 in respect to fatigue-risk management and human contribution to risks.
- ANSPs achieving a minimum maturity level C or D at the end of RP3 need to implement improvements to retain the same level of minimum maturity using the updated EoSM questionnaire.
- ANSPs not achieving the targets for RP3 for Management Objectives other than safety risk management would start RP4 with the same maturity level.

45 For the Network Manager it is expected that the EoSM in RP4 will also be more challenging than in RP3. While the EoSM in RP4 will be better tailored to the specifics of the Network Manager, the Network Manager will start RP4 at a lower level of maturity.

46 Annex I of this report provides a detailed analysis of the historical performance and a description of the approach outlined above.

PRB and EASA approach

47 Given the strong links between the different key performance areas, the interdependencies between the performance targets need to be considered for the purposes of target setting. Ensuring a continued, high level of safety performance remains the highest priority in the target setting process.

48 The safety KPI acts both as a vehicle to improve safety performance and as a control mechanism. As a control mechanism it helps to manage the impact of actions and decisions taken under the other three KPAs, known as interdependencies, and on changes implemented on a wider scale in the ATM functional system or in airport systems. When changes occur, it is important to ensure risk is not transferred, and that risks to safety are not increased. Widespread implementation may be difficult to manage and may require, for example, a strengthening of the methodologies applied, an increased monitoring to detect degrading safety levels, and/or increased awareness.

49 Russia's war of aggression against Ukraine causes an increased pressure on safety management, notably on the adjacent Member States. Such pressures include the diversion of traffic flows resulting from airspace closure, the increased operation of unmanned aerial vehicle and military flights, increased cyber security risks, and potential attacks. While it is not possible to predict the evolution of the conflict, the ANSPs need to have a safety management system that is sufficiently agile and adaptable to effectively identify and control these types of change. Against this background, the maturity of the safety management systems needs to continue to improve, especially in the areas of safety risk management and safety assurance.

50 The targets put in place should support the progress towards regulatory compliance with Regulation (EU) 2017/373 and its recent amendments. This includes regulations already proposed and becoming effective during RP4 (i.e. Unmanned Aerial Systems (UAS) and management of Security). This also includes Human performance already covered by Regulation 2017/373 but not specifically addressed by the current EoSM. Finally, the EASA working group underlined the

complementary nature of the performance scheme and the actions defined in the EASA European Plan for Aviation Safety (EPAS). The targets should be considered to support the implementation of the EPAS actions.

- 51 Considering the above and the expected developments for RP4, the PRB and EASA jointly concluded that, to ensure safety levels are retained and where possible improved, targets need to be set to ensure continued improvements of safety performance. The PRB and EASA recommend safety targets for RP4 as shown in Table 1. The same targets are proposed for the Network Manager, using the tailored RP4 EoSM.

Union-wide safety targets for RP4	
Management Objectives	2029 maturity levels
Safety culture	C
Safety policy and objectives	C
Safety risk management	D
Safety assurance	C
Safety promotion	C

Table 1 – RP4 Union-wide targets for the Effectiveness of Safety Management.

6 ENVIRONMENT

- To align with the EU’s green agenda, the PRB prioritises environmental performance for RP4, with target ranges to support the EU’s ambition of a carbon-neutral economy.
- KEA performance last improved in 2020 during the period of low traffic and has deteriorated in 2021 and 2022. Actual KEA performance has not reflected the improvements to the route network design that have been implemented during this period.
- The PRB recommends the Member States to define an environmental incentive scheme and additional environment targets based on the most appropriate KPI, which best reflects the contribution ATM makes to improve flight inefficiencies.

6.1 Introduction to the environment KPA

- 52 The KPI within the environment KPA is the average en route flight efficiency of the actual trajectory (KEA). The indicator aims to drive positive behaviours and limit environmental impact by measuring the additional distance flown beyond the great circle distance. This additional distance flown is influenced by the actions of ANSPs, but also by the route choices of airspace users, airspace restrictions, and network measures. The higher the KEA value, the worse the performance.
- 53 KEA is the only environment indicator with targets for Union-wide and local performance. The indicator, and the related targets, are defined for the whole calendar year and for each year of the reference period (i.e. 2025 to 2029 inclusive for RP4).
- 54 The target ranges for the environment KPI have been developed by the PRB in close cooperation with the Network Manager.

RP4 KPI

- 55 There are no changes foreseen with regards to the environment KPI for RP4. The target ranges are therefore based on the environment KPI as currently defined by the Regulation.

6.2 Analysis of the environment KPA

RP2 evolution

- 56 For RP2, there were two environment KPIs defined by the performance and charging schemes; KEA (which remained unchanged for RP3) and KEP, which was changed to a performance indicator for Member States in RP3 (i.e. without binding targets).
- 57 Figure 5 shows how KEA performance evolved over RP2 and RP3 to date, relative to targets and compared to traffic levels. During RP2, environmental performance, as measured by KEA,

remained stable with a series of minor improvements and degradations. As a result, targets which were set to be gradually more challenging were missed in 2018 and 2019.

- 58 While performance did not follow the ambition set by the targets, the stable trend was achieved over a period of increasing traffic and delays. This suggests that ANSPs were able to employ measures and procedures, and network measures were implemented, to mitigate the impact of increasing traffic on KEA during RP2.

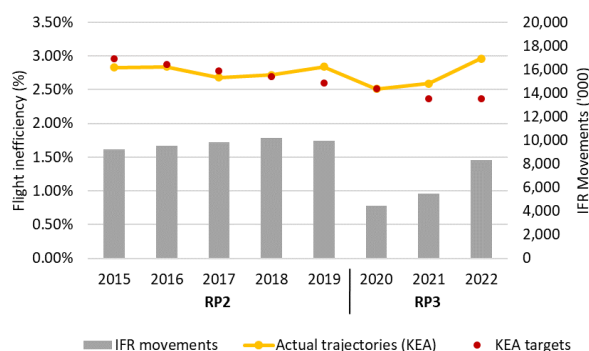


Figure 5 – Union-wide KEA performance and targets over RP2 and RP3 (source: PRB elaboration).

RP3 evolution to date (2022)

- 59 The initial Union-wide targets for KEA for RP3 were set building on those for RP2 with a gradual increase in the level of ambition: 2.53% in 2020, 2.47% in 2021, 2.40% in 2022, 2023 and 2024. The COVID-19 pandemic, and the related traffic decrease, led to a revision of the targets from 2021 onwards (following the exceptional measures Regulation). Lower traffic led to the opportunity for improved KEA, and therefore targets were revised with a higher level of ambition for 2021 and 2022

(2.37%), while remaining as previously set for 2023 and 2024 (2.40%).⁵

- 60 The lower traffic during the COVID-19 pandemic showed that horizontal flight efficiency improves when capacity is higher than traffic demand. Whilst the target for 2020 was only just achieved (by 0.02 percentage points (pp) with an actual KEA of 2.51%), the KEA values for both March 2020 to February 2021, and April 2020 to March 2021 were both equal to 2.41% over these 12-month periods. KEA then degraded from May 2021 as traffic recovered. This performance demonstrates that with sufficient capacity the ambitious targets set for RP3 were achievable.
- 61 The Union-wide situation changed once again in 2022, following Russia's war of aggression against Ukraine. The circumnavigation of Ukrainian, Belorussian, and Russian airspace led to substantial changes in traffic flows and overflights across the SES area and considerably more inefficient trajectories on certain routes. This shift in trajectories, combined with strong traffic recovery and capacity constraints in the summer of 2022 resulted in the highest year-on-year deterioration in KEA (reaching a value of 2.96%), which exceeded 2019 values (2.95%) and the target set for 2022 (2.37%).

RP3 outlook (2023-2024)

- 62 The Union-wide KEA performance target for the remaining years of RP3 is 2.40%. These years will be characterised by growing traffic levels, increased military activity and a likely continuation of the circumnavigation of Ukrainian, Russian, and Belorussian airspace.
- 63 The PRB anticipates that KEA performance is likely to remain at values above the targets as flights circumnavigate the closed airspace leading to unavoidably higher Union-wide KEA values than planned.

6.3 Environment target ranges advice

- 64 To support the setting of the environment target ranges, the PRB considered four pieces of evidence:
- Evidence 1: Analysis of the historical KEA performance;
 - Evidence 2: The estimated benefit defined in the ERNIP;
 - Evidence 3: The PRB study on the capacity and environment interdependencies; and
 - Evidence 4: The impact on Union-wide KEA of Russia's war of aggression against Ukraine.
- 65 The detail of Evidence 1 to 3 is provided in Annex I, while details of Evidence 4 are provided in Annex III.

Evidence 1 – Analysis of historical KEA performance

- 66 The KEA values during 2020-2021, specifically during rolling years ending March 2021 and April 2021, demonstrate that ambitious targets within the range proposed for RP3 (2024 upper bound 2.40%, and 2024 lower bound 2.20%) were achievable if sufficient capacity was provided. Furthermore, the route efficiency of the network design (RTE-DES) has improved from 2.22% in 2020 to 1.88% in 2022, with further improvements to 1.84% expected by the NM in 2023.⁶
- 67 Target ranges for RP4 must also take account of the fact that traffic levels are forecast to exceed those of 2019 during RP4 and that action must, therefore, be taken to increase capacity to accommodate flights. Moreover, targets must also consider the implementation of free route airspace, improved airspace management, and other projects within the European Route Network Improvement Plan (ERNIP) that will improve horizontal flight efficiency.⁷

Evidence 2 – Estimated benefit defined in the ERNIP

- 68 The ERNIP estimates that the packages of airspace proposals scheduled for implementation will reduce inefficiency of route network design to 1.80% by 2030.

⁵ Commission Implementing Decision (EU) 2021/891 setting revised Union-wide performance targets for the air traffic management network for the third reference period (2020-2024) and repealing Implementing Decision (EU) 2019/903.

⁶ RTE-DES (Flight Extension due to Route Network Design) is calculated by measuring the difference between the shortest route length (from TMA exit and entry points) and the great circle distance. For this KPI the RAD is not taken into account and all the CDR routes are considered as open.

⁷ PRB Advice to the Commission in the setting of Union-wide performance targets for RP3 (2018).

- 69 The ERNIP also shows that RTE-DES reduced to 1.88% in 2022, meaning that much of the reduction in route design efficiency anticipated by 2030 has already been achieved. The Network Manager estimates that RTE-DES will be 1.84% in 2023 and that the minimum achievable RTE-DES is approximately 1.75%.⁸
- 70 Assuming that the RTE-DES remains at 1.84% by the end of RP3, the expected benefits to materialise by the end of RP4 are expected to be between:
- -0.04pp, a conservative estimate of the route design inefficiency reducing from 1.84% to 1.80% in 2030; and
 - -0.09pp, an optimistic estimate of the route design inefficiency reducing from 1.84% to 1.75% by 2030 as estimated by the Network Manager.
- 71 The PRB proposes to consider a gradual materialisation of the benefits over RP4. The resulting yearly lower and upper bound allowances for RP4 are illustrated in Table 2, ramping up to the expected values in 2029.

Year	Upper bound impact	Lower bound impact
2025	0pp	-0.01pp
2026	-0.01pp	-0.03pp
2027	-0.02pp	-0.05pp
2028	-0.03pp	-0.07pp
2029	-0.04pp	-0.09pp

Table 2 – Yearly KEA decrease based on assumed ramp up of ATS Route Network (ARN) benefits for the upper and lower bound of the target ranges.

Evidence 3 - PRB study on the capacity and environment interdependencies

- 72 The PRB study into the interdependency between capacity and environment demonstrates that ATFM delays have a negative impact on horizontal flight efficiency, and quantified the interdependency between the environment and capacity KPIs.⁹ The targets for RP4 must account for this interdependency. The capacity targets have to be challenging to minimise the impact of delay and to support the PRB’s focus on environmental performance. Hence, the PRB proposes targets to

minimise the adjustments to the environment targets by setting ambitious, but realistic, capacity targets. Doing so supports the delivery of challenging and achievable environment target ranges, in line with ambitions.

- 73 It is estimated that an increase of one minute of average en route ATFM delay per flight causes an increase of 0.14pp to horizontal flight efficiency. Based on this figure, the lower and upper bound KEA adjustments for capacity for each year of RP4 are shown in Table 3.

Year	Upper bound adjustment	Lower bound adjustment
2025	+0.07pp	+0.06pp
2026	+0.07pp	+0.05pp
2027	+0.07pp	+0.05pp
2028	+0.06pp	+0.05pp
2029	+0.06pp	+0.04pp

Table 3 – Yearly KEA adjustments for the upper and lower bound of the target ranges due to interdependency with capacity.

Evidence 4 - The impact on Union-wide KEA of Russia’s war of aggression against Ukraine

- 74 The closure of Ukraine’s airspace, and the unavailability of Belorussian and Russian airspace to most carriers has caused considerable extensions of routes beyond the great circle distance. While this effect is most pronounced for Member States bordering these areas, there is also a wider impact.
- 75 Eurocontrol has conducted an analysis estimating that such impact has led to a Union-wide KEA deterioration of approximately 0.24 percentage points (Annex III). The analysis also shows that not all Member States are impacted by the situation (most impacted are those in the East and North of the SES area). 11 Member States have had a relative increase of KEA of over 25% in 2022, translating to absolute increases of between 0.52pp and 9.20pp.¹⁰
- 76 While it is not possible to predict the evolution of the conflict and the geopolitical climate, the PRB assumes as a starting point that route extensions resulting from Ukrainian, Belorussian, and Russian

⁸ Estimates provided by Network Manager in bilateral discussions.

⁹ <https://wikis.ec.europa.eu/display/eusinglesky/EU+Single+Sky+Performance>

¹⁰ In order of relative impact on KEA: Finland, Lithuania, Latvia, Estonia, Poland, Slovakia, Sweden, Romania, Hungary, Bulgaria, Czech Republic.

airspace closures will remain in place for the entirety of RP4.

- 77 When computing the local KEA reference values, the PRB will work with the Network Manager to ensure that any allowance for the situation in Ukraine is allocated only to those impacted.

PRB approach

- 78 To align with the European Union's green agenda, the PRB proposes to prioritise environmental performance for RP4. By following ambitious environmental targets, ANSPs can drive the development and implementation of sustainable practices within the aviation industry and contribute to lowering aviation's impact on the environment. In 2019, the European Commission published the European Green Deal, which aims for the EU to become the first climate-neutral continent by 2050, and it is accompanied by an intermediate goal of the Fit for 55 package to reduce net greenhouse gas emissions by 55% by 2030.¹¹
- 79 The environment target range proposed in this report is in line with the EU's ambition of a carbon-neutral economy, to which all sectors are expected to contribute. Aviation is no exception. Furthermore, an ambitious environment target is also dependent on ambitious capacity targets, as adequate capacity provision enables better horizontal flight efficiency.
- 80 The PRB proposes target ranges for 2029 that build on the original ambition for the end of RP3 (2024) (Evidence 1), while accounting for the benefits of recent and future improvements from ATM measures and ongoing updates to the European network (Evidence 2), and for the interdependency between environment and capacity in the environmental target ranges (Evidence 3).
- 81 The resulting target ranges for 2029 following this approach are:
- Upper bound 2029 target range (less ambitious): 2.40% - 0.04% (ERNIP benefits) + 0.06% (interdependency) = 2.42%; and
 - Lower bound 2029 target range: 2.20% - 0.09% (ERNIP benefits) + 0.04% (interdependency) = 2.15%.

- 82 This target range of 2.15% to 2.42% for KEA is more stretching than that for RP3 (despite the higher bound being slightly above that of RP3). This is consistent with the PRB ambitions and the increased importance of strong environmental performance.
- 83 The PRB proposes to include the impact of Russia's war of aggression against Ukraine on KEA. However, when defining the local targets, such an impact should be only considered for a limited number of affected Member States (Evidence 4).
- 84 The resulting KEA ranges for 2029 adding the estimated impacts are:
- Upper bound 2029 target range (less ambitious): 2.42% + 0.24% = 2.66%; and
 - Lower bound 2029 target range: 2.15% + 0.24% = 2.39%.
- 85 In order to set the target ranges for the years 2025-2028, the PRB proposes target ranges evolving based on the ramp up of ERNIP ARN improvements and interdependency with the capacity targets. The resulting yearly Union-wide KEA ranges are shown in Table 4 (next page).
- 86 To drive environmental performance improvement over RP4, the PRB strongly recommends the Member States to define an environmental financial incentive scheme and additional environment targets based on the most appropriate KPI as specified in articles 10 (3) and 11 (4) of the Regulation. As part of this work, Member States should consider arrangements that incentivise ATM related actions to reduce emissions. Such arrangements should best reflect the contribution that ATM can make to improve flight inefficiencies and schemes to assess the effectiveness of ATM in helping airspace users to achieve their, environmentally supportive, optimum trajectory. The PRB remains available to support Member States during the process.

¹¹ Compared to 1990 levels.

Union-wide environment target ranges					
KEA	2025	2026	2027	2028	2029
Targets upper bound	2.71%	2.70%	2.69%	2.67%	2.66%
Targets lower bound	2.49%	2.46%	2.44%	2.42%	2.39%

Table 4 - Union-wide environment target ranges.

7 CAPACITY

- Capacity provision must support the environmental targets and ensure a low level of delays for the airspace users.
- Most of the delays could be eliminated by solving staffing issues and realising system implementation plans.
- ANSPs need to commit to and implement more ambitious capacity improvement plans.

7.1 Introduction to the capacity KPA

87 As per the Regulation, the capacity KPI is the average minutes of en route ATFM delay per flight attributable to air navigation services. The indicator, and the related targets, are defined for the whole calendar year and for each year of the reference period (i.e. 2025 to 2029 included).

88 En route ATFM delays are pre-departure delays, which occur when the traffic demand exceeds airspace capacity in a block of airspace. The indicator measures the difference between the time an aircraft was estimated to leave its parking stand (Estimated Off-Block Time, EOBT) at the airport and the actual time it left the parking stand (Actual Off-Block Time, AOBT). These differences are averaged over the number of flights which flew in the airspace following Instrument Flight Rules (IFR).

89 The capacity KPI measures the lack of capacity rather than the actual capacity provided by ANSPs, thus it is an indicator of underperformance: Higher values indicate worse performance. While the average en route ATFM delay per flight is the only KPI used for Union-wide target setting, local target setting also uses the terminal capacity KPI of average airport arrival ATFM delay per arrival. This indicator is similar to the en route indicator, but measures delays which occur when traffic demand exceeds airport/aerodrome capacity. While terminal capacity is monitored via this KPI on the Union-wide level, this report only focuses on the en route capacity KPI.

90 The target ranges for the capacity KPI have been developed by the PRB in close cooperation with the Network Manager.

RP4 KPI

91 There are no changes foreseen as regards the capacity KPI for RP4. The target ranges are therefore based on the capacity KPI as currently defined by the Regulation. The PRB will however continue to monitor capacity provision also on the basis of

sector-opening hours, sector capacities, and various other metrics.

7.2 Analysis of the capacity KPA

RP2 evolution

92 In RP2 the capacity KPI was identical to the current KPI; except that average delay figures were calculated on a slightly different geographical reference. In RP2, the methodology considered the area of the flight information regions (FIR) whereas in RP3, the geographical basis of the calculation is the area of responsibility of the ANSPs (AUA). Datasets for both methodologies are available publicly. The following analysis is provided with the AUA reference.

93 In RP2 the Union-wide target for en route capacity was set at 0.5 minutes of average en route ATFM delay per flight, for each year between 2015 and 2019. The target took account of the economic optimum level of delays, as well as the performance from the first reference period. The targets were considered ambitious but realistically achievable.

94 During the first three years of RP2 (2015-2017), the actual performance did not achieve the target by 0.23-0.43 minutes per flight. This was a considerable margin, but indicated that with more effort, the target could be achieved. However, in 2018, it became apparent that there were structural issues and significant unresolved capacity problems in some of the ANSPs, resulting in record-high delays of 1.79 minutes per flight. This triggered a response from the Network Manager in the form of more targeted, special strategic measures to reduce delays during the summer of 2019. However, despite these efforts, average en route ATFM delays remained high by the end of RP2 (Figure 6, next page).

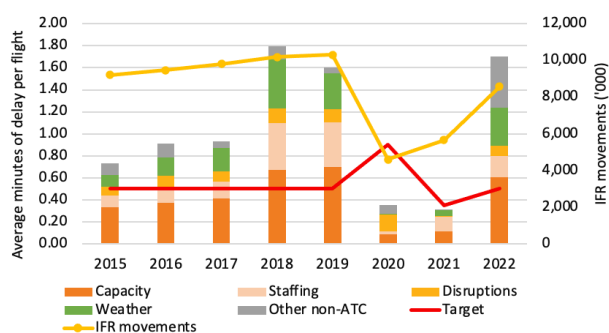


Figure 6 - Evolution of en route capacity performance and targets over RP2 and RP3 to date (source: PRB elaboration).

RP3 evolution to date (2022)

- 95 The original capacity targets for RP3 were set following a stepwise approach: The targets for 2020 and 2021 equal to 0.9 minutes per flight, 0.7 minutes per flight for 2022, and at 0.5 for 2023 and 2024. The rationale behind this approach was to strike a balance between setting ambitious and challenging targets, which were also realistically achievable within the given timeframe.
- 96 The COVID-19 pandemic, and the related drastic decrease of traffic, led to a revision of the targets from 2021 onwards (following the exceptional measures Regulation). The revised capacity targets which currently apply are: 0.35 minutes per flight in 2021 and 0.5 minutes per flight for all remaining years of RP3. Figure 6 shows the revised RP3 targets and the actual values for 2021 and 2022.
- 97 2020 and 2021 were the only two years in the history of the Performance and Charging Scheme when the Union-wide target for en route capacity was met. This was enabled by the major drop in traffic levels due to COVID-19 pandemic. In 2022, seven ANSPs did not manage to improve their capacities and did not resolve longstanding issues. When traffic levels reached around 80% of 2019 levels, en route ATFM delays increased dramatically once again. Some 45% of en route ATFM delays were due to ANSPs not being able to offer the number of sectors required by traffic demand and which were offered on other days during the year. These delays could have been resolved without the need for long-term measures and investments.
- 98 Part of the capacity performance in 2022 was also impacted by the outbreak of Russia's war of aggression against Ukraine and the implementation of major ATM system upgrades in the core area of

Europe. Overall, capacity performance in 2022 has shown little improvement, if any, compared to 2018 and 2019. Due to these facts, actual performance in 2022 is not considered as a valid baseline for target setting for RP4.

RP3 outlook (2023-2024)

- 99 The first months of 2023 already show average en route ATFM delays higher than 2022, indicating that, without the full implementation of the resource and investment plans and major interventions, the capacity performance in 2023 will further deteriorate. The PRB anticipates that ANSPs will continue to struggle to provide the necessary capacity in the remaining two years of RP3 unless immediate actions are taken by Member States.
- 100 ANSPs are falling behind schedule with the implementation of new ATM systems and other capacity enhancement measures, as well as their plans to recruit and train additional air traffic controllers (the actual number of ATCOs in OPS FTEs at the end of 2022 was 2% below the planned value). If ANSPs fail to speed up the implementation of these measures and do not start to realise their benefits, capacity performance may deteriorate further by the end of RP3. As these issues are fully under the control of ANSPs, the PRB urges ANSPs to resolve ATC capacity and staffing issues by the end of RP3. The PRB assumes that this has occurred within the RP3 timeframe when considering RP4 target ranges.

7.3 Capacity target ranges advice

- 101 To support the setting of the capacity target ranges, the PRB considered three pieces of Evidence:
- Evidence 1: Historical capacity performance of ANSPs, especially focusing on delays with ATC capacity and ATC staffing reasons;
 - Evidence 2: Historical occurrence of non-ATC disruptions-related and adverse weather-related delays; and
 - Evidence 3: Capacity improvement plans included in the European Network Operations Plan 2023-2027 Edition April 2023 (NOP), the analysis conducted by the SESAR Deployment Manager on the expected benefits of the implementation of CP1 ATM functionalities, and the RP3 performance plans and monitoring reports submitted by the Member States.

102 The detail of each evidence is provided in Annex I.

Evidence 1 - Historical capacity performance

103 The past ten years has shown that when traffic is growing (and not subject to demand-side shocks such as COVID-19), the European ATM network had insufficient capacity to handle increasing volumes of traffic without frequent and often long delays. However, despite the overall unsatisfactory capacity performance, there were some ANSPs who successfully managed to implement capacity enhancement measures and improve their capacity performance. This indicates that even ambitious capacity targets are possible to achieve.

104 When analysing capacity constraints and delays in the European ATM network, it is apparent that over the past years, most of the en route ATFM delays were generated by five to ten area control centres (ACCs). Moreover, ATC capacity and ATC staffing reasons were the key drivers of en route ATFM delays, although adverse weather and ATC-related disruptions have, on occasion, generated significant delays.

105 The PRB assumes that ANSPs will be able to resolve their ATCO training and recruitment issues, to implement investment as planned, as well as to implement best practices in staffing and rostering by the end of RP3.

Evidence 2 - Allowance for adverse weather and non-ATC disruptions

106 Adverse weather phenomena, failures in the technical equipment of airports, and industrial action at non-ATM stakeholders can also cause network disruption and generate ATFM delays. As ANSPs have little influence on delays of this nature, it is reasonable to allow for such delays when defining the Union-wide target ranges for capacity.

107 The allowance for weather and non-ATC-related disruption delays is calculated on the basis of historical averages. The allowance for weather-related delays is estimated between 0.20 and 0.27 minutes per flight at the Union-wide level, while the allowance for non-ATC disruptions is between 0.01 and 0.03 minutes per flight (details on the estimation are provided in the Annex I).

Evidence 3 - Capacity improvement plans and benefits of CP1 ATM functionalities

108 Evidence 3 provides the analysis of the capacity improvement plans and the planned capacity

profiles of each of the ACCs in the Single European Sky area. The current edition of the NOP includes capacity improvement plans for the period 2023 to 2027, covering the first three years of RP4. Most ACCs which, historically, were significant contributors to en route ATFM delays are planning to implement state-of-the-art, new ATM systems and advanced ATC tools in the timeframe of the current NOP. The PRB expects that these investments will result in significant improvements in the capacity performance of these ACCs, allowing them to minimise en route ATFM delays in the last two years of RP4. Moreover, the implementation of new ATM systems and advanced ATM functionalities should enable ANSPs to realise the benefits of dynamic cross-border demand-capacity balancing to alleviate the pressure on ATCO recruitment and training.

109 The SESAR Deployment Manager analyses the expected impact of the implementation projects under the CP1 umbrella. While the calculations used to describe the benefits are not directly applicable to the target exercise due to the differences in the methodologies, the overall conclusion from the analysis is that SDM expects that, during RP4, the implementation of CP1 projects will be a major contributing factor to capacity improvement and delay reduction. The projects monitored by the SDM are part of the capacity improvement measures of the ANSPs as included in the NOP.

110 As the PRB highlighted in the monitoring report, some ANSPs may have to revise their current capacity improvement plans and commit to more ambitious capacity enhancement measures in order to close the forecast capacity gaps.

PRB Approach

111 Given the interdependency between capacity and flight efficiency, the top priority for the capacity KPA in RP4 is to enable and support environmental performance in the European ATM network by eliminating ATFM delays as much as reasonably possible. Moreover, the capacity KPA must ensure a low level of delays experienced by airspace users.

112 The PRB assumes that ANSPs will resolve delays due to sector-opening gaps and lack of ATCOs by the end of RP3 and that ANSPs will be able to eliminate most en route ATFM delays by the end of 2027 by implementing the measures included in the NOP.

- 113 However, aiming and anticipating zero ATC-related delays is neither reasonable nor realistic. Therefore, the PRB proposes the capacity target range as the sum of the allowance for weather-related delays, the allowance for the non-ATC disruptions, and a system resilience buffer which allows for minor delays.
- 114 To define the target ranges, the PRB defined two levels of ambition in reducing delays:
- The less ambitious approach (upper bound of target ranges) assumes that ANSPs with the most delay minutes are able to eliminate 75% of delays by 2029 compared to 2022.
 - The more ambitious approach (lower bound of target ranges) assumes that the same ANSPs are able to eliminate 90% of delays by 2029, compared to 2022.
- 115 The Union-wide target range for 2029 is therefore calculated as follows:
- **Upper bound 2029 target range** (less ambitious): 0.27 minutes/flight (weather allowance) + 0.03 minutes/flight (disruption allowance) + 0.10 minutes/flight (system resilience buffer) = **0.40 minutes/flight**.
 - **Lower bound 2029 target range**: 0.20 minutes/flight (weather allowance) + 0.01 minutes/flight (disruption allowance) + 0.10 minutes/flight (system resilience buffer) = **0.31 minutes/flight**.
- 116 The PRB advises to not include any allowance related to the impact of the war in Ukraine. While it is not possible to predict the evolution of the conflict, the PRB assumes that ANSPs fully adapt to the current status by the end of RP3.
- 117 The PRB considers that ANSPs should implement all capacity improvement measures included in the current version of the NOP by 2027. The PRB proposes to take this into account in the system resilience buffer of the target range, but with a different level of ambition as regards the pace of the improvement.
- 118 For the upper bound of the target ranges, the PRB proposes to keep both the weather and disruption allowances constant for each year of RP4 (i.e. 0.27 and 0.03 minutes/flight). With respect to the system resilience buffer, the PRB proposes to consider a system resilience buffer for 2025, 2026, and 2027 of 0.20 minutes/flight, and to decrease it to 0.10 for, 2028, and 2029, once all the capacity improvement measures from the NOP are implemented by the ANSPs. Therefore, the upper bound of the target ranges starts from a target of 0.5 minutes/flight, as the current Union-wide capacity target for 2024.
- 119 For the lower bound of the target ranges, the PRB proposes to keep both the weather and disruption allowances constant for each year of RP4 (i.e. 0.20, and 0.01 minutes/flight). With respect to the system resilience buffer, the PRB proposes to consider a yearly decrease of 0.03 minutes/flight for 2026 and 2027, when most of the NOP measures will be implemented by the ANSPs. As for 2028 and 2029, the PRB proposes a yearly reduction of 0.02 minutes/flight in the system resilience buffer, as capacity improvement will be more organic, to follow traffic growth in those years. Thus, the system resilience buffer would start from 0.2 minutes/flight in 2025 and decrease to 0.1 minutes/flight in 2029.
- 120 The resulting target ranges proposed by the PRB for the RP4 Union-wide en route capacity targets are shown in Table 5.

Union-wide capacity target ranges					
Average Delays (min/flight)	2025	2026	2027	2028	2029
Targets upper bound	0.50	0.50	0.50	0.40	0.40
Targets lower bound	0.41	0.38	0.35	0.33	0.31

Table 5 – Union-wide en route capacity target ranges.

8 COST-EFFICIENCY

- The RP4 priority for cost-efficiency is to ensure that safety, environment, and capacity performances are delivered.
- The cost base should gradually become more efficient.
- The PRB proposes to recover a substantial part of the ANSPs' cost base inefficiency by the end of RP4.

8.1 Introduction to the cost-efficiency KPA

- 121 As per the Regulation, the cost-efficiency KPI is the year-on-year change of the average Union-wide determined unit cost for en route air navigation services. The determined unit cost is calculated as the ratio between the en route determined costs and the en route expected service units for a given year. For the purpose of target setting, the service units applied are included in latest available STATFOR base forecast (for the target ranges, STATFOR March 2023).
- 122 The Regulation requires the definition of the starting point for the year-on-year change at Union-wide level (baseline value) for determined costs, and determined unit costs for the year preceding the start of the reference period (i.e. 2024). The Regulation specifies that the baseline value "shall be estimated by using the actual costs available and adjusted to take into account the latest available cost estimates, traffic variations, and their relation to costs".
- 123 The target ranges for the cost-efficiency KPI have been developed by the PRB taking into consideration the academic support (Annex II).

RP4 KPI

- 124 There are no changes foreseen with regards to the cost-efficiency KPI for RP4. The target ranges are therefore based on the cost-efficiency KPI as currently defined by the Regulation.

8.2 Analysis of the cost-efficiency KPA

RP2 evolution

- 125 The Union-wide cost-efficiency KPI for RP2 was defined as the average Union-wide determined unit cost for en route air navigation services in value (and not the year-on-year change of this

value as from RP3). The targets were provided for each year of the reference period as the ratio between the en route determined costs and the en route forecast traffic.¹²

- 126 During RP2, the en route cost-efficiency Union-wide targets have been achieved in each year of the reference period. The Union-wide actual unit cost decreased by -13% over the reference period (from 52.87€₂₀₀₉ to 44.61€₂₀₀₉) and has been on average 5€₂₀₀₉ (-9%) below the determined unit cost within the RP2 decision.¹³ Higher service units and lower actual costs than the determined cost allowed Member States to achieve the Union-wide targets for each year of the reference period (Figure 7).

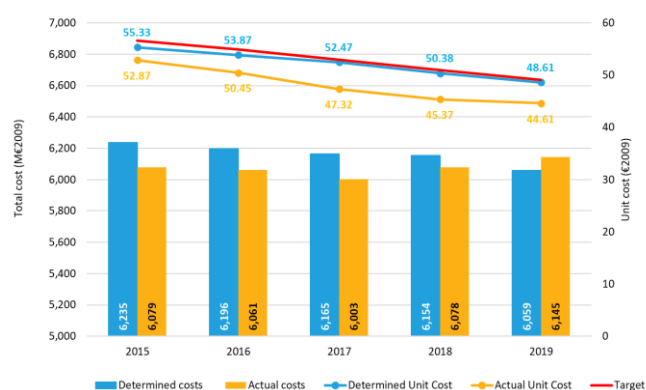


Figure 7 – Union-wide en route unit and total cost actual vs performance plans during RP2.

- 127 The lower actual costs have signalled a deficiency in the planning process, in which some ANSPs prioritised accounting conservatism over the ambition of more efficiency and the provision of more capacity. Moreover, the lower actual unit cost indicated that the targets lacked ambition. Both reasons have led to the situation in which the system was far from optimal.

¹² The cost-efficiency Union-wide targets for RP2 were: 56.64€₂₀₀₉ for 2015, 54.95€₂₀₀₉ for 2016, 52.98€₂₀₀₉ for 2017, 51.00€₂₀₀₉ for 2018, and 49.10€₂₀₀₉ for 2019. The aggregation of the plans (i.e. the sum of the costs and traffic as in the performance plans) resulted in slightly lower Union-wide determined DUC: 55.33€₂₀₀₉ for 2015, 53.87€₂₀₀₉ for 2016, 52.47€₂₀₀₉ for 2017, 50.38€₂₀₀₉ for 2018, and 48.61€₂₀₀₉ for 2019.

¹³ On average 4€₂₀₀₉ below the determined unit cost of the aggregated performance plans.

- 128 Actual costs remained flat over the reference period (on average 6.1B€₂₀₀₉) and below the determined cost, with the only exception of 2019. The 2019 result may be an indication of the regulated entities increasing the cost base in preparation for the subsequent reference period (the 2019 was the baseline used for the RP3 targets).
- 129 During RP2, Member States lagged behind in terms of delivering on their investment plans. The delays in investments resulted in actual costs related to investments (i.e. depreciation and cost of capital) being lower than the determined values. During RP2, a total amount of 371M€₂₀₀₉ was charged to airspace users for investments that were not realised. This amount was retained by most of the ANSPs under the cost sharing mechanism, while some ANSPs voluntarily returned the unspent costs related to investments.¹⁴ The Regulation (for RP3) corrected this issue by extending the cost sharing mechanism to include investment costs, requiring any differences to be reimbursed to airspace users.

RP3 evolution to date (2022)

- 130 The Regulation (for RP3) modified the cost-efficiency performance KPI. From the average en route determined costs (in value), the RP3 cost-efficiency KPI became the year-on-year change of the average Union-wide determined unit cost for en route air navigation services (which is expressed in percentage).
- 131 The original cost-efficiency targets for RP3 were set as a -1.9% decrease of the Union-wide en route determined unit costs for each year of the reference period. The COVID-19 pandemic, and the related drastic decrease of traffic, led to a revision of the targets (following the exceptional measures Regulation). The revised cost-efficiency targets which are currently applied are: +120.1% for the combined years 2020/2021, -38.5% for 2022, -13.2% for 2023, and -11.5% for 2024. The variation in the magnitude of the targets is due to the drop in traffic in the first year of the reference period, and the forecast recovery in the following years.¹⁵

- 132 The Union-wide targets have been met for 2020/2021 and 2022. The aggregated results show that Member States decreased actual costs by -516M€₂₀₁₇ (-2.8%) compared to the level of determined costs. At the same time, the targets have been mostly met because, at Union-wide level, the actual traffic exceeded the forecasts used for the performance plans.
- 133 In addition, the forecasts used for the performance plans were based on a more optimistic update of the STATFOR forecast used for the Union-wide targets. On average, in the combined year 2020/2021, the traffic in the performance plans was +9% higher compared to the STATFOR November 2020 base scenario, and +25% higher for 2022. The evolution of the cost-efficiency performance to date is shown in Figure 8.

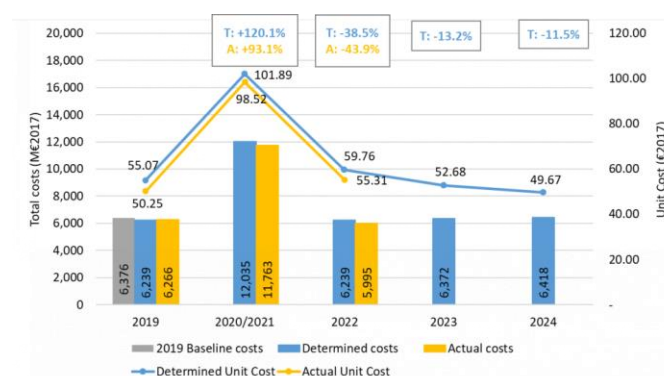


Figure 8 – RP3 targets, Union-wide en route unit and total cost actual vs performance plans during RP3.

RP3 outlook (2023-2024)

- 134 The RP3 evolution to date shows Union-wide level actual costs to be lower than determined and this trend could continue for 2023. In 2024, actual costs may rise above the determined valued as occurred in the last year of RP2. The PRB urges Member States to make efficient use of the available financial resources to support the delivery of necessary capacity by achieving the staff recruitment and investment measures as defined in the performance plans.

8.3 Cost-efficiency target ranges advice

- 135 To support the setting of the cost-efficiency target ranges, the PRB has taken three pieces of Evidence into consideration:

¹⁴ The value includes both en route and terminal.

¹⁵ The aggregation of the plans (i.e. the sum of the costs and traffic as in the performance plans) resulted in the following Union-wide determined DUC: 101.89€₂₀₁₇ for 2020/2021, 59.76€₂₀₁₇ for 2022, 52.68€₂₀₁₇ for 2023, 49.67€₂₀₁₇ for 2024. At the time of writing this report, the draft performance plan of Belgium-Luxembourg has still not been adopted, therefore the aggregated values may slightly change.

- Evidence 1 – Cost forecast based on Member States submissions. This evidence considered the information provided by the States.
- Evidence 2 – Cost forecast based on historical data. This evidence applies statistical methods to forecast the costs for each year from 2024 to 2029.
- Evidence 3 – Cost inefficiency estimated by the Academic group. As for RP3, the PRB asked a group of Academics to estimate, through benchmarking, a range of ANSP cost inefficiency observed in the current system.

136 Evidence 1 and 2 provide a forecast of the cost base for the RP4 baseline and each year of RP4. Evidence 3, combined with the PRB level of ambition, provides a range of Union-wide reduction of the cost inefficiencies for each year of RP4. By dividing the resulting costs by the Union-wide service units base forecast, the related DUCs (determined unit cost) are calculated. The target ranges (i.e. year-on-year change) are computed based on these values. Annex I of this report provides the detailed information on the calculation of Evidence 1 and 2. Annex II of this report describes Evidence 3.

Evidence 1 – Member States submission

- 137 Evidence 1 is based on the Member States initial RP4 data submissions. The PRB aggregated the values as submitted by the Member States in order to estimate the costs for the years 2025-2029 (Table 6). The detailed analysis of the amounts can be found in Annex I.
- 138 The costs, as submitted by the Member States, start from 6,959M€₂₀₂₂ and increase over RP4 reaching 8,023M€₂₀₂₂ (CAGR +2.9%).

Union-wide en route costs – States submission (M€ ₂₀₂₂)					
2024	2025	2026	2027	2028	2029
6,959	7,433	7,603	7,774	7,932	8,023

Table 6 – Aggregation of Member States cost forecasts.

Evidence 2 – PRB cost forecasts

139 Evidence 2 is based on a determined cost forecast based on two statistical models. Starting from the historical actual costs, the PRB forecast the Union-wide en route costs for the years 2024-2029.¹⁶

Details on the data, statistical models, and forecast are provided in Annex I.

140 The summary of the cost estimates at Union-wide level is presented in Table 7. The two series of forecast costs are very similar in each year and differ on average by 0.5% (i.e. 36M€₂₀₂₂). The forecast Union-wide cost for 2024 is between 7,173M€₂₀₂₂, and 7,206M€₂₀₂₂, increasing to between 7,470M€₂₀₂₂ and 7,513M€₂₀₂₂ in 2029, respectively (CAGR +0.8% for both the forecast).

Union-wide en route costs Forecast based on service units (M€ ₂₀₂₂)					
2024	2025	2026	2027	2028	2029
7,206	7,319	7,385	7,436	7,481	7,513

Union-wide en route costs Forecast based on IFR movements (M€ ₂₀₂₂)					
2024	2025	2026	2027	2028	2029
7,173	7,287	7,351	7,400	7,444	7,471

Table 7 – Union-wide en route costs PRB forecast.

Evidence 3 – Cost base inefficiency

- 141 Evidence 3 is based on the Academic study. The study (Annex II of this report) defined a distribution of inefficiencies (i.e. the percentage of costs that can be reduced based on benchmarking). The results show that the inefficiency in the cost base of the ANSPs is on average 16%.
- 142 Despite the dramatic decrease of traffic due to COVID-19 pandemic, and the opportunity ANSPs had to implement responsive cost reduction measures, ANSPs did not appear to efficiently adapt their cost base and did not implement innovative or radical changes within their operations. The PRB assumes that the estimated level of cost inefficiency in the cost base remained unchanged during RP3, therefore the results can be applied to the forecast costs for RP4. The PRB proposes to recover part of the inefficiency in the ANSPs' cost base by the end of RP4, between 5% to 10% (i.e. corresponding to 1/3 and 2/3 of the inefficiency identified in Annex II).

PRB Approach

143 The RP4 priority is to ensure that safety, environment, and capacity performance improvements are delivered. The achievement of the environment target needs to be supported by a consistent

¹⁶ The cost category of the exceptional items, costs for exempted VFR flights, NSAs and Eurocontrol costs have not been forecast, but included as submitted by the Member States.

capacity target and facilitated by an appropriate cost efficiency target. For RP4, in order to further support the delivery of the environmental and capacity performances, the PRB proposes to recover some of the ANSPs' inefficiency in the costs as estimated in Evidence 3. The cost inefficiency not recovered should be used by the ANSPs to improve operational performances. The PRB proposes to recover between 5% to 10% (i.e. corresponding to 1/3 and 2/3 of the inefficiency identified in Annex II) of the inefficiency in the ANSPs' cost base by the end of RP4. The PRB considered that additional means may be needed by some Member States to improve capacity (under certain conditions). While these costs are not reflected in the target ranges, they should be allowed on a case-by-case basis.¹⁷

144 Given the sobering RP3 experience to date, the PRB is already signalling to the Member States that the local capacity targets must be supported by a very strong and impactful financial incentive scheme. Incentives to ensure delivery of a specified outcome need to be set at an appropriate level, especially when a deviation from the cost-efficiency trends is requested.

145 With respect to the environmental performance, the PRB strongly advises the Member States to make use of the possibility provided by the Regulation to set financial incentive schemes for environment targets. The PRB remains available to support Member States during the process.

146 Finally, the PRB included the cost for the NSAs as submitted by the Member States. This will allow the NSA to further improve their effectiveness as local authorities, especially in respect to the monitoring of the implementation of recruitment and investment plans, and of safety, environmental and capacity performances.

147 The PRB proposes to set the year-on-year change of the average Union-wide determined unit cost as a constant and equal percentage over the RP4 years. The range should be based on the average change from the 2024 baseline to the 2029 forecast determined unit costs, where:

- **2024 baseline** calculated as the average of the baselines estimated in each evidence (55.61€₂₀₂₂).¹⁸ When advising the Commission on the cost-efficiency targets for RP4, the PRB will revise the baseline value in light of the new traffic forecast, the updated inflation forecast, the latest available information, and the outcomes of the stakeholder consultation;
- **Upper bound 2029 unit cost of the range** calculated as the aggregation of Member States forecast costs, factoring in a 5% recovery of inefficiency, and divided by STATFOR base forecast (53.58€₂₀₂₂); and
- **Lower bound 2029 unit cost of the range** based on the PRB cost forecast (forecast based on the IFR movements), factoring in a 10% recovery of inefficiency, and divided by STATFOR base forecast (47.49€₂₀₂₂).

148 The resulting year-on-year change of the average Union-wide determined unit cost ranges are for the **upper bound -0.7%**, for the **lower bound -3.1%** (Table 8, next page).

¹⁷ As defined in Annex IV of the Regulation.

¹⁸ Average between: Evidence 1 - State submission 53.77€₂₀₂₂; Evidence 2 - Service unit based forecast 55.68€₂₀₂₂; Evidence 2 - IFR based forecast 55.42€₂₀₂₂; Maximum of evidence 1 and 2 57.58€₂₀₂₂;

Union-wide cost-efficiency target ranges					
2024 baseline	55.61€ ₂₀₂₂ / 7,198M€ ₂₀₂₂				
y-o-y change of Union-wide determined unit costs	2025	2026	2027	2028	2029
Targets upper bound	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%
Targets lower bound	-3.1%	-3.1%	-3.1%	-3.1%	-3.1%

Table 8 – Union-wide cost-efficiency target ranges.

9 PRB ADVICE ON RP4 TARGET RANGES

Safety

Union-wide safety targets RP4	
Management Objectives	2029 maturity levels
Safety culture	C
Safety policy and objectives	C
Safety risk management	D
Safety assurance	C
Safety promotion	C

Environment

Union-wide environment target ranges					
KEA	2025	2026	2027	2028	2029
Targets upper bound	2.71%	2.70%	2.69%	2.67%	2.66%
Targets lower bound	2.49%	2.46%	2.44%	2.42%	2.39%

Capacity

Union-wide capacity target ranges					
Average Delays (min/flight)	2025	2026	2027	2028	2029
Targets upper bound	0.50	0.50	0.50	0.40	0.40
Targets lower bound	0.41	0.38	0.35	0.33	0.31

Cost-efficiency

Union-wide cost-efficiency target ranges					
2024 baseline	55.61€ ₂₀₂₂ / 7,198M€ ₂₀₂₂				
y-o-y change of Union-wide determined unit costs	2025	2026	2027	2028	2029
Targets upper bound	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%
Targets lower bound	-3.1%	-3.1%	-3.1%	-3.1%	-3.1%