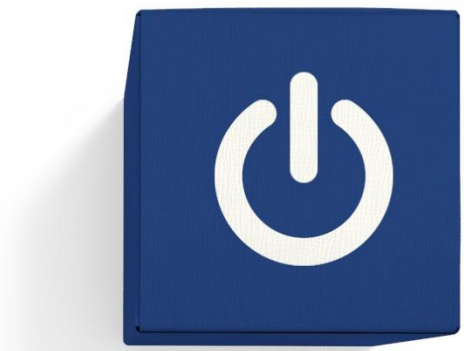
AirNav Ireland Operating Expenditure: Bottom-up Efficiency Assessment

Irish Aviation Authority

18 July 2024



PUBLISHABLE DRAFT REPORT

Important notice

This document was prepared by CEPA LLP (trading as CEPA) for the exclusive use of the recipient(s) named herein on the terms agreed in our contract with the recipient(s).

CEPA does not accept or assume any responsibility or liability in respect of the document to any readers of it (third parties), other than the recipient(s) named in the document. Should any third parties choose to rely on the document, then they do so at their own risk.

The information contained in this document has been compiled by CEPA and may include material from third parties which is believed to be reliable but has not been verified or audited by CEPA. No representation or warranty, express or implied, is given and no responsibility or liability is or will be accepted by or on behalf of CEPA or by any of its directors, members, employees, agents or any other person as to the accuracy, completeness or correctness of the material from third parties contained in this document and any such liability is expressly excluded.

The findings enclosed in this document may contain predictions based on current data and historical trends. Any such predictions are subject to inherent risks and uncertainties.

The opinions expressed in this document are valid only for the purpose stated herein and as of the date stated. No obligation is assumed to revise this document to reflect changes, events or conditions, which occur subsequent to the date hereof.

Contents

EXECUTIVE SUMMARY

Scope

CEPA has been commissioned by the Irish Aviation Authority (IAA) to assess, on a bottom-up basis, the efficiency of AirNav Ireland's operating expenditure (opex). AirNav Ireland is the air navigation service provider for Ireland, while IAA is responsible for the economic regulation of AirNav Ireland.

This study provides an independent forecast of the efficient level of opex at AirNav Ireland over Reference Period 4 (RP4), which covers the period 1st January 2025 to 31st December 2029. The opex forecast is one of the building blocks used by IAA in setting AirNav Ireland's cost efficiency target for RP4.

The forecasts in this report have been developed on a 'bottom-up' basis, where AirNav Ireland's opex is taken at its most granular level, assessed for efficiency and projected forward. This means taking individual cost lines (e.g. staffing of air traffic controllers, power costs, etc.), independently determining the efficient level of these costs in 2023, our base year, and then projecting those efficient costs over the RP4 period. The projections are linked to volume drivers (mostly traffic growth) and/or an assessment of step-changes in cost. These step-changes include movements in the prices of inputs beyond general inflation, changes in operational efficiency due to capital investment, and improvements in service quality that require additional opex.

In our assessment, we have been supported by Think, a specialised air traffic management and airports consultancy. We have also been supported by technical experts with experience in operations, asset management, and in the management and rostering of operational staff.

Staff

Staff costs, including pensions, accounted for over two-thirds of AirNav Ireland's opex in 2023, and nearly two-thirds of these staff costs related to the payroll of air traffic control officers (ATCOs).

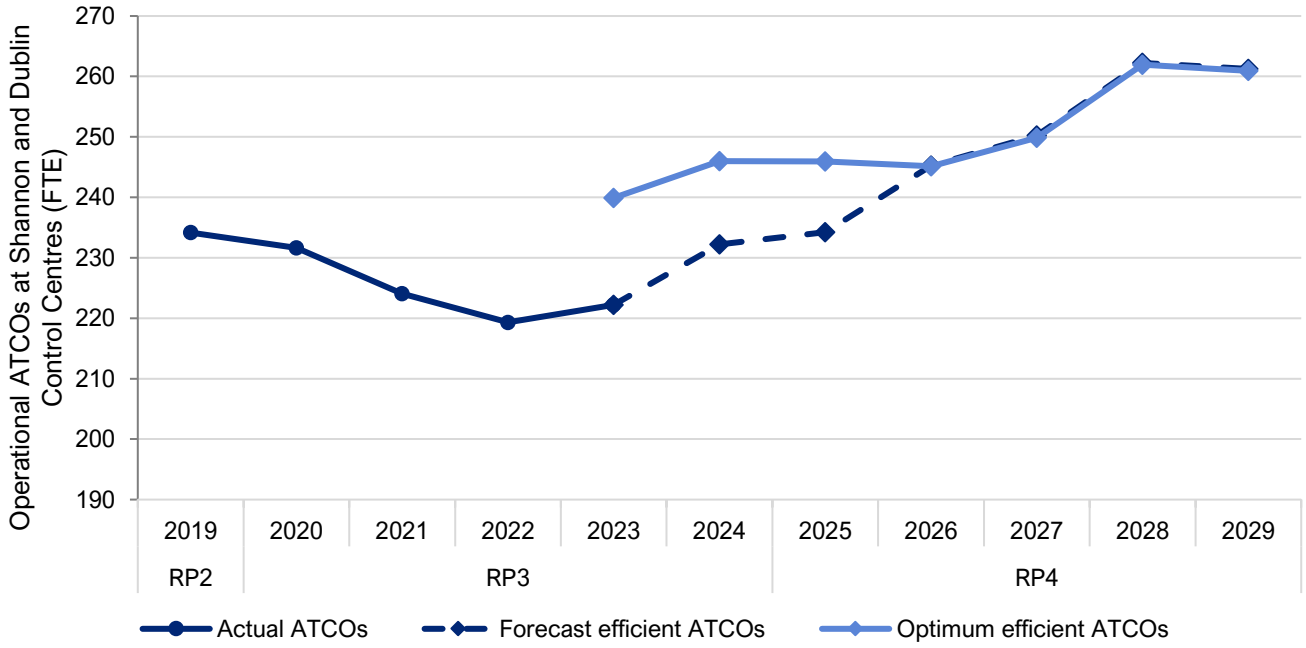
We find that AirNav Ireland's operation in 2023 was under-resourced with respect to ATCOs, and particularly with respect to ATCOs in the Shannon area control centre (ACC) and the combined Dublin area and tower control centre.[1] This led to a deterioration in AirNav Ireland's delay performance in 2023. We conclude that such an under-resourced operation is unlikely to be efficient or sustainable in the long term.

To forecast efficient ATCO headcount at the Shannon and Dublin control centres over RP4, we first estimate an optimum headcount for 2023 that remedies the under-resourced 2023 operation. We then project forwards using forecasts of traffic levels, estimates of productivity improvements and training requirements. We then overlay recruitment constraints that may prevent AirNav Ireland from immediately achieving this headcount. Figure E.1 illustrates our projected transition to the optimum number of operational ATCOs, in full-time equivalent (FTE) terms, at the Shannon and Dublin control centres.[2]

[1] Dublin Airport's tower operation is co-located with the Dublin ACC in a single facility and for the purposes of staffing, is treated as a single unit. We refer to the combined operation as Dublin control centre.

[2] We produce our forecast of optimum staffing levels initially in full-time equivalent terms and then convert to headcount.

Figure E.1: Forecast efficient profile of operational ATCO FTEs at Shannon and Dublin control centres, 2019-2029



Source: CEPA forecasts using AirNav Ireland and STATFOR data

For other ATCO staff, namely the tower operations at Cork and Shannon Airports, supervisory staff, and non-operational ACTOs, we find outturn resourcing in 2023 was closer to optimal levels. Our projections of staffing for these roles are set with reference to the forecasts proposed within AirNav Ireland's business plan.

Our resultant forecast of total ATCO staffing is a large step increase from AirNav Ireland's actual staffing levels in 2023 – from 298 ATCOs in 2023 to 353 by 2029. Nevertheless, our headcount forecast is marginally lower than the proposal within AirNav Ireland's business plan, partly reflecting our view that AirNav Ireland has not fully considered the productivity benefits from the planned investment in its air traffic management (ATM) systems.

For engineering and corporate services staff, we find that AirNav Ireland's proposed increase in headcount over RP4 appears disproportionate to the needs case that has been presented within its business plan. For example, while we recognise the need for additional engineering staff to support with the delivery of AirNav Ireland's proposed capital plan for RP4, our analysis suggests the scale of the increase proposed by AirNav Ireland is greater than is necessary to meet the needs of the capital plan. As such, our draft forecast of efficient staffing levels in these two areas is lower than AirNav Ireland's proposals. Prior to our final report, we are open to assessing further evidence AirNav Ireland may provide to demonstrate the proportionality of the proposed increase in engineering headcount, or further evidence to demonstrate the need, additionality and efficiency of the proposed increase in corporate services headcount.

For the remaining staffing roles, our forecasts are aligned with AirNav Ireland's business plan. In each case, AirNav Ireland has provided adequate justification for the need for any additional staff and has demonstrated that this increase in headcount is additional to existing staffing. We have also been able to verify the efficiency of the proposed increases or independently validate the estimates.

The resultant headcount forecast is presented in the table below. Over the RP4 period, our forecast of headcount is approximately 3% lower than AirNav Ireland's.

Table E.1: CEPA estimates of efficient headcount, 2023-2029

Staffing Group	2023	2024	2025	2026	2027	2028	2029
Operational ATCOs	261	274	279	290	295	308	307
Station Managers	28	28	31	31	31	31	31

Staffing Group	2023	2024	2025	2026	2027	2028	2029
ATM Specialists	9	9	16	16	16	16	16
Corporate Services	57	61	64	65	65	65	65
Data Assistant	42	48	48	48	48	48	48
FMP/AMC*	-	-	5	10	10	10	10
Engineer	87	107	107	115	117	118	123
Operations Management Support	56	66	77	79	82	83	83
Total CEPA forecast	**539**	**592**	**626**	**653**	**663**	**678**	**681**
AirNav Ireland business plan	**540**	**581**	**638**	**672**	**687**	**699**	**710**

Source: CEPA analysis of AirNav Ireland data

** New roles for the return of Flow Management Position (FMP) and Airspace Management Cell (AMC) function from NATS*

Separately, we use a mixture of approaches to assess the efficiency of AirNav Ireland's salary costs in 2023. We find that for most roles these salary costs were efficient, the exception being corporate services. We apply a 5% efficiency challenge to these unit costs, which is at the lower end of our estimates of the size of the efficiency gap.

We then project these salary costs using external forecasts of Irish economy-wide wage growth. Given the large increase in ATCO headcount, we also adjust our forecast of average ATCO salary costs to account for new joiner ATCOs being paid at a lower rate than the average ATCO. We combine the estimates of efficient headcount and unit salary costs to calculate base payroll costs and add on estimates of spending on overtime and pension contributions.

In Table E.2, we show our estimates of efficient payroll costs compared to AirNav Ireland's business plan. Over RP4, our forecast of total payroll costs is approximately 4% lower than AirNav Ireland's.

Table E.2: CEPA and AirNav Ireland forecast payroll costs, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 Total
Base payroll	60.1	66.4	71.2	75.0	76.6	78.4	79.4	**380.6**
Overtime	3.2	3.2	2.8	1.8	1.8	2.0	2.0	**10.3**
Pension	16.2	13.1	13.5	13.8	13.8	13.9	13.8	**68.8**
Total CEPA payroll forecast	**79.6**	**82.7**	**87.5**	**90.6**	**92.2**	**94.2**	**95.2**	**459.7**
AirNav Ireland business plan	**-**	**81.2**	**88.9**	**93.5**	**95.6**	**99.0**	**101.3**	**478.3**

Source: CEPA analysis of AirNav Ireland data

Non-staff

Non-staff operating expenses include costs related to training, travel, operations, administration, utilities, telecommunications and subscriptions. We disaggregated non-staff opex into 24 cost categories and for each category assessed efficient baseline expenditure for 2023 through benchmarking, expert judgement, or other quantitative methods. We then projected these cost categories forward through RP4 using volume drivers including traffic, capex, and staff headcount.

There are a few key areas where AirNav Ireland is proposing significant step-increases in spending compared with current and historic levels. When reviewing the evidence for these, we have concluded that some of these step-increases are well-evidenced and/or plausible in the context of other evidence we have drawn upon. We find that other step-increases are less well-evidenced:

- **Maintenance** – We agree with the need for a step-increase in spending based on our review of AirNav Ireland's bottom-up estimate, but we also consider that more needs to be done to identify areas of spend that may no longer be needed or identify contracts where prices could be renegotiated downwards. For example, AirNav Ireland implicitly assume that all contracts will increase by a minimum of inflation each year, with no consideration of whether some contracts could be renegotiated to drive efficiencies.
- **Computing** – AirNav Ireland is proposing a large step-increase in spending. We have tried to independently account for the factors that may explain this step increase (e.g. cyber security, the impact of the separation from IAA), but that still results in a forecast that is significantly lower than AirNav Ireland's.
- **Consulting, professional services and PR** – AirNav Ireland is proposing a large step-increase in spending on external support, but it is not yet apparent based on the evidence presented what the need for such an increase is.

Table E.3 presents our forecast efficient expenditure on non-staff opex compared to AirNav Ireland's business plan. Over RP4, our forecast is approximately 11% lower than AirNav Ireland's proposals.

Table E.3: Forecast non-staff costs, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 Total
Total CEPA non-staff forecast	35.5	39.0	40.7	44.5	42.2	43.5	45.3	**216.1**
AirNav Ireland business plan	-	41.6	46.2	49.4	48.0	48.1	50.8	**242.5**

Source: CEPA analysis of AirNav Ireland data

Total operating expenditure

Table E.4 summarises our assessment of total operating expenditure, which is approximately 6% lower than AirNav Ireland's business plan over RP4. Opex is forecast to increase by approximately 10% over RP4, which is slightly more than the 8% increase in IFR movements over the same period. The elasticity greater than 1 is driven by step changes in opex related to large capital projects such as TopSky ATC One and our assessment of ATCO under-resourcing at the start of RP4.

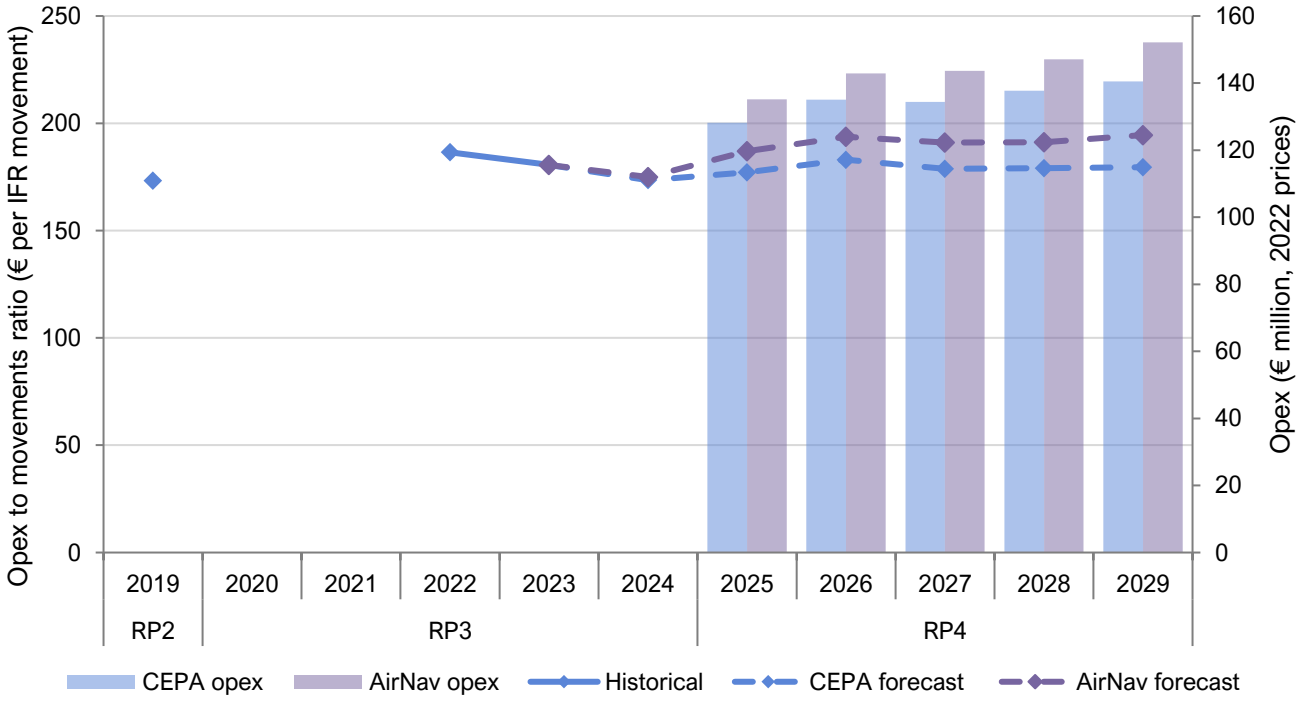
Table E.4: Forecast operating expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 Total
CEPA opex forecast	115.1	121.6	128.1	135.1	134.4	137.7	140.5	**675.8**
AirNav Ireland business plan	-	122.7	135.2	142.9	143.6	147.1	152.1	**720.9**

Source: CEPA analysis of AirNav Ireland data

As a top-down sense check, we look at the overall ratio of total opex to instrument flight rule (IFR) movements, which we expect to average €180 over RP4, as illustrated in Figure E.2. This is higher in real terms than the 2019 ratio of €173 per IFR movement but lower than the 2022 ratio of €186 per IFR movement. We consider this looks reasonable on the basis that it implies that AirNav Ireland's overall productivity stays relatively constant over the RP4 period and remains in line with its historic productivity.

Figure E.2: Forecast efficient opex (RHS: € million, 2022 prices) and opex to movement ratio, 2019-2029



Source: CEPA forecasts using AirNav Ireland and STATFOR data

1. INTRODUCTION AND CONTEXT

CEPA has been commissioned by the Irish Aviation Authority (IAA) to assess, on a bottom-up basis, the efficiency of AirNav Ireland's operating expenditure (opex).

AirNav Ireland is the air navigation service provider (ANSP) for Ireland, while the IAA is National Supervisory Authority (NSA) for the Performance and Charging Scheme of the Single European Sky (SES). As the NSA, the IAA is responsible for developing and submitting a Performance Plan, which includes performance targets for AirNav Ireland. The performance targets, which must be consistent with the Union-wide targets, are set in the four Key Performance Areas of safety, capacity, environment and cost efficiency.

This study provides an independent forecast of the efficient level of opex at AirNav Ireland over Reference Period 4 (RP4), which covers the period 1st January 2025 to 31st December 2029. The opex forecast is one of the building blocks used by IAA in setting AirNav Ireland's cost efficiency target for RP4.

References to AirNav Ireland and IAA

The Air Navigation and Transport Act 2022 was signed into law in December 2022. The Act provided for the restructuring of Ireland's civil aviation regulatory framework to ensure compliance with international best practice. The Act provided for the merger of the safety and security regulation functions of the IAA with the economic and consumer protection functions of the Commission for Aviation Regulation, within IAA, to create a single civil aviation regulator. It also provided for the air navigation functions of the IAA to transfer to a separate commercial, semi-state company, the Irish Air Navigation Service DAC trading as AirNav Ireland. This merger and separation formally took place on 1 May 2023.

To avoid confusion, we refer to the Irish ANSP as AirNav Ireland throughout this report, even when assessing the historical performance of the previous ANSP – which was part of the IAA.

The forecasts in this report have been developed on a 'bottom-up' basis, where AirNav Ireland's opex is taken at its most granular level, assessed for efficiency and projected forward. This means taking individual cost lines (e.g. staffing of air traffic controllers, power costs, etc.), independently determining the efficient level of these costs in 2023, our base year, and then projecting those efficient costs over the RP4 period. The projections are linked to volume drivers (mostly traffic growth) and/or an assessment of step-changes in cost, such as movements in the prices of inputs beyond general inflation, changes in operational efficiency due to capital investment, and improvements in service quality that require additional opex.

The remainder of this report is structured as follows:

- In Section 2, we outline the approach we have taken to assess the efficiency of AirNav Ireland's opex and project it over RP4.
- In Section 3, we present the results of our top-down benchmarking of AirNav Ireland's historic opex.
- In Section 4, we assess the efficiency of staffing levels.
- In Section 5, we assess the efficiency of unit payroll costs.
- In Section 6, we present our overall payroll forecasts including pension costs.
- In Section 7, we assess the efficiency of non-staff costs.
- In Section 8, we provide our conclusions.

This report also includes four appendices that provide further details on our top-down benchmarking, our efficiency analysis of air traffic control officer (ATCO) staffing, our benchmarking of wages, and our approach to allocating costs between en-route and terminal.

2. OUR APPROACH

In this study, we have been tasked with identifying, on an independent basis, an achievable efficient level of opex for AirNav Ireland for the years 2025 to 2029. We build up our estimate of efficient expenditure by separately examining the efficiency of historic salary levels, staff numbers, and non-staff costs, before projecting each item forward using cost drivers, elasticities and an assessment of step-changes in costs.

In this section, we set out our approach to producing efficient opex forecasts.

2.1. DATA AND EVIDENCE USED

To independently estimate and project efficient opex for AirNav Ireland, we collect, analyse and triangulate between multiple sources of evidence:

- We use actual cost and staffing data provided by AirNav Ireland for the years 2020 to 2023 to understand its current cost base. We supplement this with historic data taken from previous Reference Periods to understand trends in expenditure. This data provides annual staffing levels in terms of headcount, associated payroll and pension costs, and non-pay costs by cost category.
- We draw upon AirNav Ireland's regulatory business plan to understand AirNav Ireland's proposed step-changes in expenditure over RP4 and to assess the evidence base supporting these. We have requested and received supplementary information from AirNav Ireland, such as staff rostering patterns, contractual information for third-party suppliers etc. Where necessary, we have clarified the information provided by AirNav Ireland through workshops, site visits, and clarification questions.
- To conduct benchmarking analysis, we collect data from the ATM cost-effectiveness report (ACE) produced by the Performance Review Commission,[3] other benchmark data collected by Eurocontrol's Aviation Intelligence Unit,[4] annual accounts of other ANSPs and comparator firms, from industry benchmark reports, and from previous regulatory decisions and associated efficiency studies.

While AirNav Ireland's business plan has informed our forecast of efficient opex, the business plan is only one of multiple sources we have consulted. As our scope is to produce a forecast independently of AirNav Ireland's business plan submission, we do not simply review the business plan and make allowances/disallowances from it.

2.2. CORE ASSUMPTIONS

Inflation – The monetary figures in this report are presented in average 2022 prices unless otherwise stated. To convert between price bases, we use historical and forecast Consumer Price Index (CPI) data from the April 2024 edition of the International Monetary Fund World Economic Outlook.[5]

Traffic levels – For traffic levels, we use the baseline scenario from the Spring 2024 STATFOR forecast produced by Eurocontrol, consistent with the forecast used elsewhere by the IAA.[6]

[3] Eurocontrol Performance Review Commission (2024) ACE Benchmarking Report 2024 Edition. https://www.eurocontrol.int/publication/air-traffic-management-cost-effectiveness-ace-benchmarking-report-2024-edition

[4] Eurocontrol (2024) Aviation Intelligence Portal. https://ansperformance.eu/

[5] IMF (2024) World Economic Outlook: April 2024 edition. https://www.imf.org/en/Publications/WEO/weo-database/2024/April/

[6] Eurocontrol (2024) Eurocontrol Forecast 2024-2030: Update – Spring 2024. https://www.eurocontrol.int/publication/eurocontrol-forecast-2024-2030

Wages and payroll costs – We use data on historic wage growth to assess how wages for specific roles at AirNav Ireland compare with similar roles elsewhere in the Irish economy.[7] The data is available up to 2023, for wages in Ireland as a whole, as well as wages in specific economic subsectors.

To inform our projections of wage growth, we use forecasts from the Q1 2024 edition of the Central Bank of Ireland's Quarterly Bulletin.[8] From 2027 onwards, we assume real wage growth will be 1.5% in line with historic trends in the Irish economy in recent decades, and as per previous efficiency studies we have undertaken such as in relation to Dublin Airport in 2022.[9] Assuming 1.5% real wage growth implies that nominal wage growth will be approximately 3.5% per annum.

2.3. ANALYTICAL APPROACH

We illustrate in Figure 2.1 overleaf, the analytical approach we have taken to producing the opex forecasts, which is line with other efficiency studies we have undertaken for IAA. For each cost category, we:

- Assess the efficiency of historic expenditure over the period 2016-2023;
- Use this information to estimate a baseline for efficient expenditure in 2023;
- Project efficient level of expenditure over the period 2024-2029 using volume/price drivers and elasticities; and
- Add or subtracted any known step changes in expenditure over the period 2024-2029 e.g. because of newly emerging cost pressures, efficiency initiatives, or opex impacts from completed capital projects.

Many of the step-changes we consider including in our forecast have come from AirNav Ireland's business plan. We apply a three-part test to determine the extent to which we should include step-changes in our forecast:

- **Need** – We assess whether there is a need for the additional expenditure, i.e. whether there is an impact outside of AirNav Ireland's control that affects its cost base.
- **Additionality** – We consider whether the additional expenditure is likely to be genuinely additional to our benchmarks or volume-related estimates.
- **Efficiency** – We test if the strength of the evidence supports the scale of additional expenditure, and whether the scale of additional expenditure is proportionate to the identified need.

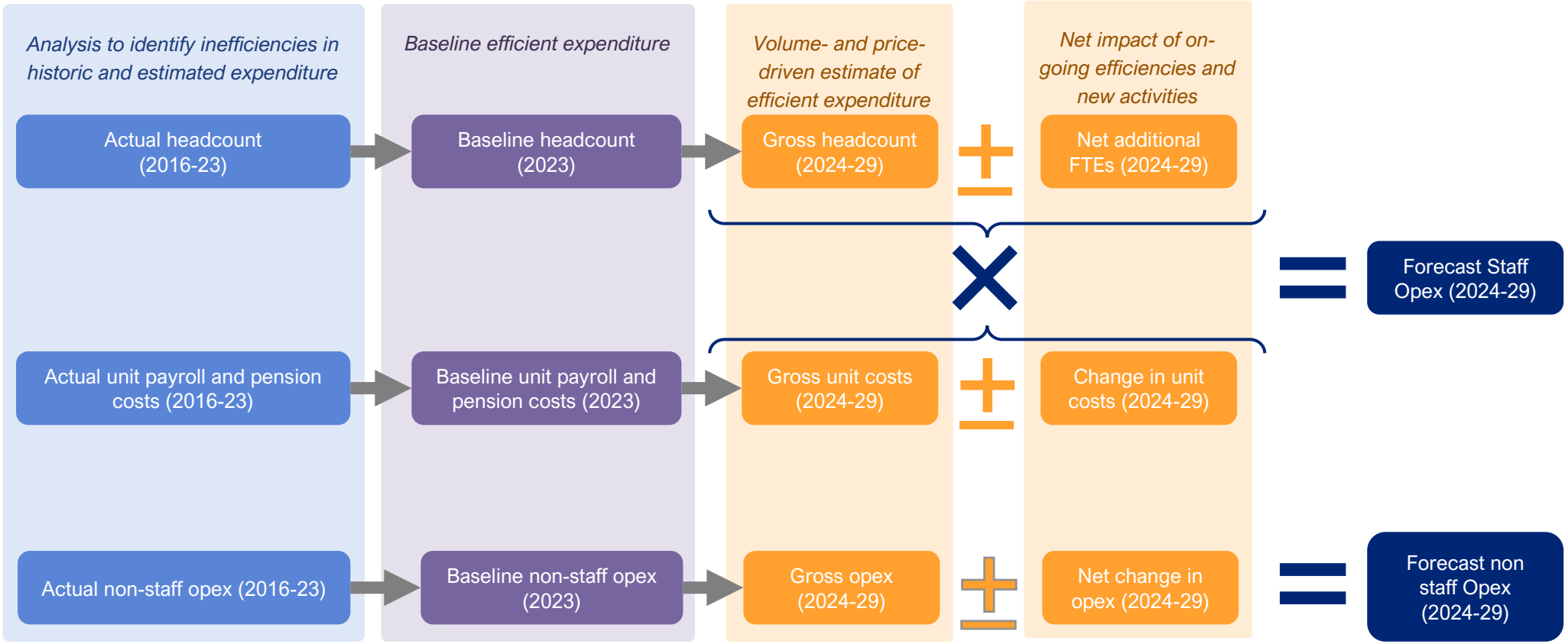
In our assessment, we have been supported by Think, a specialised air traffic management and airports consultancy. Think has supported with the efficiency analysis of ATCO staffing levels in 2023. We have also been supported by technical experts with experience in operations, asset management, and in the management and rostering of operational staff.

[7] Central Statistics Office (2024) EHQ15 - Average Weekly, Hourly Earnings and Weekly Paid Hour of All Employees. https://data.cso.ie/table/EHQ15

[8] Central Bank of Ireland (2024) Quarterly Bulletin No.1 2024. https://www.centralbank.ie/publication/quarterly-bulletins/quarterly-bulletin-q1-2024

[9] CEPA (2022) Dublin Airport Operating Expenditure Assessment: Review of Consultation Responses. https://www.iaa.ie/docs/default-source/car-documents/1c-economic-regulation/operating-cost-forecasts-final-report.pdf?sfvrsn=b98110f3_1

Figure 2.1: Approach to estimating forecast efficient operating expenditure at AirNav Ireland

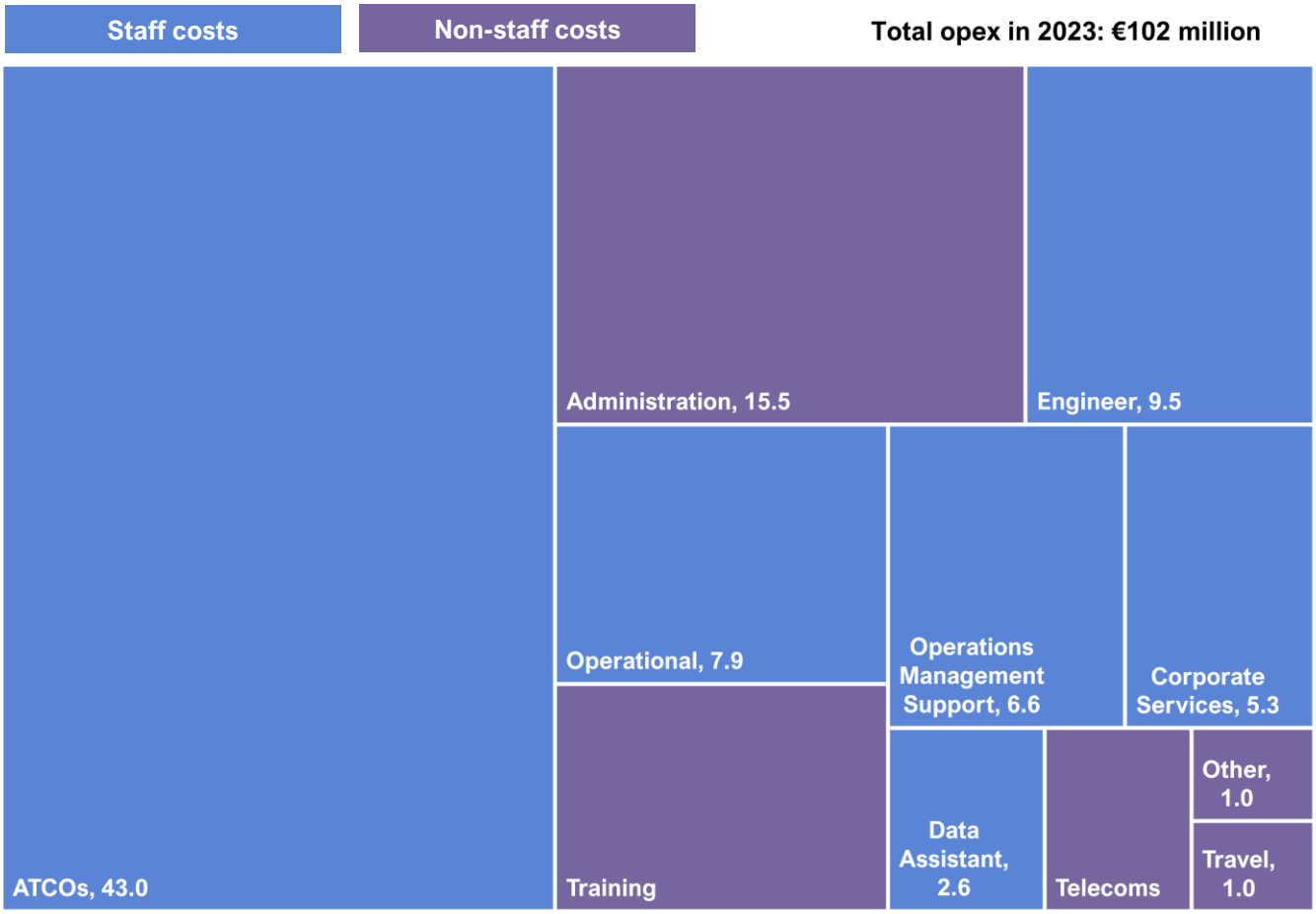


3. AIRNAV IRELAND'S OVERALL OPEX

In this section, we provide context for AirNav Ireland's cost base. We also present top-down benchmarking of AirNav Ireland's historical opex relative to its peer ANSPs, and an analysis of trends in AirNav Ireland's opex. The full details of our analysis are presented in Appendix A.

As shown in Figure 3.1 below, AirNav Ireland's opex in 2023 totalled €102 million in 2022 prices. Approximately two-thirds of this expenditure relates to staff costs, of which ATCOs form the single largest component at €43 million. Another material area of staff costs is engineers, who support with day-to-day maintenance of AirNav Ireland's assets as well as with the planning of capital investments. For non-staff costs, the training of new ATCOs and engineers as well as on-going training for ATCOs and other staff, formed €6.9 million of expenditure in 2023. Administration costs (€15.5 million in 2023) cover a range of areas of spend, of which rent and rates, computing, insurance and security account for over half of spending. Operational costs primarily comprise of spending on maintenance and power.

Figure 3.1: Breakdown of 2023 opex at AirNav Ireland (€ million, 2022 prices)



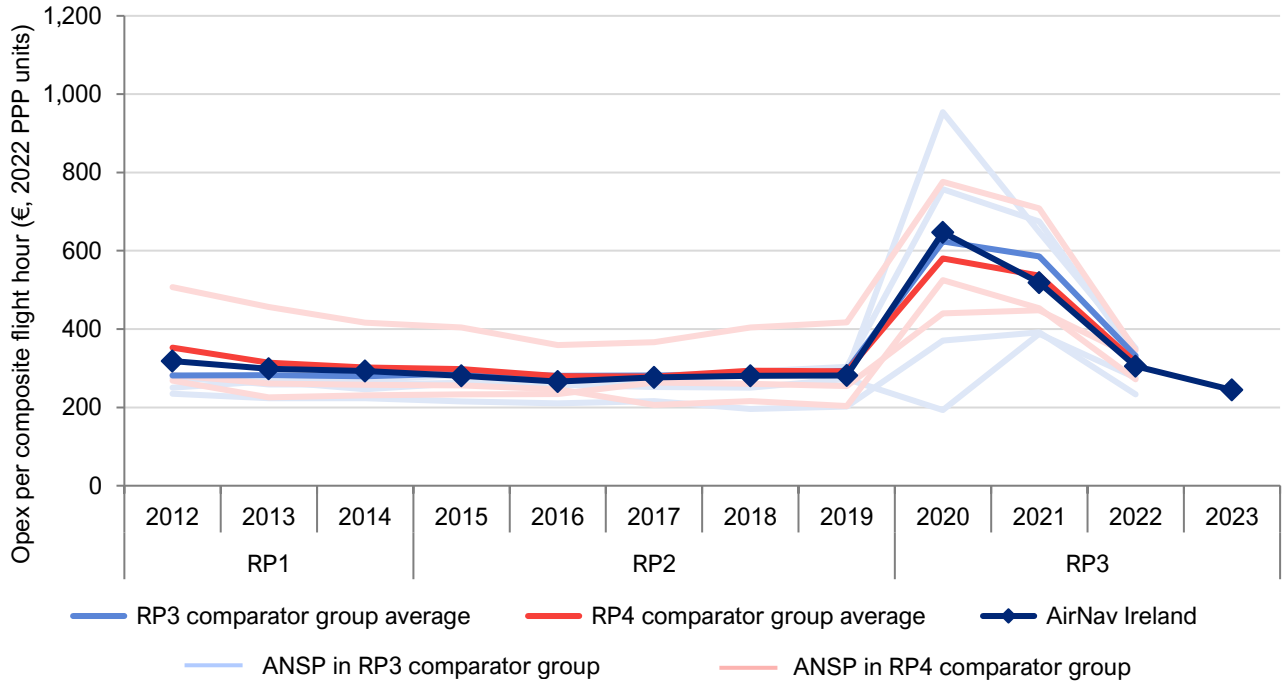
Source: AirNav Ireland

Through our top-down benchmarking, we find that AirNav Ireland's overall opex has historically been in line with or below its peers, after normalising for differences in traffic and price levels between countries. Figure 3.2, shows opex per composite flight hour in PPP-adjusted units.[10] In 2022, the most recent year for which we have comparator

[10] Purchasing Power Parity – this is a conversion that tries to equalise the purchasing power of different locations.

data, AirNav Ireland's normalised opex was marginally below the average of both sets of comparator groups we have assessed.[11]

Figure 3.2: Operating costs per composite flight hour by ANSP, 2012-2023 (€, 2022 PPP units)



Source: CEPA analysis of Eurocontrol and ANSP data

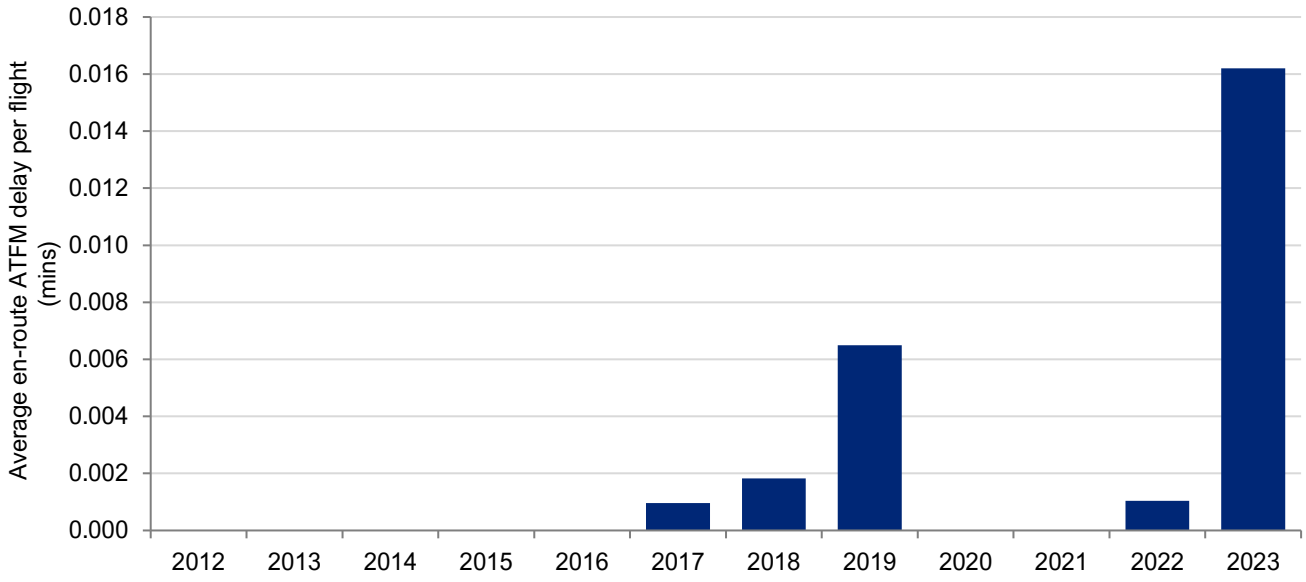
We also note that AirNav Ireland's opex in 2023, was lower than at any point in our sample period once inflation and traffic levels have been accounted for. This raises a question as to whether AirNav Ireland's 2023 spending levels imply a step change in its efficiency or are evidence of an under-resourced operation.

Figure 3.3 below shows AirNav Ireland's performance in terms of en-route air traffic flow management delays, one of the key performance indicators in the SES Performance Plan. There was a sharp increase in delays in 2023, to levels significantly higher than historic levels. AirNav Ireland has also highlighted in its business plan an increase in the instances of 'zero flow rates' being imposed,[12] which may not have a material impact on annual capacity performance but are temporarily disruptive to airspace users and can be indicative of insufficient resilience. While AirNav Ireland's delay performance is still significantly better than most of its peers, the deterioration combined with lower expenditure levels tend to suggest that its 2023 operation was under resourced.

[11] We use two comparator groups in our analysis. The first is the 'RP3 comparator group', which is the group of ANSPs that was previously used to benchmark AirNav Ireland's opex for RP3, while the 'RP4 comparator group' consists of the ANSPs identified by the Performance Review Body as most alike AirNav Ireland.

[12] A zero-flow rate restriction can be applied to an area if no ATCOs are available for a specified time. If such a restriction is applied, then no aircraft are permitted to fly through that area.

Figure 3.3: AirNav Ireland average en-route ATFM delay per flight, 2012-2023 (minutes)



Source: CEPA analysis of Eurocontrol and ANSP data

Our benchmarking of historical total opex masks differences between staff and non-staff costs when comparing AirNav Ireland to its peers. AirNav Ireland's staff costs have historically been lower than the average of the two comparator groups we use, whilst its non-staff costs have been higher. We also observe that AirNav Ireland has historically had a lower ratio of technical support staff per operational ATCO than its peers. While this might imply that AirNav Ireland has fewer technical support staff than would be considered appropriate, we consider it could indicate that AirNav Ireland is outsourcing more of its activities than other ANSPs.

Our top-down analysis shows that AirNav Ireland's historic opex has been broadly in line with its comparators, suggesting a relatively efficient operation. However, this does mask differences between staff costs and non-staff costs that we investigate further through our bottom-up analysis. Our analysis also indicates that AirNav Ireland's 2023 operation may have been under resourced, which again we investigate further in subsequent sections.

4. FORECAST OF STAFFING LEVELS

Summary

The bottom-up analysis presented in this section supports the preliminary findings of our top-down benchmarking i.e. that AirNav Ireland's 2023 operation was under resourced. In particular, ATCO staffing levels in 2023 were at a level that was likely suboptimal in ensuring operational resilience. We find less evidence of an under-resourced operation in other areas, though we recognise that AirNav Ireland attributes, to a certain extent, its failure to deliver a significant part of its RP3 capital programme to having insufficient engineering staff.

Over RP4, our draft forecast of staffing levels is slightly lower than AirNav Ireland's at an aggregate level. Three factors drive this:

- Firstly, we consider that AirNav Ireland does not fully account for improvements in ATCO productivity following investment in its ATM systems, despite this forming a key part of the business cases for those systems.
- AirNav Ireland are also projecting significant step-increases in engineering headcount, the scale of which we consider cannot be justified based on the evidence presented to us so far. While some evidence has been provided in the business plan and through subsequent clarification questions as to how the forecast of engineering headcount has been put together, we are currently unable to reconcile the projection with the fundamentals around the volume of activity that will be undertaken by AirNav Ireland's engineering function.
- Finally, for corporate services roles, we do not consider that AirNav Ireland has yet made the case for some of the step-changes it is planning.

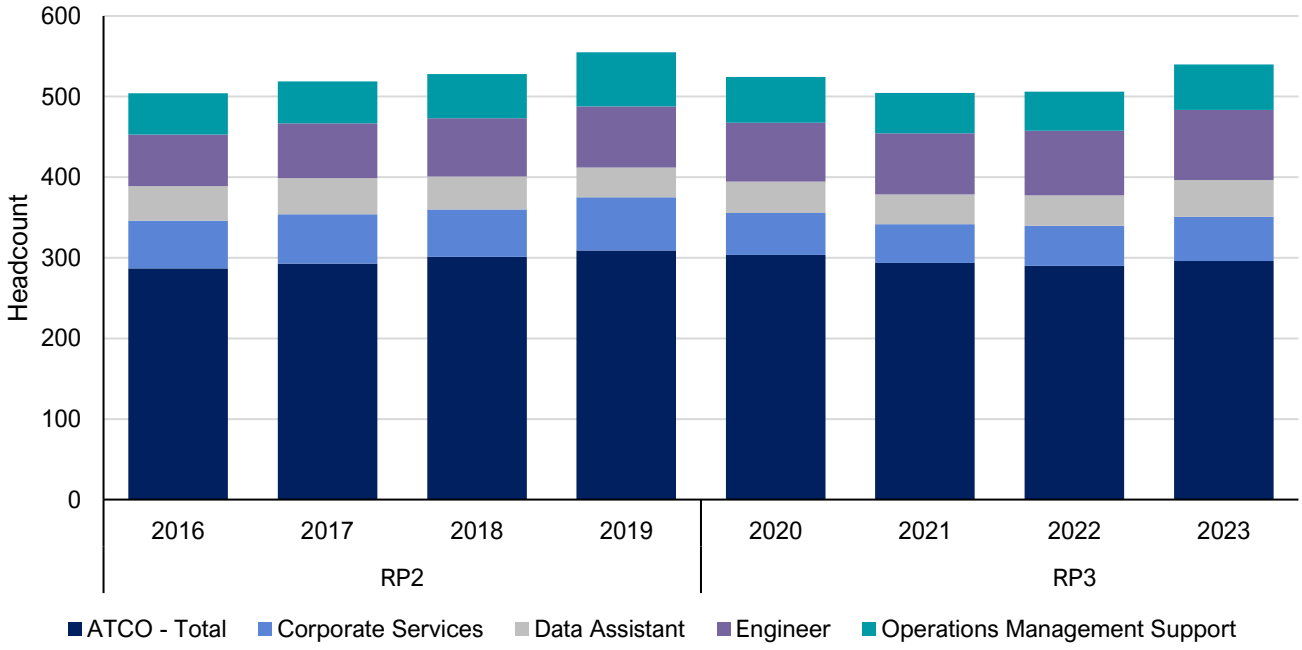
In this section, we first present our estimate of efficient staffing levels by role for 2023 and then produce a forecast of staffing levels by role for the next determination period. We begin by providing a brief outline of AirNav Ireland's staffing costs. Then for each role, we assess the efficiency of historic staffing levels before producing an estimate of efficient headcount for RP4. Particular attention is paid to operational ATCOs since they account for a large share of the total headcount and payroll.

4.1. STRUCTURE OF HEADCOUNT

AirNav Ireland's headcount can be broken-down into five groupings – ATCOs, corporate services, data assistants, engineers, and operations management support. ATCOs can be disaggregated further into station managers, operational ATCOs who may work in area control or terminal operations, and non-operational ATCOs including ATM specialists.

Figure 4.1 illustrates the breakdown of headcount by role and shows that ATCOs make up the majority of AirNav Ireland's total staff headcount, while engineers make up the second largest proportion of headcount.

Figure 4.1: Breakdown of headcount by staff type, 2016-2023

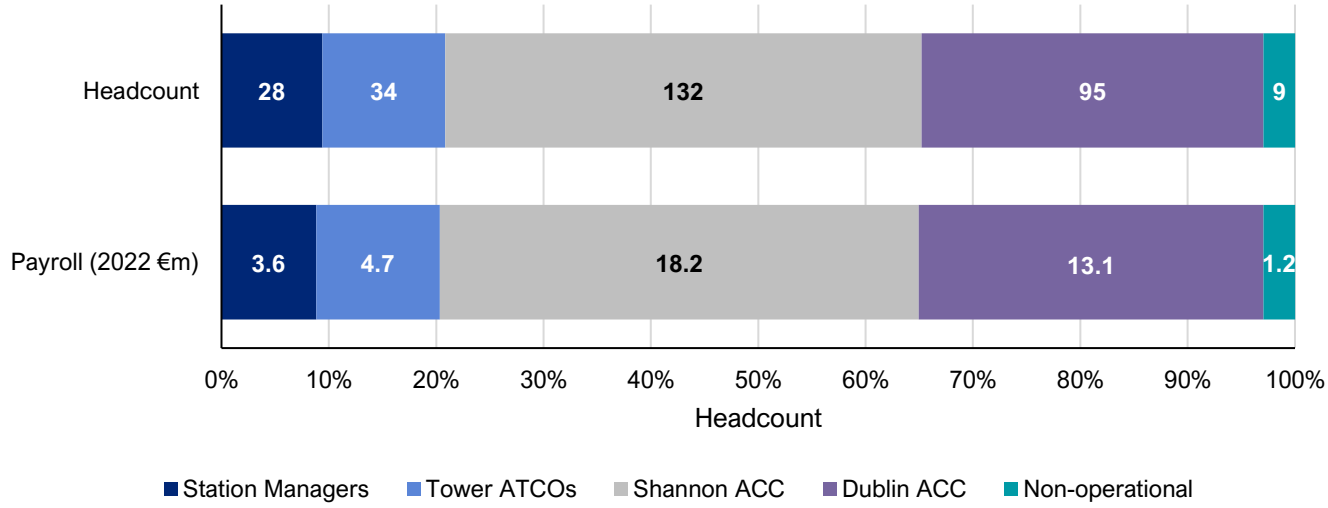


Source: CEPA analysis of AirNav Ireland data

4.2. ATCOs

ATCOs are the largest driver of AirNav Ireland's staff costs, accounting for almost two-thirds of the total staff expenditure. The breakdown of ATCOs into specific roles for 2023 is illustrated in Figure 4.2 below. Operational ATCOs working in the Shannon and Dublin area control centres (ACCs)[13] as well as the Dublin Airport tower operation are the largest share of both ATCO headcount and payroll in 2023. Collectively, they account for €31 million out of the €41 million in ATCO payroll costs (including overtime) in 2023.

Figure 4.2: Breakdown of ATCO headcount and payroll costs, 2023



Source: CEPA analysis of AirNav Ireland data

[13] An ACC is a facility – buildings, technology, people – that provides en-route air traffic control in airspace other than that immediately around or at airports. ACCs sometimes provide air traffic control to airborne aircraft arriving at or departing from airports, as is the case for Dublin Airport.

4.2.1. Assessing the efficiency of ATCO staffing levels in 2023

The number of en-route ATCOs required to safely support traffic through airspace is highly dependent on traffic volumes. Other operational ATCO roles such as station managers and terminal ATCOs are less elastic to traffic volumes, while non-operational ATCO roles are largely unaffected by traffic levels.

This means that the rostering of en-route ATCOs is complex, given daily and seasonal variation in traffic and forecasting uncertainty around how closely actual traffic volumes will match schedules. As such, it is not possible to exactly match the rostering of staff to traffic levels. Where there is a need for additional ATCOs, this is managed through shift extensions, cancellation of leave and overtime. For all operational ATCO staff, there is also a need to ensure shift breaks comply with fatigue management rules, training and other non-operational activities, and planned and unplanned leave and absence.

To assess the efficiency of AirNav Ireland's ATCO staffing, we review sector capacity, roster efficiency and ATCO utilisation:

- **Sector capacity:** Irish airspace is split into building blocks that can be grouped, horizontally and vertically, into sectors. The number and topography of sectors can be adjusted dynamically to accommodate predicted traffic flows, with each sector typically managed by two controllers. AirNav Ireland's capability to manage sectors dynamically and flexibly enables capacity to be balanced with demand. Effective sector management enables an efficient operation, with low delays and high ATCO utilisation. While other ANSPs are similarly able to group or split up sectors, they are generally less able to do it as flexibly as AirNav Ireland.

  We define sector utilisation as the ratio of number of aircraft per open sector. Sector utilisation is important because it is used as an indicator for when and where additional sectors need to be opened to manage traffic demand. If sectors are opened too early or in excessive numbers, unnecessary resource will be deployed. On the other hand, if sectors are opened too late or not at all, sectors may get overloaded risking delays and/or inefficient flight paths.

- **Roster efficiency:** Here we look at how closely staff rosters match the number of ATCOs needed based on the number of sectors that are open. We define roster efficiency as the ratio of the ATCOs needed to ATCOs rostered for each hour, targeting a roster efficiency of 85%.[14]

- **ATCO utilisation:** This looks at the proportion of time operational ATCOs spend on operational activities. We define ATCO utilisation as the ratio of operational ATCOs needed to meet traffic demand and fulfil other duties to the actual number of operational ATCOs. We target a utilisation rate of 85% in line with standard industry benchmarks.

We assess the efficiency of ATCO staffing levels in 2023 based on operational data provided by AirNav Ireland, including staffing arrangements, traffic volumes, number of open sectors, and roster data, over two sample weeks for each of Shannon and Dublin ACCs. The two sample weeks include one from February 2023 representing a typical week in the winter season, and one from July 2023, representing a typical week in the summer season. While the sample data is of small size, we consider it is sufficient for providing good efficiency indicators.

Below, we present a summary of our analysis and conclusions. Our full analysis is presented in Appendix A.

Dublin and Shannon Control Centres

Traffic controlled by the Shannon ACC is mainly overflights, crossing the North Atlantic in both directions. Shannon ACC is responsible for air traffic over most of Ireland's territorial land and waters (see Appendix Figure B.1).

[14] The modelled ATCO hours are not constrained by factors such as shift start times, shift lengths and inflexibility in break times. It is not reasonable, therefore, to expect the actual roster to mimic the perfect modelled roster. We consider 85% roster efficiency a reasonable benchmark to assume for good roster performance, based on our work in similar contexts.

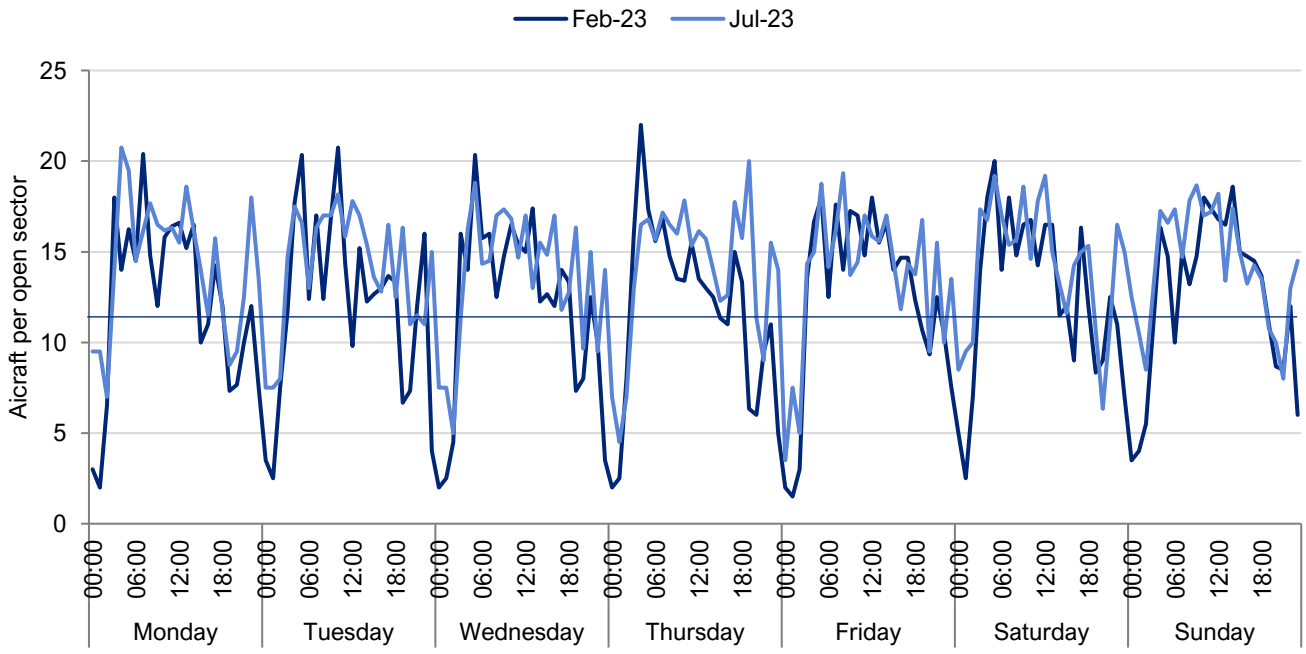
Dublin ACC provides air traffic control services in up to four sectors around Dublin Airport and approach services to the airport. Most traffic is either arriving or departing from the airport but there are also a small number of overflights. Dublin Airport's tower operation is co-located with the operation providing area control and approach services. As the ATCOs within the unit are licenced to provide both sets of services, we assess staffing efficiency on an integrated basis. We use the term Dublin control centre to refer to the combined Dublin ACC and tower operations.

Given the types of services offered by the ACCs, ATCO requirements for both Shannon and Dublin control centres are highly elastic to traffic and roster efficiency is an important consideration for both. Sector utilisation is a more significant consideration for Shannon ACC given its role primarily serving overflights.

Sector utilisation

Our analysis of sector utilisation shows that AirNav Ireland tends to be applying sector opening and closing criteria consistently and efficiently. Figure 4.3 illustrates the sector capacity in Shannon ACC during the two sample weeks, which generally shows high sector utilisation, except for the night period when there is low traffic volume but two sectors must remain open.[15] The ratio of aircraft per open sector is below 10 for approximately 25% of the time during the winter week and approximately 10% of the time during the summer week. This is what we would consider high sector utilisation. Sector utilisation is higher in the summer than the winter week, with a median ratio of aircraft to open sectors of 13 for the winter week and 15 for the summer week. This is in line with what we would expect from an efficient operation.

Figure 4.3: Aircraft per open sector on an hourly basis for the two sample weeks in February and July 2023



Source: CEPA analysis of AirNav Ireland data

Roster efficiency

In addition to the number of open sectors, staffing is also determined by shift and licensing restrictions.

- **Shifts:** ATCOs and coordinators work on overlapping shifts. There are some restrictions on shifts due to union agreements and working time act stipulations. ATCOs can work up to two hours but then must take a

[15] We understand two sectors must remain open regardless of traffic volumes as the size of the Shannon FIR is too large to be controlled as a single sector.

break as a fatigue management measure. When shifts change or ATCOs go on break they must formally handover, which takes at least 10 minutes. When averaged over the Shannon ACC, the average proportion of time each ATCO spends in position is approximately 82% of their shift. We assume the same restrictions apply at Dublin control centre, such that Dublin ATCOs spend a similar amount of time in position.

- **Licensing:** ATCOs must be licensed for each role they undertake – area control, approach and tower. Higher cross licensing allows for greater roster efficiency as a single large pool of controllers on duty can provide break cover for each other and increase utilisation. Shannon only covers area control and 97% of Shannon ATCOs are licensed for all combinations of high sectors, the most prevalent in the ACC. This results in a high degree of flexibility. Only 32% of ATCOs in Dublin are cross licensed between area control and approach, providing some roster flexibility but not at the same levels as Shannon.

To determine the efficiency with which the rostering system matches controllers on duty with the traffic demand, we define roster efficiency as the ratio of the minimum number of controllers needed to the number of controllers rostered. We do this for each hour in the two sample weeks we analyse. The controllers needed is calculated as the sum of:

- the schedule of open sectors hour-by-hour across the two sample weeks, each staffed by two ATCOs;
- a coordinator position staffed permanently, with a second coordinator in position between 08:00 and 14:00 in winter, and between 08:00 and 17:00 in summer; and
- a flight data control (FDC) position, staffed 24/7.

This figure is then adjusted to the average 82% deployment level to account for the need for breaks. A further adjustment is made to account for the proportion of ATCOs with licences to fill each of the positions.

In the appendix, we provide figures comparing the actual rostered staffing and the modelled minimum staffing for Shannon ACC and Dublin control centre over the February and July sample weeks.

Table 4.1 compares the actual roster with the modelled staffing profile. Assuming a benchmark of 85% utilisation for an efficient roster, the table shows that in the February sample week, the Shannon ACC roster was broadly in line with what would be expected. For the July sample week utilisation exceeded what normally would be expected implying that additional controllers were needed. The table also shows that in in both winter and summer, the Dublin roster is stretched above what would be expected, implying that additional controllers were needed.

Table 4.1: Roster efficiency for the Shannon ACC and Dublin control centre for the two sample weeks

	Actual ATCO hours	Modelled ATCO hours	ATCO utilisation	Actual FTE	Modelled FTE @ 85% utilisation
Shannon ACC					
Feb 2023	2,890	2,512	87%	88	90
July 2023	3,158	3,123	99%	97	111
Dublin control centre					
Feb 2023	1,869	1,827	98%	57	63
Jul 2023	2,182	1,950	89%	66	69

Source: CEPA analysis of AirNav Ireland data

Cork and Shannon airports

As Cork and Shannon airports deal with approach and tower traffic, they have fixed ATCO positions that are largely inelastic to traffic volume.

Cork has one approach position and one air/runway control position staffed 24/7, supplemented by a ground control position staffed from 11:00 to 16:30 (5.5-hour shift) in winter and from 10:30 to 17:00 (6.5-hour shift) in

summer. AirNav Ireland's 2023 headcount figure for Cork ATCOs is 18 implying that most ATCOs are licensed for multiple positions and utilisation is approximately 95%.

Shannon has one approach position and one air/runway control position staffed 24/7, supplemented by a ground control position staffed from 09:00 from 17:00 (eight-hour shift) across the year. AirNav Ireland's 2023 headcount figure for Shannon ATCOs is 20 implying that most ATCOs are licensed for multiple positions and utilisation is also approximately 95%.

In both cases, adding 3 additional ATCOs would reduce utilisation to just under 85%.

Conclusions

The analysis described above indicates that in 2023, AirNav Ireland was operating at levels of roster efficiency that are unlikely to be sustainable in the longer term. In both Shannon and Dublin ACCs and the towers at Dublin, Cork and Shannon airports, roster efficiency was at, and often considerably higher than, the 85% benchmark. Overall ATCO utilisation, considering both operational and other essential duties, was consistently above 90%. This finding is consistent with the top-down analysis presented in this report, which highlights low levels of staff opex, high ATCO productivity, and a deterioration in operational performance in 2023.

In fact, utilisation levels in 2023 were arguably higher than what can be considered sustainable in the long-term, introducing a risk that operations are vulnerable to even small attrition rates. In addition, operating at such high utilisation levels might be detrimental to resilience, with the risk that small disruptions will have large negative operational impacts. This is likely to increase instances of 'zero flow rates' being imposed, reducing capacity and increasing delays, both of which were observed in 2023.

Finally, we observe that AirNav Ireland's outturn ATCO headcount in 2023 was below the levels assumed in the setting of the RP3 Performance Plan. Assuming no training constraints, our estimate of optimum 2023 staffing levels is slightly higher than was assumed in the RP3 Performance Plan.

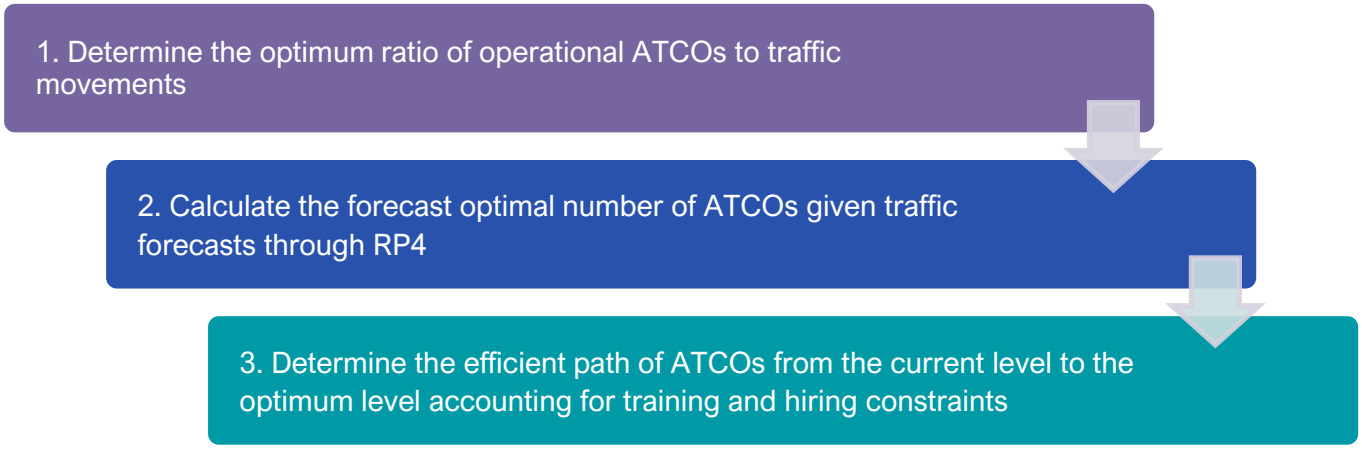
In the next section, we explain how we use this estimate to forecast efficient ATCO staffing levels, while accounting for practical constraints around the timely recruitment of ATCOs.

4.2.2. Forecasting efficient ATCO staffing levels

As activity levels at the two control centres are more elastic to traffic than the two tower-only operations, we forecast each of these separately. For the ATCOs based at the Shannon and Dublin control centres we use traffic levels as a key driver of headcount, while for the two tower operations we assess the efficiency of proposed step-changes in headcount included within AirNav Ireland's business plan. Similarly, for supervisory and non-operational roles, we forecast headcount with reference to AirNav Ireland's business plan.

Operational ATCOs at Dublin and Shannon control centres

For Shannon and Dublin control centres, our approach to forecasting efficient operational ATCO staffing levels consists of three steps:



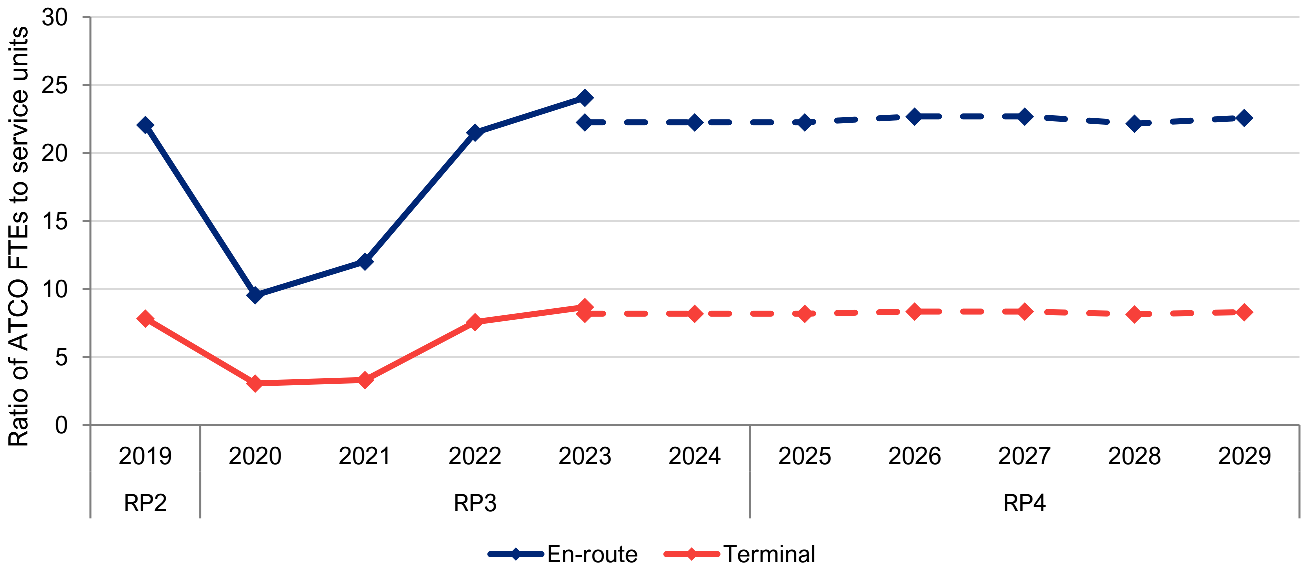
Step 1: Determine the optimum ratio of operational ATCOs to traffic movements

We use the analysis, summarised in Table 4.1 above to estimate the required percentage increase in FTEs at Shannon ACC, and at Dublin control centre (ACC and tower), to meet 85% roster efficiency, which we define as the optimal level. We determine that AirNav Ireland would optimally have had 8.2% more operational ATCOs at Shannon ACC and 5.7% more at Dublin control centre.

We then use this to estimate the impact on ATCO productivity, defined as the ratio of ATCOs to service units (an indicator of traffic levels). We do this separately for en-route and terminal. We scale down the 2023 ratio of en-route ATCOs to en-route service units by a factor of 0.92, where en-route ATCOs consist of all ATCOs in Shannon plus 76% of ATCOs in Dublin control centre.[16] Similarly, we scale down the 2023 ratio of terminal ATCOs to terminal service units by a factor of 0.94. Terminal ATCOs consist of 24% of ATCOs in Dublin control centre. This gives us the optimal ratio of ATCO FTEs to service units, given current efficient productivity levels.

We further adjust this ratio for both a planned decrease in operational working hours from 2028 to allow for additional training for TopSky ATC One and expected increases in productivity related to capex projects.[17] There are numerous capex projects planned as part of the COOPANS partnership, including upgrades to achieve CP1 compliance and the TopSky ATC One system. They are expected to deliver productivity gains over RP4. To model these gains we assume that ATCOs will be able to handle 2% more service units per FTE from 2026 aligning with the completion of a number of CP1 capex projects, and an additional 2% from 2029 aligning with the operationalisation of TopSky ATC One.[18] We propose considering these assumptions in more detail as part of our final forecasts. The efficient ratios of en-route and terminal operational ATCOs to en-route and terminal traffic movements is illustrated in Figure 4.4. It shows that we assess optimum ATCO productivity in 2023 would have been in line with what it was in 2019.

Figure 4.4: Ratio of en-route ATCO FTEs to en-route service units, 2019-2030



Source: CEPA analysis of AirNav Ireland data

[16] This follows the cost allocation methodology presented by AirNav Ireland in Section 7 of its business plan.

[17] TopSky ATC One is the next iteration of the core ATM system used by COOPANS. COOPANS is an international partnership between the air navigation service providers of Austria (Austro Control), Croatia (Croatia Control), Denmark (Naviair), Ireland (AirNav Ireland), Portugal (NAV Portugal) and Sweden (LFV).

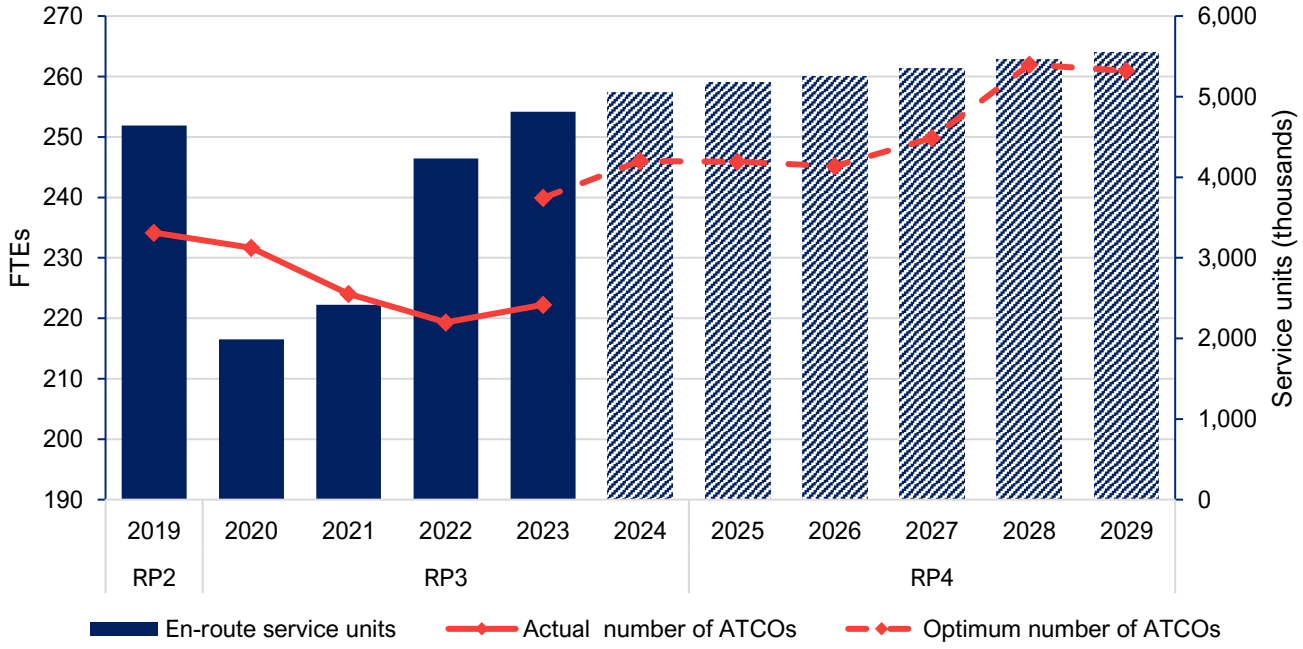
[18] We consider this growth in productivity conservative, for example, given the claimed productivity benefits in the COOPANS business case: "[redacted]". We base this on IAA's previous estimate of the productivity improvements of these investments, as used in the setting of the RP3 Performance Plan.

Step 2: Calculate the forecast optimal number of ATCOs given traffic forecasts through RP4

We use the ratio of ATCOs to service units and combine it with a forecast of service units to create an efficient profile of operational ATCOs through RP4. We use STATFOR's medium traffic forecast, in-line with traffic forecasts which the IAA proposes to use for the Performance Plan, and the forecast used by AirNav Ireland in generating its business plan.

Figure 4.5 illustrates our forecast of the optimum number of operational ATCO FTEs at Shannon ACC and Dublin control centre through RP4. In 2023, the actual number of operational ATCOs at Shannon and Dublin control centres was 222, 7.4% less than out estimate of the optimum number of ATCOs, which was 240. Over RP4, we forecast the optimum number of operational ATCOs to increase by 6% over RP4.

Figure 4.5: Historic number of ATCO FTEs at Shannon ACC and Dublin Control Centre and forecast number of ATCO FTEs, compared against traffic levels, 2019-2029



Source: CEPA analysis of AirNav Ireland and STATFOR data
Note: Hashed bars represent forecast service units

Step 3: Determine the efficient path of ATCOs from the current level to the optimum level accounting for training and hiring constraints

While our analysis finds that there was a shortage of operational ATCOs in 2023, it is not possible for AirNav Ireland to immediately address this shortfall. The shortfall can either be addressed by directly hiring experienced ATCOs or by training new ATCOs. Experienced hires will, on average, be more expensive than training new ATCOs, and there is likely to be some constraint on the number of experienced ATCOs that can be hired by AirNav Ireland (i.e., because the international labour market for ATCOs is tight and there are issues related to cross licensing). Training new ATCOs takes time and is costly to AirNav Ireland. There is also a limit on the training class size for new ATCOs given the availability of existing ATCOs who can provide the training. These constraints mean that AirNav Ireland cannot instantly move to the optimum profile illustrated in Figure 4.5, but must move to the new profile gradually over time. This is highlighted in AirNav Ireland's business plan.[19]

Additionally, existing ATCOs may exit, either by planned retirement or for other reasons, and new station manager or ATM specialist roles may be filled by existing ATCOs. These exits must also be considered when calculating the transition to an optimum profile.

[19] AirNav Ireland (2024) Business Plan 2025-2029. Section 8.2.1.2.4

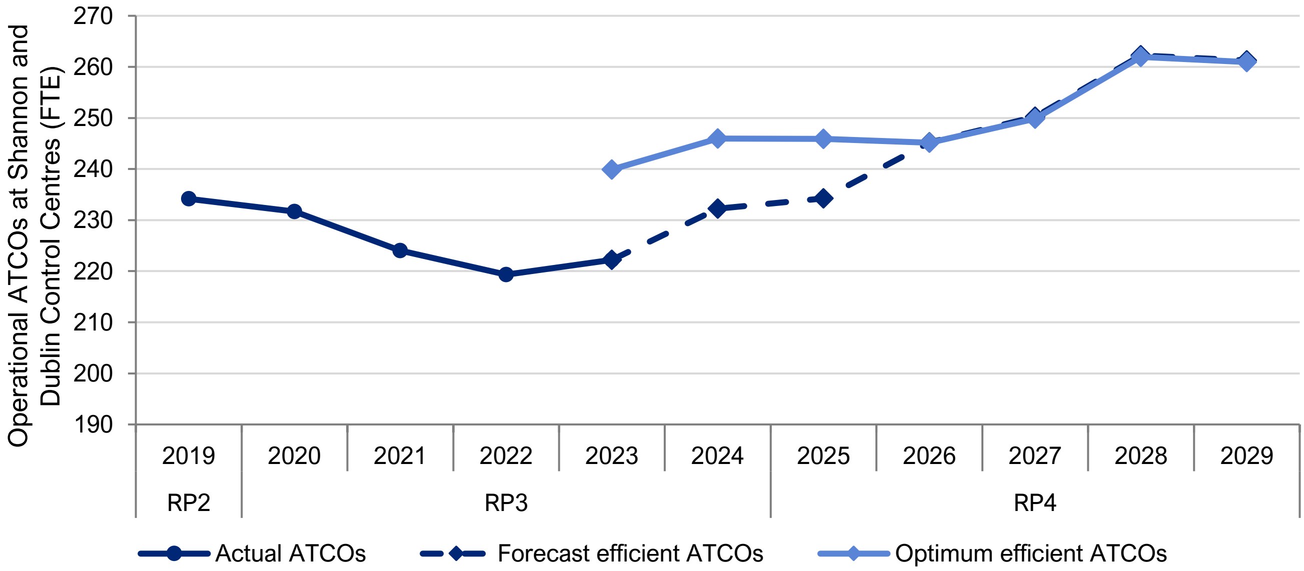
[redacted]. Our additional assumptions are listed in Table 4.2. Figure 4.6 illustrates the forecast transition from current operational ATCOs to the optimum profile of ATCOs given these constraints.

Table 4.2: List of assumptions and constraints for adjusting ATCO profile

Item	Assumptions
Direct entry	[redacted].
Training class	[redacted].
Promotions	[redacted].
Retirements and exits	[redacted].

Source: CEPA

Figure 4.6: Forecast transition from current operational ATCO headcount to optimum ATCO headcount at Shannon ACC and Dublin control centre, 2019-2029



Source: CEPA forecasts using AirNav Ireland and STATFOR data

We forecast an increase in ATCOs at Shannon and Dublin control centres from 218 FTEs in 2024 to 262 FTEs at the end of RP4. This accounts for AirNav Ireland's current shortage of ATCOs as well as the forecast increase in traffic, changes in ATCO productivity, and a small reduction in operational working hours. We then convert these FTE figures into headcount estimates by assuming the ratio of FTE to headcount from 2023 remains constant.

Table 4.3: Forecast evolution of operational ATCOs at Shannon ACC and Dublin Control Centre during RP4

Year	2024	2025	2026	2027	2028	2029
Beginning operational ATCO FTEs	222	232	234	245	250	262
- Moves into other roles	-	10	-	-	-	-
- Exits and retirements	10	10	10	10	10	10
+ New trainees (passed)	20	20	21	15	22	9
+ Direct entry	-	2	-	-	-	-

Year	2024	2025	2026	2027	2028	2029
= Ending operational ATCO FTEs	232	234	245	250	262	261
Ending operational ATCO headcount	**237**	**239**	**250**	**255**	**268**	**267**

Other operational ATCOs

Other operational ATCOs include station managers and ATCOs in Shannon and Cork towers. In 2023 there were 28 station managers and 34 tower ATCOs. We do not use the same model to forecast how these staff levels increase over RP4, but instead focus on the forecast increases presented in AirNav Ireland's business plan.

We forecast that station managers will increase from 28 to 31 in 2025 in line with AirNav Ireland's business plan, as this level of increase meets our need, additionality, and efficiency tests:

- **Need.** We accept AirNav Ireland's case that additional station managers are needed for its fatigue management strategy and should improve communication within units.
- **Additionality.** Given the forecast increase in operational ATCOs over RP4, we assess there is a need for additional station managers above the 2023 baseline.
- **Efficiency.** The increase proposed by AirNav Ireland is proportional to the forecast increase in ATCOs and the supporting evidence is sufficient given the low materiality of this increase.

For operational ATCOs at Shannon and Cork towers, we forecast efficient headcount to increase by 3 in 2025, from 20 to 21 at Cork and 20 to 22 at Shannon. We consider these step changes appropriate in the context of our efficiency analysis above where we find that the utilisation of ATCOs in Cork and Shannon towers was above 85% in 2023.

Non-operational ATCOs

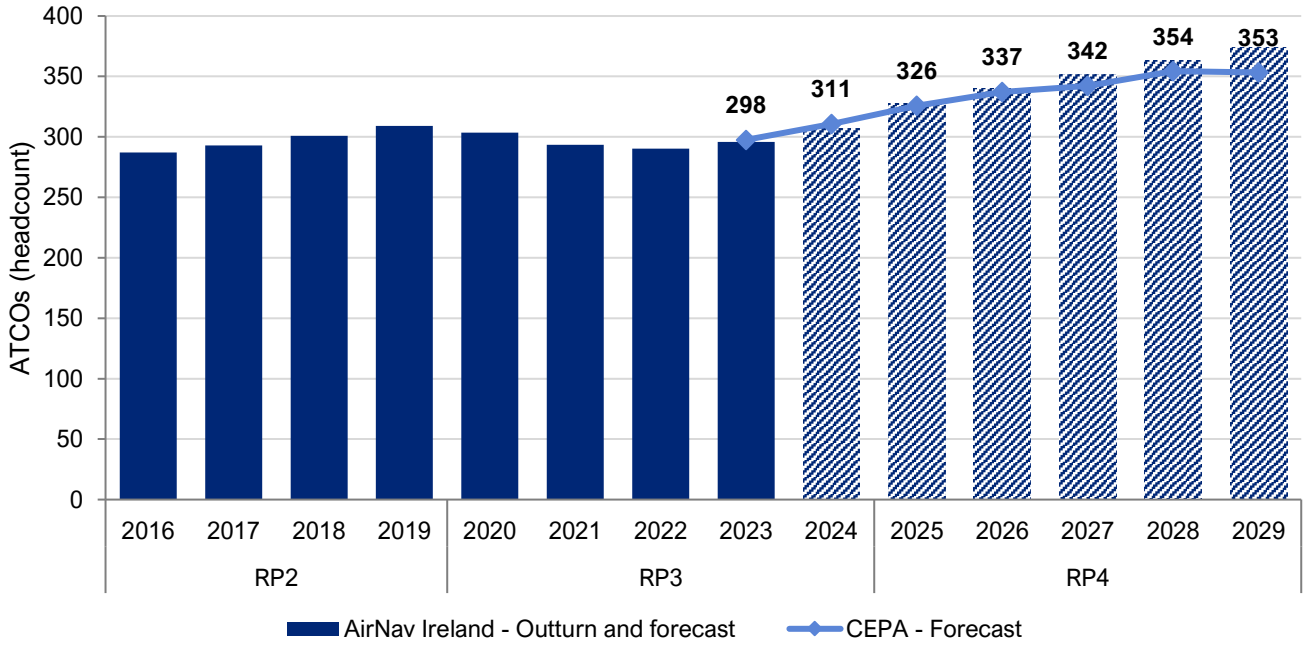
AirNav Ireland is planning to move several operational ATCOs to non-operational positions that sit outside of the rostering environment. ATM occurrence investigators and operational support group personnel will be moved after the end of 2024. This is a result of insufficient staffing during RP3, which meant ATCOs who were rostered to undertake these activities instead spent time on operational activities. We recognise the importance of these functions being carried out, and there is ample evidence that resource constraints affected AirNav Ireland's service quality in 2023.[20] AirNav Ireland has identified a clear need that is additional to the 2023 benchmark, and we believe the transfer of these ATCOs positions a dedicated non-operational function is efficient. ✂. We accept AirNav Ireland's planned increase in non-operational ATCOs (ATM specialists) from 9 in 2024 to 16 in 2025 through to the end of RP4.

Overall forecast

We forecast total ATCO headcount to increase from 298 in 2023 to 353 at the end of RP4, as illustrated in Figure 4.7. The figure shows that our forecast of efficient ATCOs is broadly similar to AirNav Ireland's forecast though with a gap emerging in 2029. This reflects our assumption of improved ATCO productivity following investment in AirNav Ireland's ATM systems. However, the overall difference between the two forecasts is small at less than 2%.

[20] IAA (2024) RP4 Methodological Consultation and Issues Paper. Page 22.

Figure 4.7: Forecast efficient ATCO headcount compared to AirNav Ireland's business plan, 2024-2029



Source: CEPA forecasts using AirNav Ireland and STATFOR data

4.3. Engineers

Engineers are the second largest group of staff by headcount and payroll for AirNav Ireland, responsible for day-to-day maintenance and to support the development of capital projects. We note that there has been a steady increase in the engineering headcount from 64 staff in 2016 to 87 staff in 2023. Given engineers are responsible for day-to-day maintenance, we expect that the requirement for engineers would broadly be linked to the size of AirNav Ireland's asset base. Similarly, as a proportion of engineering staff are responsible for capital projects, we would expect the requirement for engineers to also be linked to capex activity.

AirNav Ireland's 2023 headcount of 87, which has grown from 76 staff in 2019, remained below the number of staff (91) assumed in the setting of the IAA RP3 Performance Plan. We also note that AirNav Ireland has not been able to fully deliver its RP3 investment programme and was also unable to fully deliver its RP2 programme, which it attributes to a lack of engineering staff. AirNav Ireland also cite the requirements in EU Regulation 2017/373, which created additional workload pressures and diverted resources away from capital investment planning.

As such, we do not propose making any efficiency adjustment to AirNav Ireland's engineering headcount for our baseline, implicitly assuming that the outturn 2023 headcount was proportionate to the scale of capex delivered.

Beyond 2023, AirNav Ireland is projecting large increases in engineering headcount, to 100 staff in 2024 and 126 staff by 2029. AirNav Ireland cite both an increase in traffic and large capital works including TopSky ATC One for the need for such an increase. We have also been provided with a bottom-up resource planning tool, which AirNav Ireland indicates has been used to develop the engineer forecast.

Having reviewed the tool, it appears to build up a total resource requirement by domain for every capex project proposed, including the TopSky ATC One implementation. However, it is not clear how these figures reconcile with the headcount estimates included within the business plan. As such, we do not yet have the confidence that the forecasts proposed by AirNav Ireland are reflective of an efficient requirement based on the size of its capital programme.

We recognise that AirNav Ireland has suggested that its engineering staffing is low relative to other ANSPs, pointing to its ratio of technical staff to ATCO staff and suggesting that an increase in headcount is required to catch-up.

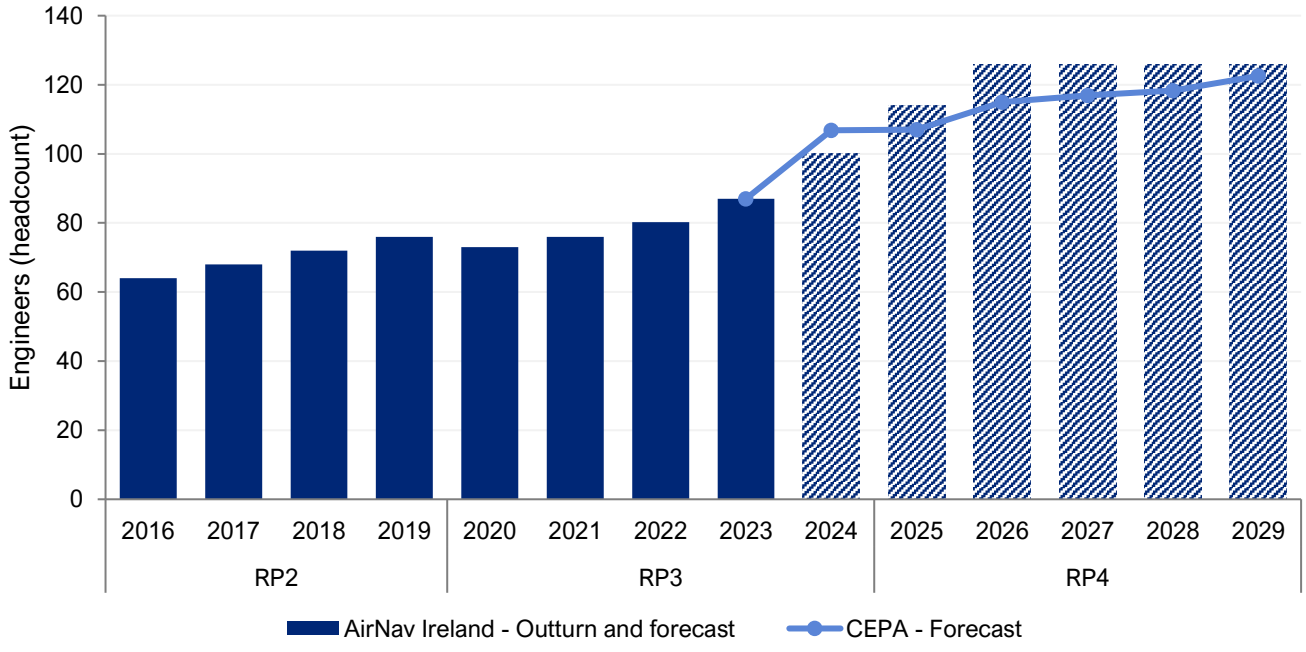
However, as our analysis in Section 3 shows, we consider this is more likely to be due to differences in outsourcing practices than a relatively under resourced engineering function compared to ATCO staff.

As a result, we conclude that while AirNav Ireland has provided sufficient justification of the need for some additional engineering headcount, and the additionality of that headcount, the efficiency of the full proposed increase has not yet been demonstrated. Consequently, we use an alternate approach to producing an efficient forecast of engineering headcount, as follows:

- We start with average headcount over the period 2016 and 2023, which results in an estimate of 76 staff.
- We then adjust this headcount to reflect the expected increase in AirNav Ireland's regulated asset base relative to the 2016-2023 average, using an elasticity of 0.5.
- Similarly, we scale headcount to reflect the average expected level of capital investment for the years (t+1) and (t+2) relative to the 2016 to 2023 average, using an elasticity of 0.15. Here, we are assuming that engineers are working on capital projects that will be delivered over the next two years.
- Finally, we include the 7 additional staff required as a result of EU Regulation 2017/373, as assessed previously by the IAA.

This results in an estimate materially higher than the current level, but lower than that put forward by AirNav Ireland in its business plan over the RP4 period, as shown in Figure 4.8 below.

Figure 4.8: Forecast efficient engineer headcount compared to AirNav Ireland's business plan, 2024-2029



Source: CEPA forecasts using AirNav Ireland data

4.4. Other Staff

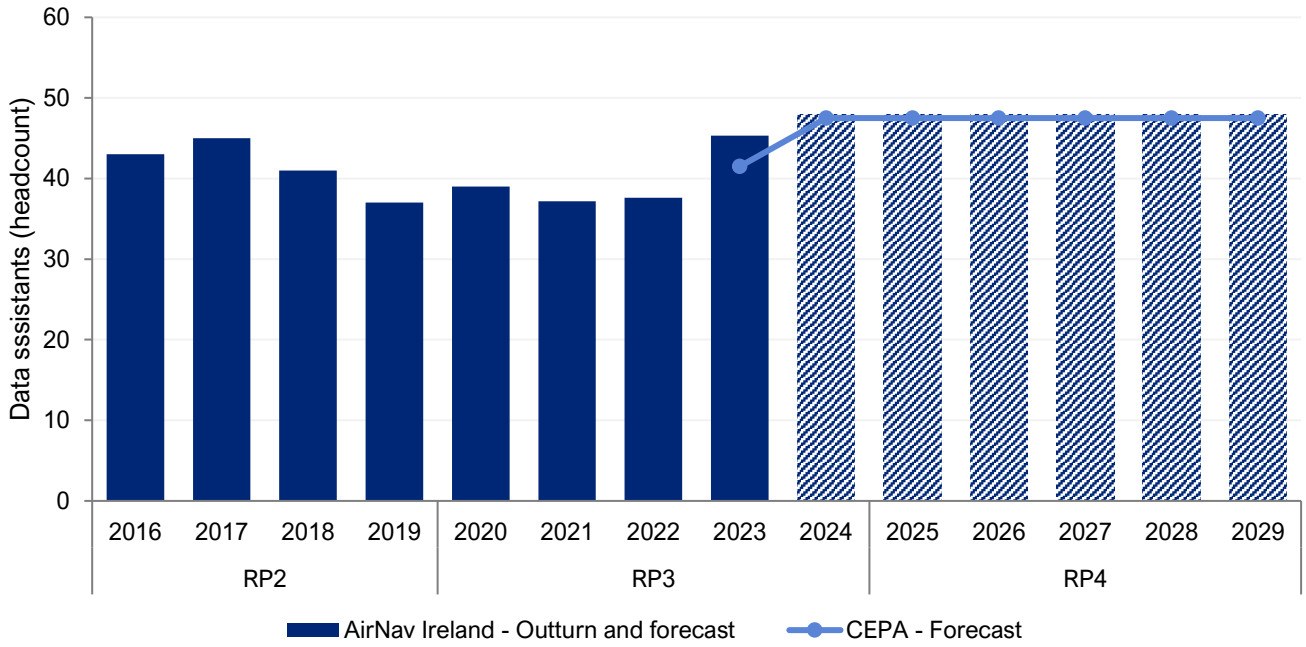
4.4.1. Data assistants

Over the period 2016 to 2023, the number of data assistants has averaged 41, with 45 data assistants in 2023. In its business plan AirNav Ireland is forecasting a step-increase in the number of data assistants to 48 from 2024 onwards.

We use the historical average to estimate our efficient baseline for data assistants, which leads to a lower estimate than AirNav Ireland's. However, we also include a step-change in our forecast that means our RP4 efficient forecast is broadly aligned with AirNav Ireland's business plan, as shown in Figure 4.9. This is due to our inclusion of 6

additional data assistants from 2024 for flight data control positions that were previously undertaken by ATCOs at the Shannon ACC operation. We include these roles and remove the associated ATCO roles from our Shannon ACC forecast.

Figure 4.9: Outturn and forecast number of data assistants, 2016-2029 (headcount)



Source: AirNav Ireland data

4.4.2. Flow Management Position (FMP) and Airspace Management Cell (AMC) roles

AirNav Ireland are proposing a step increase in headcount to account for a new staffing requirement. This requirement relates to the return of FMP and AMC roles from NATS, who currently provide those functions for Ireland. Continuation of these services by NATS is potentially non-compliant with EU regulations now that the UK is no longer an EU member state.

AirNav Ireland are proposing 5 additional staff from 2025 and a further 5 from 2026. We consider this justification meets the need and additionality tests, and our initial view is that the proposed scale of increase is broadly proportionate to the need.

4.4.3. Corporate services

Prior to the COVID-19 pandemic, AirNav Ireland's corporate services headcount averaged 61 staff. Staffing then declined during the pandemic and as a result of the separation from IAA, with AirNav Ireland having 55 corporate services staff in 2023. AirNav Ireland is forecasting corporate services staffing to increase to 61 in 2024, increasing further to 69 staff from 2026 onwards.

For our baseline, we use the estimate of efficient 2023 headcount assumed in the setting of the IAA RP3 Performance Plan, which results in an estimated 2023 headcount of 57 staff compared with actual staffing of 55 people. We have reviewed the step-increases proposed by AirNav Ireland but do not consider the need for all of its proposed increases has been justified. As a result, and as shown in Figure 4.10, our forecast assumes a smaller step-increase than that proposed in AirNav Ireland's business plan:

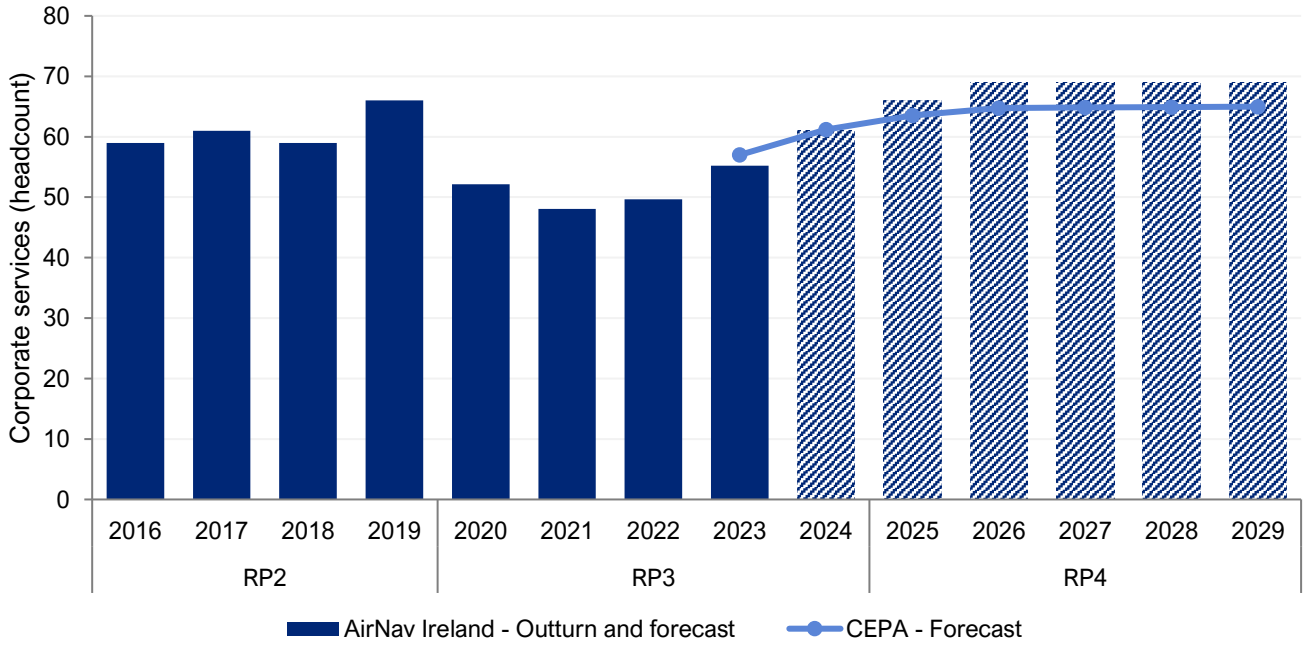
- **Sustainability:** We include the additional 2 staff proposed by AirNav Ireland to work on sustainability initiatives given the Government's additional focus on sustainability through the Climate Action Plan. We have reviewed the proportionality of the increase by comparing against proposals by Dublin Airport and Gas Networks Ireland and consider the scale of increase proposed by AirNav Ireland to be reasonable.

- **Procurement:** We assume 1 additional staff member in 2024 and 2025, and 2 additional staff members from 2026 to work on procurement. Our rationale for the step change is the scale of the capex programme, including the re-prioritisation of several smaller capital projects that were deprioritised in RP3, and our suggestion that retendering of key maintenance and cleaning contracts should drive opex efficiencies.
- **Finance:** We assume 1 additional staff member to account for higher volumes of activity as AirNav Ireland grows as a business.
- **HR:** We link the number of HR staff to the total headcount, including an additional 0.2 staff members in 2024, rising to 1 additional staff member by 2029.
- **IT:** We include 2 additional staff members to strengthen AirNav Ireland's cyber security function. We have reviewed AirNav Ireland's internal business case for the additional headcount – we find the needs case is justified given increasing cyber security threats and likely additional requirements from the NIS2 Directive,[21] which has been published in draft form. We also find that that the additionality and efficiency tests are met, given the description of the proposed duties of the 2 staff members.

We consider that any increase beyond this would need to be justified based on:

- The specific **need** for the role;
- The **additionality** of the roles, i.e. evidence that AirNav Ireland has taken into account roles that could be rationalised or may no longer be needed; and
- The proportionality or **efficiency** of the estimate.

Figure 4.10: Outturn and forecast number of corporate services staff, 2016-2029 (headcount)



Source: CEPA forecasts using AirNav Ireland data

4.4.4. Operations management and support

Over RP2 and RP3 the number of operations management and support staff has stayed relatively constant, averaging 55 staff. In 2023, there were 55 staff in this role, which we use as our efficient baseline.

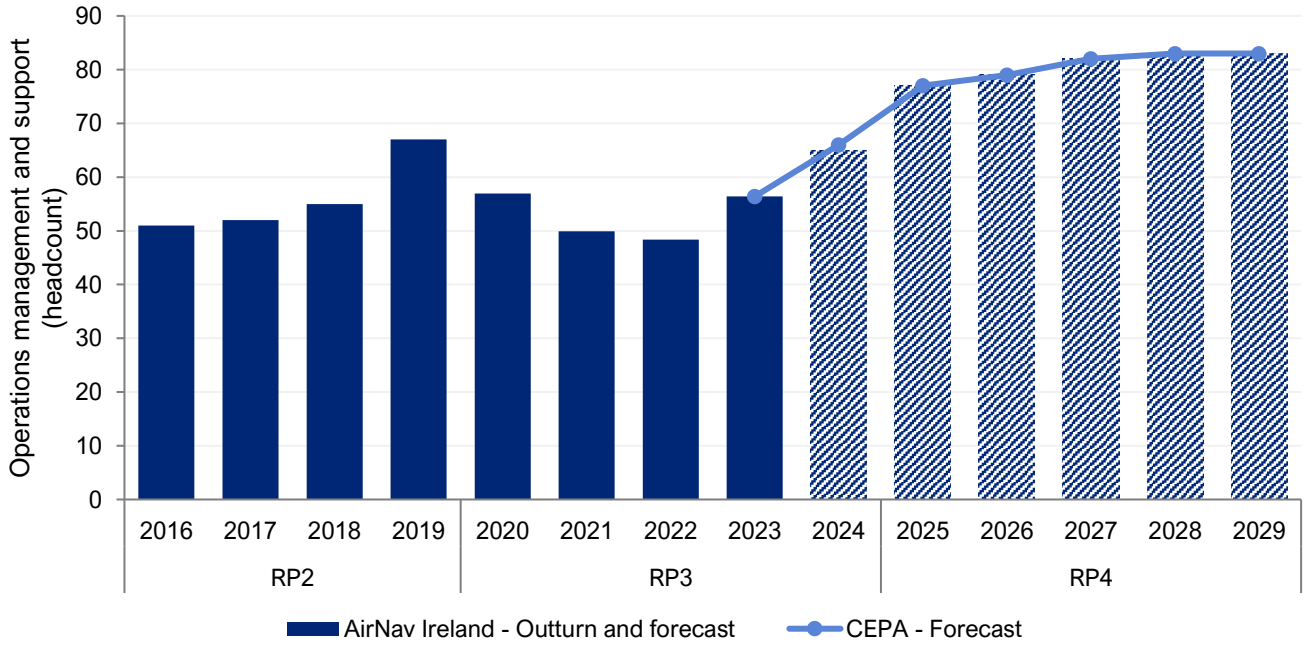
[21] Directive on measures for a high common level of cybersecurity across the Union

As with the other categories, headcount is also forecast to increase across RP4. We have assessed each of these and consider the increase reasonable:

- **Operations.** This is primarily due to increased admin support at Dublin operations and increased admin support for Operations HQ. As this increase is mostly due to a transfer of roles from ATCOs to operations management and support, we include AirNav Ireland's proposed increase in our efficient forecast.
- **Engineering:** AirNav Ireland state that additional support staff for engineering are required to coordinate engineering activity over RP4, particularly given the increased headcount and the size of the capex programme. Through subsequent engagement, AirNav Ireland have also provided further details of the specific roles being created. We allow for the increase in staffing on the basis that the evidence provided demonstrated a genuine need, was additional to existing staffing levels, and was proportionate to the need.
- **Safety management:** Similarly, AirNav Ireland propose a small increase in safety management staff. AirNav Ireland has identified a need for these roles to improve the timeliness of their accident occurrence investigations and to improve coordination of the organisation's safety and security activities. On this basis, we consider the needs case has been met, we consider the additionality test is likely to have been met, and we consider the scale of the increase sufficiently small to conclude that the efficiency test has been met. Consequently, we include AirNav Ireland's proposals in our forecast.

Overall, our headcount forecast matches AirNav Ireland's proposals, with headcount increasing from 56 in 2023, to 66 in 2024, and to 83 in 2029

Figure 4.11: Outturn and forecast number of operations management and support staff, 2016-2029 (headcount)



Source: AirNav Ireland data

4.5. Conclusion

Table 4.4 summarises our staff headcount forecasts over RP4 by staffing group.

Table 4.4: Forecast staff headcount, 2023-2029

Staffing Group	2023	2029	2025	2026	2027	2028	2029
Operational ATCOs	261	274	279	290	295	308	307
Station Managers	28	28	31	31	31	31	31

Staffing Group	2023	2029	2025	2026	2027	2028	2029
ATM Specialists	9	9	16	16	16	16	16
Corporate Services	57	61	64	65	65	65	65
Data Assistant	42	48	48	48	48	48	48
FMP/AMC	-	-	5	10	10	10	10
Engineer	87	107	107	115	117	118	123
Operations Management Support	56	66	77	79	82	83	83
CEPA total headcount forecast	**539**	**592**	**626**	**653**	**663**	**678**	**681**
AirNav Ireland business plan	**540**	**581**	**638**	**672**	**687**	**699**	**710**

Source: CEPA analysis of AirNav Ireland data

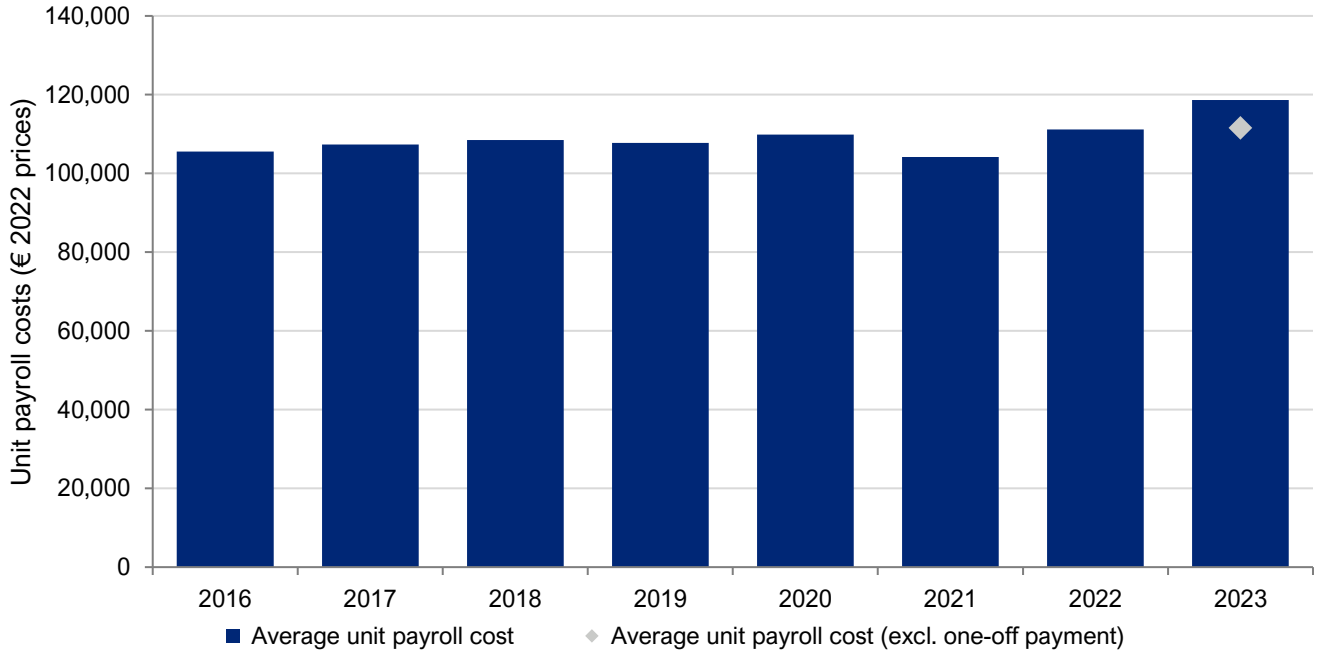
5. FORECAST OF UNIT PAYROLL COSTS

In this section, we present the findings of our efficiency analysis of AirNav Ireland's historic unit payroll costs and present our forecast of unit payroll costs by role over RP4. The full details of our analysis are presented in Appendix C. All figures continue to be presented in 2022 prices and, therefore, are shown with the effects in inflation removed.

5.1. ANALYSIS OF HISTORIC PAYROLL COSTS

As Figure 5.1 shows, there was a gradual upward trend in AirNav Ireland's average unit payroll costs between 2016 and 2020, followed by a sharp reduction in 2021. We understand that this reduction was caused by a pay cut implemented as a cost containment measure in response to the COVID-19 pandemic. There was a sharp increase in unit payroll costs in 2023, due to a one-off payment to staff who were subject to the 2021 pay cuts. This one-off payment totalled €3.8 million including Employer PRSI.[22] Excluding the one-off payment reduces 2023 unit payroll costs by 6%, bringing real unit costs in line with 2022 levels.

Figure 5.1 Average unit payroll costs excluding overtime, 2016-2023 (€, 2022 prices)



Source: CEPA analysis of AirNav Ireland data

To assess the efficiency of unit payroll costs in 2023, we triangulate between multiple sources of evidence. We compare the growth in unit payroll costs against the earnings of relevant industries and roles, as reported by the Central Statistics Office.[23] We benchmark AirNav Ireland's operational ATCO and non-ATCO costs against other ANSPs using the ACE benchmarking dataset, and we compare AirNav Ireland's payroll bands against a range of public and private sector roles. Other than the benchmarking against other ANSPs, our analysis excludes both overtime and the one-off payment made in 2023 to allow for a like-for-like comparison.

- **ATCOs** – We conclude that unit payroll costs for ATCOs were efficient in 2023. Wage growth between 2019 and 2023 was in line with comparator industries, and unit payroll costs in 2022 were lower than

[22] AirNav Ireland (2023) The Irish Air Navigation Service trading as AirNav Ireland Regulated Entity Accounts.

[23] Central Statistics Office (2024) EHQ15 - Average Weekly, Hourly Earnings and Weekly Paid Hour of All Employees. https://data.cso.ie/table/EHQ15

comparator ANSPs on a PPP-adjusted basis. We also do not find evidence of inefficiency when comparing gross salaries to comparable public and private sector roles.

- **Non-ATCOs** – We find that there may be scope for efficiency gains in unit payroll costs for some non-ATCO roles. In 2022, the latest year for which we have benchmark data, AirNav Ireland's unit employment costs for non-ATCO roles were the second highest in the sample and 11% higher than the average of comparator ANSPs, on a PPP-adjusted basis. However, as we show below, this inefficiency is only likely reflected in some roles:
    - **Data assistants** - We conclude that unit payroll costs for data assistants were likely efficient in 2023. Growth in unit payroll costs for data assistants did not exceed that of comparator industries between 2019 and 2023. We do find that the top of AirNav Ireland's payroll bands for the data assistant role exceeds that of comparable roles in other industries, though we understand that AirNav Ireland's pay bands are wide and note that the remainder of the range is in line with comparators.
    - **Engineers** – We conclude that there is insufficient evidence to justify an efficiency adjustment to unit payroll costs for engineers. Growth in unit payroll costs for engineers did not exceed that of comparator industries between 2019 and 2023. Gross salary costs do exceed other comparator roles, with the top of the pay range being 22% higher than the benchmark range, and the mid-point of the pay scale aligning with the top of the benchmark range. However, we also recognise that higher salaries are likely to have been necessary given general challenges in recruiting sufficient numbers of engineering staff.
    - **Operations management support** – We conclude that unit payroll costs for operations management and support roles were generally efficient in 2023. Growth in unit payroll costs between 2019 and 2023 was significantly lower than that of comparator industries between 2019 and 2023. While our benchmarking of 2023 payroll costs showed that salaries in some instances exceeded the wage ranges for comparable roles in other sectors, we find that this reflects the wide pay bands used by AirNav Ireland.
    - **Corporate services** – Conversely, we find evidence of inefficiency in unit payroll costs for corporate services. Growth in unit payroll costs for corporate services exceeds that of comparator industries between 2019 and 2023, having grown by 25% in nominal terms compared with benchmark growth of 20%. While we recognise that some of this may be due to differences in the mix of roles in 2019 compared with 2023, we also found evidence of inefficiency when benchmarking 2023 salaries against comparator roles.

For our baseline unit payroll costs, we exclude the one-off payment. And based on our findings above, we apply an efficiency challenge of 5% to corporate services roles.[24] We also separately assess whether a glidepath is needed for this efficiency challenge but find it unnecessary – our wage growth forecasts (presented) in the subsequent section mean that we are not assuming a nominal cut in salaries for these roles between 2023 and 2025. For the roles where we apply an efficiency adjustment, our forecasts continue to assume a 5.35% nominal increase in wages in 2025 relative to AirNav Ireland's 2023 actuals (excluding the one-off payment).

Table 5.1 details our baseline, alongside the actual unit payroll costs determined using information provided by AirNav Ireland's for 2023, excluding overtime and the one-off payment.

[24] Through our benchmarking analysis, we find that AirNav Ireland's non-ATCO unit costs exceeded the ANSP average by 10.6%. For OMS roles, we also found a 10% efficiency gap in the growth of unit payroll costs. While our other benchmarking approaches found larger efficiency gaps, some of this may be an artefact of other factors as described in this section. As such, we use the 10% efficiency gap to anchor the size of our efficiency challenge. We allow a margin of error of 5%, and therefore set the efficiency challenge to 5%.

Table 5.1 Unit payroll costs for 2023 to the nearest thousand (excluding overtime) (€ per FTE, 2022 prices)

Staffing Group	CEPA's efficient unit payroll costs, (€, 2022 prices)	AirNav Ireland actuals. excl. one-off payment (€, 2022 prices)
Operational ATCOs	✂ ✂ ✂	✂ ✂ ✂
Station Managers	✂ ✂ ✂	✂ ✂ ✂
ATM Specialists	✂ ✂ ✂	✂ ✂ ✂
Corporate Services	✂ ✂ ✂	✂ ✂ ✂
Data Assistant	✂ ✂ ✂	✂ ✂ ✂
Engineer	✂ ✂ ✂	✂ ✂ ✂
Operations Management Support	✂ ✂ ✂	✂ ✂ ✂

Source: CEPA analysis of AirNav Ireland data

5.2. PROJECTED UNIT PAYROLL COSTS

For the purposes of producing a forecast of efficient staff costs, we need to estimate how unit payroll costs may evolve over the RP4 period. For this, we start from a set of standard wage growth assumptions as shown in Table 5.2 below. For 2024 to 2026, this is based on wage growth forecasts from the Central Bank of Ireland,[25] while from 2027 onwards, we assume average wage growth will be 1.5% in real terms, in line with the historic average growth in real wages in the Irish economy in recent decades.

This assumption is a modelling input into our assessment of efficient opex and not a view on how unit payroll costs should evolve. It also does not account for other factors that may indirectly influence unit payroll costs, such as changes in productivity, changes in the mix of junior and senior staff, etc.

Table 5.2 Wage growth assumptions (% per annum)

Wage growth assumption	2024	2025	2026	2027	2028	2029
Real wage growth	✂	✂	✂	✂	✂	✂
Nominal wage growth	✂	✂	✂	✂	✂	✂

Source: CEPA analysis and AirNav Ireland assumptions

For ATCOs only, we also adjust our estimates of the unit cost to reflect rates of attrition and hiring and annual salary increments along pay scales. As AirNav Ireland hires more ATCOs, average unit payroll costs will reduce as newer staff are placed towards the bottom of their pay scale.

- **Attrition and new hiring** – We assume that newly hired ATCOs receive a salary that is just over half of the average for an ATCO. This is based on our analysis of 2024 ATCO pay scales and average salaries. This implies a salary that is higher than the lowest grade of the ATCO pay scale but is appropriately conservative given that some new ATCO hires may be direct recruits with prior experience. We then apply and adjustment factor as shown in Table 5.3 based on our forecast of new ATCOs vs existing ATCOs, which in turn is based on an assumed rate of attrition of existing ATCOs.
- **Increments** – We also adjust our wage forecasts to account for annual increments to ATCO wages as they progress up the pay scale. As some ATCOs are already at the top of their respective pay scales, we use individual level estimates provided to us by AirNav Ireland to estimate the average impact of increments.

[25] Central Bank of Ireland (2024) Quarterly Bulletin No.1 2024. https://www.centralbank.ie/publication/quarterly-bulletins/quarterly-bulletin-q1-2024

The combined impact of the three adjustments is shown below. We observe that the downward impact on average wages from attrition and new hiring is only partially offset by annual pay increments, creating downward pressure on unit payroll costs. This is explained by the large increase in headcount we are forecasting and the elevated levels of attrition.

Table 5.3 Wage growth adjustments for ATCOs

Wage growth adjustments	2024	2025	2026	2027	2028	2029
Standard wage growth	1.03	1.06	1.09	1.11	1.12	1.14
Increment adjustment	1.00	1.01	1.01	1.02	1.02	1.02
Adjustment for attrition and new hires	0.97	0.93	0.90	0.88	0.85	0.84
Wage growth index	**1.00**	**1.00**	**1.00**	**0.99**	**0.98**	**0.98**

Source: CEPA benchmarking and analysis of AirNav Ireland payroll data

For other roles (i.e. where there is less complexity), we do not adopt a similar approach, applying only the standard wage growth assumption to unit payroll costs. Implicitly, we are assuming that the impact of attrition and new hiring is offset by annual increments. We consider this a plausible assumption for most other roles as our forecast of headcount does not assume a large increase from 2023 levels.

The one exception to this is engineering staff. Here, while we are forecasting a large increase in headcount over RP4, we also recognise that many engineers are being hired by AirNav Ireland with prior experience. As such, it is not necessarily the case that they will be hired at the bottom of the pay scale. As such, the downward impact of an increase in headcount on unit payroll costs will be much more limited.

Table 5.4 summarises our unit payroll cost forecasts by role to the nearest thousand.

Table 5.4 Forecast unit payroll costs excl. pensions to the nearest thousand, 2024-2029 (€ per FTE, 2022 prices)

Staffing Group	2024	2025	2026	2027	2028	2029
Operational ATCOs	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
Station Managers	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
ATM Specialists	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
Corporate Services	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
Data Assistant	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
Engineer	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂
Operations Management Support	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂	✂✂✂

Source: CEPA analysis of AirNav Ireland data

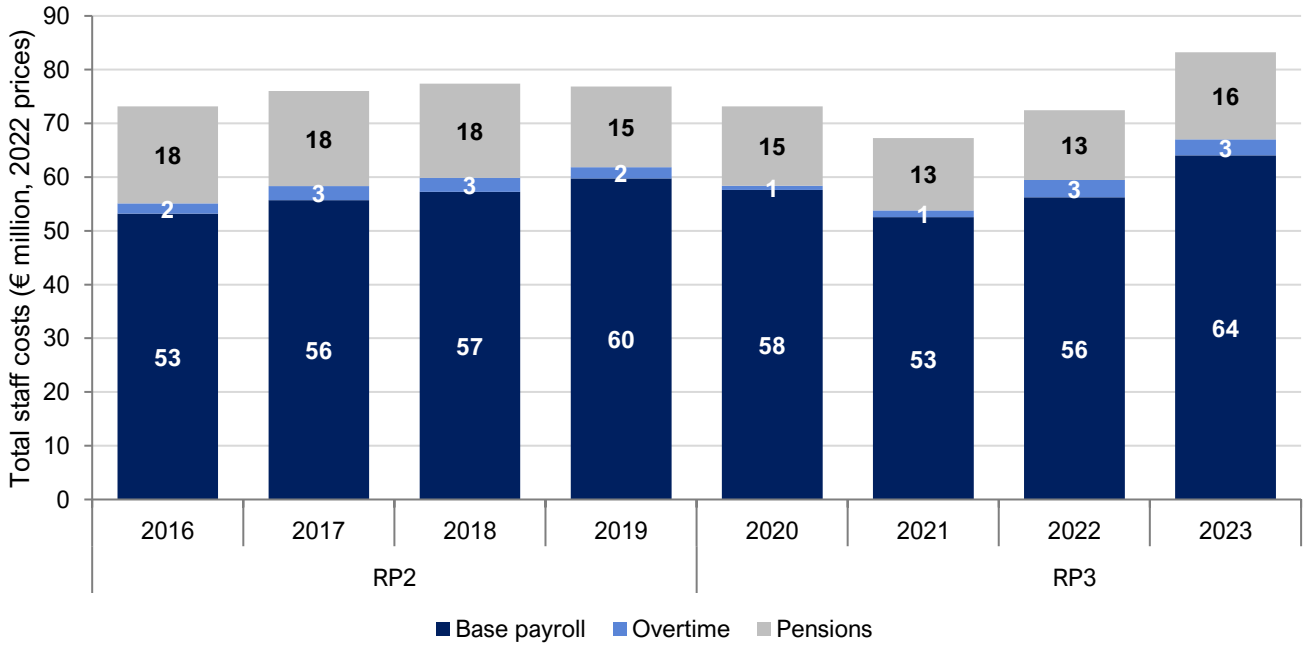
6. OVERALL PAYROLL COSTS INCLUDING PENSIONS

In this section, we present our estimate of overall payroll costs. We firstly bring together our estimates of efficient headcount and our estimate of efficient unit costs to forecast efficient base payroll costs. We then separately present our estimates of efficient overtime and pension costs.

6.1. STRUCTURE OF PAYROLL COSTS

Figure 6.1 shows the breakdown of total staff costs into base payroll, overtime, and pension costs for RP2 and RP3. Base payroll costs include salary costs, shift allowances and pay-related social insurance (PRSI) contributions. Both base payroll and pensions were affected by a one-off payment to staff in 2023 to compensate for pay reduction during 2020 and 2021 because of COVID-19.

Figure 6.1: Breakdown of total staff costs, 2016-2023 (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data

6.2. FORECAST EFFICIENT BASE PAYROLL COSTS

Our forecast of efficient base payroll costs combines the efficient staff levels discussed in Section 4 with efficient staff unit costs discussed in Section 5. The efficient staff unit costs are adjusted for the one-off payments made to staff in 2023 and pay reductions made during COVID-19. For the new FMP/AMC role, we use the unit costs for data assistants.

We present our forecast efficient base payroll costs broken down by role in Table 6.1, which shows base payroll costs increasing over the RP4 period from €71.2 million in 2025 to €79.4 million in 2029. This compares with €64.0 million in base payroll costs in 2023 including the one-off payment, or €60.2 million excluding the one-off payment. Increases in headcount account for most of the additional growth in payroll over RP4, while our wage growth assumptions have only a modest impact.

Table 6.1 Forecast base payroll costs excl. overtime and pensions, 2023-2029 (€ million, 2022 prices)

Staffing Group	2023	2024	2025	2026	2027	2028	2029	RP4 total
Operational ATCOs	33.6	35.3	36.0	37.4	37.8	38.7	38.6	**188.4**
Station Managers	3.6	3.7	4.2	4.4	4.4	4.5	4.6	**22.1**
ATM Specialists	1.2	1.2	2.2	2.3	2.3	2.3	2.4	**11.5**
Corporate Services	4.8	5.4	5.7	6.0	6.1	6.2	6.3	**30.3**
Data Assistant	2.2	2.6	2.7	2.8	2.8	2.9	2.9	**14.2**
FMP/AMC	-	-	0.3	0.6	0.6	0.6	0.6	**2.7**
Engineer	8.7	11.0	11.3	12.5	12.9	13.2	13.9	**63.8**
Operations Management Support	6.0	7.3	8.7	9.2	9.7	10.0	10.1	**47.7**
CEPA total base payroll costs	**60.1**	**66.4**	**71.2**	**75.0**	**76.6**	**78.4**	**79.4**	**380.6**

Source: CEPA analysis of AirNav Ireland data

6.3. FORECAST EFFICIENT OVERTIME COSTS

6.3.1. Forecasting efficient ATCO overtime

Figure 4.6 illustrates that there is currently a wedge between the efficient number of ATCOs and the actual number of ATCOs. As previously discussed, we calculate an optimum number of ATCOs by targeting 85% roster efficiency and ATCO utilisation, both of which are currently substantially lower than actual roster efficiency and ATCO utilisation. The wedge is forecast to exist from 2023 until 2026, after which the optimum and forecast number of ATCOs are aligned.

This wedge represents a shortage of ATCOs which can be overcome through a redeployment away from non-operational activities or by encouraging staff to work overtime. When there are insufficient ATCOs available, it is efficient to use a combination of both levers, given both impose increasing cost on AirNav Ireland the more they are deployed.[26]

Hence, to estimate an efficient level of overtime, we assume that there is a maximum feasible level of overtime per ATCO. We take this as the maximum number of annual overtime hours per ATCO observed since 2016, which was 95 hours in 2022. We assume that AirNav Ireland would use overtime up to this constraint to make up for any shortage in ATCOs, with any remaining shortage dealt with through increased ATCO utilisation (i.e. redeploying ATCOs away from non-operational activities). This approach recognises that there are limits to the sustainability of both levers.

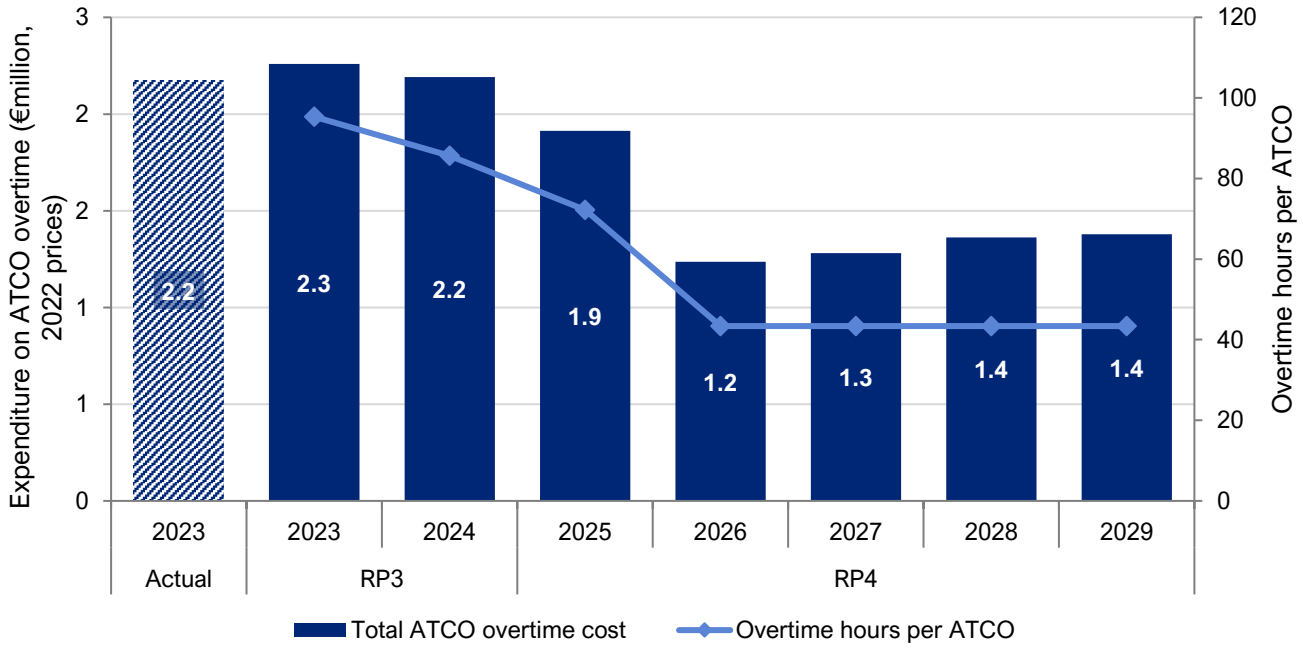
We also recognise that a certain minimum level of overtime is necessary and efficient to provide roster flexibility, even if there are sufficient ATCOs available. We take the minimum efficient level of overtime per ATCO to be the minimum observed after excluding the two pandemic years, 2020 and 2021. This was 43 hours per ATCO in 2019.

For each year, we then calculate an efficient level of overtime per ATCO based on the minimum level of overtime plus additional overtime required to close the gap between our optimum number of ATCOs and the forecast number of ATCOs. This is subject to our cap on the maximum level of overtime.

[26] ATCO overtime is paid at a premium above hourly wages, and increased usage of overtime is likely to affect the work/life satisfaction of ATCOs. Similarly, the redeployment of ATCOs away from non-operational activities will increasingly eat into essential activities.

We then calculate the cost of this overtime by multiplying this efficient estimate by the number of ATCOs and by the hourly cost of overtime. The per hour cost of overtime is taken as the average cost from 2016 to 2023, which was ✂ ✂ per hour, multiplied by our wage growth forecast.

Figure 6.2: Forecast ATCO overtime costs and overtime hours per ATCO, 2023-2029 (€ million, 2022 prices)



Source: CEPA forecasts using AirNav Ireland data

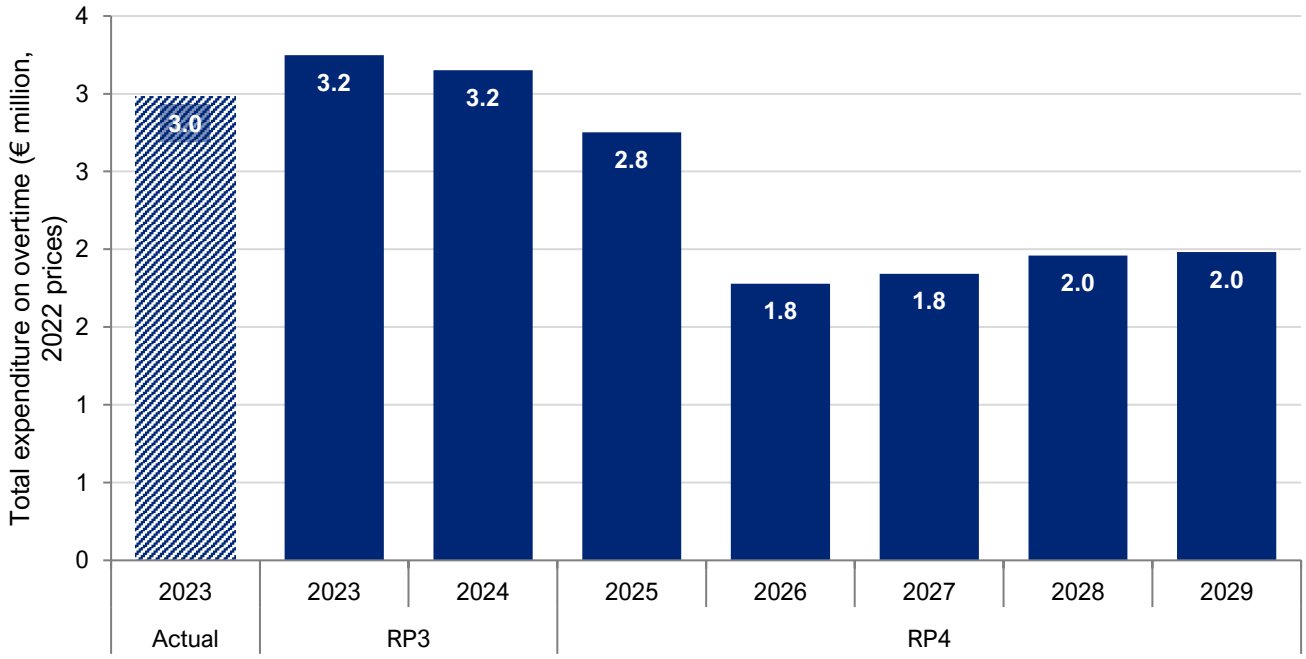
Figure 6.2 illustrates the forecast change in overtime usage and total overtime costs over RP4. We estimate overtime costs will fall gradually from the maximum to the minimum between 2023 and 2026. Overtime costs remain at the minimum thereafter, which aligns with the closing of the ATCO wedge forecast in Figure 4.6. We can also see from the figure that our modelled estimate of overtime cost in 2023 aligns closely with actual overtime expenditure.[27]

6.3.2. Forecast total overtime costs

We assume overtime for non-ATCOs scales in proportion to expenditure on overtime for ATCOs. From 2016 to 2023, the average proportion of overtime costs attributable to ATCOs was 70% and so, we divide our estimates of ATCO overtime from in Figure 6.2 by 70% to derive an estimate of total overtime. This is illustrated in Figure 6.3.

[27] Expenditure on overtime has been estimated by cost centre rather than type of staff. We apportion overtime to each staff type based on their share of each cost centre's total payroll. For example, if ATCOs made up 90% of Shannon Operation's cost centre then they would be apportioned 90% of overtime occurring in that cost centre.

Figure 6.3: Forecast efficient overtime costs, 2023-2029 (€ million, 2022 prices)



Source: CEPA forecasts using AirNav Ireland data

6.4. FORECAST PENSIONS

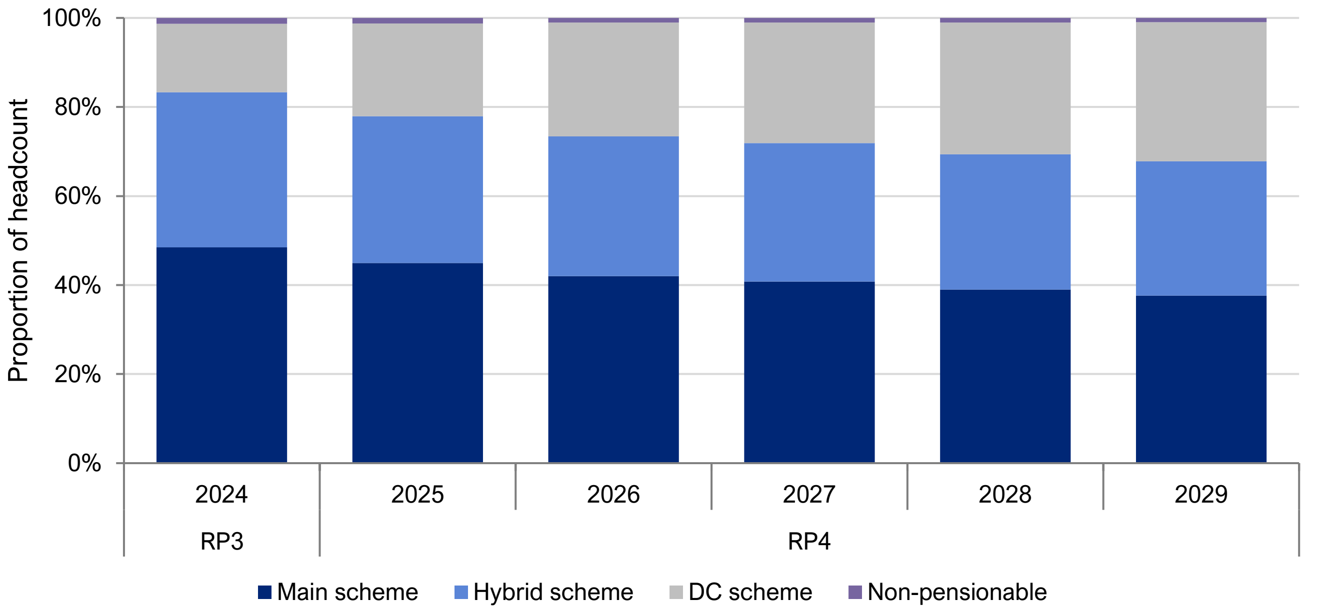
AirNav Ireland currently has staff in three pension schemes. The two legacy pension schemes are a defined benefit scheme and hybrid defined benefit and defined contribution scheme, while the current pension scheme open to new staff is defined contribution only.

Our approach to forecasting efficient pension costs requires an understanding of the proportion of staff on each scheme and how this will change over RP4. For the defined benefit scheme, we also need to understand whether AirNav Ireland is required to make any top-up contributions to make sure the defined benefit schemes are appropriately funded.

AirNav Ireland shared with us anonymised data to allow us to understand the proportion of staff contributing to each scheme, the contribution rates, and any top-up payments. We have not reviewed the efficiency of these contribution rates in any detail as they are determined by actuarial valuations and pension regulation.

We forecast the proportion of staff under each scheme, accounting for exits and new joiners, as shown in Figure 6.4. Over RP4 the proportion of headcount enrolled in the main scheme decreases as legacy staff retire and are replaced by trainees or direct entry hires enrolled in the defined contribution scheme.

Figure 6.4: Forecast proportion of headcount enrolled in each pension scheme, 2024-2029

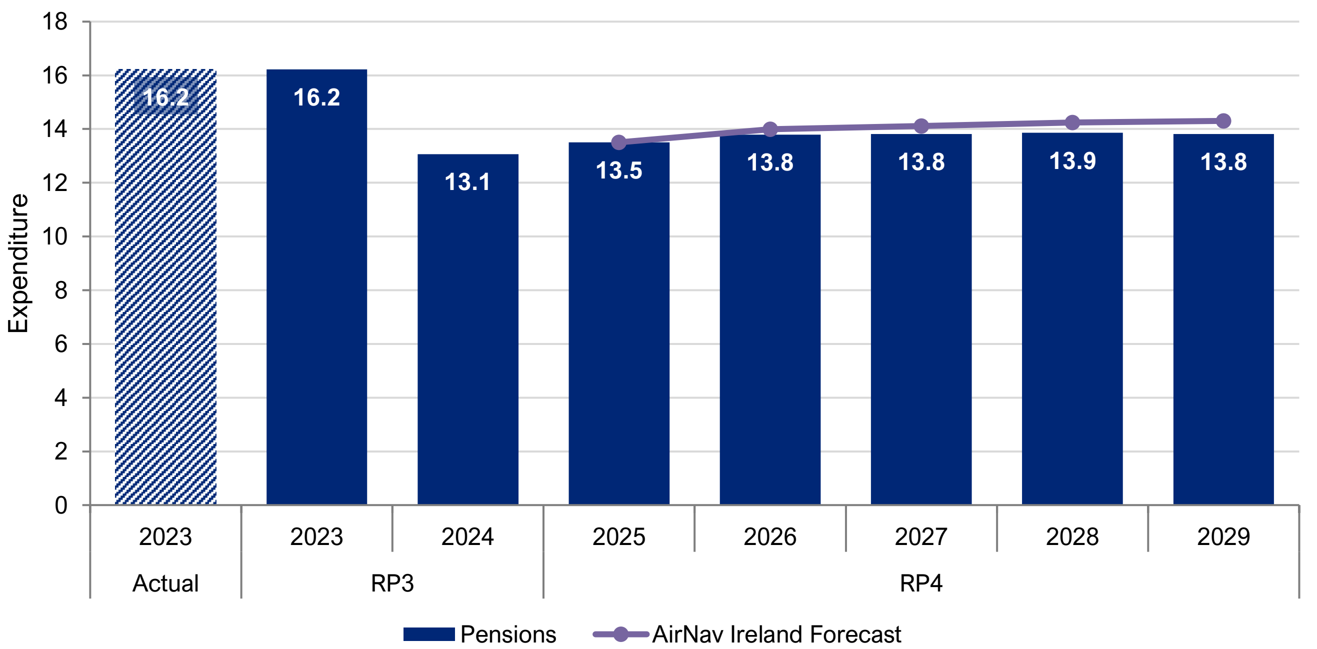


Source: CEPA forecasts using AirNav Ireland data

We assume that pension costs are a fixed proportion of each staff member's pensionable income. This proportion changes with the pension scheme. [redacted].

Based on the figures provided to us by AirNav Ireland, we estimate that approximately 87% of pay is pensionable. To derive an estimate of efficient pension costs, we multiply our base payroll estimates for each role by 87% and then by the composite pension cost. We then separately add-on approximately [redacted] per annum for a top-up payment for pensions already in payment. The resulting estimated pension costs are presented in Figure 6.5. The large difference between actual and forecast pensions in 2023 is driven by a discretionary one-off increase in pension costs due to salary sacrifices during COVID-19.

Figure 6.5: Forecast efficient pension costs, 2023-2029 (€ million, 2022 prices)



Source: CEPA forecasts using AirNav Ireland data

6.5. Conclusion

Table 6.2 summarises our forecast efficient payroll costs over RP4 and compares them to the total in AirNav Ireland's business plan.

Table 6.2: Forecast payroll costs, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 Total
Base payroll	60.1	66.4	71.2	75.0	76.6	78.4	79.4	**380.6**
Overtime	3.2	3.2	2.8	1.8	1.8	2.0	2.0	**10.3**
Pension	16.2	13.1	13.5	13.8	13.8	13.9	13.8	**68.8**
Total CEPA payroll forecast	**79.6**	**82.7**	**87.5**	**90.6**	**92.2**	**94.2**	**95.2**	**459.7**
AirNav Ireland business plan	**-**	**81.2**	**88.9**	**93.5**	**95.6**	**99.0**	**101.3**	**478.3**

Source: CEPA analysis of AirNav Ireland data

7. FORECAST OF NON-STAFF OPEX

In this section, we assess the efficiency of non-staff costs, and produce a forecast of non-staff costs by cost item for RP4. The table below summarises the structure of non-staff costs. We combine categories within our efficiency assessment where they are small, relatively similar or driven by similar cost drivers.

Non-staff cost item	Section	Type of non-staff cost
Training	7.1	Training
Other staff-related costs	7.2	Administration
Travel	7.3	Travel
Telecoms	7.4	Telecoms
Utilities		Utilities
Power		Other operational
Maintenance	7.5	
Spares		
Rent and rates	7.6	Administration
Computing	7.7	
Consultancy	7.8	
Professional services		
PR		
Insurance	7.9	
Building repairs	7.10	
Security	7.11	
Cleaning	7.12	
Subscriptions	7.13	Subscriptions
Environmental		Administration
Flight checking		Other operational
Other operational	7.14	
Other administration		Administration

7.1. STAFF TRAINING COSTS

Figure 7.1 illustrates AirNav Ireland's historic and forecast expenditure on training and compares this against the forecast assumed by IAA in the setting of the RP3 Performance Plan. Training costs include costs related to training new ATCOs, ongoing training for ATCOs, ongoing training for engineers, and training expenditure related to capex projects such as TopSky ATC One.

AirNav Ireland is also proposing temporary step ups in training costs in 2026, 2028 and 2029 to train ATCOs on the new Contingency Air Situation Display System (CASDS) and TopSky ATC One systems.[28]

[28] CASDS will be used as a contingency Air Traffic Control (ATC) system in the event of a major failure of the COOPANS system.

ATCOs make up approximately 90% of training costs, split between new trainees (65%) and existing ATCOs (25%). Hence, training costs increase through RP4 with the increasing ATCO headcount and as a result of larger forecast class sizes.

Figure 7.1: Historic expenditure on other staff related costs and AirNav Ireland's forecast (€ million, 2022 prices)

Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.1.1. Assessing the efficiency of 2023 expenditure

Over the period 2019 to 2022, training costs were initially below IAA's RP3 forecast but are expected to increase towards the end of RP3. In 2023, training costs were approximately ✂ ✂ ✂ ✂, significantly below IAA's RP3 forecast of ✂ ✂ ✂ ✂. We assume some of this underspend relates to the delayed delivery of certain capital initiatives, which meant the associated training has also been delayed.

Assuming 65% of training expenditure is on new trainees, outturn 2023 spend amounts to ✂ ✂ ✂ ✂ per student. This is in line with the level assumed by IAA in the setting of the RP3 Performance Plan and so, we consider this cost per student is reasonable. As a result, we conclude that outturn 2023 expenditure was broadly efficient.

7.1.2. Forecasting efficient expenditure over RP4

To forecast efficient expenditure, we link spending to future staffing levels and class sizes. We determine four drivers of training costs. Those are:

- **Class sizes (for the training of new ATCOs):** Class sizes determine the cost of training new ATCOs, which is 65% of total training costs. We endogenously model optimal class sizes to ensure enough ATCOs are trained to meet AirNav Ireland's resourcing needs, while recognising class size constraints.
- **Total ATCO headcount (for the training of existing ATCOs):** Ongoing training for ATCOs accounts for 25% of total training costs. We assume the cost of ongoing training increases linearly with the number of ATCOs.
- **Engineer headcount:** Training for engineers accounts for 7% of total training costs. We assume this cost increases with the number of engineers.
- **Other staff headcount:** The residual headcount drives the final 3% of staff costs.

We assume an elasticity of 1 with respect to the relevant driver and apply it to the share of training costs that it applies to. While there may be a potential for economies of scale, we consider it beneficial for AirNav Ireland to invest in training and cross-certification of staff, given the flexibility it provides for ATCO rostering. As such, we maintain an elasticity of 1.

Additionally, we have assessed AirNav Ireland's proposed step changes for training related to capex projects in 2026 and 2028/2029. We consider the need and additionality of the spend is justified on the basis that these are new systems that will require additional training beyond existing levels. And we consider the scale of the step-changes reasonable in the context of the step change assumed in the setting of the RP3 Performance Plan. Consequently, we allow for an additional ✂ ✂ ✂ ✂ in 2026, ✂ ✂ ✂ ✂ in 2028, and ✂ ✂ ✂ ✂ in 2029 in line with AirNav Ireland's business plan.[29] The resulting forecast, presented in the table below, is ✂ ✂ ✂ ✂ lower than AirNav Ireland's business plan forecasts, primarily driven by our lower headcount forecast.

Table 7.1: CEPA and AirNav Ireland's forecast of efficient training expenditure, 2023-2029 (€ million, 2022 prices)

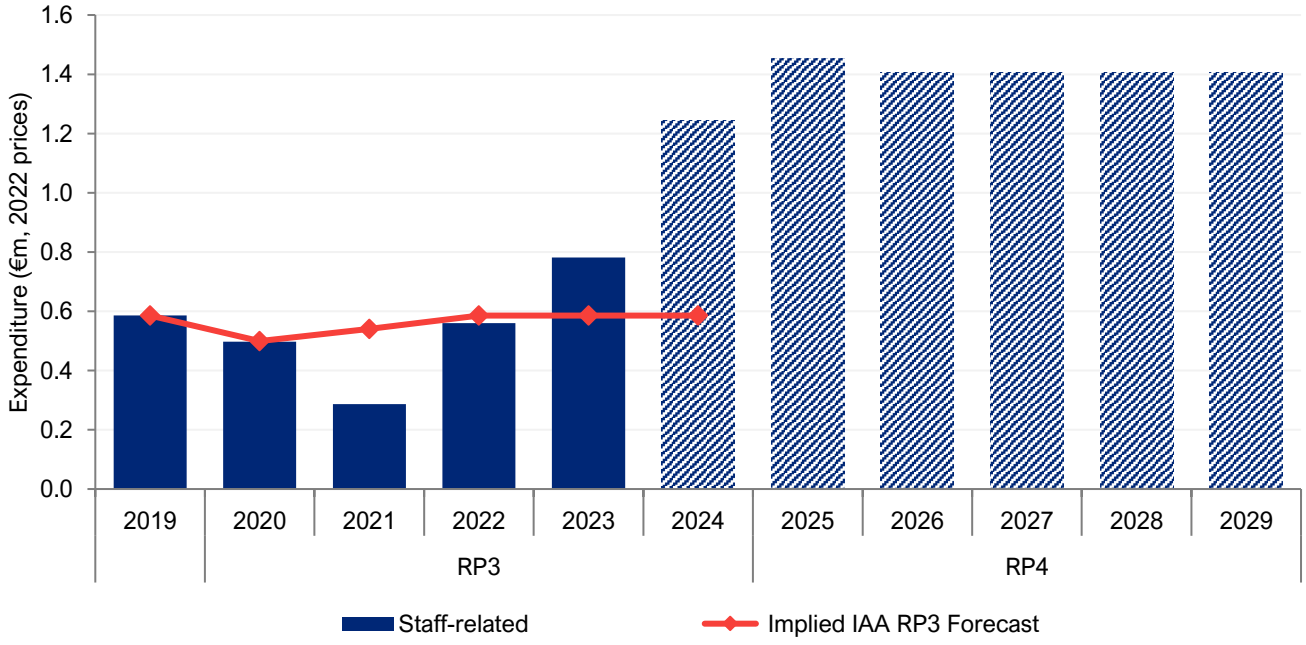
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
CEPA	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.2. Other staff related costs

In the figure below, we present AirNav Ireland's historic and forecast expenditure on other staff-related costs and compare this against the forecast assumed in the setting of the RP3 Performance Plan. This cost line covers activities such as medicals, employee wellbeing, health and safety and recruitment costs.

Figure 7.2: Historic expenditure on other staff related costs and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

[29] AirNav Ireland (2024) Business Plan 2025-2029, Table 77. We increase the 2026 figure from €1.6 million as it appears in the table of step changes to €2.9 million, as a review of the overall training forecast suggests this may have been underestimated.

AirNav Ireland is projecting a large increase in expenditure between 2022 and 2025, which we understand is primarily driven by recruitment costs.

7.2.1. Assessing the efficiency of 2023 expenditure

Over the period 2019 to 2022, spending per staff member has averaged €900, ranging from €600 in 2021 to €1,100 in 2022. In 2023, spending per staff member increased to €1,500. While this is greater than the level assumed in the setting of the IAA RP3 Performance Plan, our preliminary conclusion is that the 2023 step-increase was reasonable:

- We note that attrition increased over the COVID-19 pandemic, which meant that AirNav Ireland has had to recruit more heavily than previously.
- Similarly, we also note from our analysis of efficient staffing levels that AirNav Ireland were likely under-resourced in 2023, which meant they needed to invest more in recruitment for 2024 and beyond.

As a result, we conclude that outturn 2023 expenditure was broadly efficient.

7.2.2. Forecasting efficient expenditure over RP4

To forecast efficient expenditure we link spending to our projections of future staffing levels. The resultant forecast, shown in the table below, is approximately €2 million lower over RP4 than AirNav Ireland's business plan forecast.

Based on the narrative presented in the business plan we do not consider that a further step-increase can be justified. In the business plan, AirNav Ireland refer to the need to spend more for the recruitment of student controllers. When applying our three-part test for assessing step-changes, we consider the needs case has been met; there is a need to spend on recruitment. We do not consider that the additionality and efficiency tests have been met. We expect costs to be broadly linked to staffing levels and AirNav Ireland has not yet adequately made the case that its spending should increase by more than the growth in headcount. Similarly, AirNav Ireland has not yet made a sufficient case that the cost of recruitment has increased in real terms when compared to historic levels.

Table 7.2: CEPA and AirNav Ireland's forecast of efficient staff related expenditure, 2023-2029 (€ million, 2022 prices)

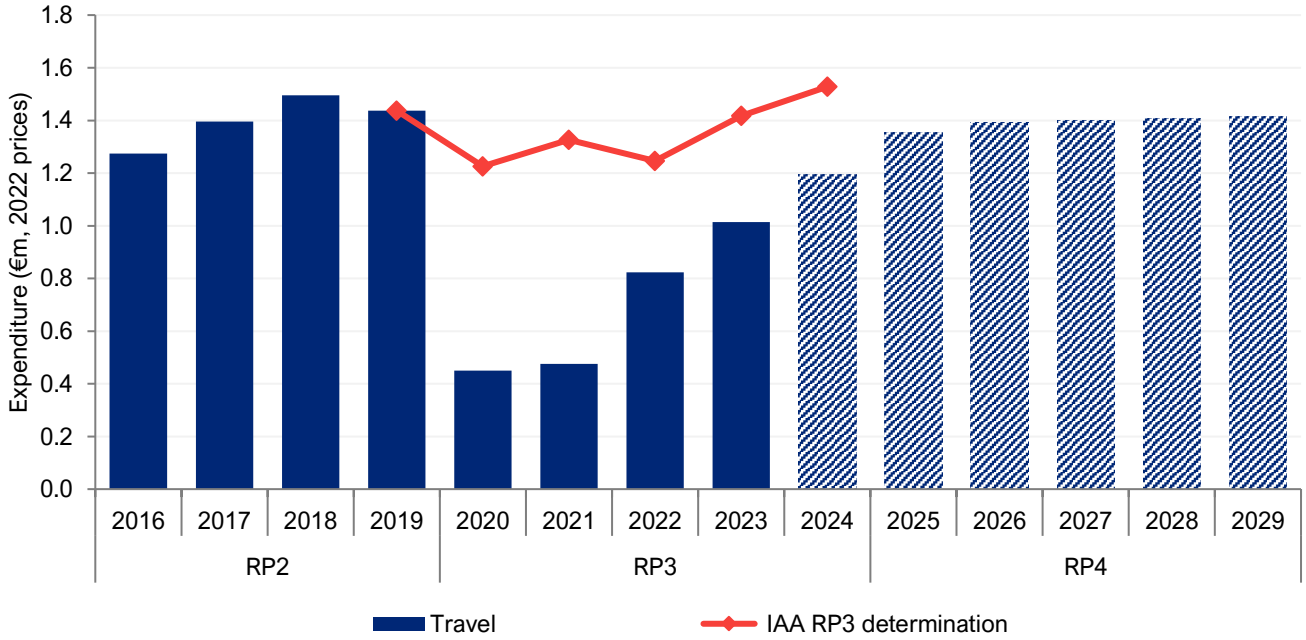
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	0.8	1.2	1.5	1.4	1.4	1.4	1.4	**7.1**
CEPA	0.8	0.9	0.9	1.0	1.0	1.0	1.0	**4.9**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.3. Travel

In the figure below, we present AirNav Ireland's historic and forecast expenditure on travel and compare this against the forecast assumed in the setting of the IAA RP3 Performance Plan. As expected, expenditure on travel reduced substantially in 2020 following the onset of the COVID-19 pandemic. While expenditure has recovered AirNav Ireland is currently expecting spending on travel to remain below 2019 levels for the duration of RP4.

Figure 7.3: Historic expenditure on travel and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

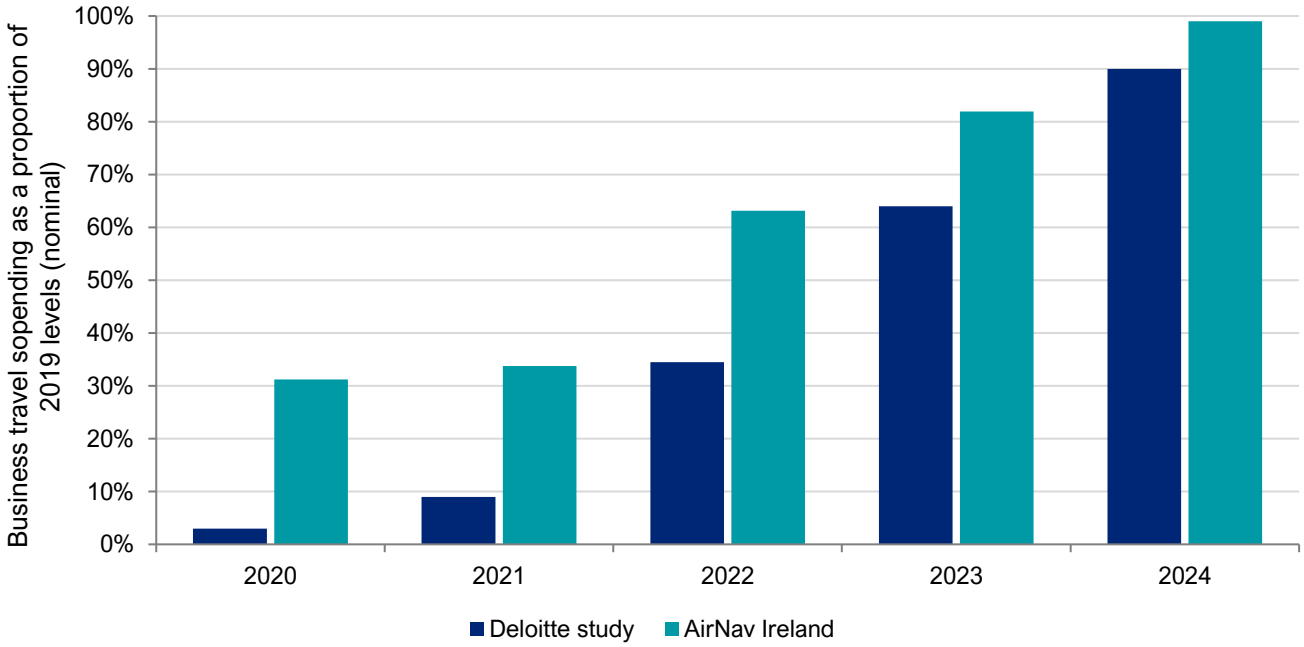
In terms of expenditure per staff member, spending averaged €2,660 per staff member over RP2, before declining to €860 in 2020 and recovering to €1,880 in 2023.

7.3.1. Assessing the efficiency of 2023 expenditure

To assess the efficiency of 2023 expenditure, we look at the reduction and subsequent recovery in travel spending over the period 2020 to 2023. We then compare this against a Deloitte study looking at patterns in business travel and the recovery in business travel spending following the COVID-19 pandemic.[30] We can see from the figure below, that travel spending declined less at AirNav Ireland than elsewhere and remained higher than elsewhere in 2023. We see that in 2024, travel spending at AirNav Ireland will largely return to 2019 levels in nominal terms while Deloitte are expecting business travel spending in general to reach 90% of 2019 levels.

[30] Deloitte (2023) Navigating toward a new normal: 2023 Deloitte corporate travel study. Available at https://www2.deloitte.com/xe/en/insights/focus/transportation/corporate-travel-study-2023.html

Figure 7.4: Comparison of business travel spending as a proportion of 2019 levels (nominal)



Source: CEPA analysis of AirNav Ireland data, IAA RP3 publications and Deloitte corporate travel study

This suggests that there may have been scope for AirNav Ireland to reduce business travel spending further. However, it must also be considered in the context that AirNav Ireland has multiple sites across Ireland and as such, travel between those sites is likely to be a core part of the business with less discretionary travel. For example, we expect engineering staff to travel frequently across AirNav Ireland's sites to provide day-to-day maintenance of assets including the radar stations. This is supported by our observation that travel during the peak years of the COVID-19 pandemic declined much less at AirNav Ireland when compared against our benchmark. As such, we accept outturn 2023 travel spending levels as our efficient baseline, but with the assumption that there will be cost restraint over RP4.

7.3.2. Forecasting efficient expenditure over RP4

For our forecast of efficient expenditure, there are two drivers that we have considered:

- **The continued recovery in business travel following the COVID-19 pandemic.** While we expect business travel will continue to recover over RP4, we also expect that there will be a permanent reduction in business travel due to the widespread use of virtual meeting technologies. Such technologies will negate the need for some business travel.
- **Volume-led growth due to higher staffing levels.** As AirNav Ireland expands with more staff and a larger asset base, we expect there will be a need for more travel between AirNav Ireland's various sites.

We consider it reasonable to assume that these two drivers cancel each other out such that travel expenditure remains at the long-term pre-pandemic average (i.e. 2016 to 2019). This leads us to a forecast of efficient travel expenditure that aligns with AirNav Ireland's proposals.

Table 7.3: CEPA and AirNav Ireland's forecast of efficient travel expenditure, 2023-2029 (€ million, 2022 prices)

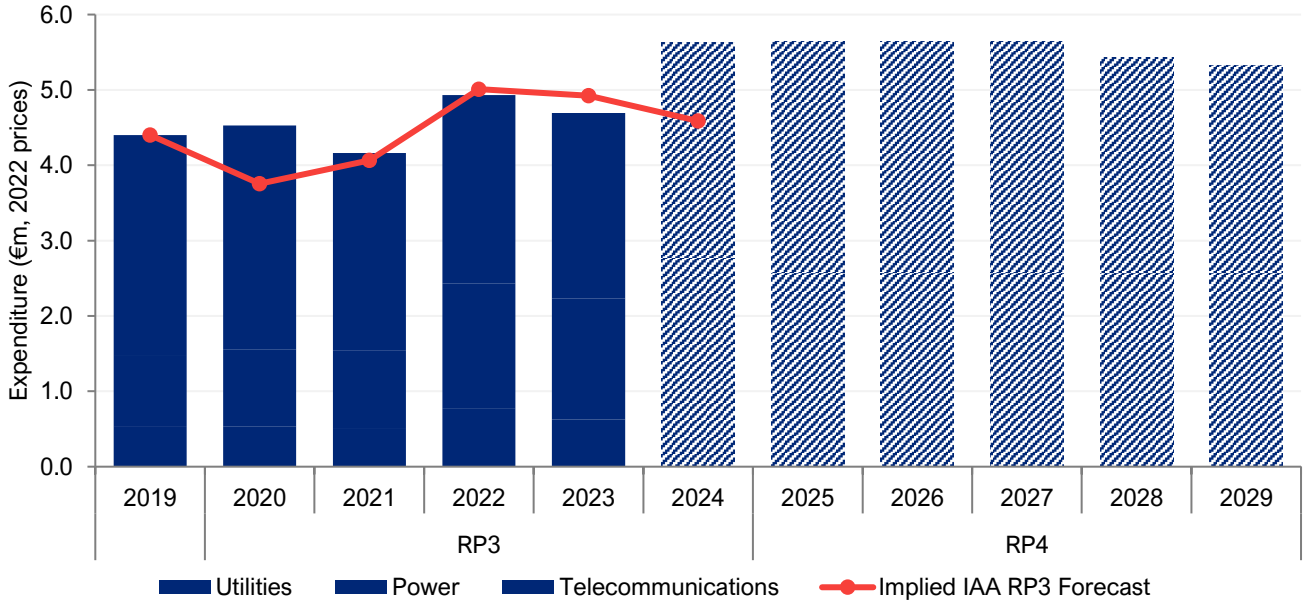
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	1.0	1.2	1.4	1.4	1.4	1.4	1.4	**7.0**
CEPA	1.0	1.2	1.4	1.4	1.4	1.4	1.4	**7.0**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.4. TELECOMS, POWER, AND UTILITIES

In the figure below, we present AirNav Ireland's historic and forecast expenditure on telecoms, power, and utilities, and compare this against the forecast assumed in the setting of the IAA RP3 Performance Plan. Over the RP3 period, expenditure on power has increased substantially, as has expenditure on other utilities, though expenditure on telecoms has reduced. In 2023, however, expenditure remained slightly below the implied forecast in the IAA's RP3 Performance Plan.

Figure 7.5: Historic expenditure on utilities, power, and telecoms, and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.4.1. Assessing the efficiency of 2023 expenditure

To assess the efficiency of AirNav Ireland's expenditure on power and other utilities in 2023, we assess the growth in expenditure between 2019 and 2023. We start with the assumption that any increase in power or utilities consumption from a larger footprint is offset by improvements in energy efficiency. This allows us to assess whether any increase in expenditure can be explained by price increases.

We compare the change in expenditure for power and utilities against external cost benchmarks:

- For power costs, we use a comparison of power costs as published by the Sustainable Energy Authority of Ireland, which shows that power costs for industrial customers rose by an average of 85% in real terms between 2019 and 2023. Taking AirNav Ireland's outturn power costs in 2019 of €0.9 million, this would imply an efficient spend in 2023 of €1.7 million, against which AirNav Ireland's outturn 2023 expenditure of ✂ ✂ ✂ ✂ compares favourably.
- For expenditure on other utilities, we use our estimate of efficient gas and water expenditure at Dublin Airport from our most recent opex efficiency analysis. Our study estimated efficient expenditure growing by 56% between 2019 and 2023, mostly owing to higher gas prices. Taking AirNav Ireland's outturn utilities expenditure in 2019 of €0.5 million, this would imply efficient 2023 expenditure of €0.8 million, against which AirNav Ireland's outturn expenditure for that year of ✂ ✂ ✂ ✂ again compares favourably.

This leads us to conclude that AirNav Ireland's expenditure on power and utilities in 2023 was broadly efficient.

AirNav Ireland's expenditure on telecoms is less well suited to external benchmarking as its spending mostly relates to the costs of private wires for the transmission of radar data, flight plans, meteorological information, and voice

communications. These activities do not have common external comparators. As a result, we have compared AirNav Ireland's 2023 expenditure against historical levels and against the levels implied by the previous efficiency analysis – we observe that outturn 2023 expenditure at ✂ ✂ ✂ ✂, was ✂ ✂ ✂ ✂ below outturn expenditure in 2019. Therefore, we conclude that AirNav Ireland's telecoms expenditure in 2023 was also broadly efficient.

For the setting of an efficient baseline, we use AirNav Ireland's outturn telecoms expenditure in 2023 and we use our own estimate of efficient power and utilities expenditure. This results in an efficient baseline of €5.0 million, compared with outturn expenditure of €4.7 million.

7.4.2. Forecasting efficient expenditure over RP4

To forecast efficient **power and utilities** expenditure over RP4, we keep expenditure constant at our 2023 baseline figure. This means we are assuming consumption of electricity, gas, and water stays constant and we are assuming that unit costs stay constant in real terms:

- **Consumption** – we recognise that many of AirNav Ireland's capex projects will have implications for utilities consumption but, we assume that any increases are offset by efficiency improvements (e.g. through the selection of more energy efficient assets).
- **Unit costs** – By keeping unit costs constant in real terms, we are either assuming that a) the cost of energy and other utilities will rise exactly by inflation, or that b) any price increases are sufficiently captured within the inflation forecast such that a separate adjustment is not required. We note that energy costs have increased by more than inflation in recent years and are expected to reduce in the shorter term, implying a negative real price effect.[31] However, as energy costs make up a similar proportion of non-staff costs at AirNav Ireland as they do within the CPI inflation basket, we conclude that a separate adjustment is not required.

For **telecoms** we take an elasticity-based approach to estimating future expenditure, linking it to IFR movements. We use an elasticity of 0.2, meaning that every 10% increase in flight movements leads to a 2% increase in expenditure. This is based on our judgement that while a large proportion of telecoms costs will be fixed, a small proportion may be linked to volumes of activity. We also include a separate increase of ✂ ✂ ✂ ✂ per annum for an upgraded private wire network between AirNav Ireland and NATS. This results in a small difference between our forecast and AirNav Ireland's forecast, where AirNav Ireland is assuming a much larger increase in expenditure in the first three years of RP4, as shown in the table below.

We would welcome further evidence from AirNav Ireland on what is driving that step-up in expenditure, demonstrating why it is needed (e.g. in terms of new activity or new requirements), why it is genuinely additional to our draft forecast, and why the scale of the proposed step-up is efficient/proportionate.

Table 7.4: CEPA and AirNav Ireland's forecast of efficient power, utilities, and telecoms expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland								
Power	1.6	1.8	1.8	1.8	1.8	1.8	1.8	**8.8**
Utilities	0.6	1.0	0.8	0.8	0.8	0.8	0.8	**4.2**
Telecoms	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
CEPA								

[31] A real price effect (RPE) is the presentation of an input price (e.g. energy) relative to a measure of general inflation such as CPI. A negative RPE means that prices are expected to rise by less than inflation and could even reduce. A positive RPE means that prices are expected to rise by more than inflation.

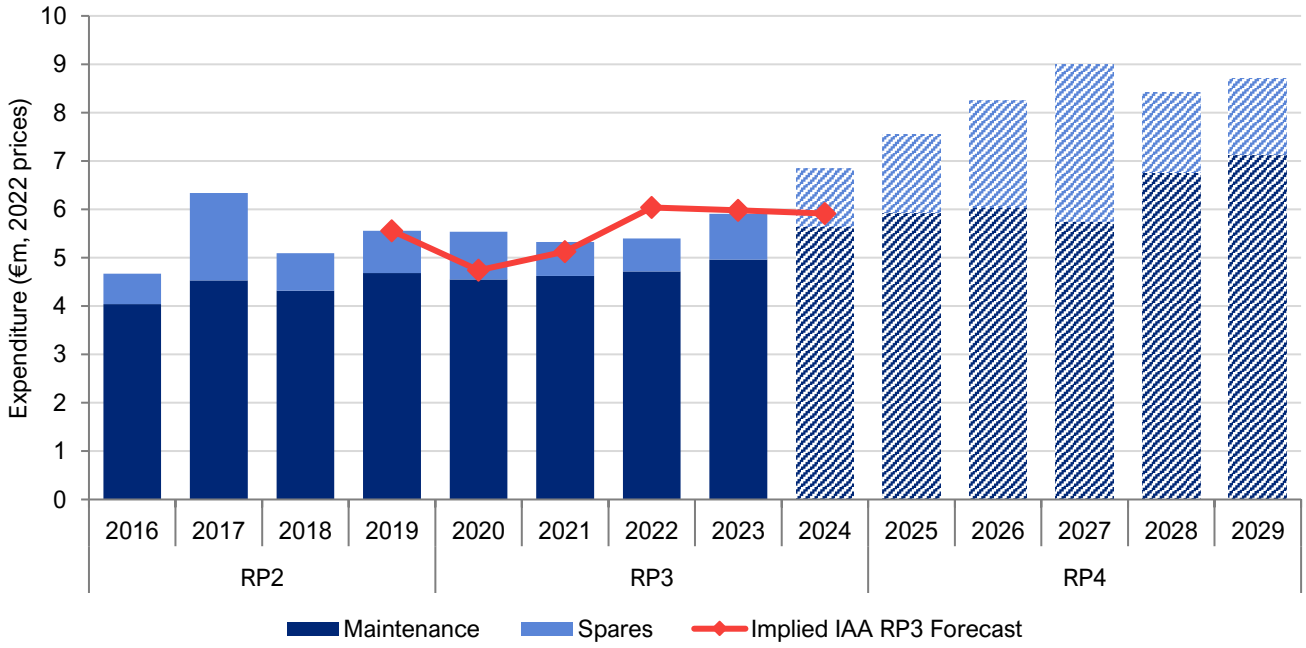
	2023	2024	2025	2026	2027	2028	2029	RP4 total
Power	1.7	1.7	1.7	1.7	1.7	1.7	1.7	**8.6**
Utilities	0.8	0.8	0.8	0.8	0.8	0.8	0.8	**4.2**
Telecoms	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.5. MAINTENANCE AND SPARES

In the figure below, we present AirNav Ireland's historic and forecast expenditure on maintenance and spares and compare this against the forecast assumed in the setting of IAA's RP3 Performance Plan. We can see that overall, spending has remained broadly in line with IAA's implied RP3 estimates, though AirNav Ireland is projecting substantial increases over RP4. AirNav Ireland's RP4 forecast is approximately 45% higher on average than RP3 expenditure.

Figure 7.6: Historic expenditure on maintenance and spares and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.5.1. Assessing the efficiency of 2023 expenditure

Maintenance and spares expenditure can be split into maintenance of AirNav Ireland's ATM operational systems, facilities management, maintenance of electrical plant, and spares. Figure 7.7 shows the breakdown in for 2023.

Figure 7.7: Breakdown of maintenance and spares expenditure in 2023 (€ million, 2022 prices)

Source: CEPA analysis of AirNav Ireland data

At a high-level, expenditure on maintenance has been relatively constant over RP2 and RP3, with AirNav Ireland spending an average of €5.4 million per annum between 2016 and 2019, compared with an average of €5.6 million per annum between 2020 and 2023. Outturn expenditure in 2023 at €6.0 million, was higher than the historical average but remained in-line with the IAA's implied forecast.

To assess the efficiency of 2023 expenditure, we look separately at the cost items as broken down in the above figure. For each cost item, we look at the historical evolution of spending and assess whether this can be justified based on assumed labour cost pressures and increases in volumes of activity.

Maintenance of ATM systems

Currently a single contract exists for the maintenance of AirNav Ireland's primary ATM system. We note that spending in 2023 at ✂ ✂ ✂ ✂ was lower than the historic average of €2.1 million, suggesting that there is some year-on-year volatility in spending. Noting that 2023 spending was lower than the historical average and was lower than the implied IAA forecast, we use this as our efficient baseline. However, we also recognise that spending in future may need to return to the long-term average.

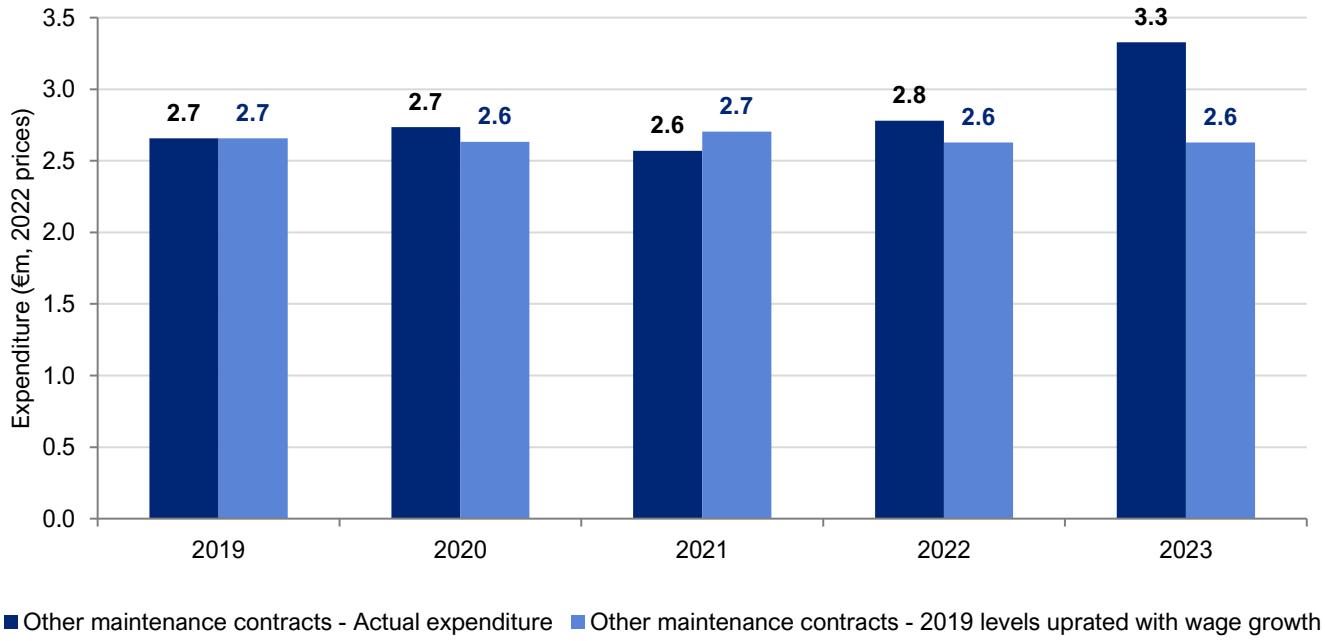
Other maintenance contracts

Of the €3.3 million expenditure in 2023 on other maintenance, ✂ ✂ ✂ ✂ is accounted for by the facilities maintenance contract, while the remainder consists of approximately 45 contracts ranging in value from €1,000 to €180,000. We expect that overall spending will depend on both the volume of activity and the price of inputs, and given the nature of the contracts, we expect that labour costs will be the primary driver of input prices.

As a result, we assess how spending on maintenance has varied since 2019 and how that compares against wage growth and the size of the AirNav Ireland's regulatory asset base.

Looking at wage growth in the first instance, Figure 7.8 shows that when uprating 2019 maintenance expenditure with real wage growth to 2023, the resultant estimate is €0.5 million (approximately 20%) lower than outturn spend in 2023. This indicates that actual maintenance expenditure has grown at a faster pace than real wages, particularly in 2023. In previous years, spending stayed relatively constant.

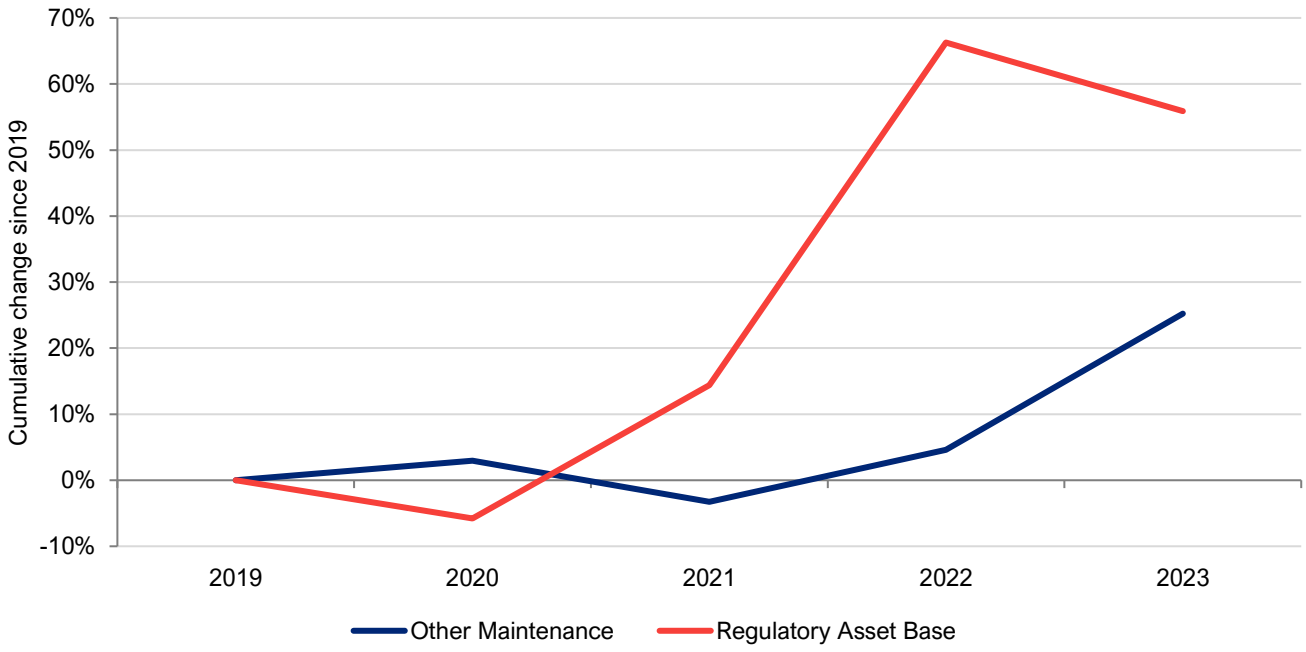
Figure 7.8: Other maintenance expenditure against modelled expenditure in line with real wage growth



Source: CEPA analysis of AirNav Ireland and Eurostat data

The other determinant of maintenance expenditure is the volume of maintenance required. Figure 7.9 plots the growth in maintenance expenditure between 2019 and 2023 against the growth in AirNav Ireland's regulatory asset base (RAB). Whilst we expect newer assets to require less maintenance than ageing assets, the figure indicates that in percentage terms AirNav Ireland's RAB has increased by much more than overall maintenance spending. We understand the step-up in the RAB in 2022 is due to the capitalisation of the new control tower at Dublin Airport, which may have subsequently increased spending on facilities maintenance and on the maintenance of assets in the control tower.

Figure 7.9: Cumulative growth in AirNav Ireland's other maintenance expenditure and regulatory asset base (%)



Source: CEPA analysis of AirNav Ireland data

Overall, our analysis suggests the step-up in spending in 2023 can at least be partially explained by an increase in the asset base. And as spending remained below the level assumed in the setting of the RP3 Performance Plan, we accept AirNav Ireland's outturn 2023 expenditure of €3.3 million as our efficient baseline.

Spares

For spares, annual spending over the period 2016 to 2023 averaged €0.9 million, compared with outturn 2023 expenditure of €1.0 million. We consider that this modest difference can be plausibly explained by a larger asset base, which requires more spares. And so, we adopt AirNav Ireland's 2023 spares expenditure of €1.0 million in 2023 as an efficient baseline.

7.5.2. Forecasting efficient expenditure over RP4

To forecast efficient maintenance and spares spending, we again split expenditure into ATM systems, the facilities management contract, other maintenance contracts and spares.

ATM systems

AirNav Ireland has provided a bottom-up forecast of maintenance expenditure on ATM systems including a forecast of the transition from the current system to the new TopSky implementation (due to commence in 2029). AirNav Ireland forecasts spending to increase slightly to ✂ ✂ ✂ ✂ in 2025 and 2026, before declining to ✂ ✂ ✂ ✂ in 2027 and 2028 as the old system is phased out, before increasing to ✂ ✂ ✂ ✂ in 2029 as the new system is phased in. We consider such a profile reasonable and, therefore, adopt it as our own forecast.

Facilities management contract

AirNav Ireland currently has a five-year facilities management contract, which is due to expire in 2028.[32] As additional services have been added to the existing contract and due to 'inflationary increases', AirNav Ireland is forecasting a step-increase in spending from ✂ ✂ ✂ ✂ in 2023 to ✂ ✂ ✂ ✂ in 2024, and a further 15% increase to ✂ ✂ ✂ ✂ when the contract expires in 2028.

We recognise that as AirNav Ireland is currently in contract, it has limited ability to influence its expenditure until the current contract expires. However, we do not consider that AirNav Ireland has provided sufficient justification for the step-increase in 2024, nor we do not accept that an automatic 15% increase upon expiry of the current contract is warranted. In both cases, we would not expect any inflationary adjustment to be required given the forecast is already set in real terms. We would also expect there to be economies of scale to be achieved as the property footprint expands.

We note that there are a number of capex initiatives being proposed for RP4 that involve the expansion of existing sites, which in turn would have an implication for spending on facilities management. We allow a 5% increase in 2028 for these expansions, and challenge AirNav Ireland to:

- Provide evidence that the step-up in spending in 2024 is commensurate to the value of the additional services sought;
- Provide evidence that a 15% step-up in spending upon expiry of the current contract is proportionate to the scale of expansion expected during RP4, and;
- Provide evidence that it has considered the efficiencies that could be achieved through economies of scale and competitive tendering.

Other maintenance contracts

AirNav Ireland estimates that its spending on other maintenance contracts will double from €1.7 million in 2023 to €3.4 million by 2029. We have sought further information from AirNav Ireland to better understand what is driving the increase. We observe that ✂ ✂ ✂ ✂ is due to increases associated with the new CASDS system in 2028,

[32] AirNav Ireland (2024) Business Plan 2025-2029, p.110.

while a further ✂ ✂ ✂ ✂ is due to new contracts. The remaining ✂ ✂ ✂ ✂ increase is due to expected and unexpected price increases as well as additional services on existing contracts.

While we acknowledge that an increased asset base would lead to an increase in the volume of maintenance works required, asset replacement associated with capital expenditure should result in some opex efficiencies. We note that many of the projects listed in the capital investment plan have 'productivity' listed as a primary driver for the project. Therefore, we would expect to see some corresponding benefit in maintenance contract costs, particularly as end-of-life assets are replaced. Similarly, while we see some evidence of efficiencies being identified from systems that will no longer be needed, it is not evidenced that this has been done comprehensively.

For example, it is not clear whether the maintenance forecast accounts for the need to no longer maintain the Emergency Air Situation Display System (EASDS), which will be replaced by the CASDS.[33] As a result, we apply a 5% efficiency challenge to account for the opex efficiencies associated with capital investments.

Spares

For spending on spares, AirNav Ireland projects that its spending will increase to €3.3 million in 2027 from €1.0 million in 2023, before falling to €1.6 million in 2028 and 2029. We understand from AirNav Ireland's business plan that this is directly linked to its capital initiatives, namely CASDS, the radar replacement programme and TopSky ATC One.

Based on the material provided to us by AirNav Ireland, it is not yet apparent why new capital initiatives would require additional investment in spares, nor why such investment would not be capitalised. Moreover, as with the other maintenance contracts, we expect that AirNav Ireland's capital plan will allow opex efficiencies to be realised by enabling less spending on spares for older, decommissioned assets. As a result, we apply a 15% efficiency challenge to AirNav Ireland's forecast of spares expenditure, such that by 2029 expenditure broadly returns to the historic average.

Summary

Our resultant forecast is presented alongside AirNav Ireland's forecast in the table below.

Table 7.5: CEPA and AirNav Ireland's forecast of efficient maintenance and spares expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland								
Maintenance	4.9	5.7	5.9	6.0	5.7	6.8	7.1	**31.6**
Spares	1.0	1.2	1.6	2.2	3.3	1.6	1.6	**10.3**
CEPA								
Maintenance	4.9	5.5	5.7	5.9	5.6	6.3	6.5	**30.0**
Spares	1.0	1.2	1.4	1.9	2.8	1.4	1.3	**8.7**

Source: CEPA analysis, AirNav Ireland RP4 business plan

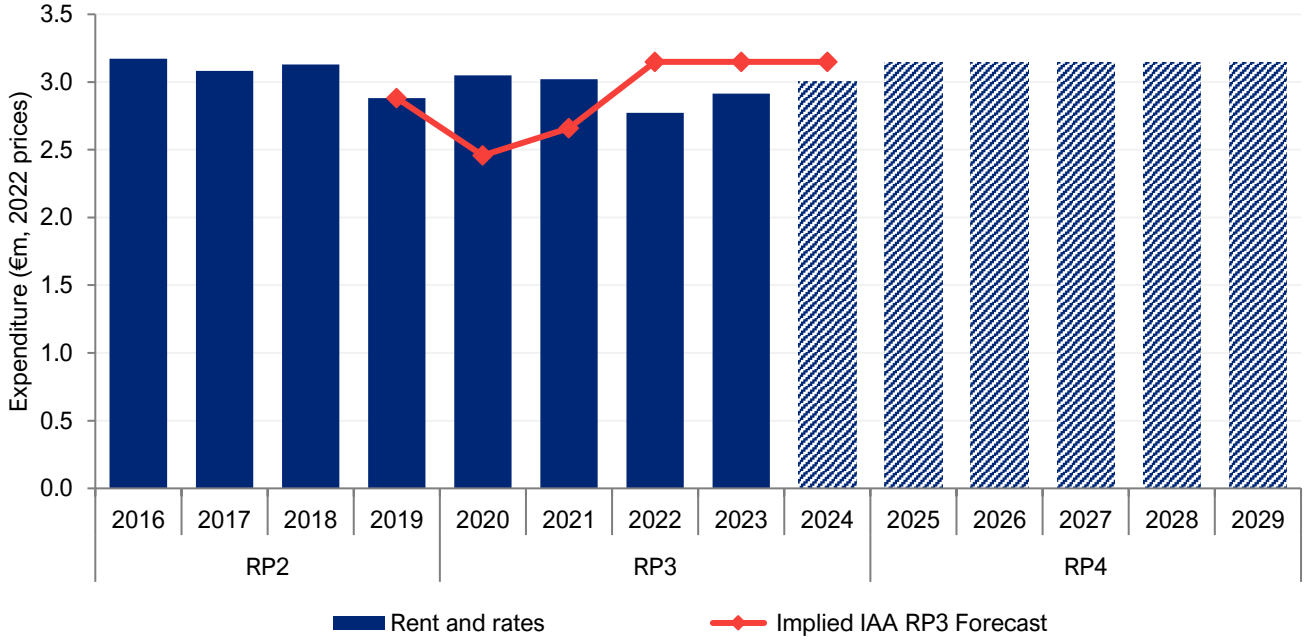
7.6. Rent and rates

In the figure below, we present AirNav Ireland's historic and forecast expenditure on rent and rates and compare this against the forecast assumed in the setting of IAA's RP3 Performance Plan. Historically, spend on rent and

[33] AirNav Ireland (2024) Business Plan 2025-2029, p.267.

rates has stayed relatively constant with a small reduction in 2022. In 2023, expenditure remained below the forecast assumed within the IAA determination, at €2.9 million compared with a forecast of €3.1 million.

Figure 7.10: Historic expenditure on rent and rates and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.6.1. Assessing the efficiency of 2023 expenditure

Of the €2.9 million in expenditure on rent and rates in 2023, ✂ ✂ ✂ ✂ relates to rent and ✂ ✂ ✂ ✂ relates to rates. And of the ✂ ✂ ✂ ✂ in rental expenditure, approximately 40% is accounted for by the sub-leasing of AirNav Ireland's corporate headquarters from the IAA while another 40% is accounted for by the leasing of radar and control tower locations from the Department of Transport.

We consider most of these expenditure items to be outside of AirNav Ireland's control with many governed by existing contracts. Also, as expenditure has remained relatively constant with 2023 spending lower than the historic average, we do not see a strong argument for applying an efficiency adjustment. As a result, we use AirNav Ireland's 2023 expenditure of €2.9 million as the efficient baseline.

7.6.2. Forecasting efficient expenditure over RP4

To forecast efficient expenditure, we use AirNav Ireland's business plan as a starting point. We note that expenditure is expected to increase marginally in 2024 and increase marginally further in 2025 to €3.1 million, before staying at that level for the remainder of RP4.

We have sought further information from AirNav Ireland to understand the basis of this increase, validating it against external sources where possible, before determining the efficient forecast:

- A large proportion of the increase being proposed in 2024 can be explained by increases in the Annual Rate of Valuation (ARV) set by the relevant local authorities.
- The remainder of the increase in 2024 is due to increases in the valuations of Ballycasey control centre and Dublin Airport tower. This has been offset by valuation reductions elsewhere.
- Finally, the RP4 forecast includes a provision for small rent increases for Department of Transport assets.

We consider these explanations adequately explain the scale of increase being proposed and so, adopt AirNav Ireland's forecast.

Table 7.6: CEPA and AirNav Ireland's forecast of rents and rates expenditure, 2023-2029 (€ million, 2022 prices)

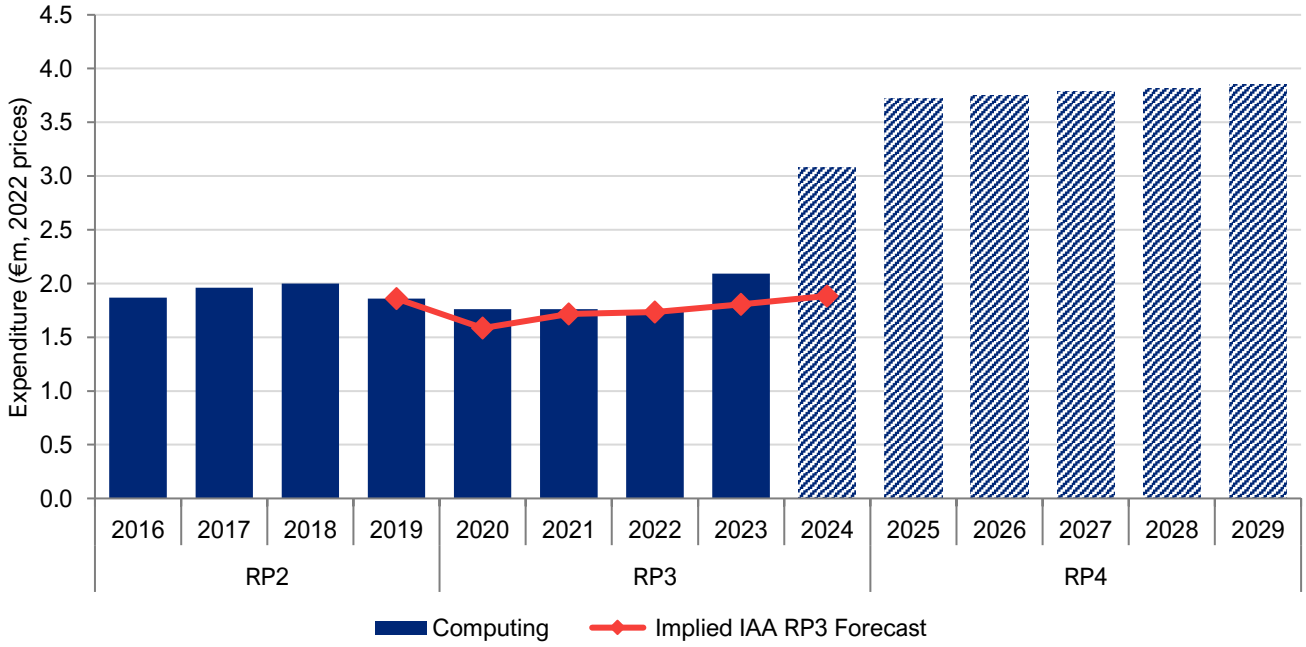
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	2.9	3.0	3.1	3.1	3.1	3.1	3.1	**15.7**
CEPA	2.9	3.0	3.1	3.1	3.1	3.1	3.1	**15.7**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.7. COMPUTING

In the figure below, we present AirNav Ireland's historic and forecast expenditure on computing and compare this against the forecast assumed in the setting of IAA RP3 Performance Plan. From 2024 onwards, AirNav Ireland is forecasting a substantial increase in spending, with average RP4 expenditure estimated to be approximately 80% higher than the levels observed in RP3.

Figure 7.11: Historic expenditure on computing and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

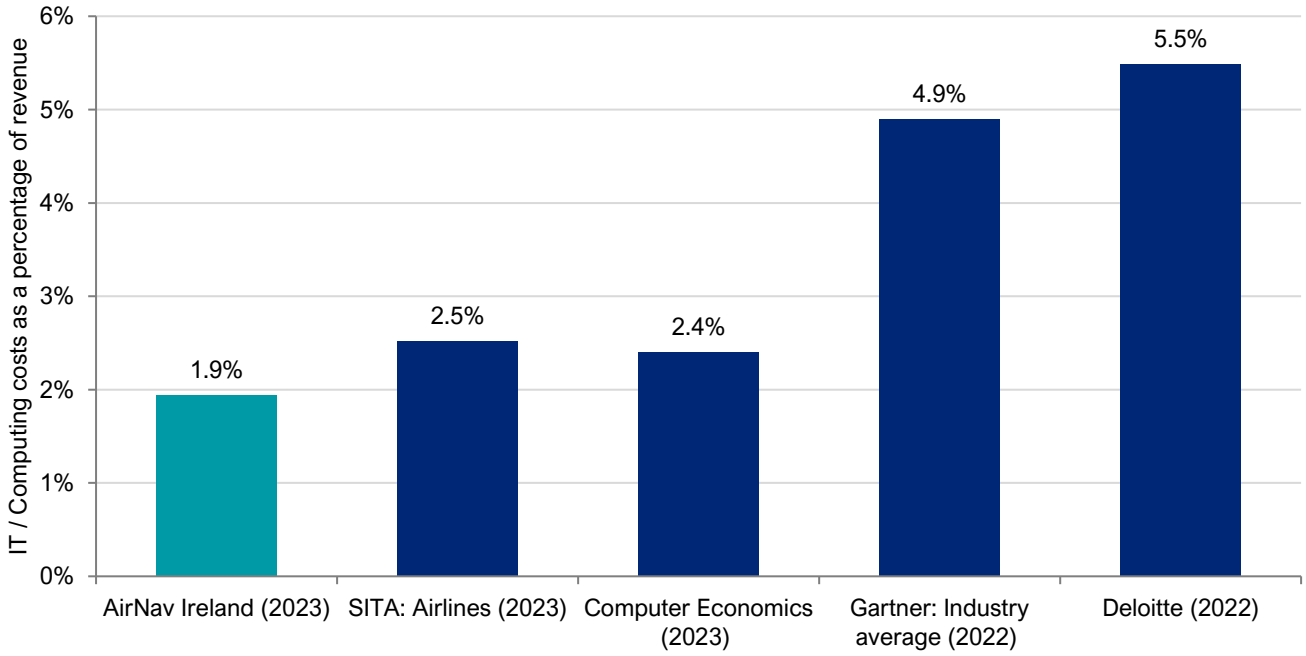
7.7.1. Assessing the efficiency of 2023 expenditure

A common measure for benchmarking IT spend is the ratio of IT expenditure to overall revenues. This is an imperfect indicator, as different businesses can be more or less IT intensive, may have different approaches to allocating IT costs, and may have different strategies for whether to spend on IT opex or IT capex.

Specifically in relation to AirNav Ireland, a large proportion of operational IT relates to the provision of ATM services, which is categorised as maintenance expenditure. In other benchmarks, such expenditure may be budgeted under IT. Therefore, AirNav Ireland's computing expenditure as a percentage of revenue may be an underestimate in comparison to industry-wide benchmarks.

Nevertheless, the benchmark provides information that can be used alongside other indicators to judge the efficiency of IT spending. As a result, we combine 2023 computing non-staff costs and IT payroll expenditure to estimate total spend on IT and then divide it by 2023 regulated revenues to get the ratio of IT spend to revenues. We then compare this measure against a set of industry-wide benchmarks, as shown in Figure 7.12.

Figure 7.12: AirNav Ireland's computing expenditure as a percentage of total revenue compared with industry benchmarks.



Source: CEPA analysis of AirNav Ireland, Deloitte, Computer Economics, SITA data

Despite the limitations of the analysis, computing expenditure that equates to 1.9% of total revenue indicates a low quantum of expenditure relative to the benchmark comparators. And while spending in 2023 was higher than the forecast assumed within the IAA RP3 Performance Plan and represented a 20% step-up from 2022 levels, the evidence from our top-down benchmarking combined with the bottom-up benchmark evidence suggests that overall IT spending in 2023 was broadly efficient. As a result, we use AirNav Ireland's outturn computing expenditure of €2.1 million in 2023 as our efficient baseline.

7.7.2. Forecasting efficient expenditure over RP4

AirNav Ireland attribute the step-up in cost from 2023-2025 to a number of factors.[34] These factors are summarised in the bullets below:

- The cost of separation from IAA, where AirNav Ireland now incur costs that were previously borne by IAA, and the re-negotiation of contracts post-separation.
- Technological advancements and the expansion of the computing remit through new projects and services, which have necessitated upgraded equipment and software that have higher costs.
- Increase cyber-security costs to meet regulatory obligations.

AirNav Ireland does not quantify the impact of each factor on its forecast of computing expenditure. However, CEPA has previously estimated step-changes in IT opex in a directly comparable context, recommending suitable allowances for Gas Network Ireland's (GNI) IT function ahead of the PC5 price control. Previously, GNI and Irish Water's IT functions were centralised as part of the Ervia Group's "Ervia Business Services Centre" but became standalone IT functions as part planned separation of Irish Water from the Ervia Group in 2023.[35] This separation is

[34] AirNav Ireland (2024), Draft Business Plan 2025-2029, May, p.114.

[35] Government of Ireland (2022), Irish Water to become 'Uisce Éireann' as a standalone national authority for water services, July

comparable to AirNav Ireland's separation from IAA. CEPA's review of an efficient IT opex for GNI allowed for a 14.2% step-change associated with the Ervia separation, and a further 8.8% for additional cyber-security.[36] [37]

- Given the direct comparability between AirNav Ireland's computing expenditure and GNI's IT function, we allow the same step-changes of 14.2% for separation and 8.8% for cyber-security between 2023 and 2024, and challenge AirNav Ireland to evidence and quantify the impact of the factors behind its forecasted expenditure increases. This allowance for separation may be an overestimate if some separation costs are already implicitly captured within AirNav Ireland's 2023 computing expenditure.
- We then uplift computing expenditure from 2024 onwards by a compound annual growth rate (CAGR) of 1.4% annually, which is calculated using historical computing expenditure across RP2 and RP3. This CAGR accounts for annual increases in computing expenditure.

Through these adjustments, we consider we have appropriately captured the impact of routine investment in IT as well as the specific step-increases required for additional investment in cyber security as well as the impact of the separation from IAA. The resultant forecast is presented in the table below, which shows that our estimate of efficient expenditure over RP4 is approximately €5 million lower than AirNav Ireland's estimate. However, our estimate is €3 million higher than expected expenditure over RP3.

Table 7.7: CEPA and AirNav Ireland's forecast of efficient computing expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	2.1	3.1	3.7	3.8	3.8	3.8	3.9	**18.9**
CEPA	2.1	2.6	2.6	2.7	2.7	2.8	2.8	**13.6**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.8. CONSULTANCY, PROFESSIONAL SERVICES, AND PR

In this section we consider the cost lines for consultancy, professional services, and public relations (PR).

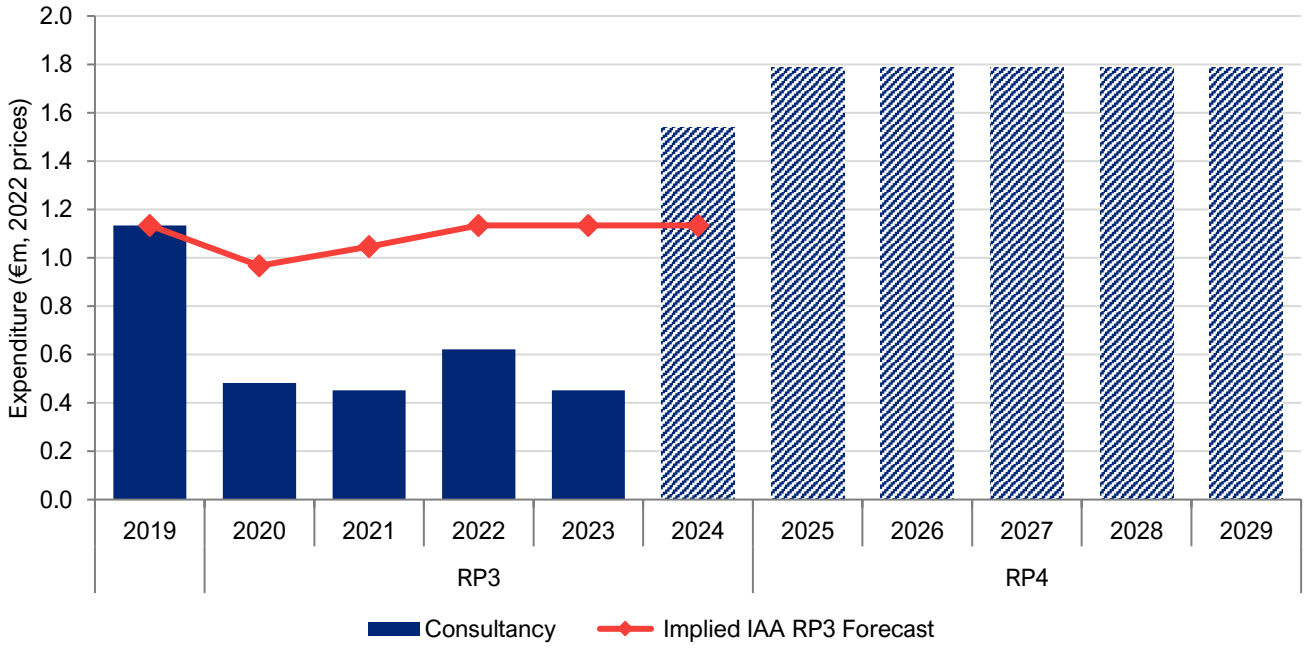
- **Consultancy** expenditure comprises of spend on specialist external advice in fields such as safety management, flight procedures, technology resilience, pay and pensions.
- **Professional Services** expenditure includes legal fees, audit and audit-related fees, taxation, pension administration, and pension actuarial and advisory fees.
- **PR** expenditure relates to items such as Corporate Social Responsibility activities, educational initiatives, crisis management costs, communication contract, annual report, attendance and support at aviation events.

AirNav Ireland's actual and forecast consultancy expenditure is illustrated on Figure 7.13, alongside the forecast used in setting IAA's RP3 Performance Plan. Actual expenditure in the first four years of RP3 was significantly below 2019 levels and below the IAA estimate, though AirNav Ireland is expecting spending to increase above 2019 levels in 2024. AirNav Ireland is also expecting consultancy expenditure to increase further over RP4 to €1.8 million per annum.

[36] CEPA (2023), PC5 Working Paper: IT Expenditure, June, p.33. https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU202377_CEPA_PC5_IT_Paper.pdf

[37] The initial step change allowance for cyber-security in the CEPA PC5 Working Paper was lower than 8.8%, but the CRU gave GNI an additional allowance in its Final Determination for PC5 that when added to CEPA's initial step-change allowance equates to 8.8%.

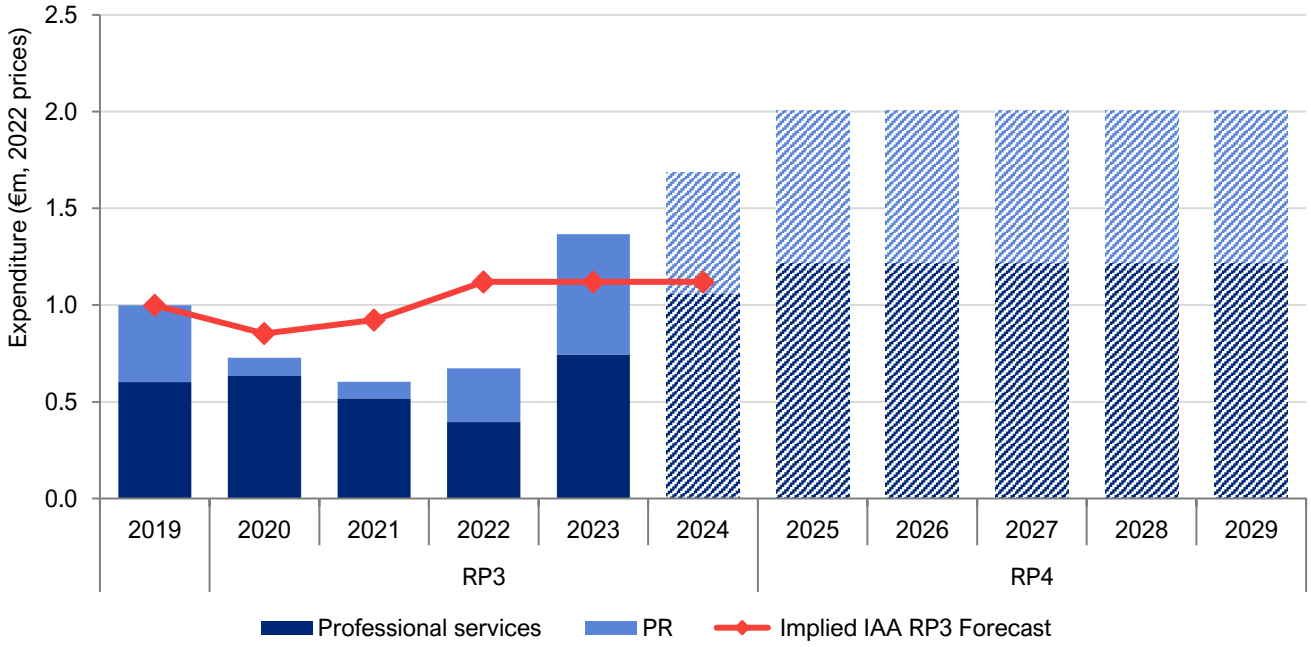
Figure 7.13: Historic expenditure on consultancy and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

AirNav Ireland's actual and forecast professional services and PR expenditure is illustrated in the figure below. While spending declined during the COVID-19 pandemic, spending exceeded 2019 levels in 2023 and is expected to increase further in 2024. Over the RP4 period, AirNav Ireland is projecting expenditure to increase further to €2.0 million per annum.

Figure 7.14 Historic expenditure on professional services and PR and AirNav Ireland's forecast (€ million, 2022 prices)



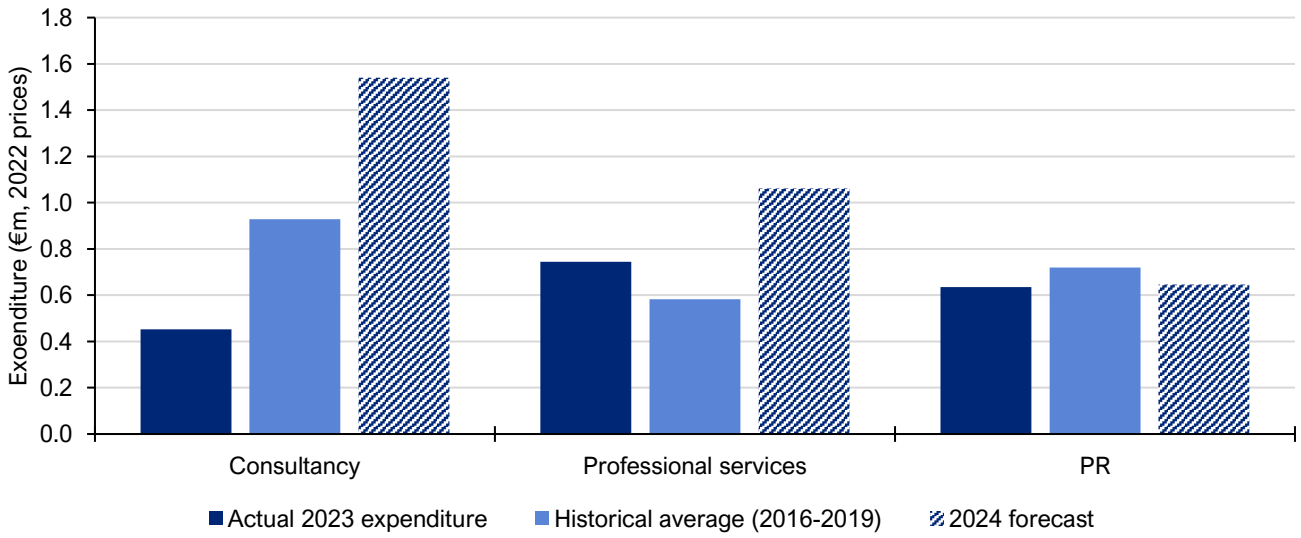
Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.8.1. Assessing the efficiency of 2023 expenditure

To account for the fluctuations in year-to-year expenditure highlighted above, we consider a historical average of expenditure to be an appropriate baseline for each cost line. In Figure 7.15 below, we present average expenditure

over the period 2016 to 2019 alongside the actual expenditure incurred by AirNav Ireland in 2023 and budgeted expenditure in 2024. We use an average of 2016 to 2019 to exclude the reduction in spending during the COVID-19 pandemic.

Figure 7.15: Actual 2023 expenditure incurred by AirNav Ireland for consultancy, professional services, and PR, alongside a historical average and AirNav Ireland's forecast 2024 expenditure (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data

We use 2016 to 2019 average spending as our efficient baseline for 2023, which results in a figure that is significantly higher than outturn 2023 spend for consultancy, marginally higher than outturn spend for PR, and lower than outturn spend for professional services. Overall, our efficient baseline of €2.2 million is around €0.4 million higher than outturn spend in 2023.

7.8.2. Forecasting efficient expenditure over RP4

AirNav Ireland is projecting an increase in spending on consultancy, professional services and PR from €1.8 million in total in 2023, to an average of €3.9 million over RP4. This is mostly due to a step-increase in consultancy spend. AirNav Ireland has attributed this increase to a few factors including sustainability and flight procedures but have not yet, in our view, provided underlying assumptions that would justify an increase in expenditure of this magnitude.[38] Similarly, AirNav Ireland attributes the forecast increase in professional services expenditure between RP3 and RP4 to some specific services within the cost category being re-tendered in RP4.[39]

We do not consider that the justification and evidence provided thus far by AirNav Ireland is sufficient to warrant a step-increase in our forecast. We understand that there may be short-term consulting needs to deal with the residual effects of the UK exit from the European Union and the opening of Dublin Airport north runway. However, AirNav Ireland has not provide sufficient evidence of a need to permanently increase consulting spend from its long-term average. Nor has AirNav Ireland provided evidence that the scale of the increase being proposed is efficient and proportionate to the need.

Instead, to project efficient expenditure for RP4, we uplift our efficient baseline by an estimate of wage growth for individuals working in 'professional, scientific and technical activities'.[40] The resultant forecast presented alongside AirNav Ireland's forecast in the table below.

[38] AirNav Ireland (2024, RP4 Meeting with IAA/CEPA, May.

[39] AirNav Ireland (2024) Business Plan 2025-2029, p.111

[40] NACE Rev. 2 is a statistical classification of economic activities applied across the European Union.

Table 7.8: CEPA and AirNav Ireland's forecast of efficient consultancy, professional services, and PR expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland								
Consultancy	0.5	1.5	1.8	1.8	1.8	1.8	1.8	**8.9**
Professional services	0.8	1.1	1.2	1.2	1.2	1.2	1.2	**6.1**
PR	0.6	0.6	0.8	0.8	0.8	0.8	0.8	**3.9**
CEPA								
Consultancy	0.9	0.9	1.0	1.0	1.0	1.0	1.0	**4.9**
Professional services	0.6	0.6	0.6	0.6	0.6	0.6	0.6	**3.1**
PR	0.7	0.7	0.7	0.7	0.8	0.8	0.8	**3.8**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.9. INSURANCE

In the figure below, we present AirNav Ireland's historic and forecast expenditure on insurance and compare this to the forecast assumed in the setting of IAA's RP3 Performance Plan. While there was a step-up in spending on insurance at the beginning of RP3, this was followed by year-on-year decreases up until 2023.

Over RP4, AirNav Ireland is forecasting insurance expenditure to increase by approximately 3% in real terms annually, from ✂ ✂ ✂ ✂ in 2024 to ✂ ✂ ✂ ✂ in 2029. This compares with outturn expenditure of ✂ ✂ ✂ ✂ in 2019 and ✂ ✂ ✂ ✂ in 2023.

Figure 7.16: Historic expenditure on insurance and AirNav Ireland's forecast (€ million, 2022 prices)

Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.9.1. Assessing the efficiency of 2023 expenditure

To determine a 2023 baseline, we assess the extent to which AirNav Ireland's insurance expenditure historically has been in line with industry-wide trends in insurance premia. We estimate an annual growth rate based on data

from Marsh on premium trends in the ANSP insurance market, and from Swiss RE Sigma on real commercial non-life insurance premium growth rates. These growth rates are shown in the table below. While the Marsh figures are more specific to the industry, our experience from previous studies have found that these tend to overestimate growth in premia. As a result, we use an average of the two data sources.

Table 7.9: Insurance annual growth rate 2020-2023 (%)

Annual growth	2020	2021	2022	2023
Swiss RE	3.3%	2.7%	0.5%	1.4%
Marsh	23.0%	3.3%	3.1%	10.0%
Average	**13.2%**	**3.0%**	**1.8%**	**5.7%**

Source: CEPA analysis of Marsh and Swiss RE Sigma

We apply these growth rates to AirNav Ireland's insurance expenditure from 2019, to estimate an 'efficient' level of insurance expenditure in line with an industry average. The result of this analysis is presented in Figure 7.17 below.

Figure 7.17: AirNav Ireland's historic insurance expenditure against modelled insurance expenditure using industry wide average growth rate (€ million, 2022 prices)

Source: CEPA analysis

We see no evidence to suggest that AirNav Ireland's insurance expenditure in 2023 was inefficient. As such, we accept AirNav Ireland's actual insurance expenditure ✂ ✂ ✂ ✂ for 2023 as an efficient baseline. While for most of RP3, AirNav Ireland's actual insurance expenditure exceeded IAA's estimates, Figure 7.17 illustrates that this greater-than-expected growth is in line with industry trends in insurance premiums. Moreover, since the significant step-up in expenditure in 2020 AirNav Ireland's expenditure has been falling in real terms, such that it is approximately equal to IAA's estimate for 2023.

7.9.2. Forecasting efficient expenditure over RP4

We use the average annual insurance premium growth rate observed / forecast by Swiss RE and Marsh from 2017-2024 to assess the reasonableness of AirNav Ireland's insurance forecast within its business plan. Taking the average over the full period results in an average annual growth rate of 5%, which, when applied to our 2023 baseline, results in forecast insurance costs of ✂ ✂ ✂ ✂ over RP4. However, excluding 2020 from our average as an outlier reduces the average growth rate to 3.9%, and results in a forecast of ✂ ✂ ✂ ✂ over RP4. As these estimates are broadly similar to AirNav Ireland's forecast of ✂ ✂ ✂ ✂, we adopt that forecast.

Table 7.10: CEPA and AirNav Ireland's forecast of efficient insurance expenditure, 2023-2029 (€ million, 2022 prices)

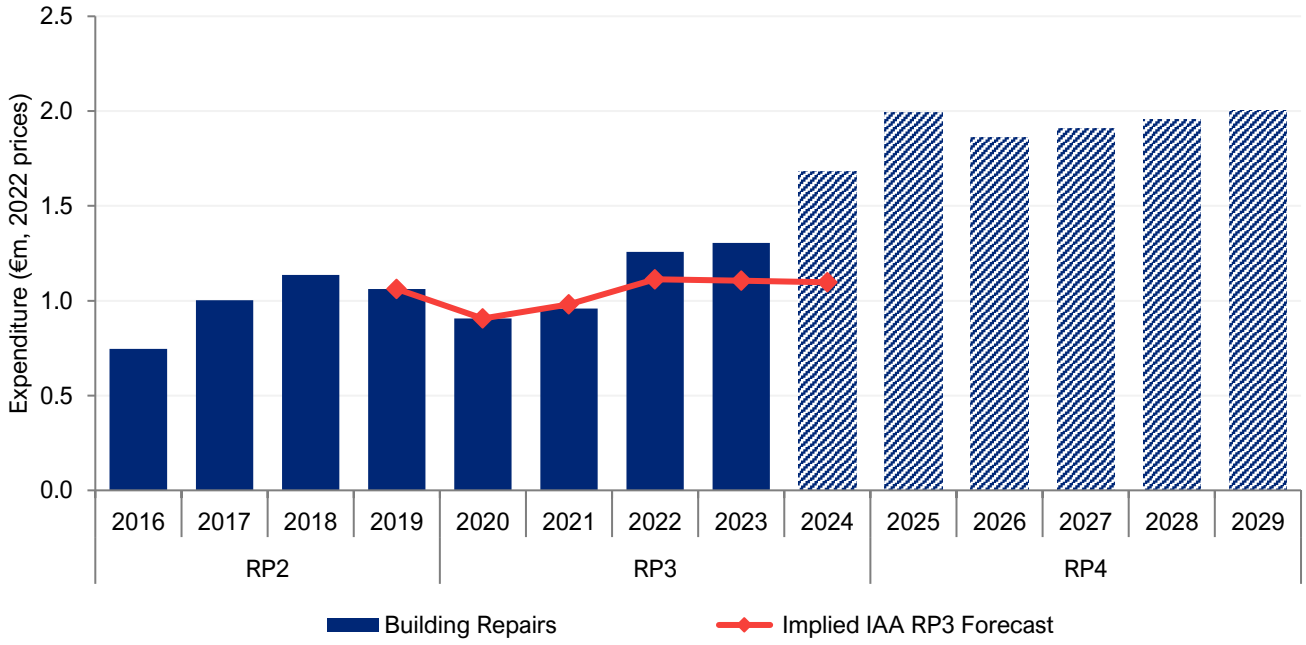
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
CEPA	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.10. BUILDING REPAIRS

In the figure below, we present AirNav Ireland's historic and forecast expenditure on building repairs and compare this against the forecast assumed in the setting of the IAA RP3 Performance Plan. There has been a step-up in spending on building repairs in 2022, with AirNav Ireland forecasting an even greater step-up in 2024. Up until 2022, actual expenditure remained in line with the forecast assumed in the previous efficiency study, though actual expenditure has exceeded the forecast since.

Figure 7.18: Historic expenditure on building repairs and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.10.1. Assessing the efficiency of 2023 expenditure

Any increase in expenditure on building repairs is the result of increased activity, due to a larger footprint or ageing sites, or down to higher prices for labour and materials, or a combination. While AirNav Ireland has suggested ageing buildings as a reason for the proposed increase in expenditure, it has not provided an estimate of the scale of the impact. Nevertheless, we recognise that AirNav Ireland has been unable to deliver the quantum of capital expenditure on property and security that it had planned to deliver over RP3, which may have led to higher spending on building repairs.[41]

[41] AirNav Ireland (2024) Business Plan 2025-2029, Section 3.7.5

We also compare the growth in spending on building repairs against construction price growth in Ireland.[42] While not a perfect benchmark as it includes activity unrelated to building repairs, it provides a useful proxy for real price inflation for labour and materials. We use the Society of Chartered Surveyors Ireland (SCSI) Tender Price Index, which captures commercial tender prices trends within Ireland's construction sector.[43] We find that, if AirNav Ireland's building repairs expenditure grew in line with the SCSI index, 2023 expenditure would be €1.25 million compared with outturn expenditure of €1.30 million.

We consider it plausible that the difference between our 2023 benchmark estimate and outturn spending could be driven by an ageing property base. And, therefore, we use 2023 outturn expenditure as our efficient baseline estimate.

However, we request further information from AirNav Ireland to explain the step-up in spending on building repairs, particularly in the context of further increases in the RP4 forecast and the capital investment plan which includes several property-related projects.

7.10.2. Forecasting efficient expenditure over RP4

AirNav Ireland's rationale for increased building repairs expenditure for RP4 over that realised in RP3 is that its ageing property portfolio will require a greater level of maintenance, as well as a complete review in regard to regulatory compliance and structural integrity.[44]

While we acknowledge that as buildings age there may be an increased volume of associated repairs, AirNav Ireland has not sufficiently evidenced or quantified this impact. It has not justified why a complete review of its building portfolio is necessary nor estimated the likely impact once such a review is complete. Additionally, within its business plan AirNav Ireland has identified several capital projects related to the extension of refurbishment or extension of existing buildings. We expect the benefits associated with this capital expenditure to offset the increase in volume of building repairs elsewhere.

As such, we hold building repairs expenditure across RP4 equal to our 2023 efficient baseline in real terms, and challenge AirNav Ireland to justify this step-change in expenditure in greater detail.

Our resultant forecast is presented alongside AirNav Ireland's forecast in the table below.

Table 7.11: CEPA and AirNav Ireland's forecast of building repairs expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	1.3	1.7	2.0	1.9	1.9	2.0	2.0	**9.7**
CEPA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	**6.5**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.11. Security

In the figure below, we present AirNav Ireland's historic and forecast expenditure on security and compare this against the forecast assumed in the setting of the IAA RP3 Performance Plan. AirNav Ireland's spending on security increased year-on-year to 2021 before falling in 2022 and rising again in 2023. Spending in 2023 was broadly in line with the implied IAA forecast. From 2024 to 2026, AirNav Ireland is expecting spending to increase year-on-year before staying flat for the remainder of RP4.

[42] Whilst we acknowledge there is a difference between construction and repairs, we consider construction prices as an appropriate benchmark given the similarity in materials and resource employed in both activities.

[43] Society of Chartered Surveyors Ireland (2024), Tender Price Index 2024 – Press Release, February. Available at – link.

[44] AirNav Ireland (2024) Draft Business Plan 2025-2029, May.

Figure 7.19: Historic expenditure on security and AirNav Ireland's forecast (€ million, 2022 prices)

Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.11.1. Assessing the efficiency of 2023 expenditure

We expect security operating costs to be driven by:

- the number and size of sites used by AirNav Ireland,
- labour costs for security personnel,
- changing regulatory requirements and evolving security threats, and
- capital investment to augment security.

In terms of the evolution of security expenditure over the period 2019 to 2023, we note that:

- The opening of a new control tower at Dublin Airport as well as the ACC contingency centre will have likely increased the number of sites requiring security.
- Labour costs have stayed relatively flat in real terms between 2019 and 2023.
- AirNav Ireland has referenced in its business plan increased security through the introduction of the National Civil Aviation Security Programme (NCASP).
- Some of the capital initiatives due to be introduced over RP3 were expected to introduce security opex efficiencies.

While there has been a step-increase in security spending over RP3 relative to RP2 levels, outturn 2023 spending was broadly in line with the implied IAA forecast for that year. We assume that the step-increase assumed in the IAA forecast accounted for the increase in AirNav Ireland's property footprint as well as increased regulatory requirements. And so, we conclude that AirNav Ireland's security spending in 2023 appropriately reflected the additional activity. As such, we adopt outturn 2023 spending as our efficient baseline.

7.11.2. Forecasting efficient expenditure over RP4

Projecting forwards to RP4, we note that AirNav Ireland is expecting spending to increase by approximately €0.5 million from 2023 levels. Some of that can be explained by expected wage growth, which is reflected in our forecast.

AirNav Ireland state that the remaining increase is driven by *"enhanced security requirements, additional regulatory training requirements and the introduction of a new independent security network with monitoring centres at Dublin ATC and Ballycasey requiring increased staffing levels"*. While we recognise that there may be additional activity associated with these factors, we do not consider that AirNav Ireland has fully evidenced the proportionality of the increase proposed. We also find relevant projects within AirNav Ireland's capital plan that should introduce opex efficiencies.

As a result, we include a preliminary step increase of 5% to account for the combined effect of the additional requirements and the capex efficiencies. We will consider any further information from AirNav Ireland on how the factors referenced in the business plan and the capital initiatives have been incorporated into the security forecast.

Table 7.12: CEPA and AirNav Ireland's forecast of efficient security expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂
CEPA	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂	✂✂

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.12. Cleaning

In the figure below, we present AirNav Ireland's historic and forecast expenditure on cleaning and compare this against the forecast assumed in the setting of the IAA RP3 Performance Plan. AirNav Ireland's spending on cleaning has experienced a steady increase in each year of RP3, with the company forecasting a continued increase over RP4. In all years but 2022 this RP3 expenditure exceeded the implied IAA forecast.

Figure 7.20: Historic expenditure on cleaning and AirNav Ireland's forecast (€ million, 2022 prices)

Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.12.1. Assessing the efficiency of 2023 expenditure

As with many other cost categories, we expect spending on cleaning to vary due to changes in volumes of activity, changes in the cost of labour and materials, and changes in productivity. In the context of AirNav Ireland's expenditure over RP3, we are aware that there has been an increase in AirNav Ireland's footprint due to the investment in a new tower at Dublin Airport and the new ACC contingency centre.

To assess the efficiency of spending on cleaning in 2023 we look at the evolution in expenditure since 2019. Specifically, we assess whether any growth can be considered efficient given the increased footprint, once changes in labour costs are taken into consideration. Cleaning is generally a labour-intensive activity and as such, we assess cleaning costs to be largely driven by wage growth with a small proportion driven by the cost of cleaning chemicals. Data from the Central Statistics Office shows that comparable labour costs grew by 5% in real terms between 2019 and 2023,[45] while AirNav Ireland's cleaning costs grew by 70% in real terms. While we understand that AirNav Ireland's footprint has grown larger over this period, the evidence provided to us by AirNav Ireland does not yet demonstrate that the increase in cleaning costs can be fully explained by the larger footprint.

Despite the above, AirNav Ireland is currently within a five-year cleaning contract that was competitively tendered and its actual expenditure for 2023 reflects that contract. Notwithstanding our concerns about large real price increases to cleaning costs while the cleaning contract is still live, we also recognise that AirNav Ireland will have limited opportunity to renegotiate this contract until RP4. As such, we do not consider it realistic to apply an efficiency adjustment to 2023 expenditure. Thus, we use AirNav Ireland's 2023 expenditure of ✂ ✂ ✂ ✂ as our baseline.

7.12.2. Forecasting efficient expenditure over RP4

While we do not apply an efficiency adjustment to the base year, we conclude that the level of expenditure incurred in 2023 may have been inefficient. As such, we propose assuming cleaning costs stay constant at 2023 levels for the duration of RP4. By making this assumption, we are expecting that a retendering and renegotiation of the cleaning contract combined with improved supplier management, will deliver efficiencies that will offset any increases from a larger footprint and higher labour costs. This results in expenditure remaining at approximately ✂ ✂ ✂ ✂ throughout RP4, as shown in the table below.

While this presents a lower forecast for cleaning expenditure than that proposed by AirNav Ireland in its business plan, we challenge AirNav Ireland to provide evidence that:

- The contractual increases observed over RP3 proportionately reflect increases in activity and inflationary pressures.
- The cost increases assumed over RP4 similarly reflect expected increases in activity and expected real increases in labour costs.

Table 7.13: CEPA and AirNav Ireland's forecast of efficient cleaning expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
CEPA	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.13. Flight checking, subscriptions and environmental

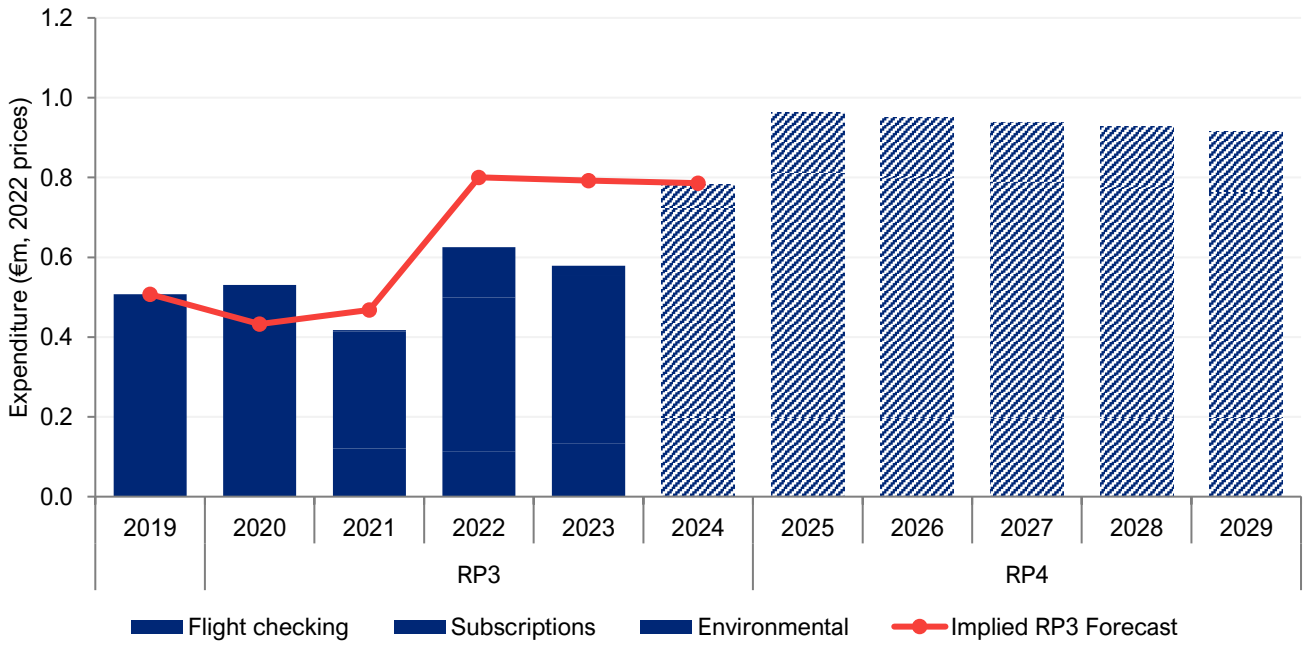
In this section we consider the cost lines for flight checking, subscriptions, and environmental spending:

- **Flight checking** refers to the inspection of navigational aids.
- **Subscriptions** refer to AirNav Ireland's participation in cross-ANSP partnership initiatives such as COOPANS.
- **Environmental** refers to spending on sustainability initiatives.

[45] We analysed real wage growth in the 'Administrative and support service activities' NACE economic sector as it was the most granular level of aggregation available. 'Cleaning activities' is a subcategory within that sector.

Below, we present AirNav Ireland's outturn and forecast expenditure across these cost categories and compare them against the forecast assumed in the setting of the IAA RP3 Performance Plan. We observe that while spending has fluctuated year-on-year, it has typically averaged €0.5 million, which has been either in line or below the implied IAA forecast. AirNav Ireland is expecting spending to increase to €0.8 million in 2024, in line with the implied IAA forecast, before increasing further over RP4 to an average of €0.95 million per annum.

Figure 7.21: Historic expenditure on flight checking, subscriptions, and environment and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.13.1. Assessing the efficiency of 2023 expenditure

As expenditure in 2023 of €0.6 million is only slightly higher than the historical average of €0.5 million, and below the implied IAA forecast, we do not see a strong argument for applying an efficiency adjustment to expenditure across any of these categories. As a result, we use outturn 2023 expenditure as the efficient baseline.

7.13.2. Forecasting efficient expenditure over RP4

To forecast efficient expenditure from 2023 levels, we take a different approach for the three cost lines:

- For **flight checking**, we link future spending to IFR movements, but with a one-year lag. While we would not necessarily expect there to be a direct link between air traffic movements and spending on flight checking, we observe that there has been a link.
- For **subscriptions**, we adopt the forecast provided by AirNav Ireland within its business plan. We consider these costs largely outside AirNav Ireland's control and necessary for AirNav to maintain its place in COOPANS. We also observe that the subscription costs over RP4 are staying relatively constant, and do not represent a large increase over 2019 levels.
- Finally, for **environmental** spending, we link our forecast to the step increase for sustainability initiatives allowed for in our efficiency study for Dublin Airport. In our efficiency study for Dublin Airport, we assessed a step-increase of 0.5% of opex for sustainability initiatives and environmental management. As a result, we apply a proportionate increase in spending by AirNav Ireland.

The resultant forecast is presented in the table below, where the CEPA forecast is marginally higher (at €4.9 million over RP4) than the AirNav Ireland forecast (at €4.8 million).

Table 7.14: CEPA and AirNav Ireland's forecast of efficient flight checking, subscriptions, and environmental expenditure, 2023-2029 (€ million, 2022 prices)

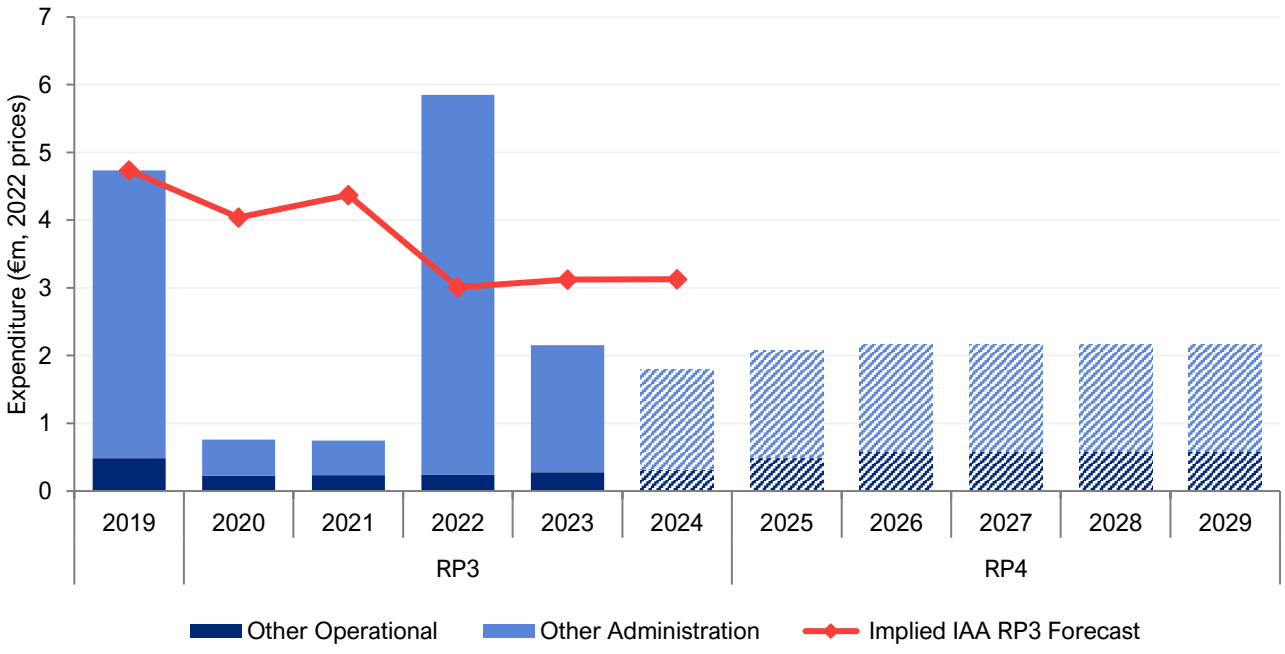
	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland								
Flight checking	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
Subscriptions	0.4	0.5	0.6	0.6	0.6	0.6	0.6	**3.0**
Environmental	0.0	0.1	0.2	0.2	0.2	0.2	0.2	**0.8**
CEPA								
Flight checking	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂	✂ ✂
Subscriptions	0.4	0.5	0.6	0.6	0.6	0.6	0.6	**3.0**
Environmental	0.0	0.2	0.2	0.2	0.2	0.2	0.2	**1.1**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.14. 'OTHER' NON-STAFF COSTS

In the figure below, we present AirNav Ireland's historic and forecast expenditure on other administrative and operational areas. While historically, this has sometimes been a large area of expenditure for AirNav Ireland, spending reduced substantially in 2020 and 2021, and again in 2023, to a level below the forecast assumed in the setting of the IAA RP3 Performance Plan. The large increase in expenditure in 2022 relates to a one-off impairment loss of €4.7 million that was recognised in that year. AirNav Ireland is forecasting spending to remain broadly in line with 2023 levels for the duration of RP4.

Table 7.15: Historic other operational and administration expenditure and AirNav Ireland's forecast (€ million, 2022 prices)



Source: CEPA analysis of AirNav Ireland data and IAA RP3 publications

7.14.1. Assessing the efficiency of 2023 expenditure

We note that expenditure for these two cost categories was substantially higher in 2023 that it was in 2020 and that very little detail has been provided in the AirNav Ireland business plan as to what is captured within these two cost categories. However, we also note that spending for these two cost categories has reduced substantially in 2023 relative to 2019 levels and remains below the implied IAA RP3 forecast. Given this and given the results of our top-down benchmarking analysis, we choose not to include any efficiency challenge and instead, adopt outturn 2023 spending as our efficient baseline.

7.14.2. Forecasting efficient expenditure over RP4

Over RP4, AirNav Ireland are forecasting average annual expenditure to remain slightly below what it was in 2023. It is not yet clear what is driving this reduction, but for the basis of setting our efficient forecast, we match our forecast to AirNav Ireland's. However, without further detail on what is captured within the other administration category, we are unable to say with confidence that this represents efficient expenditure.

When reviewing representations made by AirNav Ireland or other parties in response to the Draft Decision on the Performance Plan, we will reconsider our forecast for these categories. We will review any further details provided by AirNav Ireland on what is captured by these cost categories, with a view to bringing our estimates closer to AirNav Ireland's 2020 and 2021 outturn spend should we assess the proposed spending as not efficient.

Table 7.16: CEPA and AirNav Ireland's forecast of efficient other operational and administration expenditure, 2023-2029 (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
AirNav Ireland								
Other operational	0.2	0.3	0.5	0.6	0.6	0.6	0.6	**2.8**
Other administration	1.7	1.4	1.6	1.6	1.6	1.6	1.6	**7.9**
CEPA								
Other operational	0.2	0.3	0.5	0.6	0.6	0.6	0.6	**2.8**
Other administration	2.1	1.4	1.6	1.6	1.6	1.6	1.6	**7.9**

Source: CEPA analysis, AirNav Ireland RP4 business plan

7.15. Overall non-staff forecast

In the table below, we present our overall non-staff and compare it against AirNav Ireland's forecast.

Table 7.17: Summary of non-staff forecast (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 total
Travel	1.4	1.4	1.4	1.4	1.4	1.4	1.4	**7.0**
Training	✂	✂	✂	✂	✂	✂	✂	✂
Utilities	0.8	0.8	0.8	0.8	0.8	0.8	0.8	**4.2**
Telecoms	✂	✂	✂	✂	✂	✂	✂	✂
Maintenance	4.9	5.5	5.7	5.9	5.6	6.3	6.5	**30.0**
Spares	1.0	1.2	1.4	1.9	2.8	1.4	1.3	**8.7**
Power	1.7	1.7	1.7	1.7	1.7	1.7	1.7	**8.6**
Flight checking	✂	✂	✂	✂	✂	✂	✂	✂

	2023	2024	2025	2026	2027	2028	2029	RP4 total
Other Operational	0.2	0.3	0.5	0.6	0.6	0.6	0.6	**2.8**
Subscriptions	0.4	0.5	0.6	0.6	0.6	0.6	0.6	**3.0**
Rent and rates	2.9	3.0	3.1	3.1	3.1	3.1	3.1	**15.7**
Computing	2.1	2.6	2.6	2.7	2.7	2.8	2.8	**13.6**
Consultancy	0.9	0.9	1.0	1.0	1.0	1.0	1.0	**4.9**
Insurance	✂	✂	✂	✂	✂	✂	✂	✂
Building repairs	1.3	1.3	1.3	1.3	1.3	1.3	1.3	**6.5**
Environmental	0.0	0.2	0.2	0.2	0.2	0.2	0.2	**1.1**
Security	✂	✂	✂	✂	✂	✂	✂	✂
Professional services	0.6	0.6	0.6	0.6	0.6	0.6	0.6	**3.1**
Cleaning	✂	✂	✂	✂	✂	✂	✂	✂
PR	0.7	0.7	0.7	0.7	0.8	0.8	0.8	**3.8**
Staff related	0.8	0.9	0.9	1.0	1.0	1.0	1.0	**4.9**
Other Administration	1.7	1.4	1.6	1.6	1.6	1.6	1.6	**7.9**
Redacted categories	13.8	15.8	16.4	19.3	16.4	18.2	19.8	90.2
Total CEPA non-staff forecast	**35.5**	**39.0**	**40.7**	**44.5**	**42.2**	**43.5**	**45.3**	**216.1**
AirNav Ireland forecast	**34.7**	**41.6**	**46.2**	**49.4**	**48.0**	**48.1**	**50.8**	**242.5**

Source: CEPA analysis, AirNav Ireland RP4 business plan

8. CONCLUSIONS AND FORECAST SUMMARY

In Table 8.1 below, we present our projections of staff and non-staff costs and compare them against AirNav Ireland's forecast. Over the RP4 period, our forecast is approximately 6% lower than AirNav Ireland's business plan forecast. More of this is driven by non-staff costs where our forecast is around 11% lower than AirNav Ireland's business plan, while our payroll forecasts are approximately 4% lower.

Nevertheless, our forecast remains a significant step up on AirNav Ireland's outturn expenditure in 2023, which was €120 million, and includes a significant increase over the RP4 period. From 2025 to 2029, we are expecting opex to increase by approximately 10%, while traffic is expected to only grow by 8% over the same period. This equates to an elasticity of opex with respect to traffic volumes of greater than 1, meaning that every 1% increase in traffic volumes is leading to an increase in opex of greater than 1%. Taking a longer time horizon from 2019 to 2029, the elasticity remains slightly above 1.

While an elasticity greater than 1 could imply that our forecast is too generous, we consider it appropriate in the context of our assessment of ATCO under resourcing in 2023 and the capital initiatives being implemented over RP4, which require a temporary increase in expenditure.

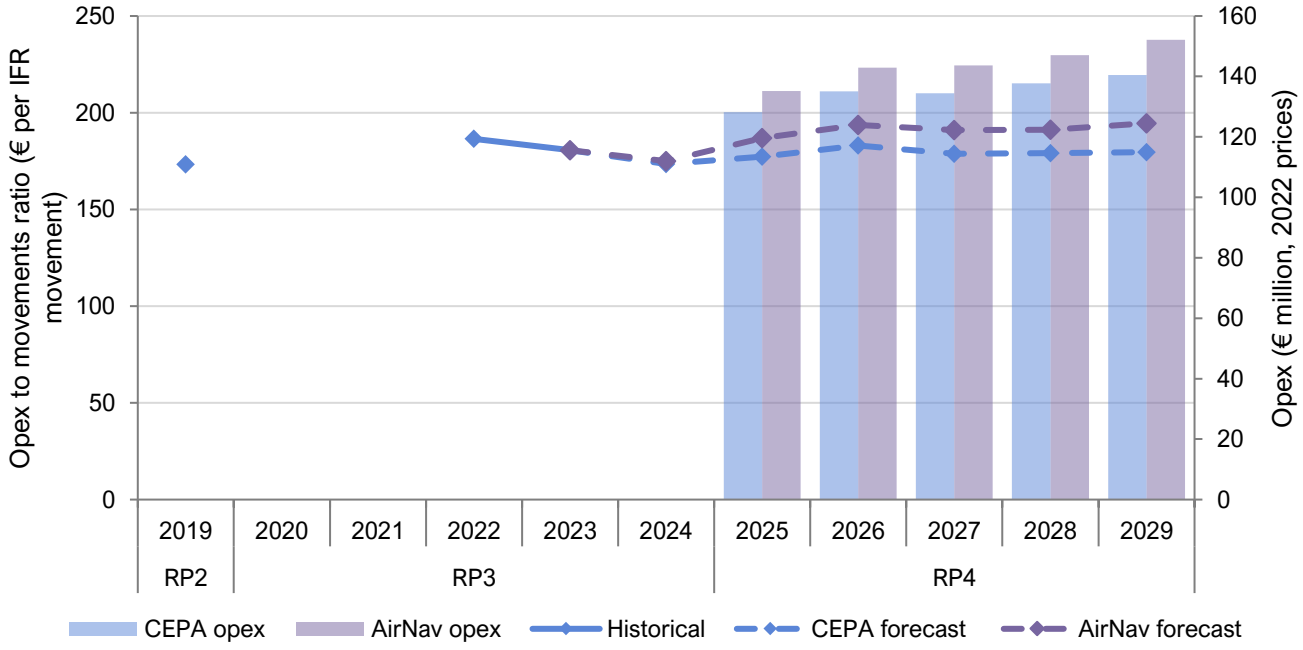
Table 8.1: Overall CEPA and AirNav Ireland opex forecasts (€ million, 2022 prices)

	2023	2024	2025	2026	2027	2028	2029	RP4 Total
CEPA total opex forecast	**115.1**	**121.6**	**128.1**	**135.1**	**134.4**	**137.7**	**140.5**	**675.8**
Staff costs	79.6	82.7	87.5	90.6	92.2	94.2	95.2	**459.7**
Non-staff costs	35.5	39.0	40.7	44.5	42.2	43.5	45.3	**216.1**
AirNav Ireland total opex forecast	**-**	**122.7**	**135.2**	**142.9**	**143.6**	**147.1**	**152.1**	**720.9**
Staff costs	-	81.2	88.9	93.5	95.6	99.0	101.3	**478.3**
Non-staff costs	-	41.6	46.2	49.4	48.0	48.1	50.8	**242.5**

Source: CEPA analysis, AirNav Ireland RP4 business plan

We undertake a second top-down sense check, by comparing the ratio of overall opex to IFR movements, illustrated in the figure below. Our forecast implies the ratio of opex to movements will average €180 over RP4, which is higher in real terms than the 2019 ratio of €173 per movement but lower than the 2022 ratio of €186 per IFR movement. We consider this to be reasonable on the basis that it implies that AirNav Ireland's overall productivity stays relatively constant over the RP4 period and remains in line with its historic productivity, while driving continued improvements in performance.

Figure 8.1: Forecast efficient opex (RHS: € million, 2022 prices) and opex to movement ratio, 2019-2029



Source: CEPA forecasts using AirNav Ireland and STATFOR data

APPENDIX A TOP-DOWN ANALYSIS OF AIRNAV IRELAND'S OPEX

In this appendix, we assess historical trends in AirNav Ireland's overall opex and compare historical opex and performance against a set of comparable ANSPs. For this, we use data from Eurocontrol's annual ATM Cost Effectiveness (ACE) reports and Aviation Intelligence Unit Portal, as well as data provided to us by AirNav Ireland.

A.1. IDENTIFYING COMPARATORS

We compare AirNav Ireland's historical expenditure and performance against the comparator groups recommended by the EU Performance Review Body of the Single European Sky (PRB) ahead of both RP3 and RP4. These comparator groups are summarised in the table below.

Appendix Table A.1: Sample of comparator ANSPs used in benchmarking

RP3 comparator group	RP4 comparator group
Avinor – Norway	**DCAC** – Cyprus
Luftfartsverket (LFV) – Sweden	**MATS** – Malta
Air Navigation Services (ANS) – Finland	**Navegação Aérea (NAV Portugal)** – Portugal
NAVIAIR (Denmark) – Denmark	

Source: PRB

In previous efficiency analysis of AirNav Ireland on behalf of IAA, Steer benchmarked AirNav Ireland's expenditure and performance against the RP3 comparator sample, plus NAV Portugal. Steer's rationale for selecting these comparators was threefold:

- The comparators are positioned on the periphery of European airspace in a similar manner to AirNav Ireland.
- The same sample was used to benchmark AirNav Ireland's performance in RP1, RP2 and RP3.
- The sample of ANSPs have broadly similar traffic levels relative to airspace size.[46]

When defining comparator groups for assessing cost efficiency ahead of RP4, the PRB conducted a multi-dimensional analysis to cluster ANSPs by operational and economic variables,[47] shown in the table below.

Appendix Table A.2: Operational and economic variables included in the PRB's analysis

Operational variables	Economic indicators
Traffic variability	Price level index
Traffic complexity	Inflation index
Traffic volume	
Size of controlled airspace	
Difference in traffic between 2019 and 2024	

Source: PRB

This initial cluster put AirNav Ireland in the following cluster:

Cluster 2: The ANSPs of Cyprus, Denmark, Finland, Ireland, Malta, Norway, Portugal, and Sweden

[46] Steer (2021), IAA ANSP 2020-2024 Operating Costs, July, p.4. Available online – link.

[47] PRB (2024), Performance Review Body Advice on the Union-wide targets for RP4 Annex IV – Definition of comparator groups for cost-efficiency, March. Available online – link.

These ANSPs have broadly similar traffic volumes, traffic complexity and traffic variability, but operate in very different macroeconomic environments. Because of this, the PRB recommended splitting this cluster into two, with AirNav Ireland placed in a comparator group with the ANSPs for Cyprus, Malta, and Portugal as a result.

AirNav Ireland has expressed concern with its comparator grouping for RP4, stating that its benchmark performance relative to the ANSPs in that grouping is influenced by factors that are largely out of its control, such as local labour market conditions and the wider economic landscape.[48]

We observe that, in terms of economic indicators, AirNav Ireland is arguably between both clusters. Ireland has experienced relatively low inflation over the past decade but has a relatively higher price level. As AirNav Ireland is similar to the full cluster in terms of the operational variables, we benchmark AirNav Ireland's performance against both the RP3 and RP4 comparator groups. We consider this appropriate given our benchmarking is conducted across multiple reference periods.

To account for the economic differences between the comparators, we adjust costs using 'Purchasing Power Parity' (PPP) units which account for local standards of living by removing differences in price levels between countries. Removing the differences in price levels between countries this PPP adjustment allows for a like-for-like comparison of costs that should address AirNav Ireland's concerns.

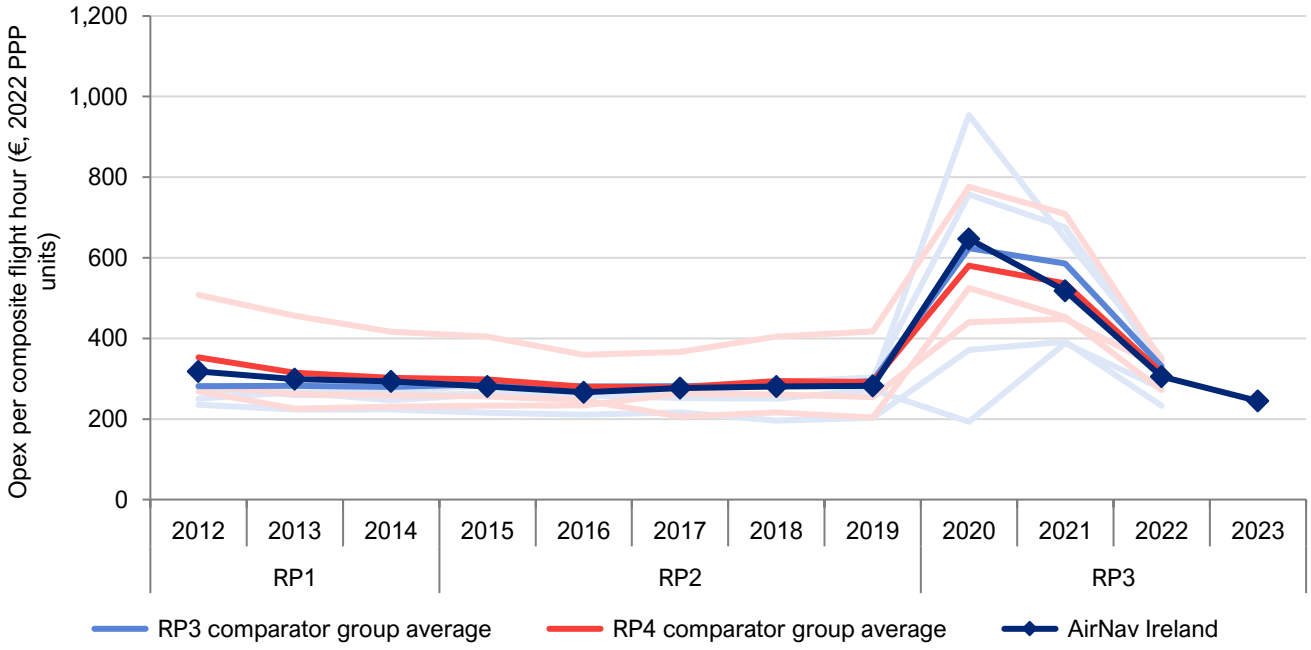
A.2. Operating costs

In Appendix Figure A.1, we compare opex normalised by air traffic and presented in PPP adjusted expenditure, for AirNav Ireland and the RP3 and RP4 comparator groups. We show the average of the RP3 and RP4 comparator groups in the dark coloured lines, while showing individual ANSPs within those comparator groups in the light-coloured lines.

The figure shows that the trend in opex relative to air traffic remained relatively constant throughout RP1 and RP2, with a large increase between 2019 and 2020 during the COVID-19 pandemic and the resultant reduction in flight hours. When adjusted for price differences, AirNav Ireland's opex per composite flight hour has remained below both the RP3 and RP4 comparator group averages, in every year since 2015 except for 2020. Following the spike in 2020, unit opex has reduced such that by 2023, AirNav Ireland's opex per composite flight hour was lower than at any point in the sample period.

[48] AirNav Ireland (2024), Business Plan 2025-2029, May, p.52.

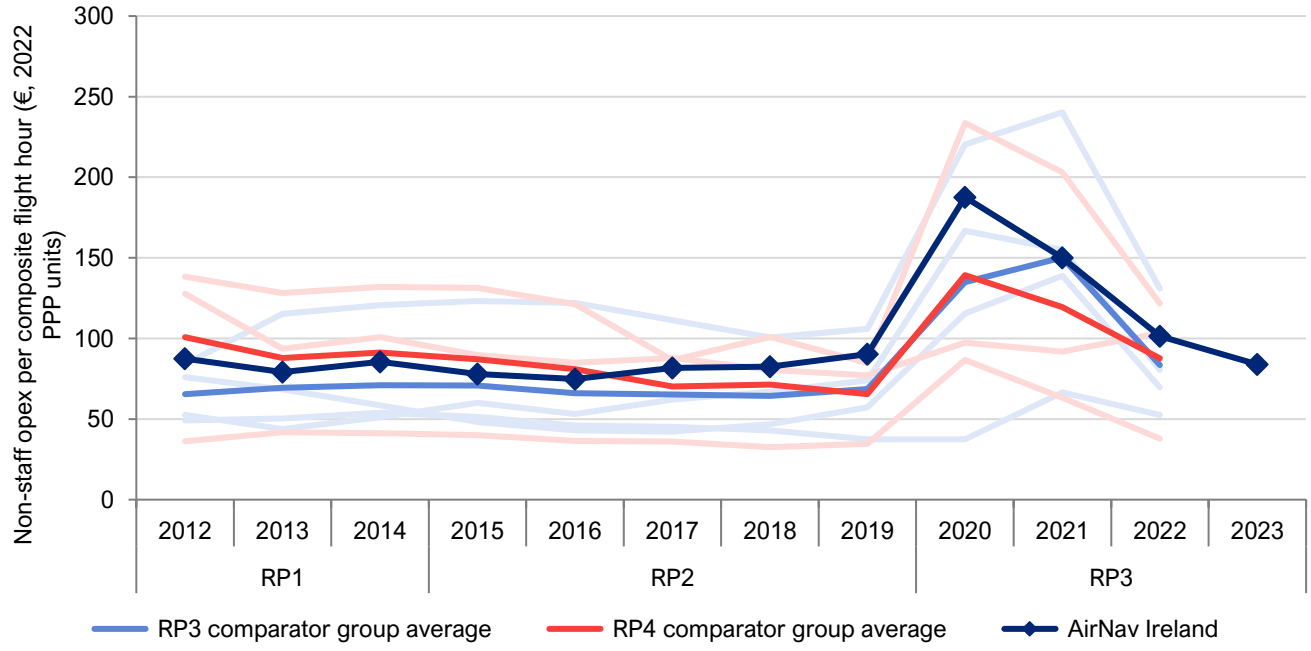
Appendix Figure A.1: Operating costs per composite flight hour by ANSP, 2012-2023 (€, 2022 PPP units)



Source: CEPA analysis of Eurocontrol and ANSP data

When compared to the rest of the comparator sample, AirNav Ireland has historically had higher non-staff opex relative to air traffic and lower staff-related opex, as shown in the two figures below. Appendix Figure A.2 shows that since 2017 AirNav Ireland's non-staff opex per composite flight hour was higher than both the RP3 and RP4 comparator sample averages. Following the spike in unit non-staff costs in 2020, AirNav Ireland's non-staff opex per composite flight hour has been falling, with its 2022 value approximately 20% and 15% higher than the RP3 and RP4 group averages respectively. This is a decrease from the 37% and 30% difference from the RP3 and RP4 group average observed pre-pandemic in 2019. In 2023, unit costs fell further such that they were below the level observed in 2019.

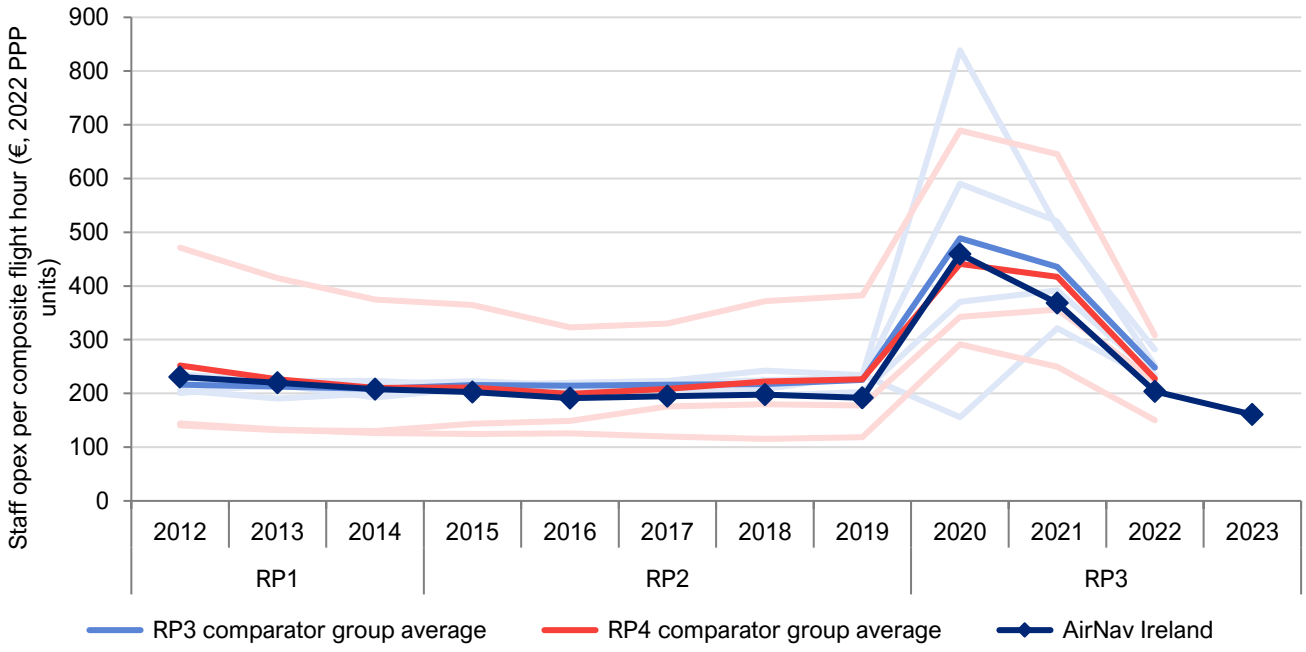
Appendix Figure A.2: Non-staff operating costs per composite flight hour by ANSP, 2012-2023 (€, 2022 PPP units)



Source: CEPA analysis of Eurocontrol and ANSP data

Appendix Figure A.3 illustrates that in every year since 2015 (except for 2021), AirNav Ireland's staff cost per composite flight hour has been below both the RP3 and RP4 comparator group averages. In 2023, staff unit costs fell further such that they were lower than at any time in the sample period.

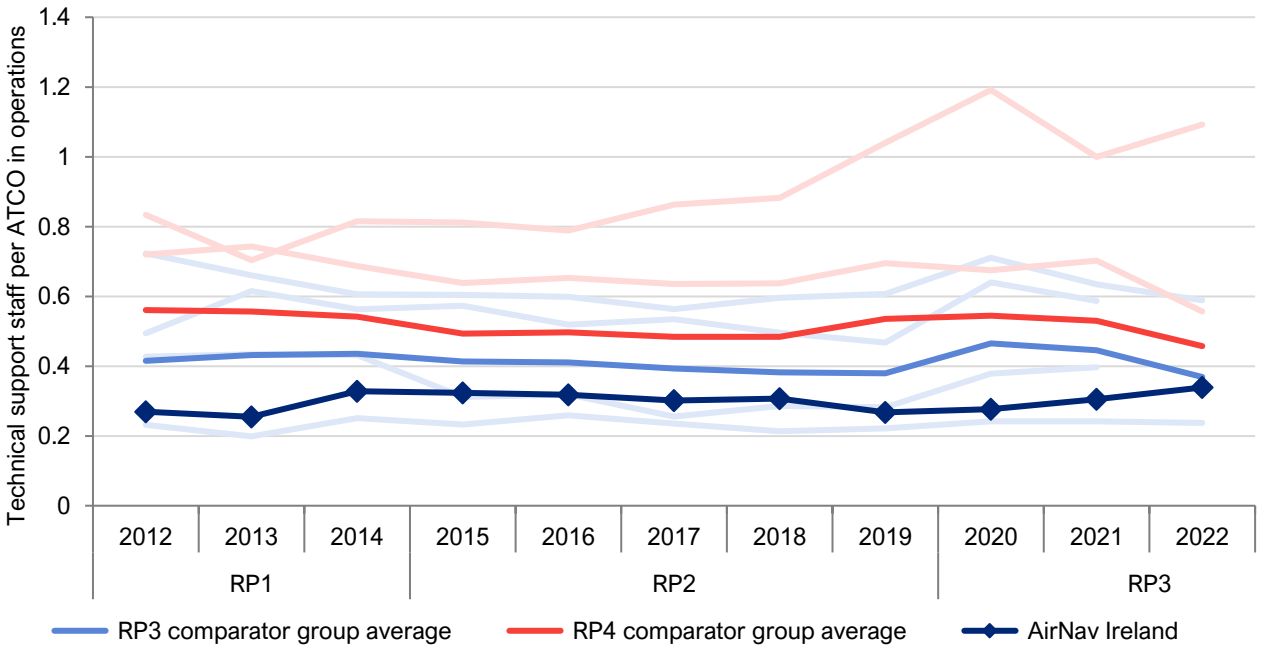
Appendix Figure A.3: Staff costs per composite flight hour by ANSP, 2012-2023 (€, 2022 PPP units)



Source: CEPA analysis of Eurocontrol and ANSP data

One possible explanation for the difference in relative levels of staff and non-staff expenditure is that AirNav Ireland may be outsourcing relatively more activities than other ANSPs. The data presented in Appendix Figure A.4 supports this explanation, as it shows that AirNav Ireland has had a lower ratio of technical support staff per ATCO in operations than the average in both the RP3 and RP4 comparator groups.

Appendix Figure A.4: Technical staff per ATCO in operations by ANSP, 2012-2023



Source: CEPA analysis of Eurocontrol and ANSP data

Overall, this analysis shows that opex has historically been broadly in line with or below peer ANSPs, once traffic levels and cost differences are taken into consideration. It also shows that we need to be mindful of differences in the split in outsourcing patterns between ANSPs when benchmarking at a bottom-up level. Finally, we observe the reduction in unit costs in 2023 to levels below those observed at any time since at least 2012. There are a number of possible explanations for this, which we explore further through the bottom-up analysis:

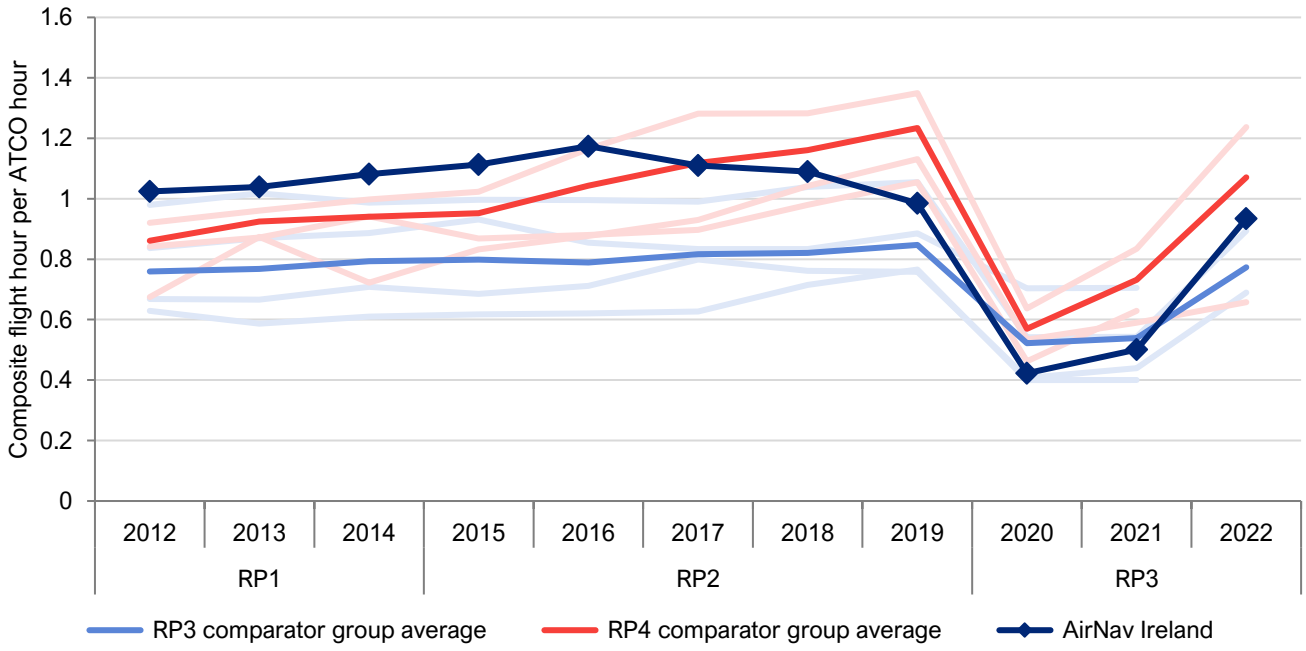
- There has been an efficiency improvement in AirNav Ireland's opex, either through capex initiatives, operational improvements, or economies of scale.
- AirNav Ireland had been temporarily protected from high levels of inflation observed elsewhere in the economy, which will be unwound in future years.
- AirNav Ireland was under-resourced in 2023 given outturn traffic levels, in a manner that is unsustainable in the long-term.
- A combination of some or all of the above.

A.3. PRODUCTIVITY AND DELAY PERFORMANCE

An important determinant of staff opex is the productivity of the staff employed and particularly, the ATCOs. Here, we consider the productivity of ATCOs across the comparator sample. One such measure is ATCO-hour productivity, which captures the number the number of composite flight hours per hour worked by an ATCO undertaking operational activity, as illustrated in Appendix Figure A.5.

The figure shows that AirNav Ireland's productivity was rising throughout RP1 and RP2, and above both the RP3 and RP4 comparator group averages. AirNav Ireland's ATCO-hour productivity then fell year-on-year from 2016 until a significant decrease in 2020 following the COVID-19 pandemic. During that time AirNav Ireland's ATCO-hour productivity fell below the RP4 comparator group average, and then the RP3 group average in 2020. Following this, by 2022 AirNav Ireland's ATCO-hour productivity had risen back above the RP3 group average.

Appendix Figure A.5: ATCO-hour productivity by ANSP, 2012-2022



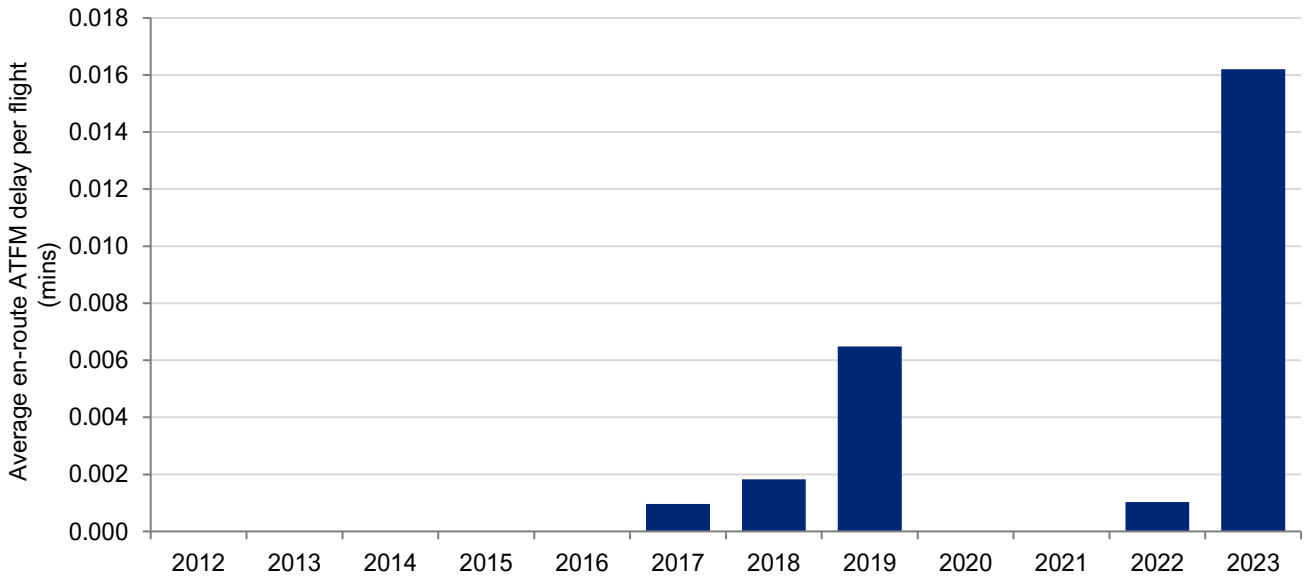
Source: CEPA analysis of Eurocontrol and ANSP data

Another reflection of efficiency and performance is the number and length of delays experienced by an ANSP.

One measure of delays is the 'average minutes of en-route ATFM delay per flight attributable to air navigation services', which is used as a KPI in the Performance Plan for capacity.[49] En-route ATFM delays are pre-departure delays, which occur when the traffic demand exceeds airspace capacity in a block of airspace. The capacity KPI measures the lack of capacity rather than the actual capacity provided by ANSPs. Therefore, it is an indicator of underperformance, with higher values reflecting poorer performance.

Appendix Figure A.6 shows AirNav Ireland's average en-route ATFM delay minutes per flight from 2012 to 2023. AirNav Ireland had zero delay minutes on average between 2012 and 2016, rising year-on-year from 2017 to 2019. The average delay minutes per flight reduced back to zero in 2020 and 2021, which was then followed by an increase in 2022 and a significant increase in 2023.

Appendix Figure A.6: AirNav Ireland average en-route ATFM delay per flight, 2012-2023 (minutes)

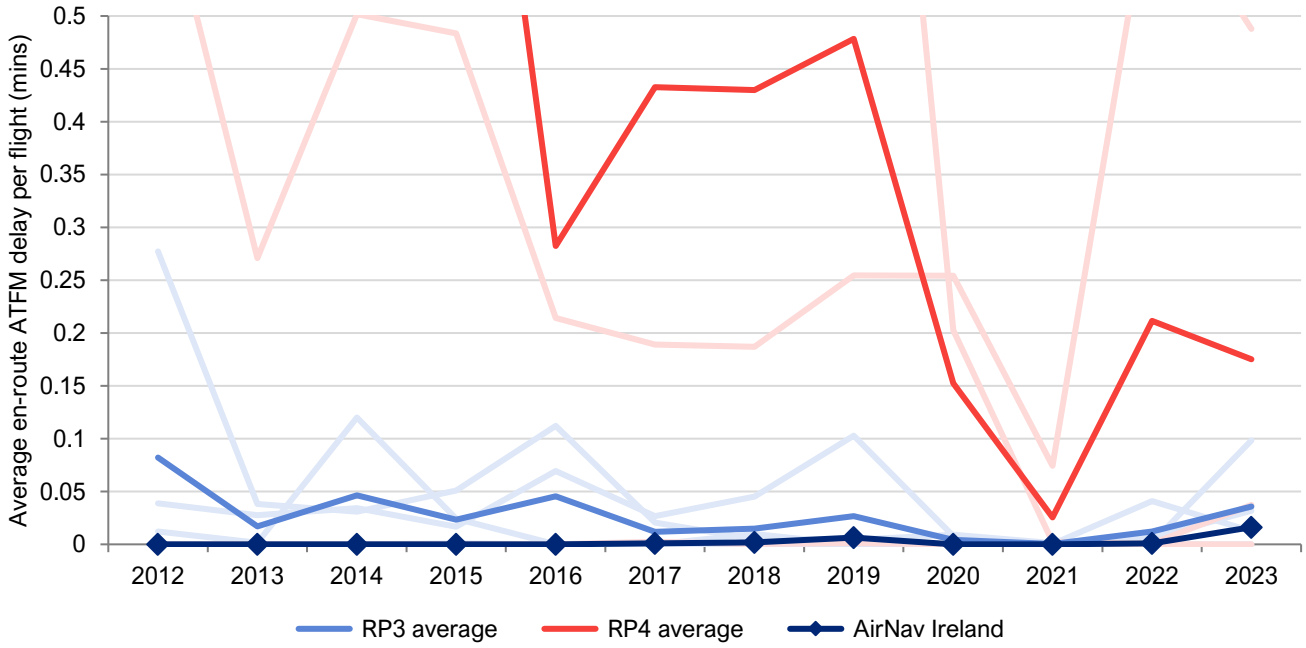


Source: CEPA analysis of Eurocontrol and ANSP data

These delay figures must be placed in the context of delay performance of other ANSPs. Appendix Figure A.7 shows that while AirNav Ireland has experienced higher delays in 2023 relative to its historic performance, other ANSPs experienced much greater volatility in delay performance and generally much higher delays across the time period observed. The data in Appendix Figure A.6 suggests that AirNav Ireland may have been under-resourced in 2023 leading to higher delays. However, the data presented in Appendix Figure A.7 suggests that the increase in delays in 2023 may not have necessarily been a company-specific issue for AirNav Ireland.

[49] Performance Review Body of the Single European Sky (2023), Performance Review Body Advice on the Union-wide target ranges for RP4, September. Available online at – link.

Appendix Figure A.7: Average en-route ATFM delay per flight by ANSP, 2012-2023 (minutes)



Source: CEPA analysis of Eurocontrol and ANSP data

APPENDIX B ASSESSMENT OF ATCO EFFICIENCY

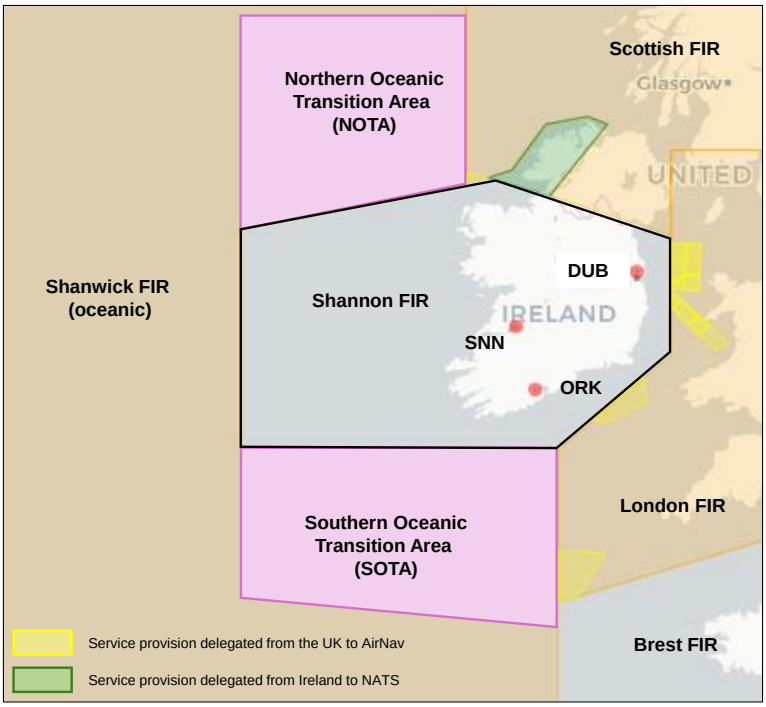
In this appendix, we present our detailed assessment of ATCO efficiency at AirNav Ireland. We look separately at the Shannon and Dublin area control centres (ACC)[50] and at the tower operations and Shannon and Cork airports. Dublin Airport's tower operation is co-located with the Dublin ACC.

B.1. INTRODUCTION

AirNav Ireland provides air traffic services within the Shannon flight information region (FIR), the Shanwick FIR, the Northern Oceanic Transition Area (NOTA) and the Southern Oceanic Transition Area (SOTA), as well as at Dublin Airport (DUB), Shannon Airport (SNN) and Cork Airport (ORK). AirNav Ireland also provides air traffic services in some operationally critical airspace blocks under delegation from the UK, while Ireland delegates the provision of air traffic services in the Donegal area to the UK (NATS). Irish airspace border both the Scottish and London FIRs of UK airspace and the Brest FIR in French airspace.

The figure below shows the airspace structure around Ireland.

Appendix Figure B.1: Airspace structure around Ireland



Source: AirNav Ireland

The Shannon FIR refers to the airspace over the Irish landmass and within territorial waters, and a portion of oceanic airspace off the west coast of Ireland. The Shannon FIR borders with London, Scottish and Shanwick FIRs. Within the Shannon FIR, air traffic services are provided from the Dublin ACC in the Dublin control area and from the Shannon ACC in the remainder of the FIR. The Shannon ACC also provides ATS in the Northern and Southern Oceanic Transition Areas (NOTA and SOTA). Provision of services in the Shanwick Oceanic FIR is shared between Ireland (AirNav Ireland provides communications services) and the UK (NATS provides air traffic control services).

AirNav Ireland also provides ATS at Dublin, Cork and Shannon airports. At Dublin, approach services are provided from the Dublin ACC and aerodrome services are provided from Dublin tower, though both Dublin ACC and Dublin

[50] An ACC is a facility – buildings, technology, people – that provides en-route air traffic control in airspace other than that immediately around or at airports. ACCs sometimes provide air traffic control to airborne aircraft arriving at or departing from airports, as is the case for Dublin Airport.

tower are co-located in one facility. Approach and aerodrome services are provided at Cork and Shannon airport from their respective towers.

B.1.1. Data

Our analysis of ATCO staffing efficiency is based on operational data provided by AirNav Ireland. Data was provided on:

- The staffing arrangements in each of the units.
- Traffic volumes controlled at hourly intervals.
- Operational data, such as the number of sectors open.
- Anonymised rosters for operational staff.

The data cover two sample weeks, one from February 2023 representative of a typical winter season week, and one from July 2023, representative of a typical summer season week. The sample weeks are:

- 1 to 7 February 2023 and 1 to 7 July 2023 for Shannon.
- 22 to 28 February 2023 and 15 to 21 July 2023 for Dublin ACC and tower.

The two sets of data are relatively small samples. While the data cannot be used to produce highly statistically significant results, they are sufficient to provide good efficiency indicators.

B.2. SHANNON ACC

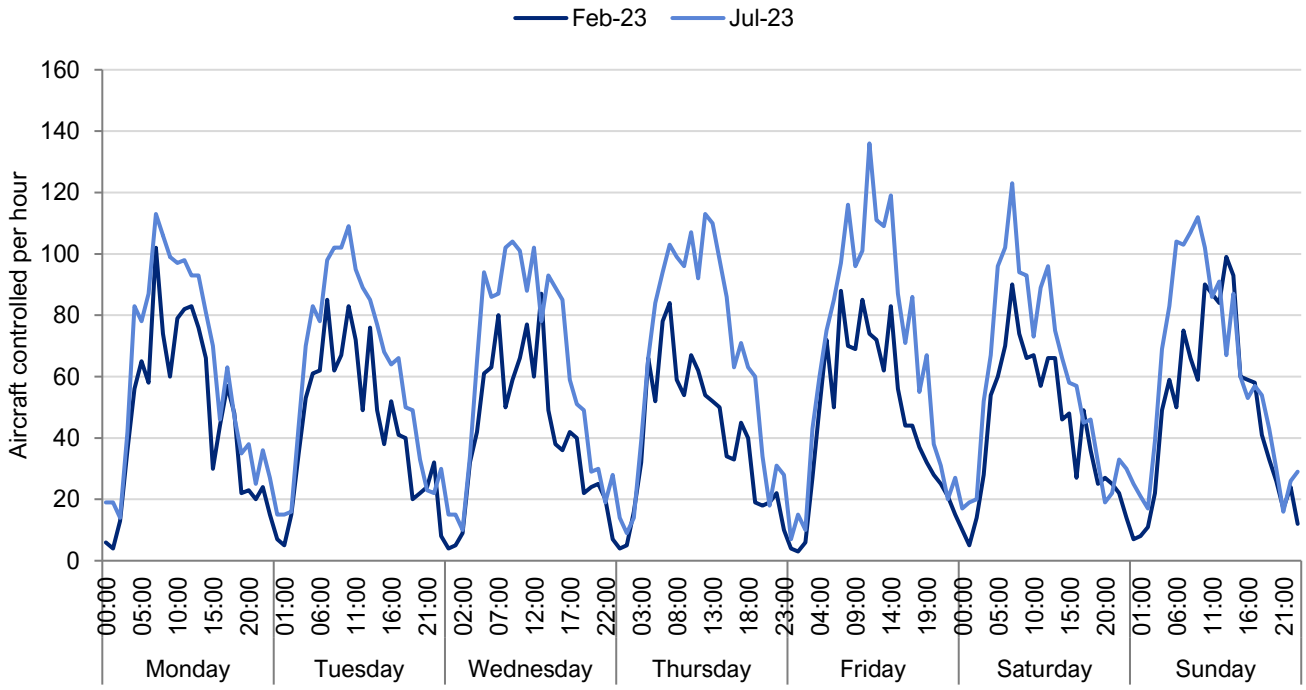
Except in the airport CTAs, air traffic in the Shannon FIR is controlled from the Shannon ACC. This airspace is split vertically at flight level (FL) 245 (24,500 feet), above which is termed the Shannon upper flight information region (UIR) and below which is termed the Shannon FIR.

Traffic controlled by the Shannon ACC is mainly overflights, crossing the North Atlantic in both directions. Generally, in the early morning this traffic flows predominantly eastwards from the Americas to Europe. Westbound flows generally occur in the afternoon. The latitude of trans-Atlantic flights is driven by wind conditions, principally, the westerly jet stream. Westbound flights try to avoid flying into the jet stream and eastbound flights try to take advantage of the tailwind by flying in the jet stream. As the position of the jet stream varies, route structures are also variable. To provide the flexibility to account for this, free route airspace (FRA) has been implemented in the Shannon UIR/FIR, such that a flight can traverse from any entry point to any exit point.

In the figure below, we show traffic through the Shannon FIR on an hourly basis for two sample weeks – one in February 2023 and one in July 2023 representing winter and summer traffic profiles respectively. For comparability, we organise this by day-of-the-week rather than chronologically.

The figure shows that traffic increased between February and July 2023, as would be expected from winter to summer, most likely compounded by continuing recovery from the COVID-19 pandemic. The figure also shows the very peaky nature of traffic demand across the main part of the day as well as low traffic volumes during the night period between approximately 22:00 and 03:00.

Appendix Figure B.2: Hourly traffic managed in the Shannon FIR for sample weeks in February and July 2023

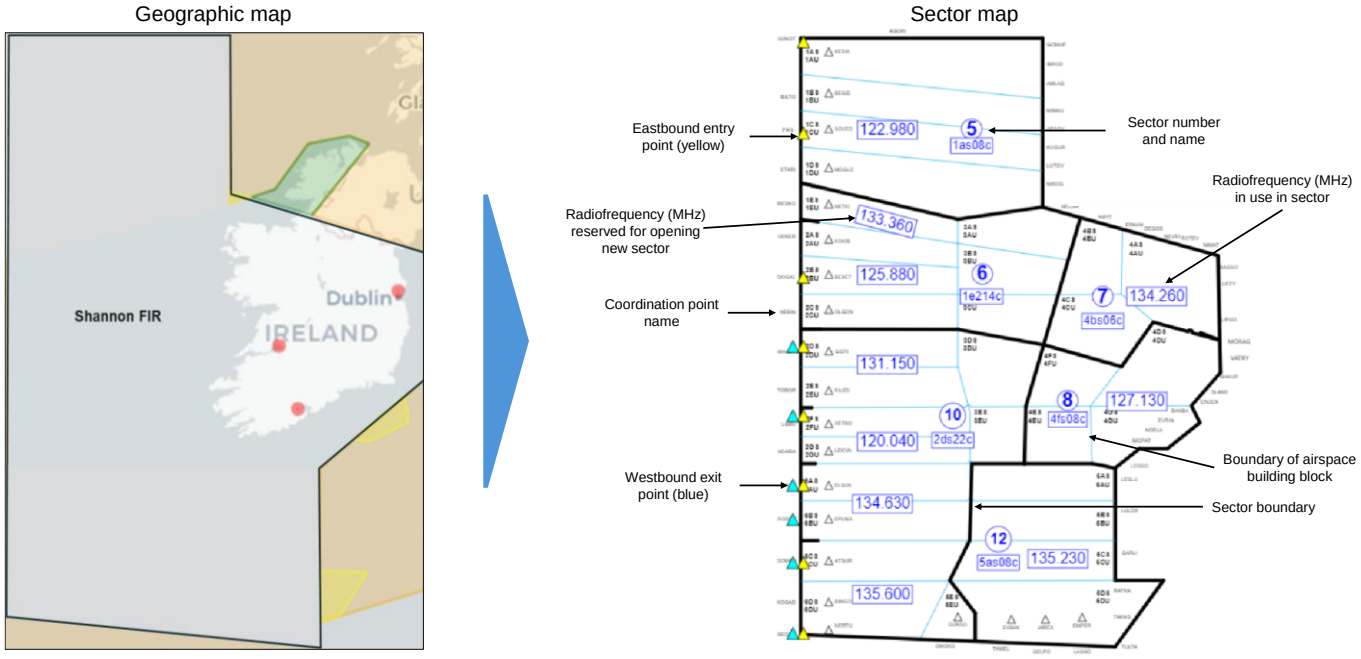


Source: CEPA analysis of AirNav Ireland data

B.2.1. Sectors

The Shannon FIR is divided into building blocks of airspace that can be grouped, horizontally and vertically, into sectors. This principle is illustrated in the figure below for the case where the building blocks are grouped into six sectors.

Appendix Figure B.3: Illustration of Shannon airspace configured into sectors

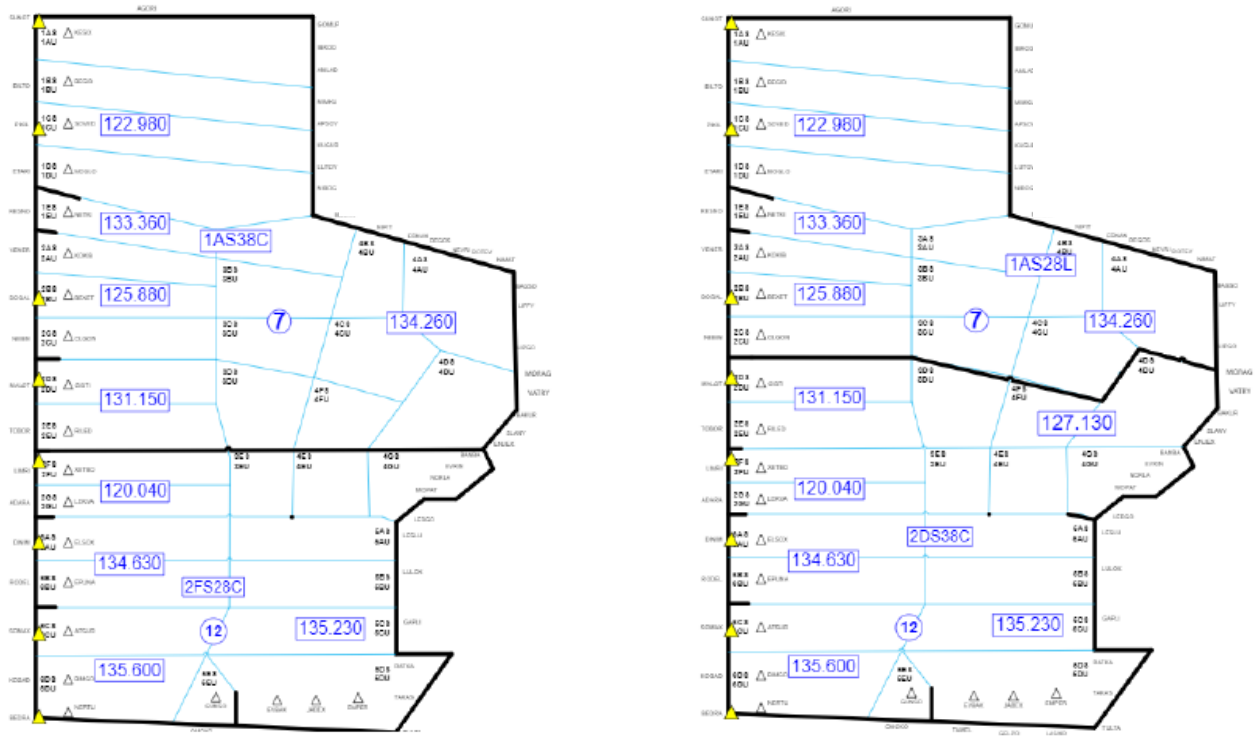


Source: AirNav Ireland

The number and topography of the sectors can be adjusted very flexibly using different combinations of airspace building blocks to accommodate the predicted traffic flows. For example, when the traffic volume exceeds the capacity of a sector, that sector can be split into two to provide the additional capacity needed to meet demand.

Actual flows are monitored on the day and sectors can be reconfigured dynamically to provide the required capacity. Due to technical constraints, the minimum number of sectors that can be opened at any one time, in cases of very low traffic, is two, one covering the north and the other covering the south. Two different configurations of two sectors are shown in the following figure.

Appendix Figure B.4: Illustration of two different two-sector combinations



Source: AirNav Ireland

AirNav Ireland's capability to manage Shannon sectors dynamically and flexibly enables capacity to be balanced with demand and should make for an effective and efficient operation, with low delays and high ATCO utilisation.

Managing sector capacity

Sector capacity, expressed in terms of the number of aircraft that an ATCO can handle in some time interval, depends on multiple factors including sector size, the complexity (e.g. proportions of traffic climbing or descending and the proportion of traffic with crossing flight paths, ATCO proficiency, etc.) Sector capacity is important because it is used as an indicator for when and where additional sectors need to be opened to cope with traffic demand. If sectors are opened too early or in excessive numbers, unnecessary resource will be deployed. Conversely, if sectors are opened too late or not at all, delays and/or inefficient flight paths will likely occur. AirNav Ireland uses standard measures of sector capacity, coupled with traffic forecasts and flight plans to estimate the number of sectors that will be needed to meet demand, both strategically for long-term planning purposes and tactically for on-the-day resource management.

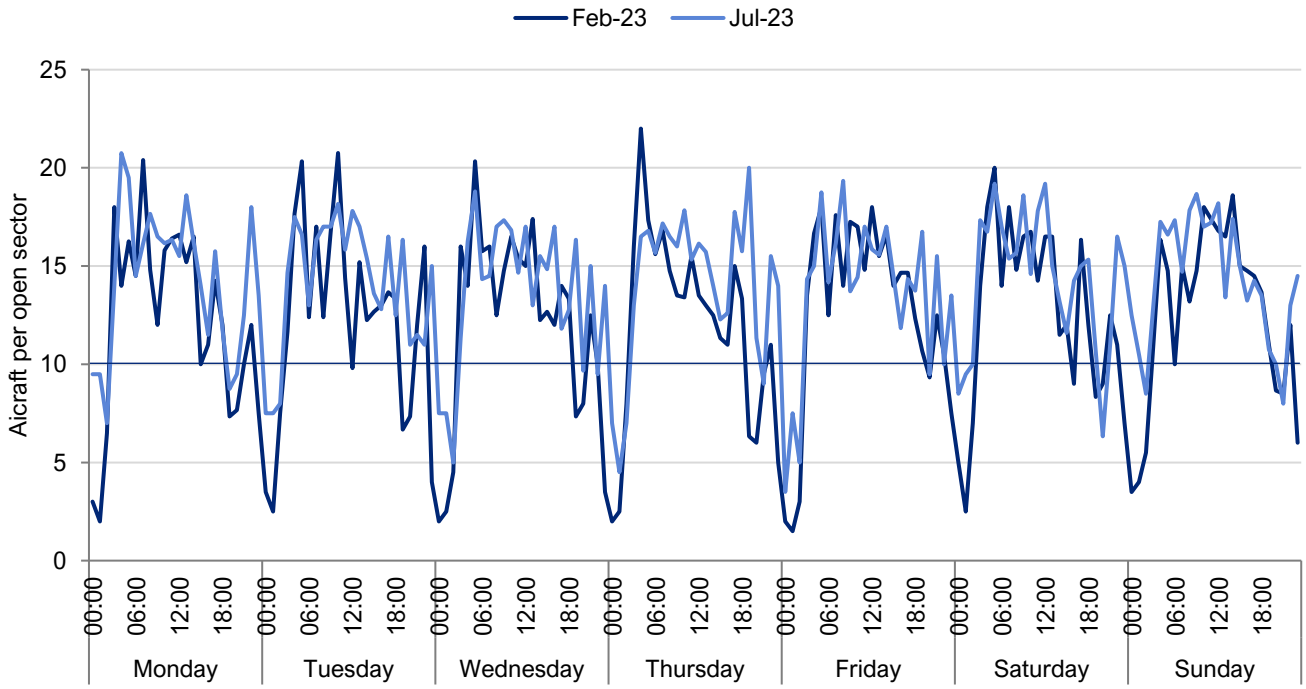
To assess how well AirNav Ireland is managing Shannon sectors, we assess the ratio of number of aircraft per open sector, for the two weeks of sample data from February and July 2023. This sample size is too small to draw definitive conclusions but provide an indication of whether sector opening policies are broadly in line with traffic demand and hence are reasonably efficient.

In Appendix Figure B.5, we show a simple ratio of the number of aircraft per open sector for each hour of our two sample weeks. And in The cumulative distribution shows that the ratio of aircraft per open sector is below 10 for approximately 25% of the time during the winter week and approximately 10% of the time during the summer week. The 50th percentile is approximately 13 for the winter week and 15 for the summer week whereas the 95th percentile

is approximately 17 aircraft per open sector for both winter and summer. The difference between the two curves is likely due to the faster tail-off of demand in the early evening in winter compared to summer (see Appendix Figure B.7).

Appendix Figure B.6 we show the associated cumulative distribution. Appendix Figure B.5 shows that the number of aircraft per open sector falls below 10 during the night period when there is little traffic, but two sectors must remain open.

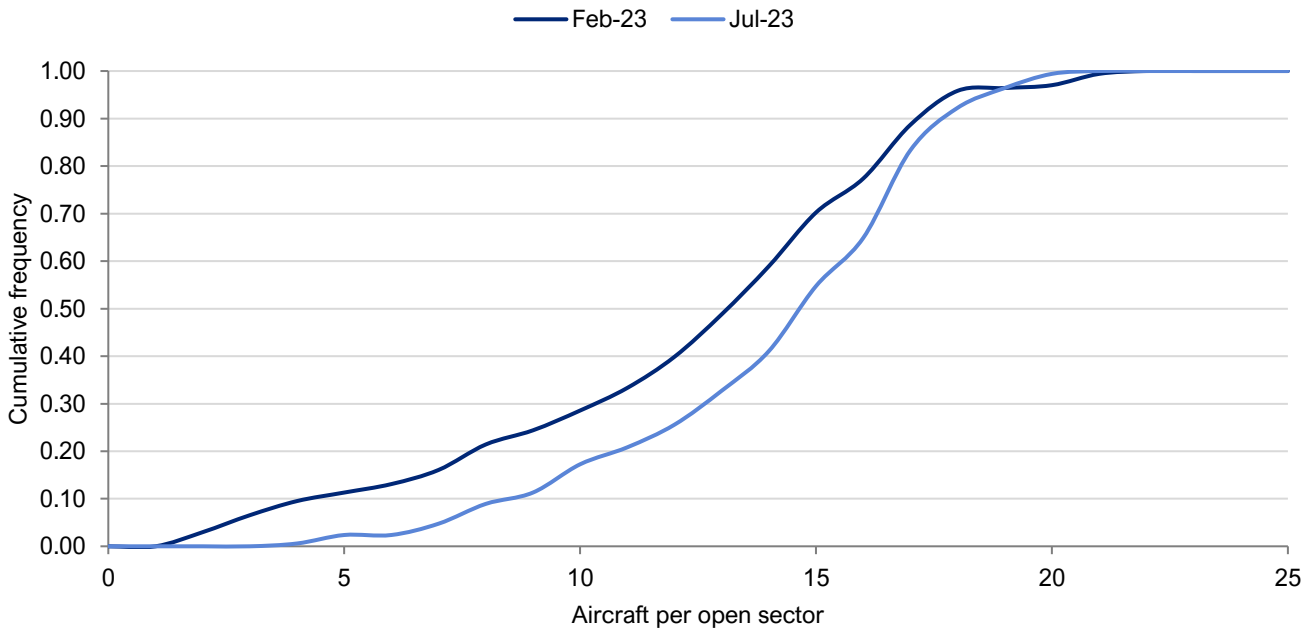
Appendix Figure B.5: Aircraft per open sector on an hourly basis for the two sample weeks in February and July 2023



Source: CEPA analysis of AirNav Ireland data

The cumulative distribution shows that the ratio of aircraft per open sector is below 10 for approximately 25% of the time during the winter week and approximately 10% of the time during the summer week. The 50th percentile is approximately 13 for the winter week and 15 for the summer week whereas the 95th percentile is approximately 17 aircraft per open sector for both winter and summer. The difference between the two curves is likely due to the faster tail-off of demand in the early evening in winter compared to summer (see Appendix Figure B.7).

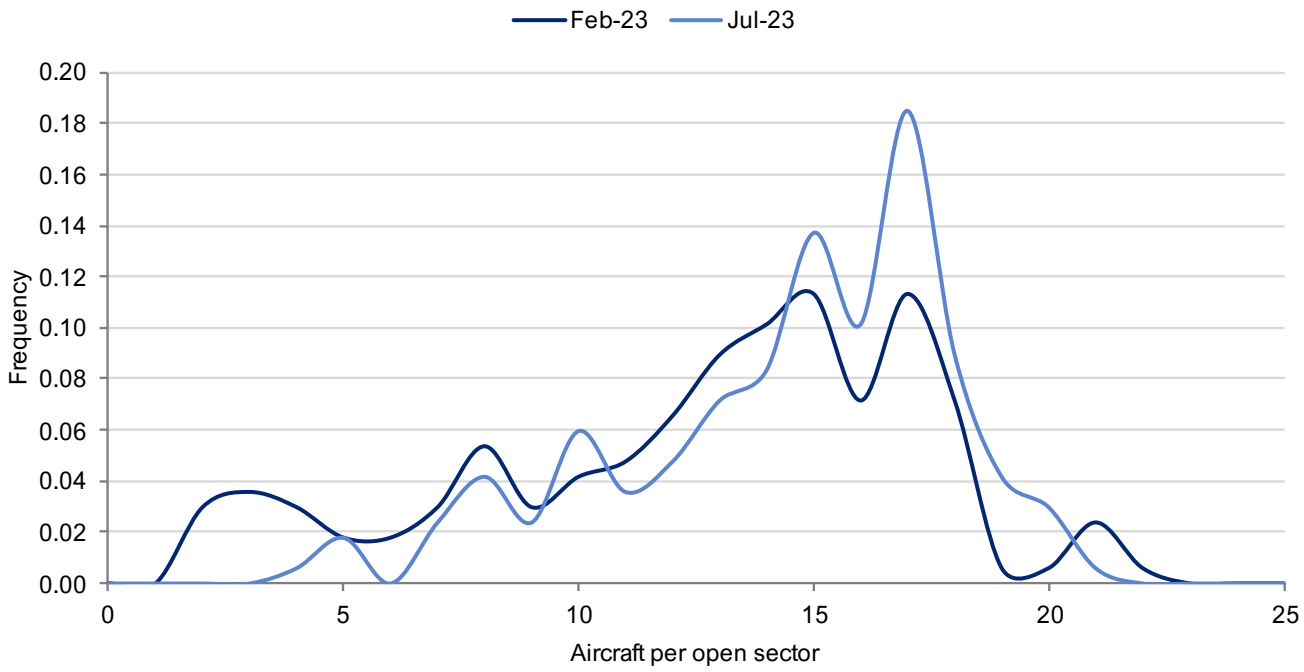
Appendix Figure B.6: Cumulative distribution of aircraft per open sector on an hourly basis for the two sample weeks in February and July 2023



Source: CEPA analysis of AirNav Ireland data

There are also other complications to interpreting performance. Additional capacity can only be providing in chunks, whereas demand is more of a continuum – when an additional sector is opened it necessarily results in a step up in capacity and step down in aircraft being controlled per sector. This is illustrated by the peaks in the distribution curves for aircraft per open sector shown in the figure below. If, for example, the peaks at around 17 aircraft per open sector for both winter and summer represent three open sectors operating at capacity, a small increase in demand would necessitate opening an additional sector, which would result in the ratio of aircraft per open sector being reduced to around 13. It is, therefore, impossible to manage capacity to demand precisely.

Appendix Figure B.7: Frequency distribution of aircraft per open sector on an hourly basis for the two sample weeks in February and July 2023



Source: CEPA analysis of AirNav Ireland data

The peaky nature of the traffic is a further challenge to adjusting capacity. There is a finite time needed to open and close sectors. Additional sectors will need to be opened slightly before the demand has materialised and will necessarily stay open after the demand has dissipated.

The need to have two sectors open in the nighttime with low traffic, skews the performance to lower aircraft per open sector than if it were possible to reduce to one open sector during the nighttime.

Overall, our review indicates that AirNav Ireland appears to be applying sector opening/closing criteria consistently and efficiently.

B.2.2. Staffing

Seats

In the Shannon ACC, generally each open sector is staffed by two air traffic controllers (ATCOs). However, in certain circumstances between 19:00 and 03:00 the next day when sector occupancy is fewer than 10 aircraft, equipment is functioning normally and the traffic is of low complexity, single ATCO operations are permitted. These conditions are so specific that we have assumed two person operations in our subsequent analysis.

There is one permanently staffed coordinator position with a second coordinator in position between 08:00 and 14:00 in winter, and between 08:00 and 17:00 in summer. The coordinator's role is to:

- monitor predicted traffic levels to ensure that sectors do not become overloaded;
- ensure breaks are arranged and taken to comply with fatigue management rules; and
- liaise with neighbouring FIRs – Shanwick, Scottish, London and Brest.

In addition, there is one permanently staffed flight data control (FDC) position to catch and correct errors in flight data messages that cannot be handled automatically by the COOPANS air traffic management system.

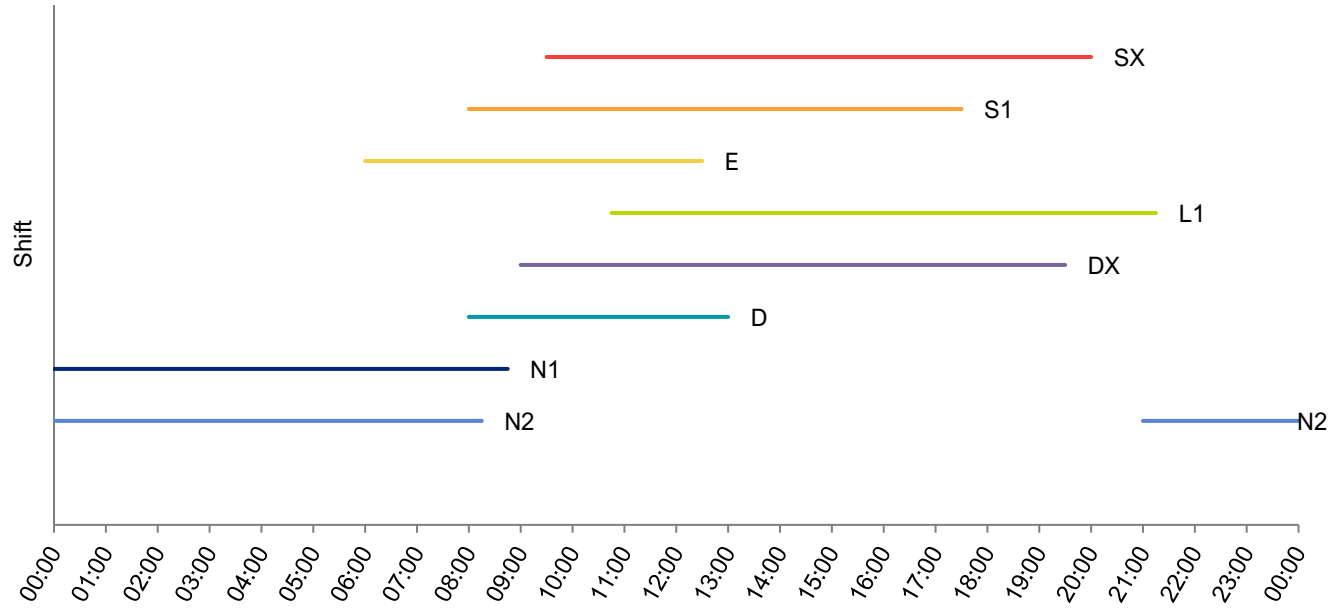
Finally, there is a 24/7 station manager/supervisor position in the Shannon ACC. As this is a single, fully staffed permanent role it is not included in our efficiency and utilisation analysis described below.

Shifts

The Shannon ACC shift pattern is shown in Appendix Figure B.8. In the figure:

- Each shift is indicated by a horizontal bar.
- The shift name is indicated by the letter.
- The shift starts at the left-most point of the bar.
- The shift ends at the right-most point of the bar.
- The night shift, N2, starts the previous day.

Appendix Figure B.8: Shannon shift pattern for February and July 2023



Source: CEPA analysis of AirNav Ireland data

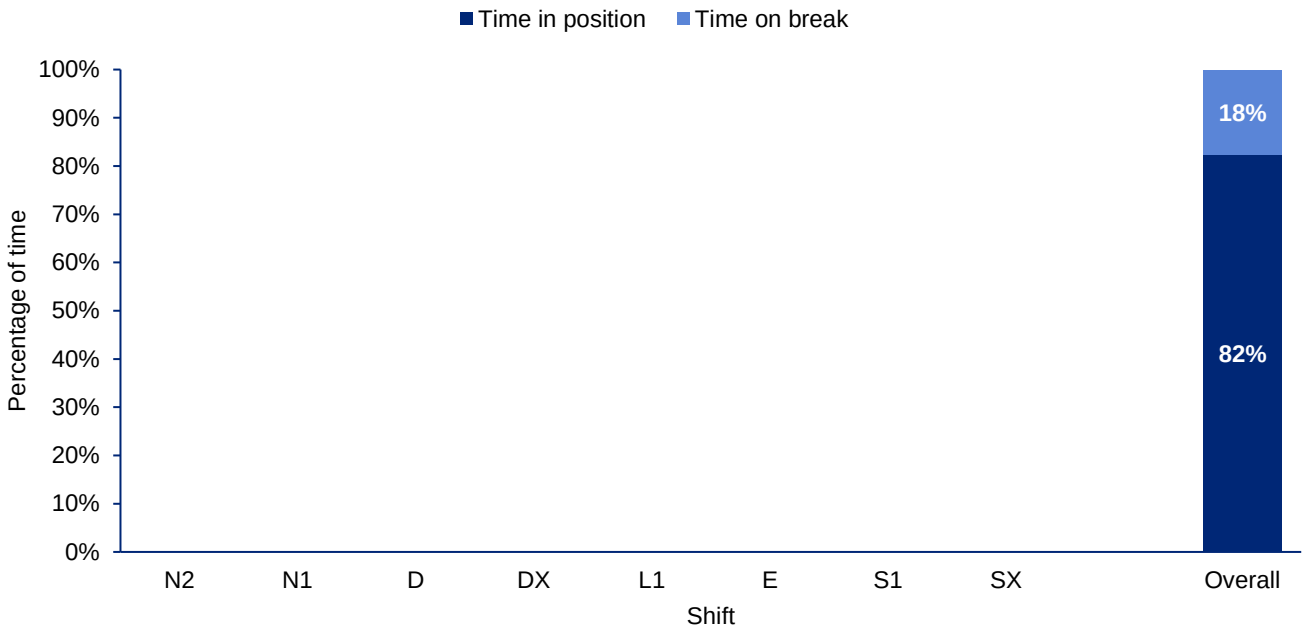
There are some restrictions on shifts:

- Duties cannot start between 00:00 and 06:00 due to union agreements and a working time act stipulation.
- There are mandatory breaks during shifts in compliance with fatigue regulations and best practice.
- ATCOs can work up to two hours but then must have a break. This two-hour period includes a 10-minute handover time so the maximum productive time between breaks is one hour 50 minutes.

The amount of time spent on breaks depends on the length of the shift and the time of day. Appendix Figure B.9 shows the proportion of time that ATCOs spend in position and on breaks for each of the shifts. The figures for the night shifts, N1 and N2, are estimates because night shifts include rest periods when there is low traffic as part of fatigue management.

There is overlap between the start of a shift and the end of the preceding shift, especially in the morning between 08:00 and 09:00 when traffic patterns can be complex and comprehensive handovers are needed. These overlaps cause short-term spikes in numbers of staff on duty.

Appendix Figure B.9: Proportion of time on duty and time on break for Shannon shifts



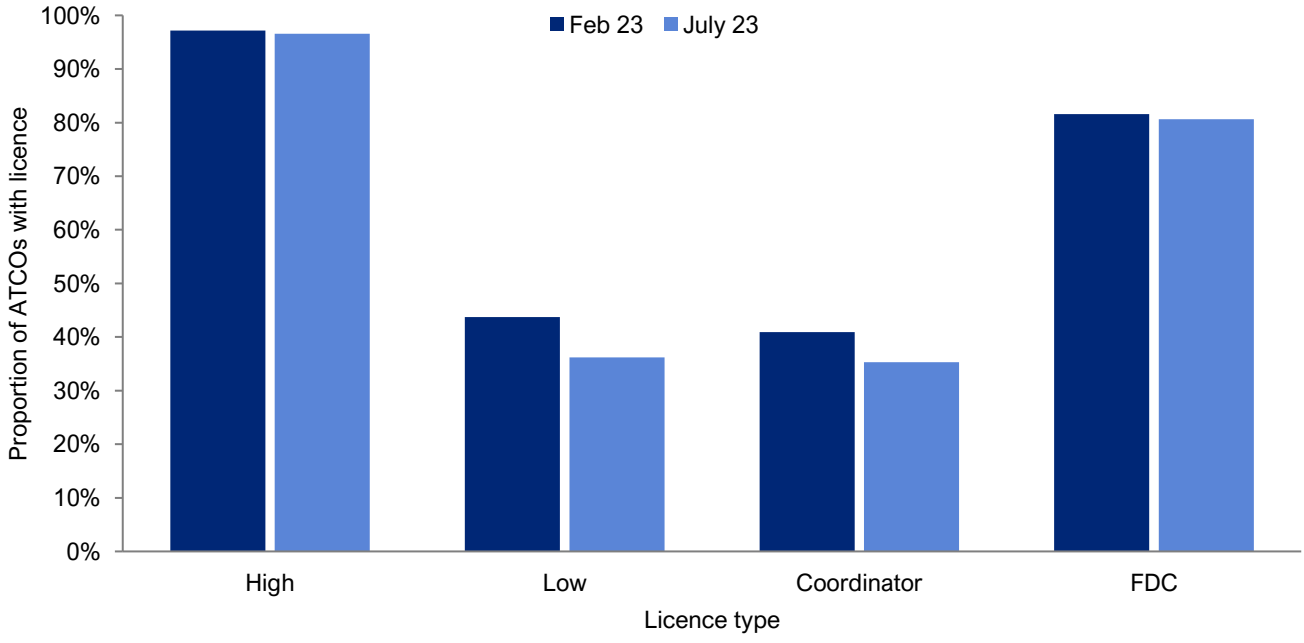
Source: CEPA analysis of AirNav Ireland data

The figure above shows that averaged over the ACC, the average proportion of time each ATCO spends in position is approximately 82%.

Licences

Each ATCO must be appropriately licensed to operate in any of the sector, coordinator, or FDC positions. Appendix Figure B.10 shows the proportion of Shannon ATCOs licensed for each role in winter and summer 2023. The 'high' licence type refers to ATCOs controlling sectors at FL 245 and above with the 'low' licence type covering sectors below FL 245.

Appendix Figure B.10: Proportion of ATCOs licensed by role for February and July 2023



Source: CEPA analysis of AirNav Ireland data

The figure shows that 97% of Shannon ATCOs are licensed for all combinations of high sector, the most prevalent in the ACC. The results in a high degree of flexibility. For example, if all ATCOs are licensed for all sectors, three ATCOs would be required to fulfil the requirements for two seats – each can cover for the other during breaks. However, if the ATCOs only hold single licences, then four appropriately qualified ATCOs would be needed to fill the two seats. As ATCOs hold multiple licences across the disciplines – high and low sector controller, coordinator, and FDC – rest periods can be arranged across the one single, large pool of controllers on duty, increasing utilisation, compared to the situation where rest periods would need to be coordinated across four, smaller pools of controllers on duty. Multiple licensing is a feature that enables high levels of efficiency.

B.2.3. Roster efficiency

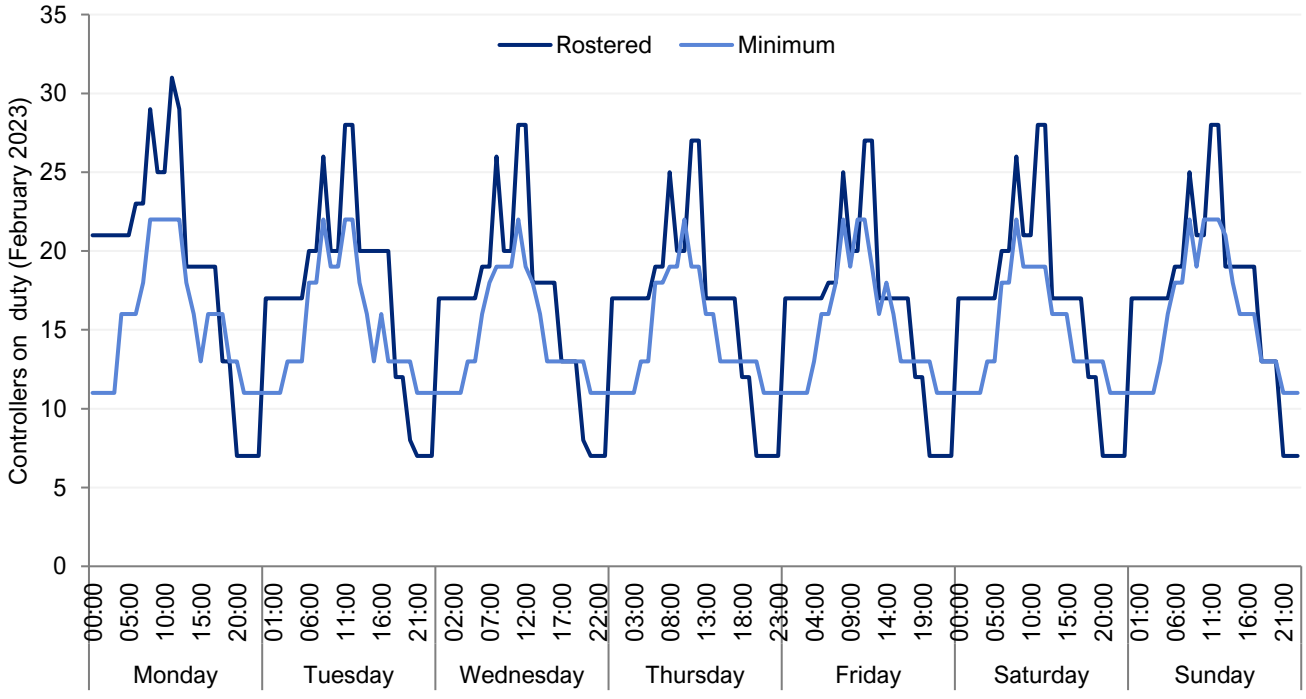
To determine the efficiency with which the rostering system matches controllers on duty with the traffic demand we have defined roster efficiency as the ratio of the minimum number of controllers needed to the number of controllers rostered on an hourly basis for the two sample weeks. The controllers needed is calculated as the sum of:

- the schedule of open sectors hour-by-hour across the two sample weeks, each staffed by two ATCOs,
- the coordinator position, staffed as described above, and
- the FDC position, staffed 24/7.

This figure is then adjusted to the average 82% deployment level to account for the need for breaks. A further adjustment is made to account for the proportion of ATCOs with licences to fill each of the positions.

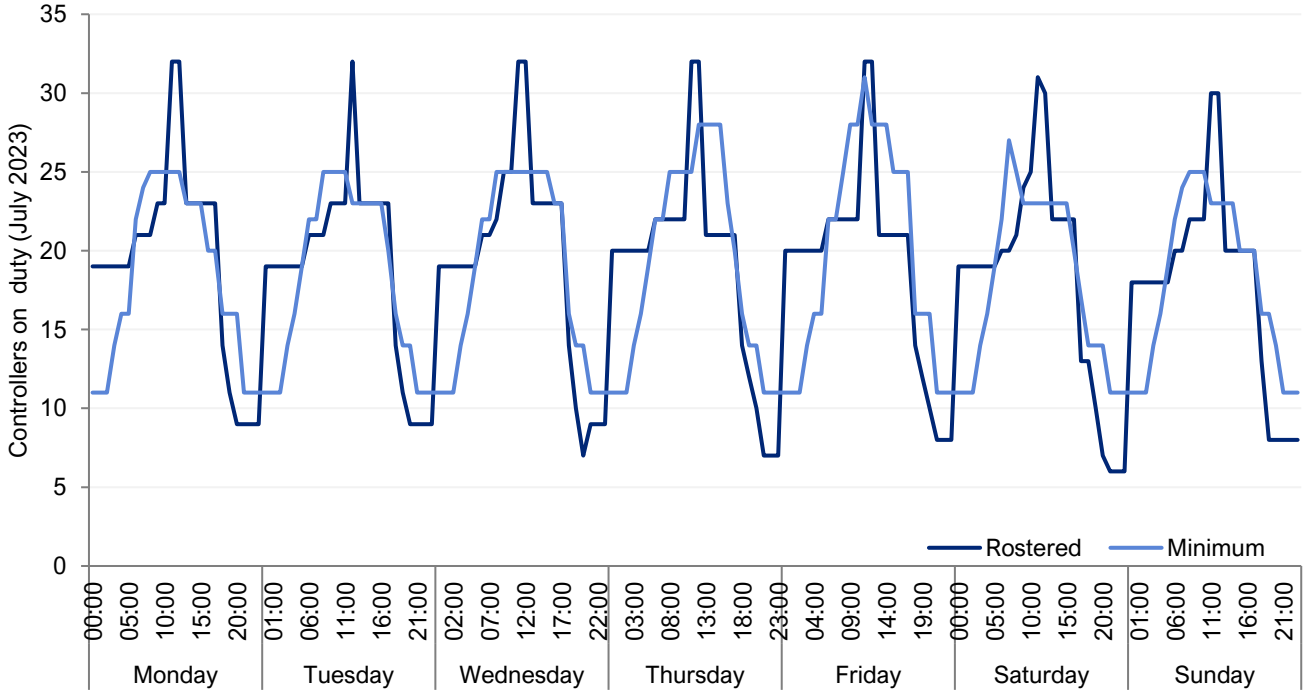
Appendix Figure B.11 and Appendix Figure B.12 show comparisons of the actual rostered staffing and the modelled minimum staffing based on sector opening for the Shannon ACC for the February and July sample weeks respectively.

Appendix Figure B.11: Comparison of Shannon ACC rostered staffing to minimum (modelled) staffing for the February sample week



Source: CEPA analysis of AirNav Ireland data

Appendix Figure B.12: Comparison of Shannon ACC rostered staffing to minimum (modelled) staffing for the July sample week



Source: CEPA analysis of AirNav Ireland data

The spikes in the actual roster are caused by overlapping shifts as described above. These do not appear in the model because it is not constrained by shift patterns. The less frequent spikes in the modelled (minimum) data are causes by opening and closing of sectors over one-hour intervals, which the model can react to, but the actual roster cannot.

The following table compares the actual roster with the modelled staffing profile.

Appendix Table B.1: Shannon ATCO Utilisation

	Actual ATCO hours	Modelled ATCO hours	ATCO utilisation	Actual FTE	Modelled FTE	Modelled FTE 85%
Feb 2023	2,890	2,512	87%	88	77	90
Jul 2023	3,158	3,123	99%	97	95	111

Source: CEPA analysis of AirNav Ireland data

In the table, utilisation is defined as the ratio of the minimum required hours to the actual hours expended. The number of FTE needed is estimated from the ATCO hours assuming a 33-hour average working week for each ATCO derived from a working year of 1,700 hours.

Assuming a benchmark of 85% utilisation for an efficient roster,[51] the table above shows that in February sample week, the Shannon ACC roster is efficient. For the July sample week utilisation exceeds what normally be expected implying that additional controllers are needed.

[51] The modelled ATCO hours are not constrained by factors such as shift start times, shift lengths and inflexibility in break times. It is not reasonable, therefore, to expect the actual roster to mimic the perfect modelled roster. The 85% utilisation is a reasonable benchmark to assume for good roster performance and is used as an industry standard.

B.2.4. Controller utilisation

Overtime

The roster efficiency estimated above simply compares the staff deployed to those needed. The staff deployed contains a mix of those working core hours, those called in on overtime and shift extensions, for example, to cope with earlier or later than anticipated traffic flows.

Overtime is identified in the rosters and is applied in the two sample weeks as follows:

- In the February sample week, there are three overtime shifts out of a total of 320, implying an overtime rate of just under 1%.
- In the July sample week, there are four overtime shifts out of a total of 351, implying an overtime rate of just over 1%.

This overtime rate appears low.

Other duties

Licensed ATCOs are deployed on other essential duties in addition to providing air traffic services. These other duties include:

- Training student ATCOs.
- Supporting operational activities, such as airspace change and procedure design.
- Supporting technical activities, such as ATM system development and testing.

AirNav Ireland estimates that ATCOs spend around 15% of their time on other duties. Because of the way the Shannon roster is structured, it is not possible to verify this estimate but for comparison, our analysis of the Dublin roster suggests Dublin controllers spend approximately 17% of their time on other duties.

Overall utilisation

Based on the roster efficiency analysis described above and the amount of time that controllers spend on other duties, it is possible to estimate the overall utilisation levels for ATCOs in operations or conversely estimate how many controllers would be needed to achieve a target utilisation level. The underlying assumptions in this analysis are:

- The two sample weeks are representative of winter and summer seasons.
- The two sample weeks can be extrapolated to give an annual picture based on a weighting of 7/12 for summer and 5/12 for winter assuming IATA summer and winter seasons.

Two scenarios have been investigated:

- The actual roster.
- The actual roster with staff numbers adjusted to achieve 85% utilisation.

For the actual roster, the weighted average number of ATCOs in ops to meet traffic demand and fulfil other duties is 112. This compares with the figure of 122 for 2022 from the ACE benchmarking report, equating to a utilisation of 92%.

Conversely, to achieve an 85% utilisation with the current roster, a total of 145 ATCOs in ops would be required.

B.3. Dublin ACC and tower

B.3.1. Overview

The Dublin ACC provides air traffic services with the Dublin CTA:

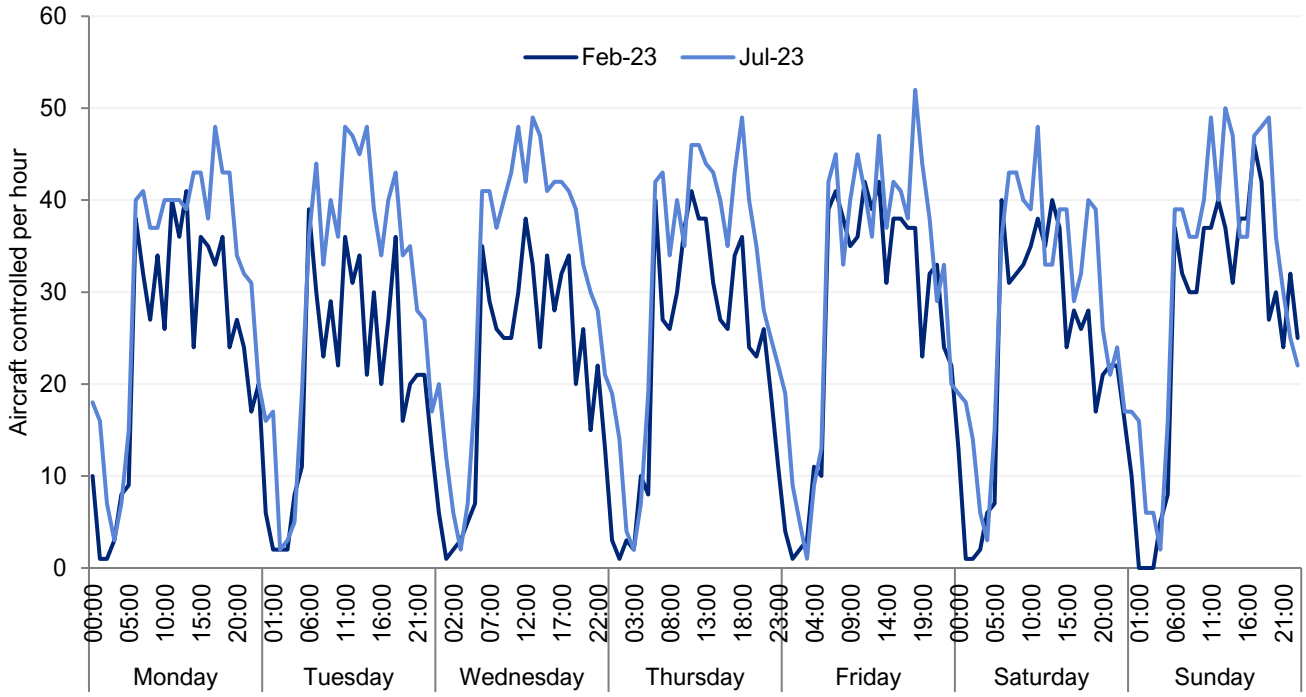
- Area control services in up to four sectors around Dublin Airport.
- Approach services to Dublin airport.

The Dublin ACC also provides delegated services in UK airspace that are critical to the efficient operation of traffic to and from Dublin Airport. Most traffic handled by Dublin ACC is arriving to or departing from Dublin Airport although there is a small number of overflights.

Dublin tower provides services to traffic using Dublin Airport.

Appendix Figure B.13 shows the hourly traffic at Dublin Airport over the two sample weeks. Both winter and summer traffic show the same general characteristics. Traffic is low in the early morning period, but then increases rapidly at around 06:00. There is a series of peaks across the day until around 18:00 when the traffic volume starts to reduce. The amplitude of the peak to trough oscillations can be large, ~30%, over short periods of around one hour. It will be very challenging to open and close controller positions/adjust staffing levels in anticipation or response to these changes.

Appendix Figure B.13: Hourly traffic at Dublin Airport for the two sample weeks



Source: CEPA analysis of AirNav Ireland data

B.3.2. Staffing

Seats

In addition to the watch manager/supervisor, there are four ATCO positions in the Dublin ACC:

- Sector controllers for each of the four area sectors, which are opened and closed according to traffic demand. It is possible to bandbox all four sectors into a single sector when traffic is very low. Each position is staffed by a single controller. There is always at least one area controller in position.
- Approach controllers for arrivals into Dublin airport. There are two approach positions, staffed according to the traffic levels and the mode of runway operations at the Airport. There is always at least one approach controller in position.
- A traffic manager (XTM) to coordinate between area and approach positions and with neighbouring ACCs. The XTM is in position between 06:30 and 23:00.

There is also an ACC data assistant in place 24/7 but that role is not included in this analysis.

In the Dublin tower, in addition to the supervisor role, there positions are:

- Two ground control positions at most times,
- One clearance delivery position at most times,
- One runway/air control positions at off-peak times during single runway operations,
- Two runway/air control positions during busy periods or dual runway operations (07:00 to 23:00),
- A tower coordination position, to facilitate the opening and closing of the second runway, and
- A data assistant, not included in this analysis.

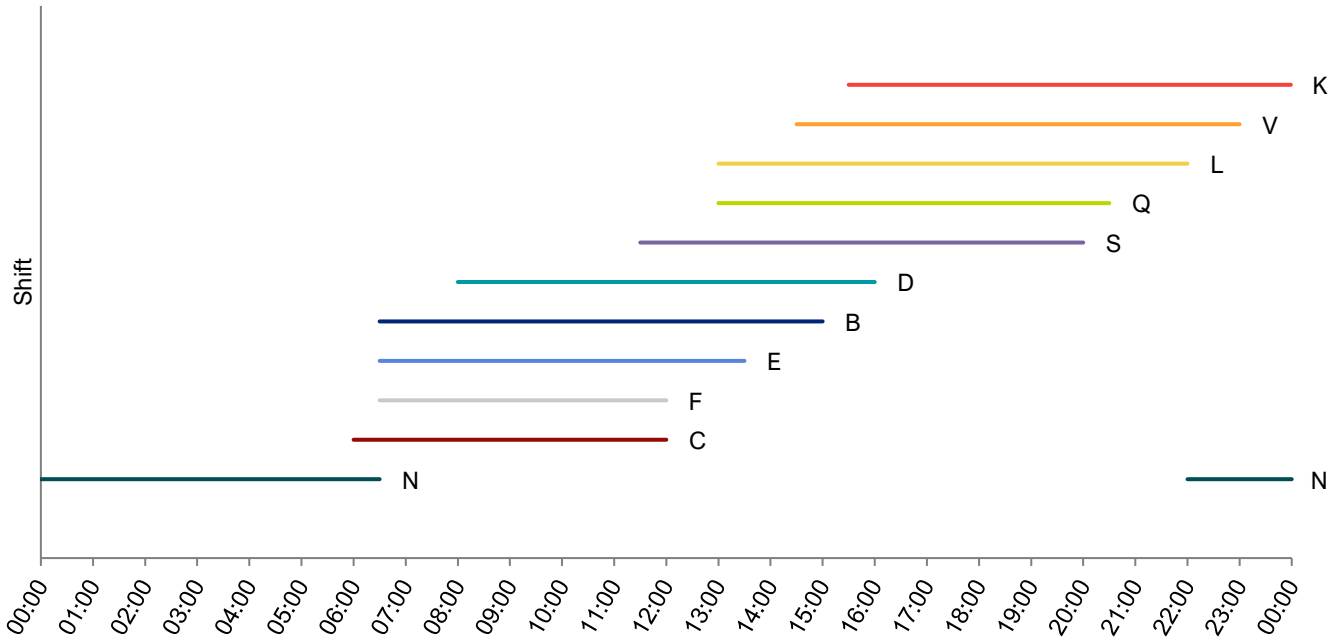
In addition there is a 24/7 station manager with responsibility for both the Dublin ACC and tower.

Shifts

The Dublin ACC and tower shift pattern is shown in Appendix Figure B.14. In the figure:

- Each shift is indicated by a horizontal bar.
- The shift name is indicated by the letter.
- The shift starts at the left-most point of the bar.
- The shift ends at the right-most point of the bar.
- The night shift, N, starts the previous day.

Appendix Figure B.14: Dublin shift pattern for February and July 2023



Source: CEPA analysis of AirNav Ireland data

It is assumed that the same staffing restrictions apply to Dublin as to Shannon, both in terms of shift starts and ends and mandatory breaks. Therefore, the analysis described below assumes that the average proportion of time each ATCO spends in position in Dublin is the same as that for Shannon, at approximately 82%.

Licences

The Dublin roster format does not allow for calculation of the licences held by the staff. However, AirNav Ireland reports that in Dublin:

- All ACC licensed staff can operate all four Dublin sectors,
- 32% of staff are dual ACC-APP licensed, and

- 5% of staff are triple licensed for ACC, APP and the tower.

The 32% of staff that are dual licensed in the ACC offers some rostering flexibility but not nearly to the level achieved in the Shannon ACC.

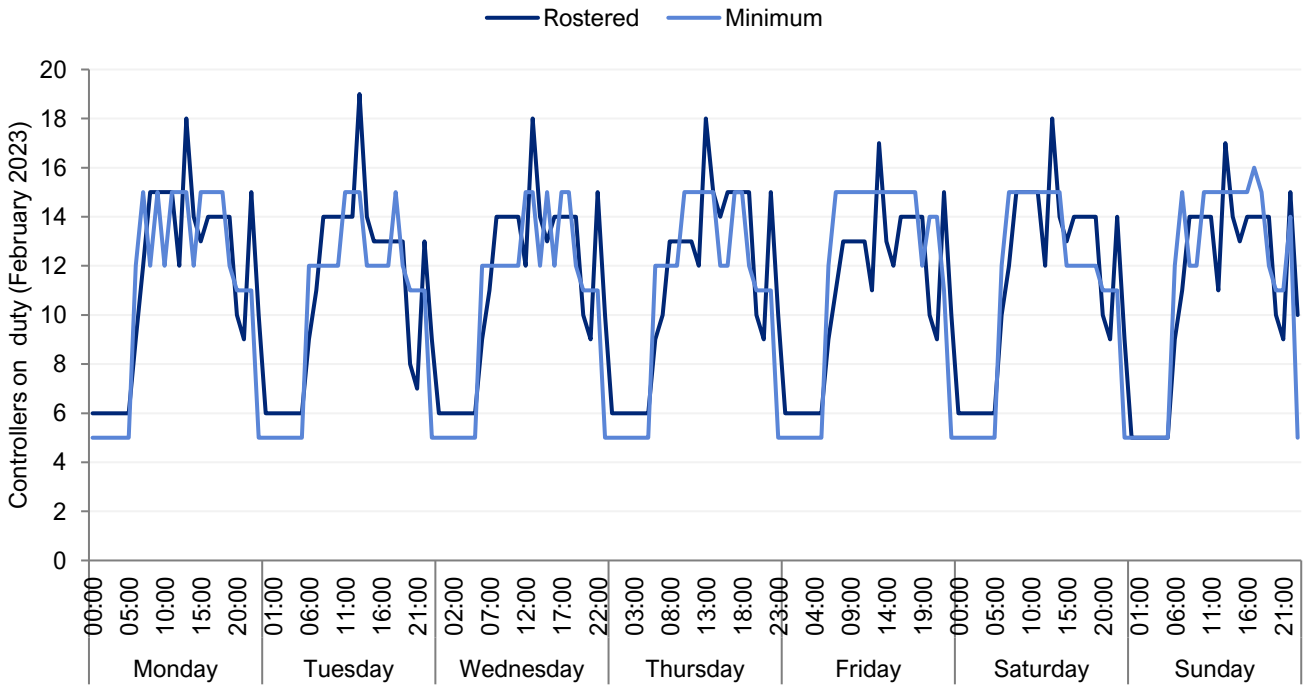
B.3.3. Roster efficiency

Roster efficiency has been calculated for Dublin as a whole – ACC and tower – using the same approach as for Shannon using the staffing principles described above. However, in addition it has been necessary to make additional assumptions concerning the number of ACC and APP positions open as the data on this was incomplete. The assumptions are:

- From 00:00 to 06:00 and when the number of hourly movements is less than 30, there are one ACC sector and one APP positions open.
- When the number of hourly movements is between 30 and 41, there are two ACC sector and two APP positions open.
- When the number of hourly movements is between 42 and 47, there are three ACC sector and two APP positions open.
- When the number of hourly movements is between above 48, there are four ACC sector and two APP positions open.
- The hourly movements for the airport are broadly representative of the movements controlled by the ACC, i.e. the number of overflights is small.
- The proportion of time taken up by breaks is similar to that for Shannon, so that controllers spend approximately 82% of their shift in position.

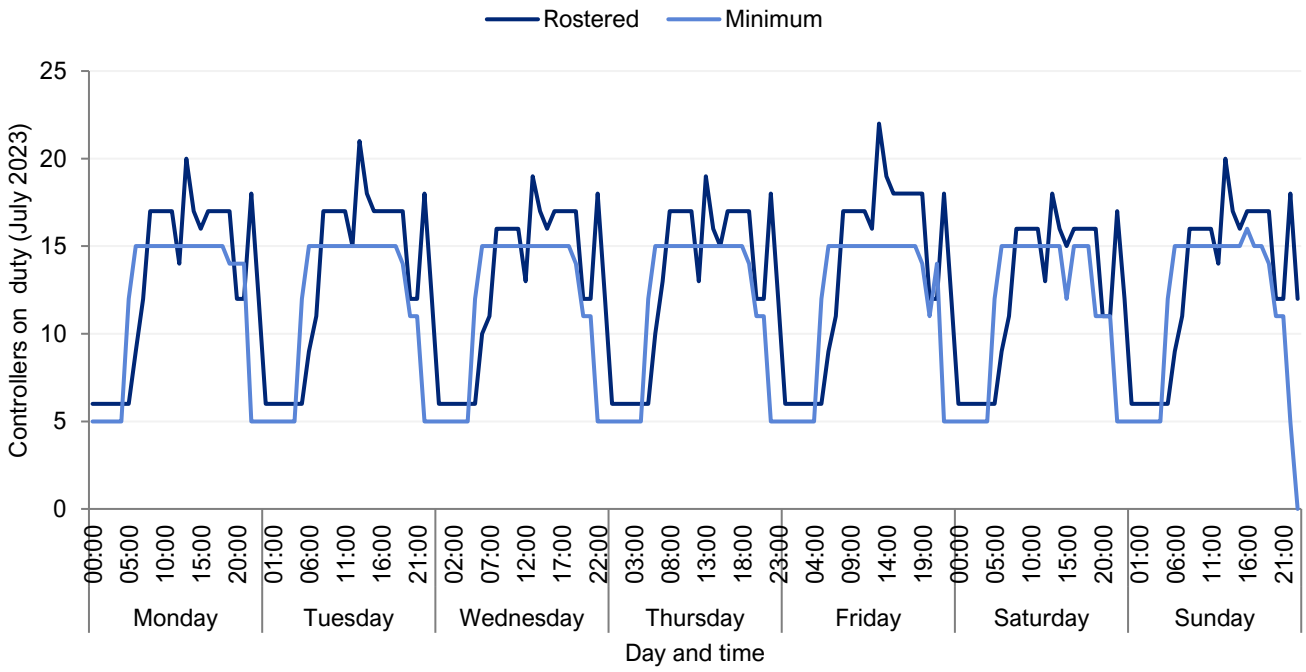
Appendix Figure B.15 and Appendix Figure B.16 show comparisons of the actual rostered staffing and the modelled minimum staffing based on sector opening for the Shannon ACC for the February and July sample weeks respectively.

Appendix Figure B.15: Comparison of Dublin ACC and tower rostered staffing to minimum (modelled) staffing for the February sample week



Source: CEPA analysis of AirNav Ireland data

Appendix Figure B.16: Comparison of Dublin ACC and tower rostered staffing to minimum (modelled) staffing for the July sample week



Source: CEPA analysis of AirNav Ireland data

As with the Shannon analysis, the spikes in the actual roster are caused by overlapping shifts. These do not appear in the model because it is not constrained by shift patterns. The less frequent spikes in the modelled (minimum) data are causes by opening and closing of sectors over one-hour intervals, which the model can react to, but the actual roster cannot.

The following table compares the actual roster with the modelled staffing profile.

Appendix Table B.2: Dublin ATCO Utilisation

	Actual ATCO hours	Modelled ATCO hours	ATCO utilisation	Actual FTE	Modelled FTE	Modelled FTE 85%
Feb 2023	1,869	1,827	98%	57	55	63
Jul 2023	2,182	1,950	89%	66	59	69

Source: CEPA analysis of AirNav Ireland data

In the table, utilisation is defined as the ratio of the minimum required hours to the actual hours expended. The number of FTE needed is estimated from the ATCO hours assuming a 33-hour average working week for each ATCO derived from a working year of 1,700 hours.

Assuming a benchmark of 85% utilisation for an efficient roster, the table above shows that in both winter and summer, the Dublin roster is stretched above what would be expected implying that additional controllers are needed.

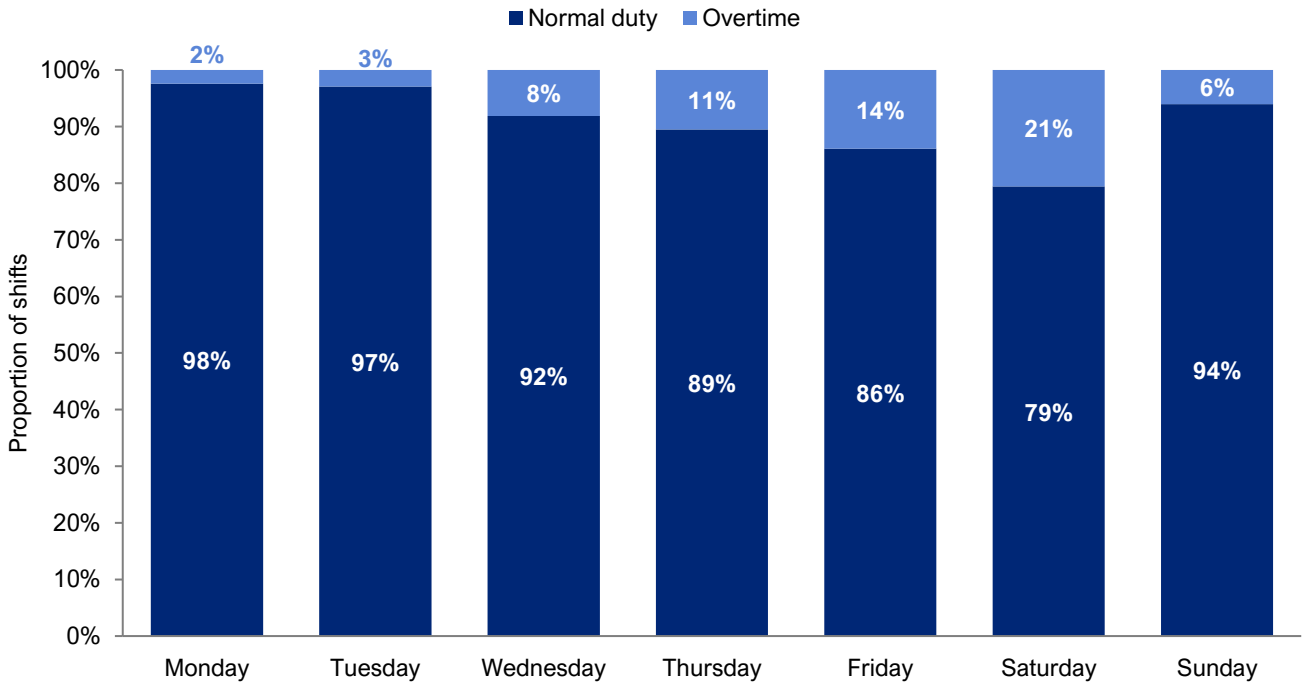
B.3.4. Controller utilisation

Overtime

The roster efficiency estimated above simply compares the staff deployed to those needed. The staff deployed contains a mix of those working core hours, those called in on overtime and shift extensions, for example, to cope with earlier or later than anticipated traffic flows.

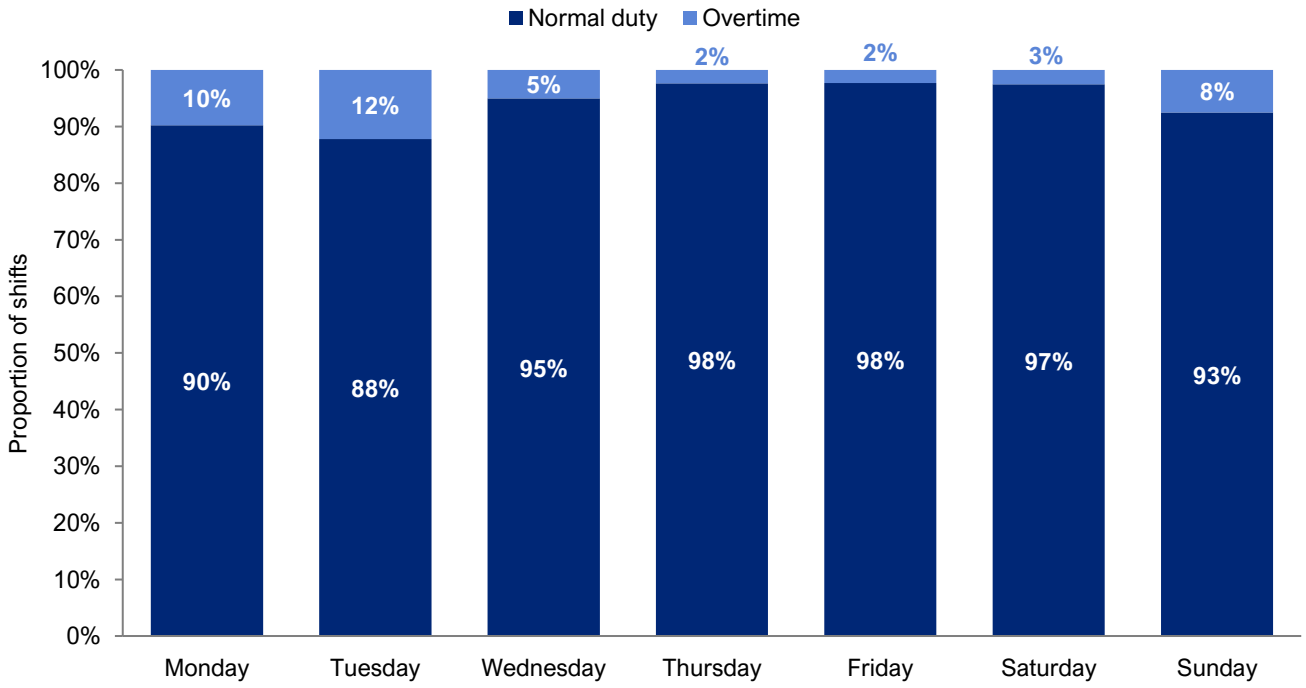
Overtime is identified in the rosters and is applied in the two sample weeks as shown in the figures below for the winter and summer sample weeks respectively.

Appendix Figure B.17: Dublin overtime profile for winter sample week



Source: CEPA analysis of AirNav Ireland data

Appendix Figure B.18: Dublin overtime profile for summer sample week



Source: CEPA analysis of AirNav Ireland data

For the small sample available there does not seem to be a pattern in overtime. In the winter sample, most overtime occurred on the Friday and Saturday, whereas in summer most overtime occurred on Monday and Tuesday.

The average over time across the sample is:

- 9% the February sample week,
- 6% in the July sample week, and
- 7% overall.

This overtime rate appears reasonable.

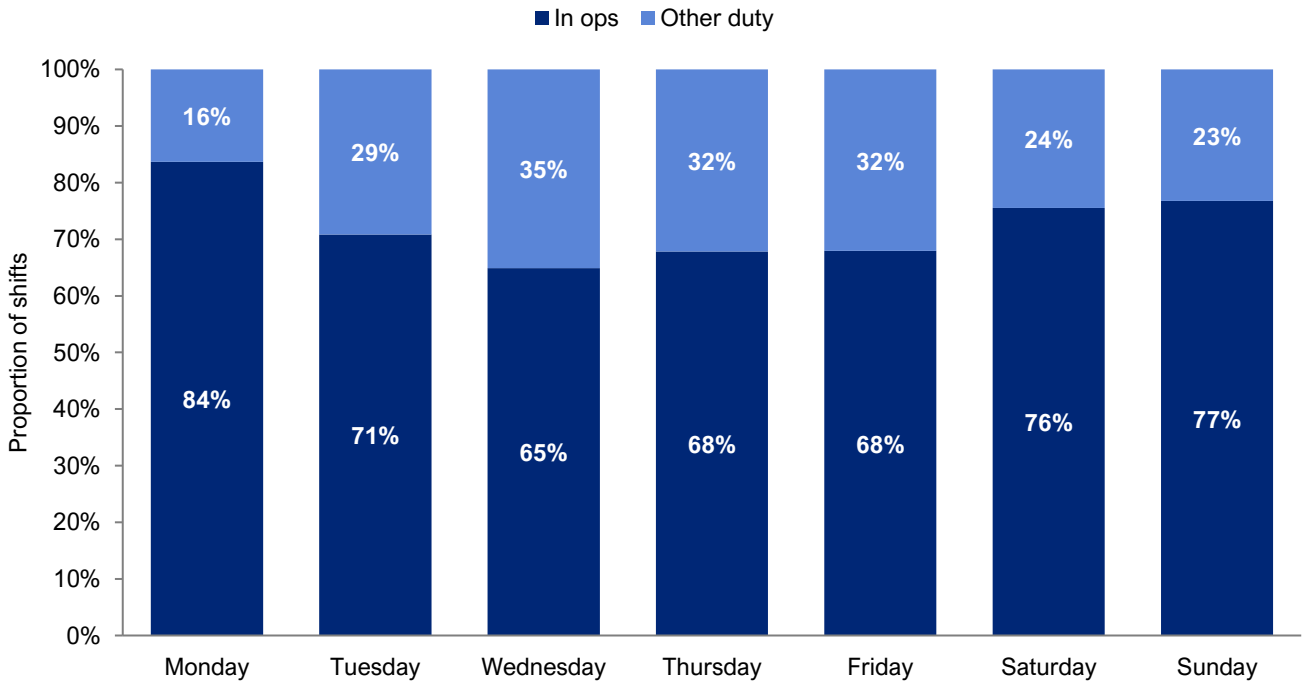
Other duties

Licensed ATCOs are deployed on other essential duties in addition to providing air traffic services. These other duties include:

- Training student ATCOs,
- Supporting operational activities, such as airspace change and procedure design, and
- Supporting technical activities, such as ATM system development and testing.

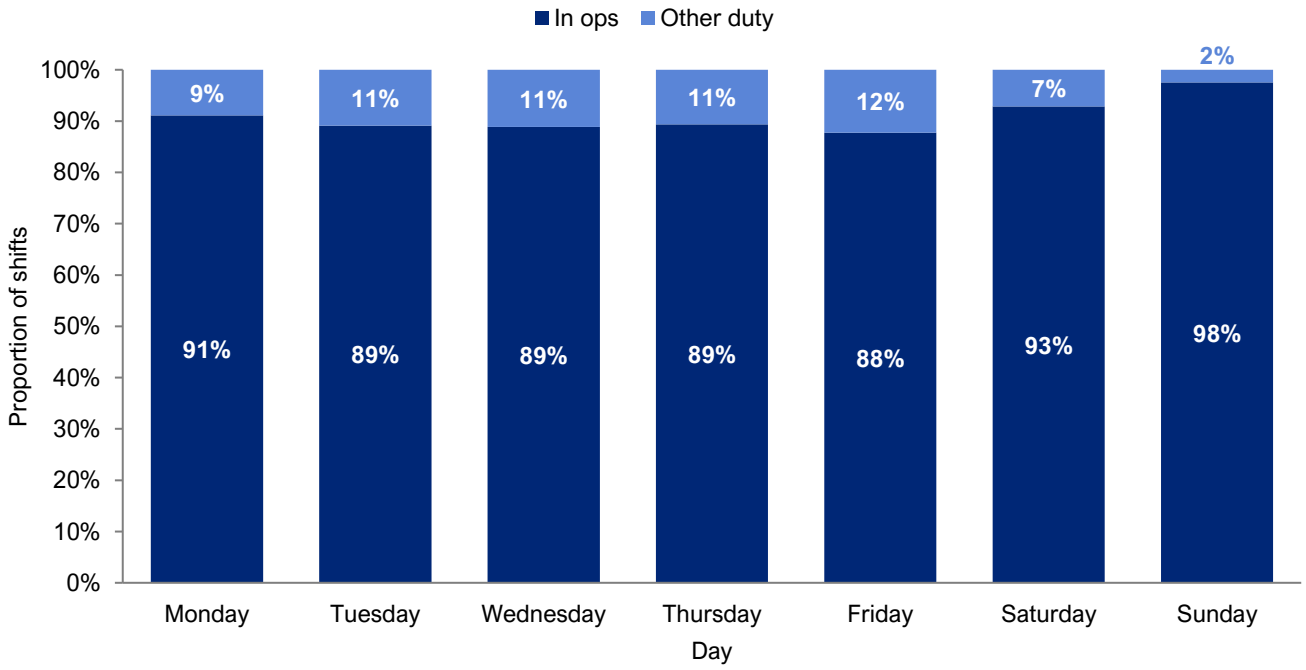
Other duties are captured in the Dublin roster and are shown in the following two figures for the winter and summer sample weeks respectively.

Appendix Figure B.19: Comparison of in ops and other duty shifts for the February sample week



Source: CEPA analysis of AirNav Ireland data

Appendix Figure B.20: Comparison of in ops and other duty shifts for the July sample week



Source: CEPA analysis of AirNav Ireland data

The two figures show that more time is allocated to other duties during the winter week, which is sensible given the lower traffic demand in winter than in summer.

The average time spent on other duties across the sample is:

- 28% in the February sample week,
- 9% in the July sample week, and
- 17% overall based on a weighting of winter to summer based on the length of the IATA seasons.

Overall utilisation

Again using the same approach as applied to Shannon, it is possible to estimate the overall utilisation levels for Dublin ATCOs in operations or conversely estimate how many controllers would be needed to achieve a target utilisation level. The underlying assumptions in this analysis are:

- The two sample weeks are representative of winter and summer seasons;
- The number of ATCOs in ops is derived from the 2022 ACE benchmarking report for the ACC combined with AirNav Ireland headcount data for the tower; and
- The two sample weeks can be extrapolated to give an annual picture based on a winter to summer weighting based on the IATA seasons.

Two scenarios have been investigated:

- The actual roster, and
- The actual roster with staff numbers adjusted to achieve 85% utilisation.

For the actual roster, the weighted average number of ATCOs in ops to meet traffic demand and fulfil other duties is 76. This compares with the figure of 78 for 2022 from the EUROCONTROL ACE report and AirNav Ireland headcount data, equating to a utilisation of 97%.

Conversely, to achieve an 85% utilisation with the current roster, a total of 94 ATCOs in ops would be required.

B.4. Cork and Shannon airports

Cork and Shannon airports have fixed ATCO positions that are largely inelastic to traffic volume.

Cork has one approach position and one air/runway control position that are staffed 24/7, supplemented by a ground control position staffed from 11:00 to 16:30 (5.5-hour shift) in winter and from 10:30 to 17:00 (6.5-hour shift) in summer. Assuming all controllers are licensed for all positions, and they work a 1,700-hour year, this arrangement would require approximately 17 FTE at full utilisation and 20 FTE at 85% utilisation. If ATCOs were only licensed for single roles these figures would rise to approximately 24 and 29 FTE respectively. AirNav Ireland's 2023 headcount figure for Cork ATCOs is 18 implying that all ATCOs hold multiple licences and utilisation is approximately 95%.[52]

Shannon has one approach position and one air/runway control position that are staffed 24/7, supplemented by a ground control position staffed from 09:00 from 17:00 (eight-hour shift) across the year. Using the same assumptions for Cork, this suggests that if all ATCOs hold licences for all positions, 19 FTE would be required at full utilisation, increasing to 23 at 85% utilisation. If ATCO only hold single licences, then 26 and 31 FTE would be required respectively. AirNav Ireland's 2023 headcount figure for Shannon ATCOs is 20 implying that all ATCOs hold multiple licences and utilisation is also approximately 95%.

B.5. Conclusions

The analysis described above indicates that AirNav Ireland is operating at high levels of efficiency in both Shannon and Dublin ACCs and the towers at Dublin, Cork and Shannon airports. In all cases, roster efficiency is at and often considerably higher than the 85% benchmark. Overall ATCO utilisation, considering both operational and other essential duties, is consistently above 90%.

In fact, utilisation levels are arguably too high with the risk that operations are vulnerable to even small attrition rates and will not be sustainable. In addition, operating at such high utilisation levels might be detrimental to resilience, with the risk that small disruptions will have large negative operational impacts.

[52] Summary payroll data 2020-2023

APPENDIX C WAGE BENCHMARKING

In this appendix, we assess the efficiency of AirNav Ireland's historic pay in the following three ways:

- We assess the growth in AirNav Ireland's unit payroll costs over the period 2019 to 2023.
- We benchmark high level employment costs for ATCO and non-ATCO roles against other ANSPs using the ACE benchmarking dataset.
- We benchmark specific unit payroll costs against available wage data from sources such as Glassdoor and Forsa.

C.1. ANALYSIS OF HISTORIC PAYROLL COSTS

We note that in 2023, there was a one-off payment to employees who were the subject of a pay cut in 2021 as a COVID-19 cost containment measure. [53] This payment totalled €4.1 million (€3.9m in 2022 prices). We have accounted for this in our analysis by excluding the value of the payment from 2023 pay figures to allow a more like-for-like comparison across years.[54]

C.1.1. Growth in unit payroll costs between 2019 to 2023

We assess the growth in AirNav Ireland's unit payroll costs between 2019 and 2023 to determine if the level of increase between the end of RP2 and the company's latest unit payroll costs is efficient.

In Appendix Table C.1 below, we compare the growth in unit payroll costs against the earnings of relevant industries and roles, as reported by the Central Statistics Office.[55] We exclude overtime and the 2023 one-off payment to staff who were subject to the 2021 pay cuts.

Appendix Table C.1: Growth in AirNav Ireland's unit payroll costs and comparator roles and industries between 2019-2023 (nominal)

AirNav Ireland Role	Growth (2019-2023)	Comparator industries	Growth (2019-2023)
ATCO	17.8%	**Air Transport**	19.9%
Corporate Services	25.0%	**Office administrative, office support and other business support activities**	19.6%
Operations Management Support	2.9%		
Data Assistant	0.0%	**Scientific research and development; advertising, other professional, scientific, technical and veterinary activities**	18.2%
Engineer	16.1%		
Average for all categories	23.6%	**National average**	15.1%

Source: CEPA analysis of AirNav Ireland payroll data and Central Statistics Office data
Note: Our calculation of 2019 unit payroll costs for Corporate Services and Operations Management Support uses updated headcount estimates provided to us by AirNav Ireland, which reflect an accurate allocation of headcount to the ANSP business.

For ATCOs, the growth in unit payroll costs was 17.8%, in line with the 19.9% growth in Air Transport earnings.

[53] AirNav Ireland (2023) The Irish Air Navigation Service trading as AirNav Ireland Regulated Entity Accounts.

[54] We account for this one-off payment by reducing the unit payroll costs for each staffing group by the same percentage as total payroll costs excluding the one-off payment. This value is 6.1%.

[55] Central Statistics Office (2024) EHQ15 - Average Weekly, Hourly Earnings and Weekly Paid Hour of All Employees. https://data.cso.ie/table/EHQ15

For corporate services and operations management and support, unit payroll costs grew by 25.0% and 2.9% respectively, between 2019 and 2023. The growth in the corporate services unit payroll cost significantly exceeded the comparator's growth of 19.6% in the same period. For corporate services roles, we assume this is not purely a wage growth effect but instead, also reflects changes in the mix of staff. Nevertheless, it does indicate potential inefficiency.

Finally, for engineering and data assistant roles, unit costs changed by 0.0% and 16.1% respectively against 'scientific research and development; advertising, other professional, scientific, technical and veterinary activities' growth of 18.2%.

Overall, we find that the average growth in AirNav Ireland unit payroll costs over the period 2019 to 2023, has been around 8% greater than the national average. In particular, we find evidence of potential inefficiency in unit payroll costs for corporate services, and operations management and support roles.

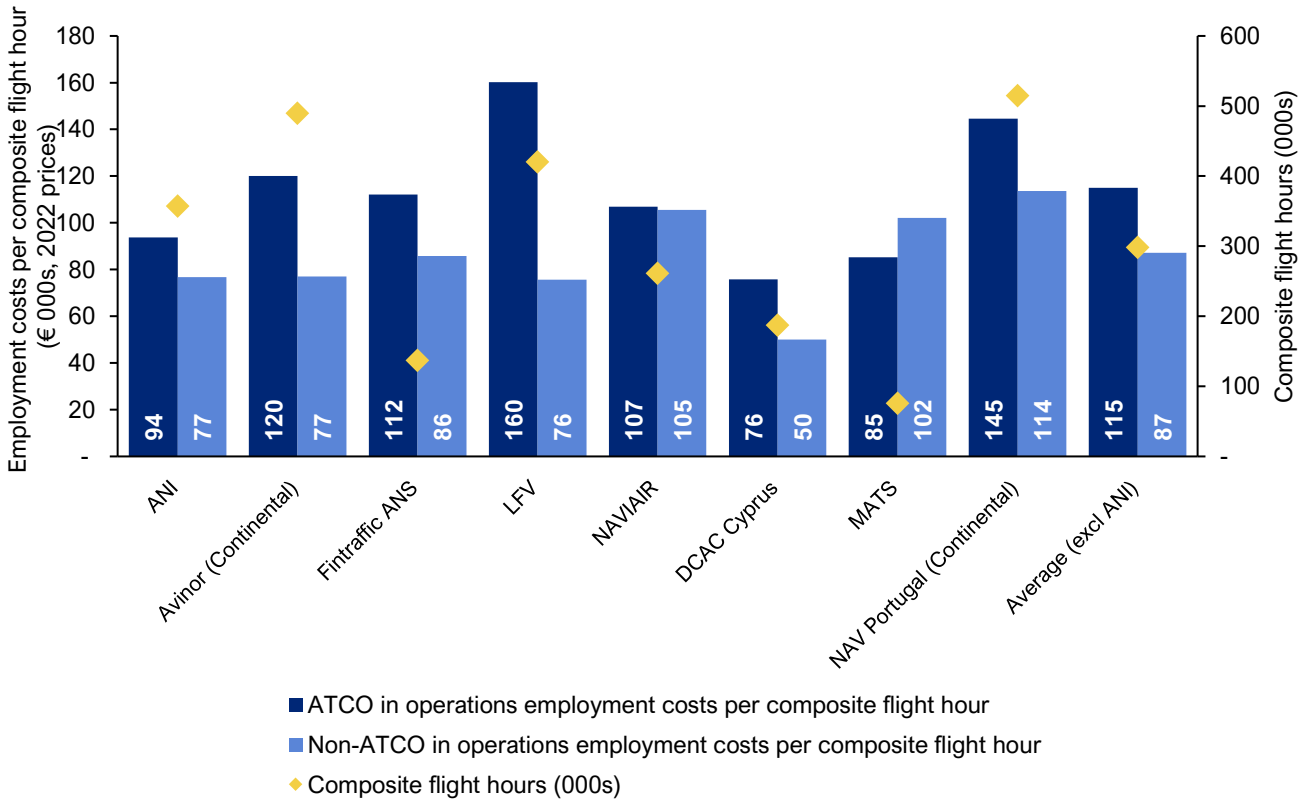
C.1.2. Benchmarking unit payroll costs against other ANSPs

We benchmark AirNav Ireland's operational ATCO and non-ATCO costs against other ANSPs using the ACE benchmarking dataset.[56] Where possible, we show costs are shown in both € 2022 prices and "Purchasing Power Parity" (PPP) adjusted units, which take account of differences in the local standard of living.

Appendix Figure C.1 below shows that, in 2022, AirNav Ireland had the third lowest operational ATCO and non-operational staff employment costs per composite flight hour in the sample of ANSPs considered, in PPP units. For ATCOs in Operations, AirNav Ireland's cost per composite flight hour of €117 compares with a comparator range of €72 to €213. For non-operational staff the AirNav Ireland figure of €96 compares to a comparator range of €79 to €129. This indicates that AirNav Ireland's employment costs when considered alongside composite flight hours are broadly in line with peer ANSPs.

[56] The ACE dataset only contains data for operational ATCOs. The Operational ATCO category includes Station Managers.

Appendix Figure C.1: Employment cost by ANSP, Euros per composite flight hour (PPP, 2022)

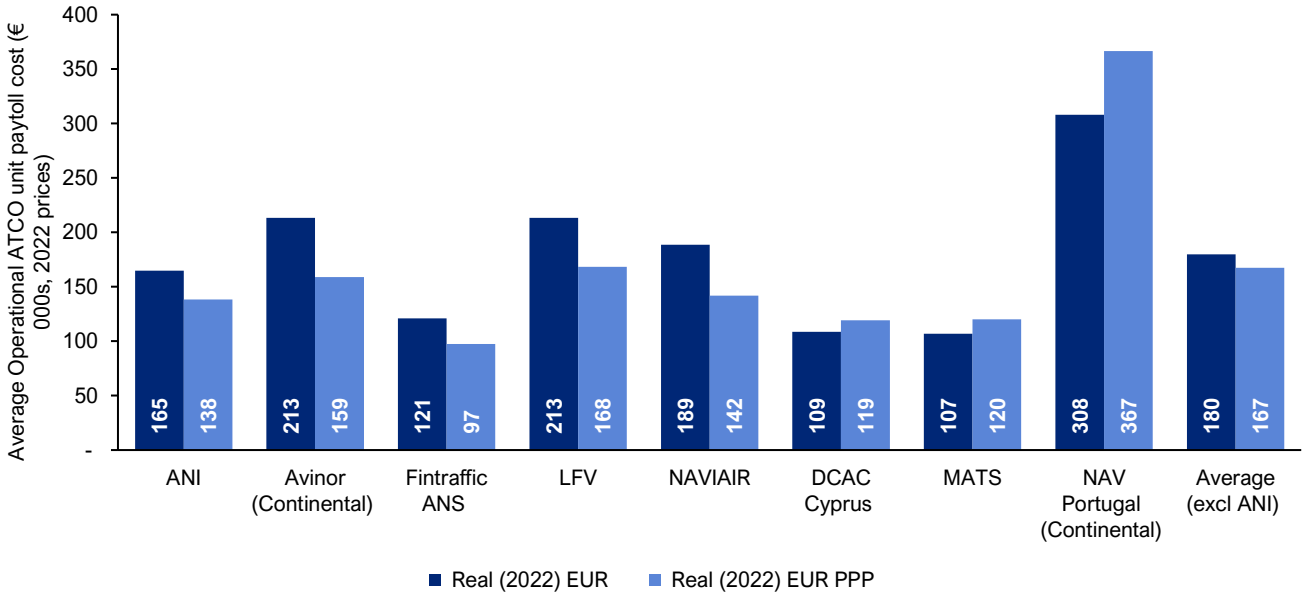


Source: CEPA analysis of ACE Benchmarking Report (April 2024 Edition)

We also consider employment costs on an average unit basis. Appendix Figure C.2 below shows the average cost per employee for operational ATCOs, both in real terms and in PPP-adjusted units. Appendix Figure C.3 shows the equivalent for non-operational staff.

AirNav Ireland's operational ATCOs unit payroll costs exceed Fintraffic ANS, DCAC Cyprus and MATS, but are lower than other comparators, in real terms. Operational ATCO unit employment costs, considered in PPP terms were 21% lower than the average (excluding ANI) of comparator ANSPs.

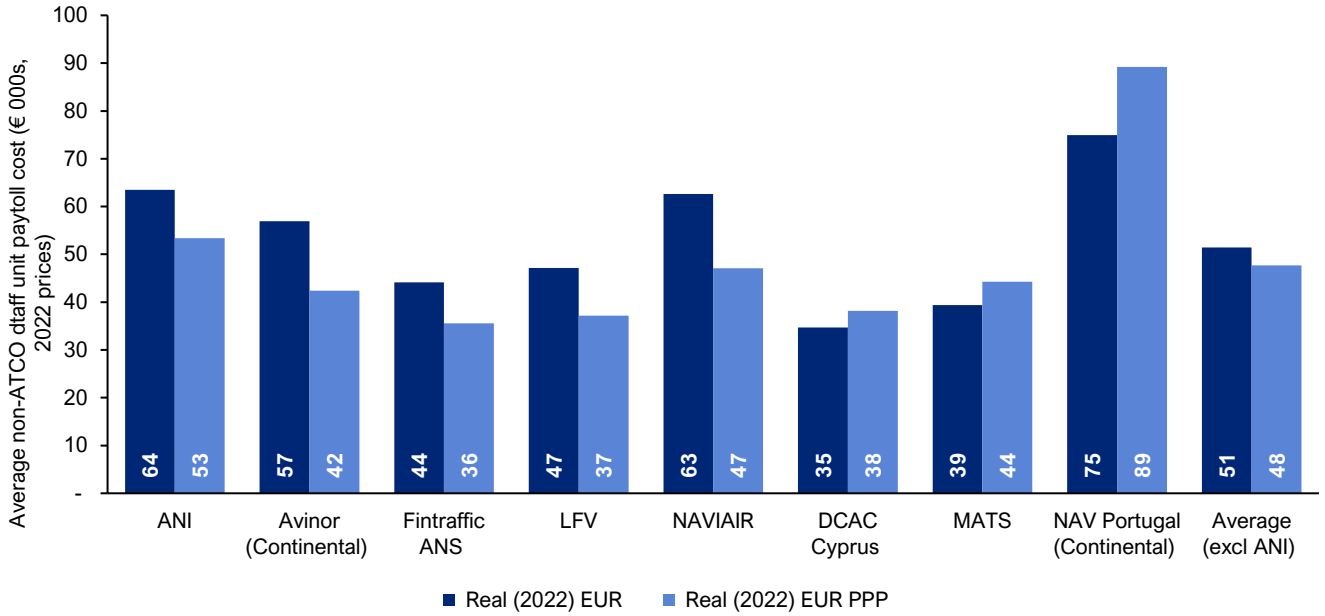
Appendix Figure C.2: Average operational-ATCO employment costs by ANSP



Source: CEPA analysis of ACE Benchmarking Report (April 2024 Edition)

In contrast to operational ATCO unit costs, Appendix Figure C.3 shows that AirNav Ireland's unit employment costs for non-operational staff are the second highest in the sample, below NAV Portugal. Non-operational staff unit employment costs, considered in PPP terms are 11% higher than the average (excluding ANI) of comparator ANSPs.

Appendix Figure C.3: Average non-ATCO employment costs by ANSP



Source: CEPA analysis of ACE Benchmarking Report (April 2024 Edition)

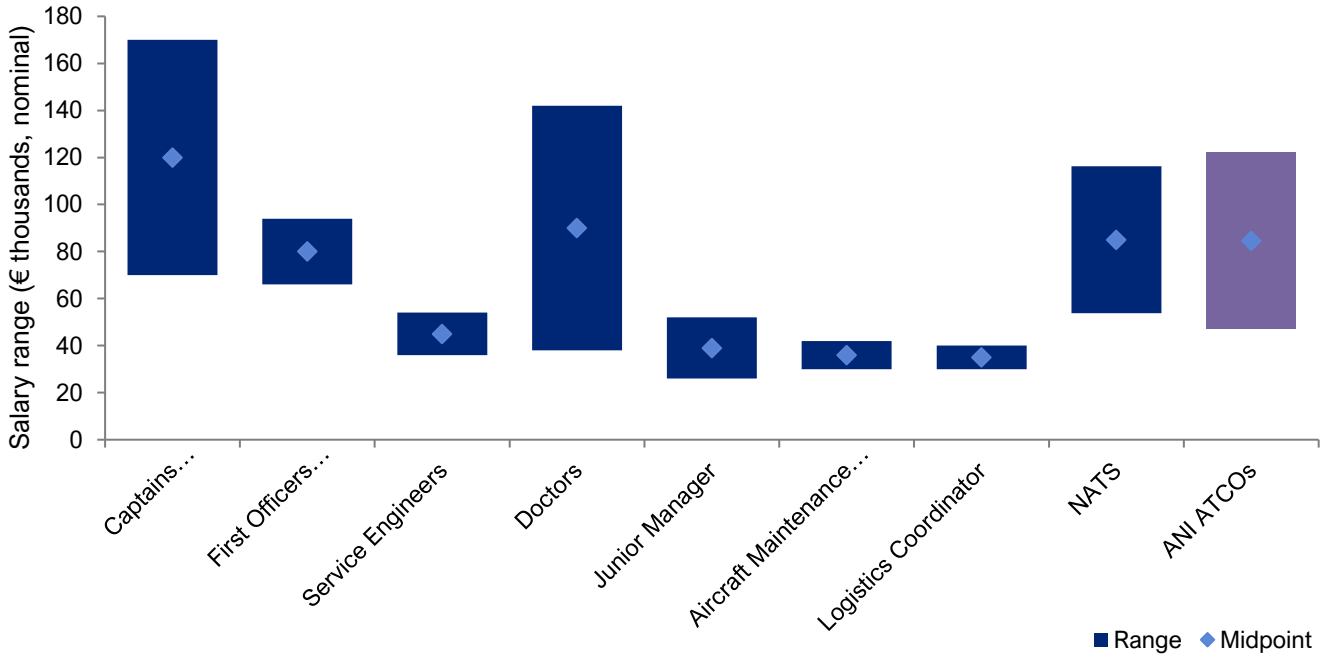
Overall, this analysis indicates that there may be scope for efficiency improvements within AirNav Ireland's non-ATCO unit payroll costs.

C.1.3. Gross Wage Benchmarking

For the third area of our analysis, we benchmark AirNav Ireland's payroll bands, excluding overtime and PRSI and pension contributions, against a range of public and private sector roles. We use data from Glassdoor and Forsa for wages specific to Ireland. We observe that AirNav Ireland's pay bands are relatively broad and so, it is possible that depending on which part of the pay band is benchmarked, the analysis may indicate either inefficiency or efficiency. For this benchmarking analysis, we consider the position of the midpoint of the benchmark and also assess the proportion of the pay band that is above the range of comparators.

For ATCOs, we benchmark against a range of public and private sector roles in Ireland and also included a UK ATCO comparator (NATS). We find that AirNav Ireland's wages are in line with relevant comparators, such as NATS staff and doctors, as shown in Figure C.4.

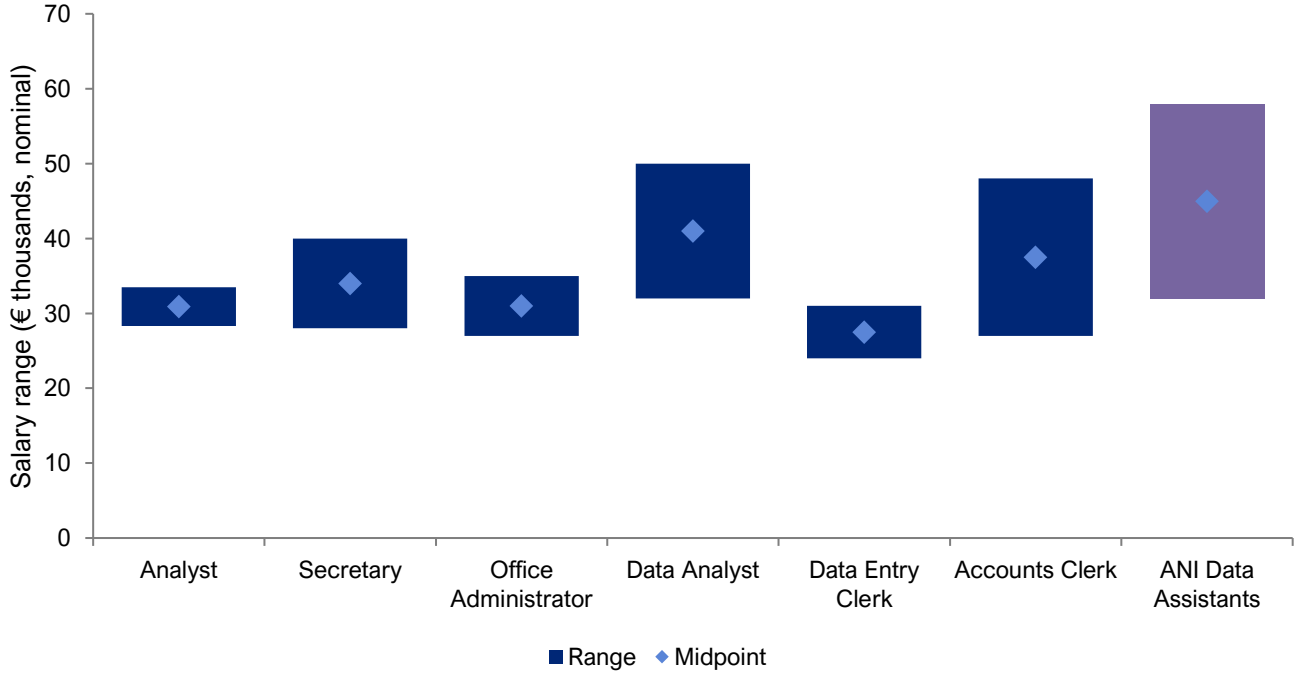
Appendix Figure C.4: Benchmarking of ATCO gross salary costs, 2024 (€ thousands, nominal)



Source: CEPA analysis of data from AirNav Ireland, Glassdoor and Forsa.ie. Note: AirNav Ireland data excludes pension and PRSI contributions.

Appendix Figure C.5 below shows that AirNav Ireland's mid-point for data assistants exceeds that of all comparator roles, which include data analysts and accounts clerks. The top of the wage band for AirNav Ireland's data assistant is 16% higher, and the mid-point in the range is 10% greater than other data analyst roles in Ireland.

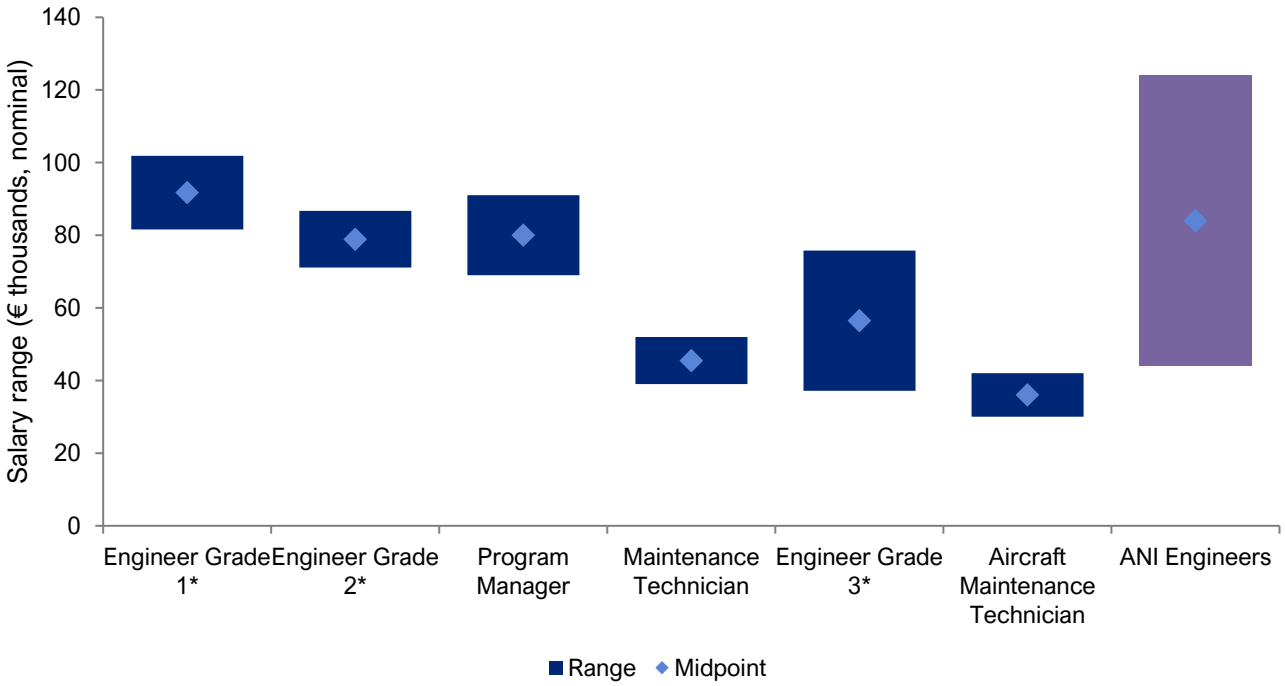
Appendix Figure C.5: Benchmarking of Data Assistant gross salary costs, 2024 (€ thousands, nominal)



Source: CEPA analysis of data from AirNav Ireland, Glassdoor and Forsa.ie. Note: AirNav Ireland data excludes pension and PRSI contributions.

Appendix Figure C.6 below shows that the top end of the wage range for AirNav Ireland's engineers exceeds all comparator roles. The top of AirNav Ireland's range is 22% higher than the highest paid comparator, however we find that that the mid-point of AirNav Ireland's range aligns with the highest paid comparator.

Appendix Figure C.6: Benchmarking of Engineer gross salary costs, 2024 (€ thousands, nominal)



Source: CEPA analysis of data from AirNav Ireland, Glassdoor and Forsa.ie. Note: AirNav Ireland data excludes pension and PRSI contributions.

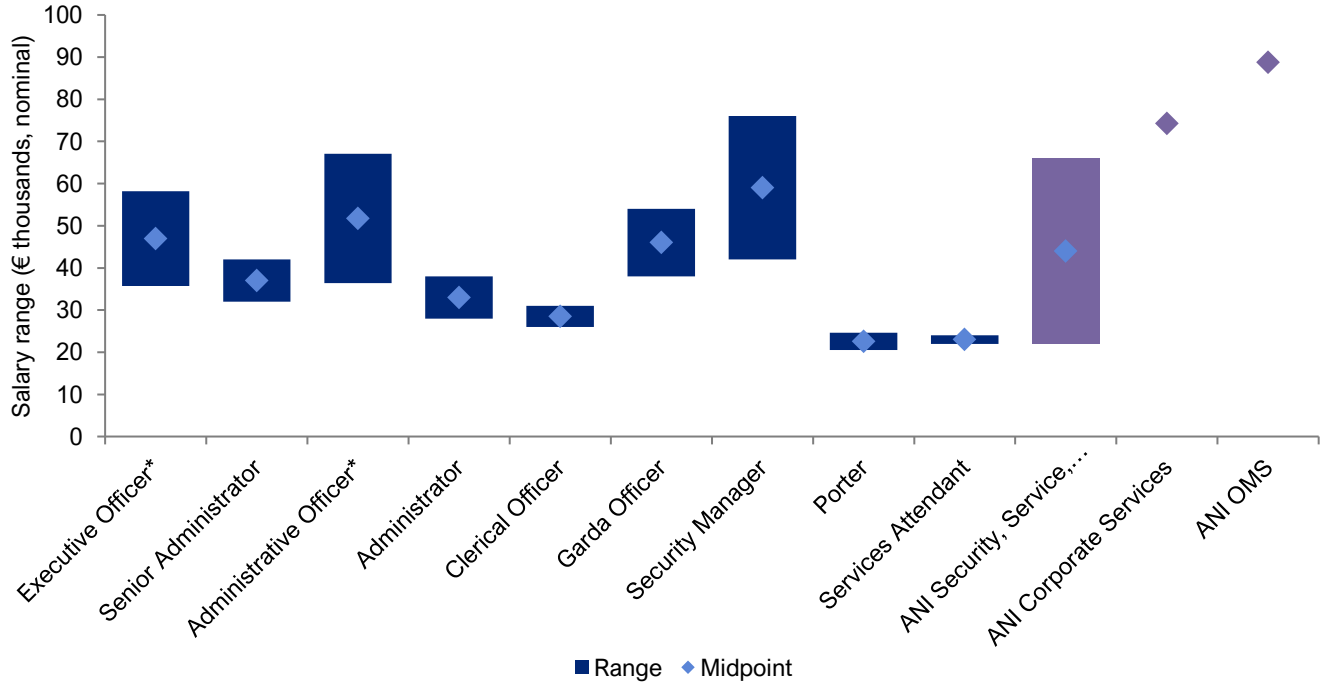
Appendix Figure C.7 below shows that the top of the wage range for AirNav Ireland's managers exceeds all other comparator roles, exceeding the highest paid comparator by 4%. The comparators include operations director, engineering managers, project managers, operations managers and junior managers. The unit payroll costs for corporate services and operations management and support fall within the ranges for both AirNav Ireland managers and comparator roles.

Appendix Figure C.7: Benchmarking of managerial staff gross salary costs, 2024 (€ thousands, nominal)

Source: CEPA analysis of data from AirNav Ireland, Glassdoor and Forsa.ie. Note: AirNav Ireland data excludes pension and PRSI contributions.

We benchmark AirNav Ireland's security, service and aviation executive roles against comparable roles in Ireland. Appendix Figure C.8 below shows that the wage range for AirNav Ireland's roles are in line with the comparator roles, such as security manager, administrative officer, garda officer and administrators. The unit payroll cost for both operations management and support exceeds the ranges for comparator roles in all cases. The unit payroll cost for corporate services exceeds all but one comparator range.

Appendix Figure C.8: Benchmarking of other gross salary costs, 2024 (€ thousands, nominal)



Source: CEPA analysis of data from AirNav Ireland, Glassdoor and Forsa.ie. Note: AirNav Ireland data excludes pension and PRSI contributions.

Overall, we find that this analysis identifies evidence of scope for efficiency improvements within certain non-ATCO roles, consistent with our other benchmarking exercises. However, this analysis suggests that the scope for efficiency is more widespread than the one role identified as potentially inefficient when benchmarking the growth in unit payroll costs between 2019 and 2023.

Nevertheless, we choose not to apply any efficiency adjustment to engineering staff, recognising that AirNav Ireland has failed to recruit sufficient numbers of engineering staff in recent years, which may be an indicator of tightness in the labour market. Similarly, as unit payroll costs for data assistants and operations management support have stayed largely flat over the past four years, we consider it impractical to apply any efficiency adjustment.

APPENDIX D COST ALLOCATION

In this appendix, we briefly summarise the cost allocation keys used to split our opex forecast into en-route and terminal. In summary, we adopt the approach taken by AirNav Ireland and reviewed by independent advisors, considering it a logical and pragmatic approach.

D.1. STAFF COSTS

We allocate staff costs to terminal based on the split of headcount into en-route and terminal. We do this separately by role:

- For **operational ATCOs**, we model headcount separately for each location – Dublin ACC/Tower, Shannon ACC, Shannon Tower and Cork Tower. We then use AirNav Ireland's allocation keys to split into en-route and tower:
  - For Dublin ACC/Tower, we use a ratio of 76:24 (en-route to terminal)
  - For Shannon ACC, we use a ratio of 100:0 (en-route to terminal)
  - For Shannon and Cork Towers, we use a ratio of 60:40 (en-route to terminal)
- For **non-operational ATCOs**, we use the 2024 budget cost-allocation, which includes the transfer of Operational Support Group staff. Beyond that, we expect the allocation to remain constant.
- For **corporate services staff**, we use a ratio of 73:14 (en-route to terminal) in line with AirNav Ireland's cost allocation key.
- For **data assistants**, we start with the 2023 cost allocation. We then adjust year on year to account for step changes:
  - We assume that the transfer of 6 FDCP from Shannon ACC to data assistants will all be en-route.
  - We assume that the 10 new data assistants for FMP/AMC will be split in accordance with the Dublin ACC/Tower cost allocation key of 76:24 (en-route to terminal).
- For **engineers**, we use the 2023 outturn cost-allocation, which we expect to remain constant through RP4.
- For operations management support, we also use the 2023 outturn cost-allocation, which we expect to remain constant through RP4.

The resultant allocation by year is summarised in the table below:

Appendix Table D.1: Cost allocation assumptions for staff costs

	2025	2026	2027	2028	2029
Operational ATCOs	86%	86%	86%	86%	86%
Non-Operational ATCOs	86%	86%	86%	86%	86%
Corporate Services	89%	89%	89%	89%	89%
Data Assistant	84%	84%	84%	84%	84%
Engineer	88%	87%	87%	87%	87%
Operations Management Support	85%	85%	85%	85%	85%

Source: CEPA analysis of AirNav Ireland data

D.2. NON-STAFF COSTS

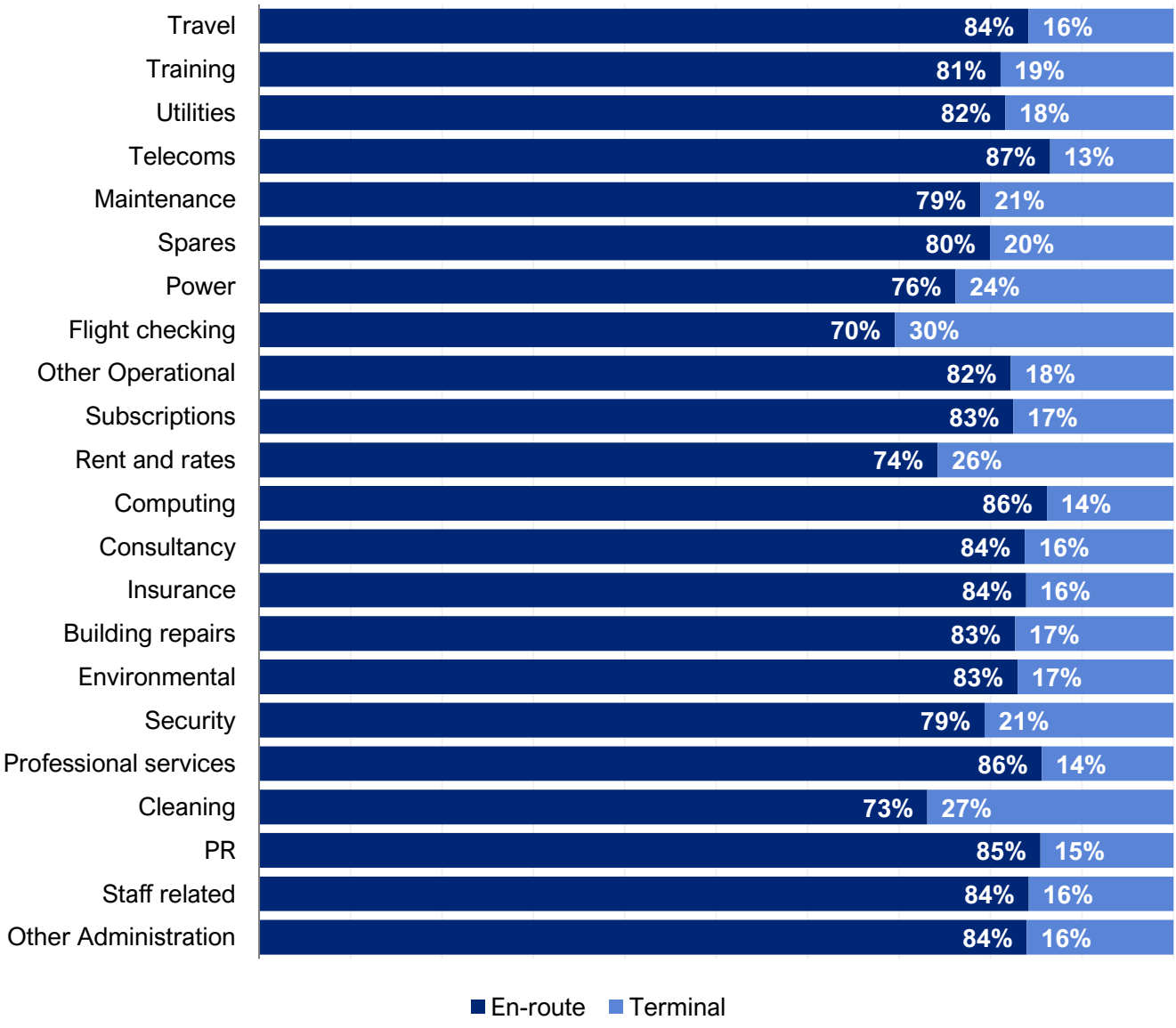
AirNav Ireland's approach to the cost allocation of non-staff costs can be summarised as follows:

- For **operational non-staff costs**, the costs are initially allocated to an 'Activity' and to a 'Location'. Then AirNav Ireland used a standardised allocation key to split these costs into en-route and terminal, depending on the Activity and Location.

- For more **general support costs**, these are split into specific subcategories, each of which have a defined allocation key.

As most non-staff costs comprise of multiple activities and locations, the overall allocation for each non-staff cost category is a weighted average depending on the structure of spend. As such, we use the proportions within AirNav Ireland's 2024 budget as the basis for our allocation of costs into en-route and terminal, on the basis that the split of costs by activity and location remain relatively static. Based on the overall allocation of costs from previous years, as well as AirNav Ireland's proposed allocations for RP4, we consider this assumption reasonable. The resultant cost allocations are summarised in the figure below.

Appendix Figure D.1: Cost allocation assumptions for non-staff costs



Source: CEPA analysis of AirNav Ireland data

UK

Queens House

55-56 Lincoln's Inn Fields

London WC2A 3LJ

T. **+44 (0)20 7269 0210**

E. **info@cepa.co.uk**

www.cepa.co.uk

Australia

Level 20, Tower 2 Darling Park

201 Sussex Street

Sydney NSW 2000

T. **+61 2 9006 1308**

E. **info@cepa.net.au**

www.cepa.net.au

Cepa-ltd **@cepaltd**