



INDEPENDENT REVIEW OF EVIDENCE ON OPERATING COST EFFICIENCY

A REPORT FOR NATS



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1. Introduction and Executive Summary

In this report, we set out our independent review of the evidence relating to NERL’s operating cost efficiency. Overall, our conclusions are: (a) NERL’s Business Plan incorporates significant and ambitious efficiency savings; and (b) the additional savings identified by the CAA are unlikely to be achievable in RP3.

1.1 Introduction – the difference between the CAA and NERL is £45m

NERL’s operating costs provide for:

- (i) the day-to-day running of its business - the provision of air traffic control services;
- (ii) maintenance of its facilities, systems, and infrastructure; and
- (iii) the strategic change programme - related to airspace modernisation, technological change, etc.

In its RP3 Final Decision, the CAA decided to allow NERL £2,111m of operating cost allowances (excluding depreciation and pensions). This compares to the figure in NERL’s (revised) Business Plan¹ of £2,156m – a difference of £45m.²

As shown in Table 1, the difference between the CAA and NERL arises in the last two years of RP3, where the CAA considers that NERL’s operating costs should be around 5-6% lower than set out in the (revised) Business Plan (RBP).

¹ All references to NERL’s Business Plan in this document relate to its (revised) Business Plan.

² NERL has told us that the £2,156m and £2,111m figures are not ‘like-for-like’. This is because the CAA figure is intended to fund additional activities that have not been included in NERL’s (revised) Business Plan, relating to Opex Flexibility Fund (OFF) and Airspace Change Organising Group (ACOG). Deducting the costs of these activities (as estimated by the CAA) would increase the difference between the CAA and NERL from £45m to £67m.

Table 1: A comparison of the operating costs in NERL's RBP and the CAA's Proposals

(2017 prices)	2020	2021	2022	2023	2024	RP3
NERL RBP (£m)	426	424	441	438	427	2,156
The CAA FD (£m)	425	423	440	418	404	2,111
Difference (£m)	0	0	0	-20	-24	-45
Difference %	0	0	0	4.6%	5.6%	2.1%

Notes: (i) Figures in the table relate to operating costs for the provision of en-route services only. (ii) Figures may not add up because of rounding.

Source: 'UK RP3 CAA Decision Document (CAP 1830)', CAA (August 2019); Table 5.2.

In view of the CAA's referral of its Final Proposals to the CMA, NERL commissioned Economic Insight to undertake an independent review of the evidence relating to operating cost efficiency. In particular, we sought to answer the following questions.

- First, does NERL's (revised) Business Plan incorporate efficiency savings and to what extent are they ambitious?** It is important that the (revised) Business Plan incorporates an efficiency challenge that is ambitious, but at the same time is not so onerous to risk compromising NERL's ability to meet its safety and service obligations. For the reasons set out below, we conclude that NERL's (revised) Business Plan incorporates efficiency savings of c.6.3% in the final year³ and that they are ambitious.⁴
- Second, to what extent does the evidence show that the additional efficiency savings identified by the CAA would be achievable?** For the reasons set out below, we conclude that the additional savings identified by the CAA (c.5% in the final year)⁵ are not supported by the evidence, and may not be achievable.
- Third, what would a robust approach to determining an efficiency challenge for NERL look like? And, how does NERL's and the CAA's approach perform against this?** In the context of a single regulated company, where appropriate benchmarks may not exist, determining the efficient level of operating costs is a challenging exercise. Therefore, a robust approach to the assessment of efficient operating costs would: (a) use a combination of top-down and bottom-up approaches; and (b) clearly connect this evidence to the determined efficient level of operating costs.

On the one hand, NERL's evidence in its (revised) Business Plan is based only on a bottom-up analysis of its business needs. By design, there is a clear connection between this evidence and its estimates of operating costs. On the other hand, in its Final Decision, the CAA considers a range of top-down and bottom-up evidence. However, there is no transparent connection between this evidence and its determination of the efficient level of operating costs. This results in inconsistencies between its evidence and its consideration of the efficient level of

³ Please see Table 3 for further details on the calculations.

⁴ As shown in Table 1, the difference in operating costs between the CAA and NERL only arises in the last two years of RP3. Therefore, for ease of comparison, in this report, the efficiency challenge is calculated for the final year of RP3. This equates to an average efficiency challenge in each year of RP3 of 2.3%.

⁵ We note that this figure is conservative because no adjustment has been made to account for the additional activities included in the CAA's figure, but not included in NERL's (revised) Business Plan. Please see footnote 2.

operating costs. This is most evident in its suggested profile of efficient operating costs - these follow NERL's (revised) Business Plan in the first three years and are then expected to drop significantly in the last two years of RP3. There seems to be no evidence (top-down or bottom-up) to support the feasibility of these substantial efficiency savings in the last two years.

Taking a step back, on the basis of our own consideration of available evidence, both NERL's (revised) Business Plan and the CAA's Final Decision incorporate significant and ambitious efficiency savings. As noted above, however, the scope for the savings identified in NERL's (revised) Business Plan would themselves be challenging, and therefore, the additional efficiency savings identified in the CAA's Final Decision would seem unachievable. In particular, we find no evidence to support the CAA's expectation that, after incurring the costs identified in NERL's (revised) Business Plan in the first three years, it can make rapid efficiency savings in the last two years.

- Fourth, what are the key issues the CMA may need to consider relating to operating cost efficiency in making its redetermination?** In determining the efficiency challenge for NERL during the redetermination process, we think it is most important for the CMA to carefully consider: (a) how the evidence connects to the determined level of operating costs; (b) whether the scope for efficiency savings in NERL's (revised) Business Plan is ambitious; (c) whether there is evidence to support the additional efficiency challenge identified by the CAA; and (d) whether, after allowing the operating costs identified in NERL's (revised) Business Plan in the first three years, there is evidence to support the scope for NERL to significantly reduce the operating costs in the final two years.

1.2 NERL's Business Plan incorporates ambitious efficiency savings

In this section we summarise our conclusions regarding the scale and ambition of the efficiency savings in NERL's (revised) Business Plan.

1.2.1 Our view of the scale of the efficiency challenge in NERL's Business Plan

The evidence shows that NERL's (revised) Business Plan incorporates significant efficiency savings. Specifically, it shows that by the end of RP3, NERL is expected to deliver higher levels of activity compared to the end of RP2, while facing input price pressures, but without a similar increase in its operating cost allowance.

- The CAA anticipates a significant increase in traffic over RP3, from 12,265 (at the end of RP2) to around 13,472 Chargeable Service Units (CSUs) at the end of RP3 – around a 10% increase. This increase will put upward pressure on NERL's operating costs in RP3 relative to RP2.
- At the same time, it is likely to face input price pressures in terms of real wage increases (i.e. wage increases over CPI), of around 6% by the end of RP3. This will also put an upward pressure on NERL's operating costs in RP3 relative to RP2.
- Without efficiency savings (reducing NERL's operating costs); any additional incremental activities (increasing NERL's operating costs) or easing of service delivery standards (reducing NERL's operating costs), one would expect NERL's

operating costs at the end of RP3 to be around 8% higher than at the end of RP2 – about £456m.⁶

- But, NERL's (revised) Business Plan shows that it expects its operating costs to be very similar at the end of RP3 in 2024 (£427m) compared to the end of RP2 in 2019 (£422m) in real terms – about 1.2% increase.

The implication is that NERL's (revised) Business Plan already incorporates a significant efficiency challenge – approximately 6.3% in the final year of RP3.⁷

The above figure does not take account of the significant strategic improvements that NERL is also planning to deliver over RP3 relating to: (a) airspace change; (b) technology change; and (c) development of future ATM capability. This will put further upward pressure on NERL's operating costs in RP3 relative to RP2. Specifically, these amount to additional operating costs of c.£117m over RP3. The overall efficiency challenge incorporated in NERL's (revised) Business Plan is, therefore, likely to be even higher.⁸

1.2.2 Our assessment of the ambition of the efficiency challenge

NERL's ability to achieve this efficiency challenge depends on its scope to:

- make 'one-off' efficiency savings, for example by 'catching-up' to the most efficient air navigation service providers (ANSPs); and
- take advantage of 'ongoing' efficiency savings, for example by taking advantage of economy-wide increases in productivity, or sector-specific technological change.

There are broadly two ways of evaluating the scope for making these efficiency savings:

- top-down methods – this involves comparing NERL's RP3 (revised) Business Plan to its historic expenditure for a similar level of activity and/or comparing NERL to other similar ANSPs; and
- bottom-up methods – this involves reaching a view on the type, number and cost of individual inputs needed to deliver the requisite activity.

Each method has well known strengths and weaknesses and both types of evidence have been developed in the context of this price control review. We comment specifically on the evidence below.

1.2.2.1 Top-down evidence

We note that the top-down evidence strongly suggests that the scope for NERL to make one-off and ongoing efficiency savings (in addition to those that it has already made through RP2) is limited.

- The evidence suggests that the scope for NERL to make one-off efficiency savings due to 'catching up' may be limited. Specifically:

⁶ Please see Table 3 for further details on the calculations.

⁷ Please see Table 3 for further details on the calculations.

⁸ Estimated to be c.11% - please see Table 4 for further details on the calculations.

- NERL has made significant operating cost reductions since part-privatisation in 2001. Therefore, as the company responds to incentive regulation, the inefficiencies related to functioning in a monopolistic environment would likely diminish. Consequently, the opportunity for making further efficiency savings may be more limited in RP3 than in previous price controls.
- Evidence from the Eurocontrol ATM Cost Effectiveness Dashboard comparing NERL to six other comparable European ANSPs using several efficiency metrics shows that, across all of these metrics, NERL is ranked first or second in terms of its efficiency. In fact, given similar performance against benchmarks in other regulated sectors, NERL would be considered to be an upper quartile (if not the frontier) firm.
- The evidence suggests that the scope for NERL to make ongoing efficiency in line with economy-wide increases in productivity is also likely to be limited. This is because productivity in the UK economy has flatlined since the financial crisis. In fact, even in comparative industries (notably IT and information services, and professional support services), though TFP growth has been positive, it has significantly declined since 2007.

1.2.2.2 Bottom-up evidence

We further note that considering the specific features of NERL's operations, the scope for it to make continuous efficiency savings in line with historic trends also appears limited. Specifically:

- The paucity of supply of the highly specialised safety-related skills of air traffic controllers, combined with the significant (c.2-3 years) training lead times, limits the flexibility of its operations.
- Labour productivity in the UK economy is low and so NERL cannot benefit from any economy-wide productivity improvements. Furthermore, some of the efficiency measures may create upfront costs (such as, redundancy costs) which would need to be funded.
- The high level of unionisation in its workforce has implications in terms of, both, the efficiency measures NERL can employ as well as the costs associated with them.

1.2.2.3 Implication

The implication of the above is that, on the evidence, the scale of the efficiency challenge in NERL's (revised) Business Plan is ambitious and challenging for it to meet.

1.3 The CAA's efficiency challenge is not supported by the evidence and may not be achievable

1.3.1 The evidence that the CAA relied upon

To arrive at its view of NERL's efficient level of operating costs in RP3, the CAA stated that its draft proposals relied on the following facts and analyses:

- NERL’s operating costs per CSU fell by around 2.3% per year from 2007 to 2017;
- NERL’s average operating cost outperformance from 2007 to 2017 was about 5%;
- the Performance Review Body (PRB) estimated the potential for operating and capital cost efficiencies from NERL’s 2014 to 2016 baseline was around 8%; and
- analysis undertaken by Steer/Helios.⁹

In its Final Proposals, the CAA recognised that “...the scale of importance of NERL’s capital programme during RP3 will require it to have additional resilience in its staffing to train operational staff on new systems and procedures...” and decided to allow it its (revised) Business Plan forecasts of operating costs in the first three years of RP3.¹⁰ Except for some minor changes, the CAA did not change its view from its draft proposals regarding the efficient level of operating costs in the last two years of RP3 (2023 and 2024).

This equates to an efficiency challenge of c.11% in the final year of RP3 (or, 5% additional efficiency savings beyond NERL’s (revised) Business Plan).¹¹

1.3.2 Our assessment of the evidence

Overall, our conclusion is that the additional savings identified by the CAA are not supported by robust evidence, and are likely not achievable. In particular, after incurring the costs identified in NERL’s (revised) Business Plan in the first three years, it does not seem feasible for it to make rapid and substantial efficiency savings in the last two years.

In our assessment below, we first consider the CAA’s top-down evidence and then its bottom-up evidence. Finally, we assess the link between this evidence and the overall efficiency challenge the CAA proposes.

1.3.2.1 Top-down evidence

We consider that there is a risk that the CAA has attached too much weight to NERL’s costs in 2017 (which appears to be an unusual year) and also to its performance in CP2 (which is now almost a decade ago). The consequence is that the CAA is likely to overstate the scope for NERL to make efficiency savings in RP3.

- First, the stated reduction in NERL’s operating costs per CSU of 2.3% per year from 2007 is substantially driven by: (a) an unusually low unit cost in 2017; and (b) the CAA’s use of CSU as the unit of traffic. We find that:
 - the unit cost in 2017 is the lowest it has been since 2007;
 - unit costs have since increased by 5.2% between 2017 and 2018;
 - comparing 2007 to 2016 instead, results in a much smaller (1.3%) reduction – more generally, the rationale for focus on 2017 is unclear; and

⁹ [‘UK RP3 CAA Decision Document \(CAP 1830\),’ CAA \(August 2019\); paragraphs 5.9 and 5.10.](#)

¹⁰ [‘UK RP3 CAA Decision Document \(CAP 1830\),’ CAA \(August 2019\); paragraph 5.25.](#)

¹¹ *We note that this figure is conservative - please see footnote 5.*

- using an alternative metric of traffic (number of flights as opposed to CSUs) indicates a smaller (1.8%) average decline in unit operating costs between 2007 and 2017.
- Second, the stated average operating cost outperformance of 5% from 2007 to 2017 is substantially driven by the outperformance in CP2 and RP1, which has not persisted into RP2. We find that the cost outperformance has fallen in each price control, which is consistent with NERL exhausting the scope for efficiency savings. Specifically:
 - the average cost outperformance in CP2 and RP1 was 7.0% (positive); whereas
 - the average cost outperformance in RP2 so far (from 2015 to 2018) has been -2.6% (negative) – i.e. on average, there has not been cost outperformance in RP2.
- Third, notwithstanding the uncertainty in the PRB’s evidence highlighted by the authors, and consistent with the comparative evidence discussed in section 1.2.2.1, it finds NERL to be one of the most efficient European ANSPs. On this basis, it suggests that the scope for NERL to make catch-up efficiency savings in its total costs (capital and operating) could be as low as 1%.

1.3.2.2 Bottom-up evidence

We have material methodological concerns regarding Steer’s bottom-up assessment of individual elements of NERL’s operating costs. These include, but are not limited to, the following:

- Steer’s estimates of headcount for operational air traffic controllers (ATCOs) are not underpinned by any evidence. For instance, without providing any basis for the assumption, Steer suggested that NERL should be able to drive at least 2% to 3% efficiency gains as a result of increased capacity of controllers from the deployment of DSESAR.
- Steer’s estimates of headcount for trainee air traffic controllers (TATCs) is based on an unevidenced assumption of a one-to-one relationship between the headcount for TATCs and demand for operational ATCOs in the same year. In reality, TATCs face average training lead times of 2-3 years, which Steer does not account for. Furthermore, notwithstanding the above, these calculations are inconsistent with its estimates of headcount for operational ATCOs.
- Relevant to its headcount for staff in the managerial support group (MSG) and personal contract group (PCG), Steer’s analysis is based on the elasticity of head office staff to growth in traffic volumes. However, this is: (a) based on airports (not ANSPs); (b) only considers two airports; and (c) does not assess the suitability of these airports as benchmarks for NERL.

1.3.2.3 Link between the evidence and the overall efficiency challenge

We find that there is no transparent or explicit link between the CAA’s forecasts and the evidence listed above. Therefore, we do not know the details of how the CAA has reached its conclusions on the efficiency challenge; whether it has attached

appropriate weight to different types of evidence; or interpreted it correctly. This makes it difficult for us to be confident in the CAA's forecasts.

Importantly, it leads to apparent inconsistencies in the CAA's assessment. This is most evident in its suggested profile of efficient operating costs. In particular, the CAA allowed NERL its (revised) Business Plan forecasts of operating costs in the first three years of RP3. Given this, there is no evidence to support the CAA's view that NERL will be able to significantly cut its operating costs in the last two years of RP3. Specifically:

- The CAA's own assessment is that NERL will require "*additional resilience in its staffing to train operational staff on new systems and procedures*",¹² there is no evidence or reason given as to why this requirement will fall away in the final years of RP3. Even if it did, as discussed in section 1.2.2.2, the rapid workforce reduction implied by it may not be feasible and would not be costless.
- Similarly, the CAA's argument that staff retiring provides "*scope for NERL to identify and achieve greater efficiencies*"¹³ is weak. Staff retiring is as likely to give rise to increased cost pressures associated with managing the orderly exit of existing staff members; the recruitment and training of new staff members; and the possible loss of productivity this entails. As detailed in the Annex, based on its operational experience, NERL suggests that it takes trainee air traffic controllers nearly 5 years to get the same level of experience (i.e. to get to the same number of technical validations) as a retiring ATCO.
- More broadly, the context; the requirements; or the drivers of the overall operating costs are not expected to be different in the final two years of RP3. Therefore, in light of the top-down and bottom-up evidence, there does not seem to be any evidence to expect that the scope for making efficiency savings would be higher in these final two years.

1.4 Key issues for consideration by the CMA

On the basis of our consideration of the evidence detailed above, Table 2 sets out the key issues that we think that the CMA needs to consider in determining the efficient level of operating costs for NERL at RP3.

¹² '[UK RP3 CAA Decision Document \(CAP 1830\)](#),' CAA (August 2019); paragraph 5.25.

¹³ '[UK RP3 CAA Decision Document \(CAP 1830\)](#),' CAA (August 2019); paragraph 5.24.

Table 2: Key issues for consideration by the CMA

Topic	Key issues for consideration by the CMA
Link between evidence and operating costs	<ul style="list-style-type: none"> • Whether there is a clear and transparent link between the evidence and the determined level of operating costs?
Scale of the challenge	<ul style="list-style-type: none"> • Is the scope for efficiency savings in NERL’s (revised) Business Plan challenging given the contextual evidence available? • Is there evidence to support the additional efficiency challenge identified by the CAA? • Specifically, after allowing the operating costs identified in NERL’s (revised) Business Plan in the first three years, is there evidence to support the scope for NERL to significantly reduce the operating costs in the final two years?

Source: *Economic Insight*.

1.5 Structure of this report

The rest of this report is structured as follows:

- Chapter 2 sets out our assessment of the scale of the efficiency challenge incorporated in NERL’s (revised) Business Plan and our assessment of its ambition and achievability. This chapter contains the analyses that support the points set out in section 1.2 above.
- Chapter 3 sets out our assessment of the evidence underpinning the CAA’s forecasts of NERL’s costs in RP3. It contains the analyses that support the points set out in section 1.3 above.
- Chapter 4 summarises the main conclusions of our independent review and the implications for the CMA.
- Chapter 5 is the Annex which contains a detailed explanation of the drivers of the headcount for each staff category which is important to the understanding the bottom-up evidence prepared by Steer for the CAA.



2. Our assessment of NERL's efficiency challenge at RP3

In this chapter, we present our assessment of the scale, scope and ability for NERL to make the efficiency savings identified in its (revised) Business Plan. Overall, our conclusion is that the scale of the efficiency challenge in NERL's (revised) Business Plan is ambitious. Specifically, we find that: (i) NERL's (revised) Business Plan incorporates significant efficiency savings; (ii) top-down evidence suggests that the scope for it to make catch-up and ongoing efficiency savings seems limited - in fact, given similar performance against benchmarks in other regulated sectors, NERL would be considered to be an upper quartile (if not the frontier) firm; and (iii) given specific features of NERL's operations, its ability to make efficiency in line with historic trends appears limited. Therefore, the efficiency savings identified in NERL's (revised) Business Plan appear challenging.

This chapter is structured as follows:

- In section 2.1, we estimate the scale of the efficiency challenge in NERL's (revised) Business Plan.
- In section 2.2, we use top-down evidence to assess the scope for NERL to make these efficiency savings over RP3.
- In section 2.3, we consider the specific features of NERL's operations to evaluate its ability to make efficiency savings over RP3.
- Finally, in section 2.4, we present our conclusions regarding the scope, scale and ability for NERL to make the efficiency savings identified in its (revised) Business Plan.

2.1 Our assessment of the scale of the efficiency challenge in NERL's Business Plan

Neither NERL, nor the CAA, transparently lay out the efficiency challenge that they have assumed within their estimates of the operating costs for RP3. Therefore, in this section, we estimate the efficiency challenge implied by the estimates of operating costs in NERL's (revised) Business Plan.

In the absence of planned efficiency savings, NERL's operating costs would be expected to increase in line with:

- its expected level of 'activity'; and
- the input price pressures it faces.

Over the RP3 period, the CAA anticipates a significant increase in NERL's expected level of activity.

Impact of growth in traffic over RP3

Firstly, the magnitude of traffic that NERL is expected to handle is forecast to increase from 12,265 Chargeable Service Units (CSUs) in 2019 (at the end of RP2) to 13,472 in 2024 (at the end of RP3).¹⁴ This is equivalent to an approximately 10% increase in traffic. This increase would be expected to put an upward pressure on NERL's operating costs in RP3 compared to RP2.

NERL estimates that 25% of its staff costs and 10% of its non-staff costs over RP3 would be affected by these changes in traffic.¹⁵ Since 68% of NERL's estimated operating costs over RP3 relate to staff costs and the remaining 32% to non-staff costs,¹⁶ this implies that the additional traffic would put an upward pressure on about 20% of NERL's operating costs.¹⁷ Therefore, all other things being equal, one would expect NERL's operating costs by the end of RP3 to be c.2% higher.

In practice, however, NERL's (revised) Business Plan estimates its operating costs at the end of RP3 to be only 1.2% higher than at the end of RP2.¹⁸ This implies that NERL's (revised) Business Plan incorporates efficiency savings equivalent to at least 0.8%.

Impact of real wage growth over RP3

Further to the impact of traffic, NERL's operating costs would also be impacted by the real wage growth over RP3. Specifically, since a significant portion of NERL's operating costs relate to staff costs, and a substantial part of its non-staff costs also relate to outsourced labour costs, an increase in economy-wide wages over CPI would be expected to put an upward pressure on NERL's operating costs.

As shown in Table 3, in the absence of planned efficiency savings, one would therefore expect NERL's operating cost over RP3 to be c.8% higher (row F). However, in its (revised) Business Plan, NERL only expects a 1.2% increase in its operating costs between 2019 (the end of RP2) and 2024 (the end of RP3). This implies that NERL's

¹⁴ CSUs as estimated by the STATFOR forecasts used by the CAA as reported in 'UK RP3 CAA Decision Document (CAP 1830).' CAA (August 2019); Table 1.1.

¹⁵ 'Appendices: RP3 Business Plan 2020-2024.' NATS (26 October 2018); Appendix I; page 64.

¹⁶ 'Appendices: RP3 Business Plan 2020-2024.' NATS (26 October 2018); Appendix H; page 50.

¹⁷ This is a weighted average calculated as such: $(68\% \times 25\%) + (32\% \times 10\%) = 20\%$.

¹⁸ NERL's Business Plan operating cost estimates at the end of RP2 (in 2019) is £422m and at the end of RP3 (in 2024) is £427m (figures may be rounded) - as reported in 'UK RP3 CAA Decision Document (CAP 1830).' CAA (August 2019); Table 5.2.

(revised) Business Plan incorporates efficiency savings equivalent to c.6.3% (=£427/£456 - 1).

Table 3: Implied efficiency challenge in NERL's (revised) Business Plan

(2017 prices)		End of RP2	End of RP3
		2019	2024
A ¹⁹	Operating costs (£m)	£422	£427
B ²⁰	CSUs ('000s)	12,265	13,472
C = A/B	Operating costs per CSU	£34.4	£31.7
D ²¹	% operating costs variable to traffic	20%	
E ²²	Real wage growth (cumulative)		5.9%
F ²³	Expected operating costs (£m)		£456
G=(A-F)/F	Implied efficiency challenge	6.3%	

Notes: Please see footnotes 19; 20; 21; 22; and 23.

Source: Economic Insight analysis.

Impact of significant change programme

Secondly, beyond the additional traffic that it is expected to handle, NERL is also expected to deliver significant strategic improvements over RP3 (incremental to RP2). In particular, the CAA details aspirational plans for NERL over RP3 related to the following:

- **Airspace modernisation.** Over RP3, NERL is tasked with continued investment in and delivery of the airspace modernisation programme through the introduction of new technology. As part of this, the CAA has required NERL to establish more stringent governance systems which includes the involvement of all stakeholders.
- **Deployment of DSESAR.** In addition, NERL is expected to upgrade its legacy technology system to deploy a new software environment for its air traffic control services. In order to ensure a smooth transition while maintaining a safe level of service, this involves simultaneously running both the legacy and upgraded

¹⁹ Operating costs in NERL's (revised) Business Plan as reported in 'UK RP3 CAA Decision Document [CAP 1830].' CAA (August 2019); Table 5.2.

²⁰ CSUs as estimated by the STATFOR forecasts used by the CAA as reported in 'UK RP3 CAA Decision Document [CAP 1830].' CAA (August 2019); Table 1.1.

²¹ Please see footnote 17.

²² Real wage growth is calculated as the forecast growth in average earnings (as reported by the OBR March 2019 Economic and fiscal outlook) net of the CPI forecast (as reported in the CAA's Final Decision Table 7.3). Since the OBR does not forecast average earnings growth up to 2024, we assume that the average earnings growth in 2024 is equivalent to 2023.

²³ In the absence of the impact of wage growth, the expected operating costs would be simply calculated as the sum of: (i) the proportion of the operating costs that are not variable to traffic [i.e. (1-D) x C₂₀₁₉ x B₂₀₁₉]; and (ii) the proportion of the operating costs that vary with traffic [i.e. D x C₂₀₁₉ x B₂₀₂₄]. Therefore, including the additional impact of wage growth, expected operating costs is calculated as such: $F = [(1-D) \times C_{2019} \times (1+E) \times B_{2019}] + [D \times C_{2019} \times (1+E) \times B_{2024}]$.

software environments for the large part of RP3 while its operating staff is undergoing training on the new platform.

- Developing future air traffic management (ATM) capability.** Further, NERL is expected to make significant investments in research and development in order to improve future operating performance. These include research into airspace redesign; managing drones; cyber security; satellite surveillance; automation; etc.

Delivering each of these improvements would also be expected to create an upward pressure on operating costs (incremental to operating costs incurred over RP2).

However, the precise scale of the expected incremental increase in operating costs related to these activities is difficult to estimate. Therefore, it is also hard to estimate the related efficiency challenge encompassed in NERL’s (revised) Business Plan.

Nonetheless, in Table 4, we provide indicative estimates of the incremental costs of these activities over RP3 based on NERL’s (revised) Business Plan. These are estimated to be c.£117m - this provides an indicative scale of the related efficiency challenge.²⁴ Although we do not know the profile of this spend over RP3, if divided equally through each of the five years, this would equate to an overall efficiency challenge in the final year of RP3 of nearly 11%.

Table 4: Incremental costs of significant change programme

(2017 prices)	NERL’s estimates of costs
Deployment of DSESAR ²⁵	£57m
Airspace modernisation	£10m
Developing future ATM capability	£50m
Total incremental costs of change programme	£117m

Notes: (i) Incremental costs of deployment of DSESAR comprise of asset management costs (which includes dual running of legacy and new systems for part of RP3 – please see footnote 25) and staff costs of providing early life support on the new system. (ii) Incremental costs of airspace modernisation include staff and non-staff costs for the major airspace change programmes (LAMP; PLAS; and SAIP). (iii) Incremental costs of developing future ATM capability includes costs of future ATM capability; drones and cyber security. Source: Economic Insight analysis of NERL’s data.

Impact of changes in service delivery targets

Thirdly, changes to service delivery targets relative to RP2 would also have an impact on the operating costs needed to service these obligations. For instance, even without any increase in traffic, a reduction in acceptable delay for flights could be expected to require more air traffic controllers and, therefore, increase the operating costs. On the other hand, an increase in the acceptable level of delay could be expected to make it

²⁴ We note that this is based on estimates in NERL’s (revised) Business Plan and should, therefore, be considered an upper bound. In Steer’s bottom-up analysis of NERL’s operating costs for the CAA, it raised some questions on the validity of these estimates for an efficient operator. However, it did not provide a clear alternative estimate.

²⁵ Incremental costs related to asset management costs are calculated as the difference between the asset management costs related to the dual running of systems over RP3 (as reported in “16. Data request for SDG 9 November.xlsx”; tab: “Opex - Asset Management”) and the counterfactual asset management costs related to the continued use of legacy assets (as reported in “23. Difficulty to maintain existing systems v3 MTRW”; page 1).

easier to service increased traffic, and therefore, soak some of the resultant increase in operating costs.

In this regard, however, the change in service delivery targets in RP3 relative to RP2 is varied. For instance:

- **Environmental measures.** NERL is expected to deliver to better targets relative to RP2. Specifically:
 - **KEA.** The target has increased from 4.05% at the end of RP2 to 3.72% at the end of RP3.
 - **3Di.** There is a 1% improvement in target from the previous year.
- **Capacity measures.** The network-wide delay targets (C1, C2, C3 and C4) have been adjusted downwards, relative to RP2, to be in line with the European measures.

Beyond the network-wide service delivery targets set out in the CAA’s Final Decision; we understand that NERL also faces an increased obligation to improve the resilience of its operations which impacts the quality of its operations on specific parts of the network. Specifically, following formal investigations in response to customer complaints in RP2 (most recently, Project Oberon), the CAA identified the need for NERL to improve the resilience of its operations to minimise the localised impacts of stress on its operations.

Overall, therefore, we are unable to estimate the expected impact of service quality measures on operating costs, and therefore, the implied efficiency savings (if any).

Implied efficiency challenge in NERL’s (revised) Business Plan

Taken together, as noted in Table 5, the indicative efficiency savings in NERL’s (revised) Business Plan is likely to be over 6.3% (and could be nearly 11%) relative to RP2.

Table 5: Overall implied efficiency savings in NERL’s (revised) Business Plan

	Impact on operating costs	Implied efficiency savings
Increase in traffic	↑	0.8%
+ Real wage growth	↑	6.3%
+ Change programme	↑	10.9%
+ Service delivery targets	Unclear	Unknown

Source: Economic Insight.

2.2 Our assessment of the scope for NERL to meet its efficiency challenge

Having considered the scale of the implied efficiency savings incorporated in NERL’s (revised) Business Plan, in this section, we consider the top-down evidence on the scope for NERL to make efficiency savings over RP3.

Specifically, the efficiency challenge for a regulated monopoly has two components:

- **A catch-up element.** This reflects the fact that, because it is not active in a competitive market, it might not be operating on the ‘efficiency frontier’; and
- **A ‘frontier shift’ element.** This relates to the ongoing efficiency savings even an efficient firm could make as a result of productivity gains.

In relation to the first element, if incentive regulation works effectively, the catch-up inefficiency should reduce over time, as the company responds to incentives set in the price control. Ultimately, therefore, the overall efficiency challenge should, over time, converge to just the ‘frontier shift’ element. In relation to the ‘frontier-shift’ element, one might reasonably expect the scope of these efficiency gains to be close to the UK’s overall total factor productivity (TFP), or to the TFP of comparative industries to the one that the regulated monopoly operates in.²⁶

Therefore, in this section, we:

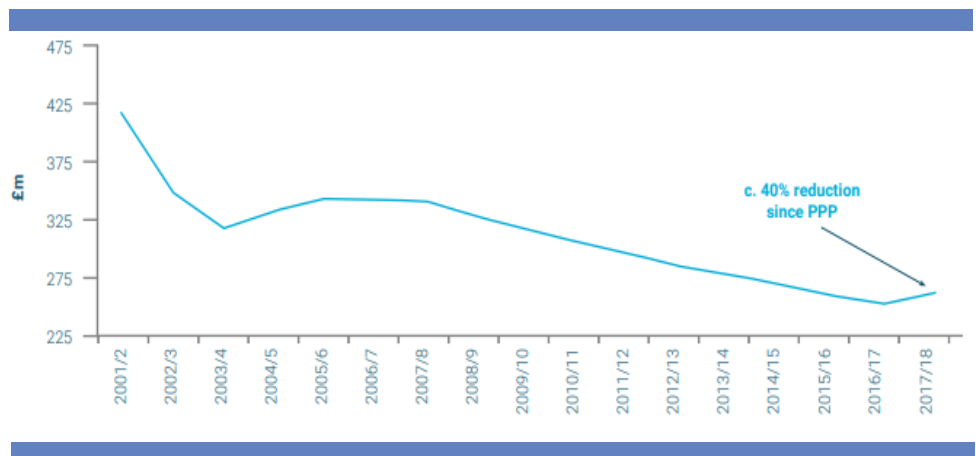
- firstly, we consider the scope for catch-up efficiency savings:
 - » in section 2.2.1, based on NERL’s historical performance; and
 - » in section 2.2.2, based on comparison with other European ANSPs.
- secondly, in section 2.2.3, we consider the scope for ongoing efficiency savings based on evidence on productivity in other comparative sectors.

Finally, in section 2.2.4, we consider the implication of this evidence on the scope for NERL to make the efficiency savings identified in its (revised) Business Plan.

2.2.1 Evidence on NERL’s historic efficiency

NERL’s analysis presented in Figure 1 suggests that, since privatisation in 2001, NERL has made considerable reductions in operating costs – c.40% between 2001-2002 and 2017-2018.

Figure 1: NERL’s actual operating costs since part-privatisation



Notes: Presents real operating costs in 2008-09 prices.

Source: ‘Appendices: RP3 Business Plan 2020-2024,’ NATS (26 October 2018); Appendix I; page 62.

²⁶ The time period over which such convergence should occur is subject to uncertainty. In addition, there might be reasonable debate as to which sectors provide the most appropriate point of comparison to the regulated monopoly.

Consistent with theory, therefore, NERL’s historic evidence points towards significant reductions in operating costs soon after 2001, but with the rate of such reductions diminishing over time.

2.2.2 Comparison of NERL’s efficiency with other ANSPs

Similar to the above, considering NERL’s efficiency relative to other air navigation service providers (ANSPs) in Europe, would indicate the extent to which NERL could achieve further efficiencies.

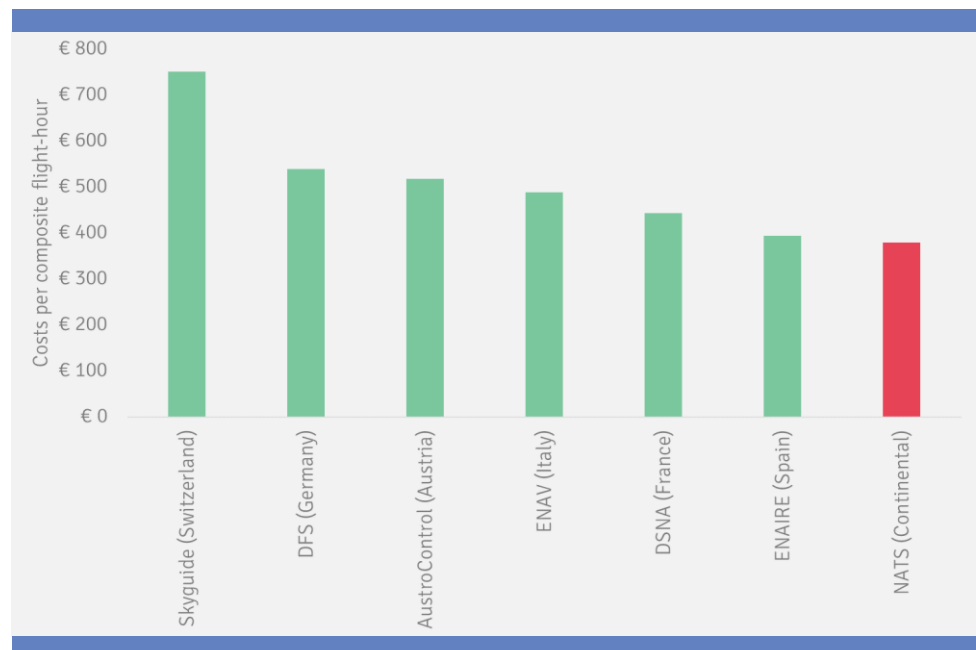
Therefore, we have assessed NATS’ (including NERL) relative operating efficiency on four different measures from the Eurocontrol ATM Cost Effectiveness Dashboard:²⁷

- ATM provision costs per composite flight hour (in Figure 2);
- Support costs per composite flight hour (in Figure 3);
- ATCO-hour productivity (in Figure 4); and
- ATCO employment costs per ATCO-hour (in Figure 5).

We compare NATS’ performance on these measures against the ANSPs in cluster 1 of the ANSP comparator groups created by Steer for its study conducted for the European Commission. These clusters are based on the ANSPs’ similarities based on the latest data on traffic complexity, traffic volume, cost of living indices, traffic variability and unit ATCO employment costs.²⁸

As shown in Figure 2 to Figure 5, on every measure, NATS is the most or second most efficient operator among the seven selected comparator ANSPs. Given similar performance against benchmarks in other regulated sectors, NERL would be considered to be an upper quartile (if not the frontier) firm.

Figure 2: Comparison of ATM provision costs per composite flight hour (€, 2017)

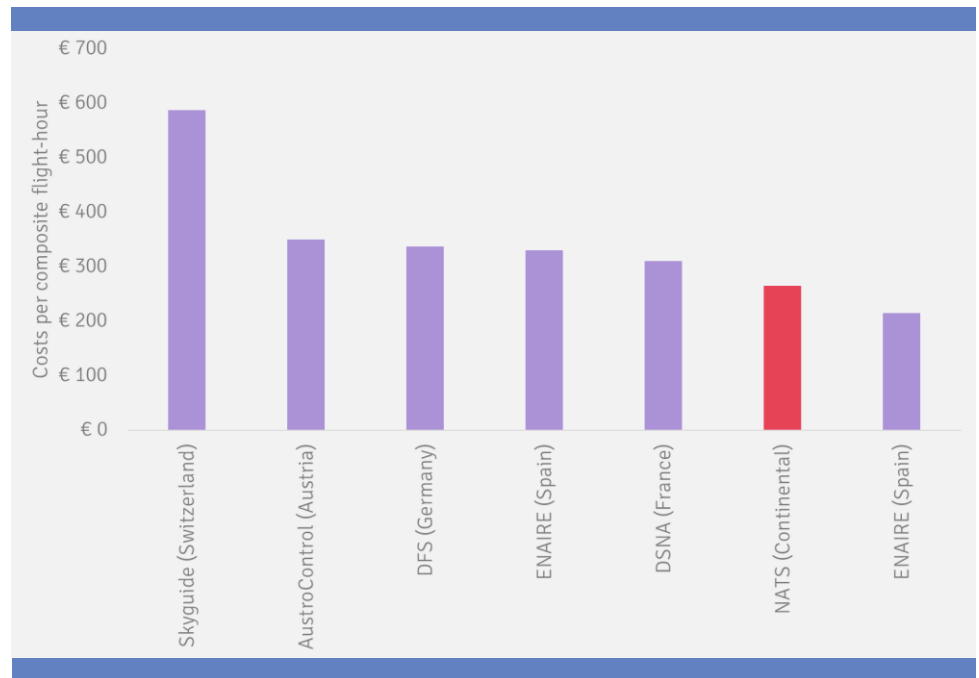


Source: <https://www.eurocontrol.int/ACE/ACE-Comparators.html>

²⁷ Available at: <https://www.eurocontrol.int/ACE/ACE-Comparators.html>.

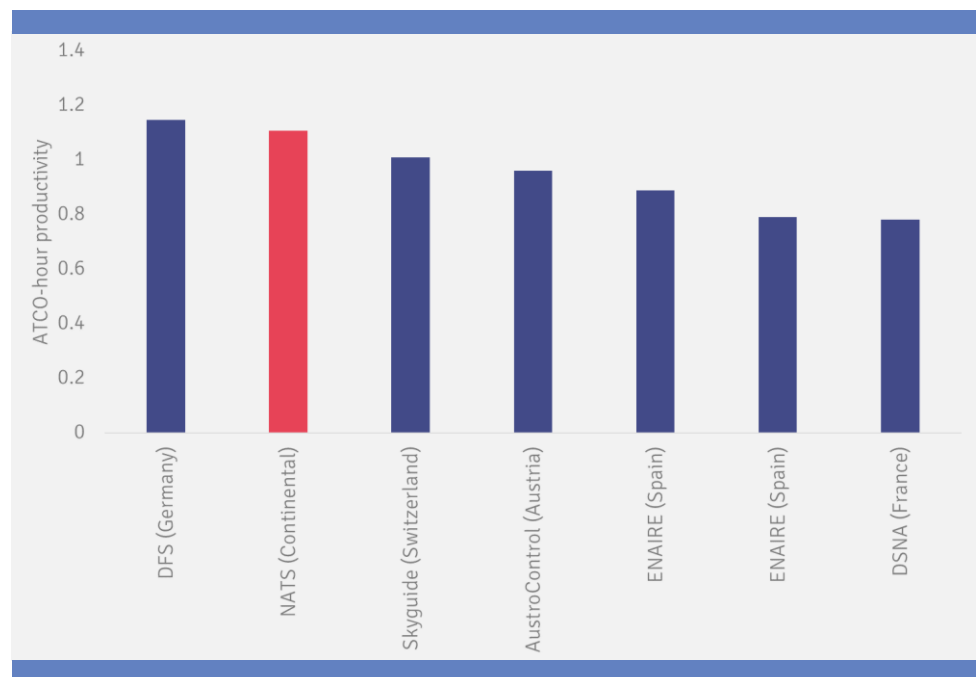
²⁸ ‘PRB Advice to the Commission in the setting of Union-wide performance targets for RP3: Final report.’ PRB (30 September 2018); page 48.

Figure 3: Comparison of support costs per composite flight hour (€, 2017)



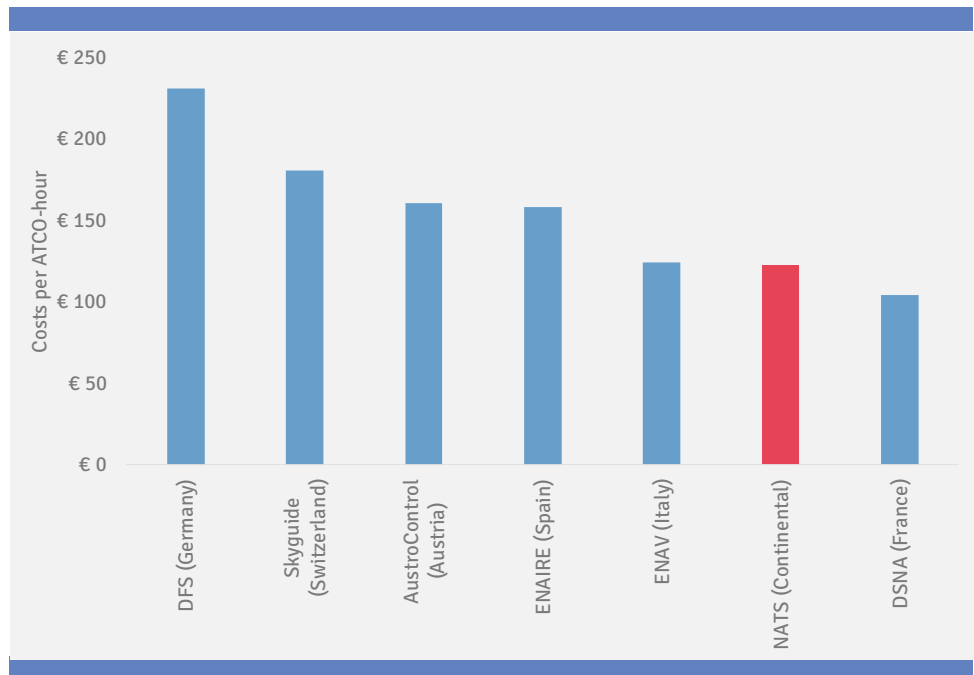
Source: <https://www.eurocontrol.int/ACE/ACE-Comparators.html>

Figure 4: Comparison of ATCO-hour productivity (2017)



Source: <https://www.eurocontrol.int/ACE/ACE-Comparators.html>

Figure 5: Comparison of ATCO employment costs per ATCO-hour (€, 2017)



Source: <https://www.eurocontrol.int/ACE/ACE-Comparators.html>

Overall, this indicates that NERL is already operating at a high level of efficiency for an ANSP, implying that the potential for further catch-up efficiency is presumably lower.

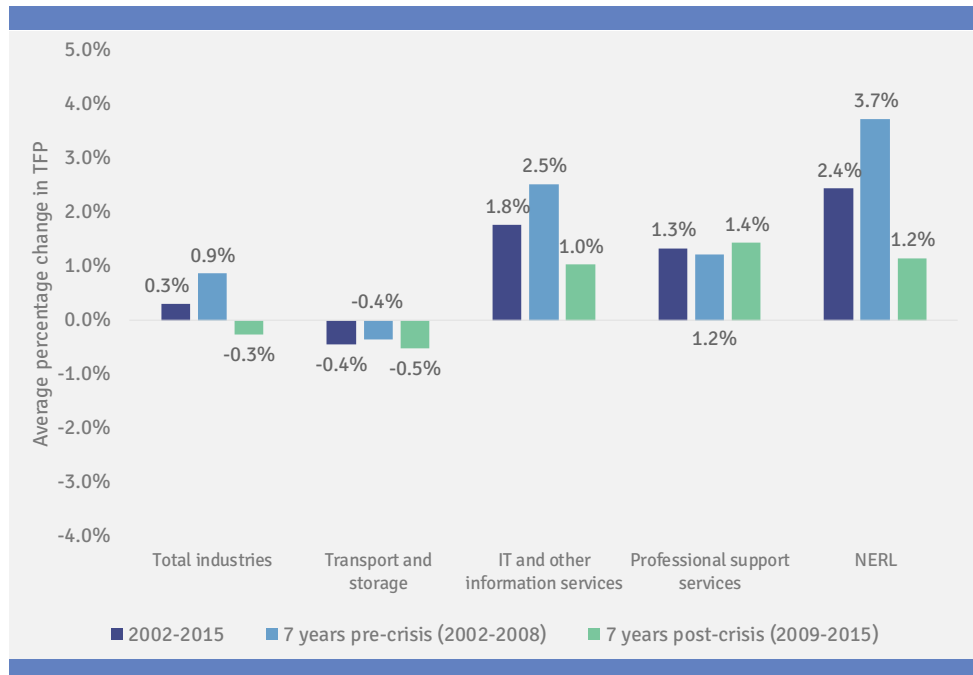
2.2.3 Comparison of NERL’s efficiency with productivity growth in comparative industries

The above would suggest that catch-up inefficiency in NERL’s operations has been diminishing. Going forward, therefore, one would logically expect the efficiency challenge to converge to the ‘frontier shift’ element (which, as above, can be thought about in terms of TFP). In light of this, it is helpful to examine the available evidence on TFP performance in comparative industries over time.

Therefore, Figure 6 compares NERL’s productivity (for this purpose, calculated as the change in operating costs per flight) against the TFP growth in UK industry, as a whole, as well as other similar non-regulated industries since 2001: transport and storage; IT and other information services; and professional support services. Reflecting the shift in productivity since the financial crisis, wherein the UK is facing the longest ever productivity flatline,²⁹ it also presents the change in TFP in the 7 years pre-crisis (2002-2008 inclusive) and the 7 years post-crisis (2009-2015 inclusive).

²⁹ Please see: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/whatisstheproductivitypuzzle/2015-07-07>.

Figure 6: Comparison of NERL’s productivity against UK TFP across comparative non-regulated industries (2002 -2015)



Notes: (i) NERL’s change in TFP is calculated as the change in the ratio of real operating costs (in 2008-09 prices) as reported in the statutory accounts to traffic (in terms of number of flights). (ii) Change in TFP in comparative sectors is calculated using TFPva_1 from EU KLEMS data. Source: Economic Insight analysis of EU KLEMS data and NERL’s data (034. Underlying Opex since PPP BP19_return slide Jul19.xlsx; tab: “Underlying (LC)”).

This indicates that, the TFP growth in comparative sectors in the UK has been low overall, and has been declining since the financial crisis. In fact, TFP growth in UK industry averaged -0.3% in the 7 years post-crisis. While the TFP growth in other similar sectors, notably IT and information services as well as professional support services, has been higher and positive, it is between 1.0% and 1.4%.

2.2.4 Implication

In the absence of evidence on the scope for significant remaining catch-up efficiency savings, and in the context of diminishing productivity growth in comparative sectors in the UK, one would expect the scope for efficiency savings going forward to be relatively low.

Within this context, the indicative 6.3% efficiency challenge implied in NERL’s (revised) Business Plan already appears ambitious.

2.3 Our assessment of the NERL’s ability to make efficiency savings in RP3

Following from the consideration of the top-down evidence on the scope for NERL to make efficiency savings over RP3, in this section, we consider the characteristic features of NERL’s operations which could have implications on its ability to make efficiency savings over RP3.

In particular, the following features of NERL’s operational structure would seem to have important implications for its efficient operating costs:

- **Firstly, given the highly specialised and safety-related nature of their role, combined with long training lead times of c.2-3 years, NERL faces limitations in supply of air traffic controllers.** This has four key implications in terms of the scope for NERL to make efficiency savings:
 - (i) It limits the flexibility of its operations. In particular, unlike in other businesses, it is not easy for NERL to upscale and downsize its operations in response to demand.
 - (ii) It creates a need to balance short-term and long-term demand. Specifically, even if operational needs in the short term could be met with fewer air traffic controllers (ATCOs), it may be efficient for NERL to maintain its headcount for ATCOs if operational needs are expected to rise in the longer term.
 - (iii) It generates a need for additional caution in planning operations. Specifically, given the safety nature of its operations, NERL faces the additional responsibility to ensure that any efficiency measures do not negatively impact its safety obligations.
- **Secondly, NERL is particularly labour intensive.** Specifically, a large part of its operating costs, c.68% over RP3, are staff costs. As a result, in the context of falling labour productivity in the UK economy, NERL cannot benefit from any economy-wide productivity improvements. Relatedly, some of the efficiency measures may have upfront costs associated with them which would then need to be funded. For instance, say there was a way to reduce operating costs through the reduction of staff headcount. However, employing this measure would itself create upfront costs in the form of redundancy payments; negotiations; etc.
- **Thirdly, NERL faces a highly unionised workforce.** Specifically, c.100% of its operational staff (i.e. air traffic controllers who make up the bulk of staff costs) are part of a trade union. This has implications in terms of, both, the efficiency measures it can employ as well as the costs associated with them.

In light of this, the scope for NERL to make continuous efficiency savings in line with historic trends appears to be limited.

2.4 Conclusion

In conclusion:

- **Firstly, the evidence shows that the scale of efficiency savings in NERL's (revised) Business Plan is significant.** Specifically, it shows that by the end of RP3, NERL expects to make efficiency savings of c.6.3%.
- **Secondly, the top-down evidence strongly suggests that the scope for NERL to make one-off and ongoing efficiency savings over RP3 is limited.** Specifically:
 - (i) NERL has made significant cost reductions since 2001, and therefore, the opportunity for making further catch-up efficiency savings can be expected to be more limited in RP3.

- (ii) NERL is already highly efficient in comparison to the other European ANSPs as per the metrics considered by the Eurocontrol ATM Cost Effectiveness Dashboard - this would indicate that, in other regulated sectors, it would be considered the upper quartile (if not the frontier) firm.
 - (iii) The scope for NERL to make ongoing efficiency savings due to economy-wide increases in productivity is likely to be limited in the context of the UK's stagnating productivity growth.
- **Thirdly, considering the specific features of NERL's operations, the ability for it to make continuous efficiency savings in line with historic trends also appears limited.** Specifically:
 - (i) The paucity of supply of the highly specialised safety-critical skills of air traffic controllers: (a) limits the flexibility of NERL's operations; (b) creates a need to balance short-term and long-term demand; and (c) generates a need for additional caution in planning operations.
 - (ii) Since NERL is particularly labour intensive, in the context of falling labour productivity in the UK economy, NERL cannot benefit from any economy-wide productivity improvements.
 - (iii) The high level of unionisation in its workforce has implications in terms of, both, the efficiency measures it can employ as well as the costs associated with them.
- **Finally, given the above, the scale of the efficiency challenge in NERL's (revised) Business Plan is ambitious and challenging for it to meet.**



3. Our assessment of the CAA's efficiency challenge at RP3

In this chapter, we evaluate NERL's and the CAA's approach to determining the operating costs in RP3. Our overarching conclusion is that, both, NERL's and the CAA's approaches have some deficiencies. Specifically, NERL's estimates of operating costs: (i) are based only on its bottom-up analysis (without explicit consideration of intuitive top-down evidence); but (ii) are clearly linked to this evidence. On the other hand, the CAA has considered a range of top-down and bottom-up evidence, but: (i) it appears to have considered the top-down evidence only partially; (ii) we have material methodological concerns regarding the bottom-up evidence it has relied upon; and (iii) there does not appear to be a transparent link between this evidence and the overall efficiency challenge. The last of these issues is particularly concerning since it results in apparent inconsistencies in the CAA's suggested profile of efficient operating costs. Specifically, there is no evidence to support the CAA's expectation that, after incurring operating costs in line with its Business Plan in the first two years of RP3, NERL will be able to make substantial and rapid efficiency savings in the final two years. However, based on our consideration of the evidence detailed in Chapter 2, the scale of efficiency savings in NERL's (revised) Business Plan is ambitious and challenging. Given the concerns around the CAA's evidence, there does not appear to be reliable evidence to support the additional efficiency savings identified by the CAA, especially given that these are expected to be made rapidly in the final two years of RP3.

This chapter is structured as follows:

- In section 3.1, reflecting NERL's specific context, we consider the appropriate approach for determining its efficient operating costs.

In the remainder of the chapter, we use this framework to assess NERL’s and the CAA’s approach to determining the operating costs in RP3. Specifically:

- In section 3.2.2, we detail our assessment of the CAA’s approach.
- In section 3.3, we detail our assessment of NERL’s approach.
- Finally, in section 3.4, we present our conclusions.

3.1 The appropriate framework for determining NERL’s efficient operating costs

A robust approach to determining NERL’s efficient costs at RP3 involves a combination of bottom-up and top-down approaches. Specifically, this would involve:

- **Firstly, the development of detailed bottom-up evidence.** In particular, this needs to incorporate:
 - (i) a detailed understanding of cost drivers by individual category of cost;
 - (ii) a distinction between efficient ‘resource levels’ and efficient ‘per unit’ costs linked back to those drivers; and
 - (iii) a consideration of the evolution of the cost drivers over RP3 (ensuring that these reflect ‘efficient’ levels).

This is important in order to establish where and how any efficiency savings could be made, and importantly, the consequences of these on the operations.

- **Secondly, the use of top-down evidence as a cross check.** Specifically, in the absence of detailed comparative benchmarking, top-down methods of scaling the ‘size’ and ‘speed’ of the overall efficiency challenge relative to intuitive expectations are important to ensure that the expected scale of efficiencies are in fact feasible for an efficient firm.
- **Thirdly, a clear and transparent connection between the above evidence and the overall allowed operating costs.**

Reflecting on this framework, Table 6 presents our overarching assessment of NERL’s and the CAA’s approaches at RP3.

Table 6: Overall assessment of NERL and the CAA’s approach to setting operating costs

Framework	NERL’s Business Plan	The CAA’s Final Decision
Bottom-up evidence	✓	✓ (but concerns regarding robustness)
Top-down evidence	✗	✓ (but concerns regarding relevance)
Link between costs and evidence	✓	✗

Source: Economic Insight.

3.2 Our assessment of the CAA's approach to determining NERL's operating costs

In this section, we detail our assessment of the CAA's approach to determining the operating costs for NERL over RP3. Specifically:

- in section 3.2.1, we present our assessment of the link between the CAA's evidence and its determination of the overall operating costs;
- in section 3.2.2, we present our assessment of the CAA's top-down evidence;
- in section 3.2.3, we present our assessment of the CAA's bottom-up evidence; and
- finally, in section 3.2.2.4, we present our overall conclusions and assessment of the scale of additional efficiency savings suggested by the CAA.

3.2.1 Our assessment of the link between the CAA's evidence and its evidence

The CAA's evidence

In order to arrive at its view of NERL's efficient level of operating costs in RP3, the CAA stated that its Draft Proposals relied on the following facts and analyses:³⁰

- (i) NERL's operating costs per CSU fell by around 2.3% per year from 2007 to 2017;
- (ii) NERL's average operating cost outperformance from 2007 to 2017 was about 5%;
- (iii) the Performance Review Body (PRB) estimated the potential for operating and capital cost efficiencies from NERL's 2014 to 2016 baseline was around 8%; and
- (iv) it considered the bottom-up analysis undertaken by Steer/Helios which indicated the scope for additional efficiency savings over and above NERL's (revised) Business Plan.

On this basis, in its Draft Proposals, the CAA assumed that NERL could achieve more significant efficiencies of 2.3% per year over RP3, in line with historic trends.³¹

In its Final Proposals, the CAA recognised that “...the scale of importance of NERL's capital programme during RP3 will require it to have additional resilience in its staffing to train operational staff on new systems and procedures...” and decided to allow it its forecasts of operating costs as per its (revised) Business Plan in the first three years of RP3.³² Apart from some minor changes, the CAA did not change its view from its draft proposals regarding the efficient level of operating costs in the last two years of RP3 (2023 and 2024).

This equates to an efficiency challenge of c.11% in the final year of RP3 (or, 5% additional efficiency savings beyond NERL's (revised) Business Plan).³³

Our assessment

As detailed above, the CAA considers a wide range of evidence in determining the efficient level of operating costs. However, in practice, there is no transparent or

³⁰ 'UK RP3 CAA Decision Document (CAP 1830),' CAA (August 2019); paragraphs 5.9 and 5.10.

³¹ 'UK RP3 CAA Decision Document (CAP 1830),' CAA (August 2019); paragraph 5.11.

³² 'UK RP3 CAA Decision Document (CAP 1830),' CAA (August 2019); paragraph 5.25.

³³ We note that this figure is conservative - please see footnote 5.

explicit link between the CAA's forecasts of NERL's efficient operating costs and this evidence.

Specifically, it does not explain how it has used the range of evidence to determine the final level of operating costs. For instance, it does explain the weight it has given to the top-down and the bottom-up evidence in establishing the scope for efficiency savings.

Importantly, it does not explain the basis for allowing NERL the full operating costs identified in its (revised) Business Plan for the first three years and then identifying scope for the significant efficiency savings in the final two years of RP3. Specifically, in the Final Decision:

- The CAA's assessment suggests that NERL will require "*additional resilience in its staffing to train operational staff on new systems and procedures*".³⁴ Given this, there seems to be no evidence or reason given as to why this requirement will fall away in the final years of RP3. Even if it did, as discussed in section 2.3, the rapid workforce reduction implied by it may not be feasible and would not be costless.
- Similarly, the CAA's argument that staff retiring provides "*scope for NERL to identify and achieve greater efficiencies*"³⁵ is weak. Staff retiring is as likely to give rise to increased cost pressures associated with managing the orderly exit of existing staff members; the recruitment and training of new staff members; and the possible loss of productivity this entails. As detailed in the Annex, based on its operational experience, NERL suggests that it takes trainee air traffic controllers nearly 5 years to get the same level of experience (i.e. to get to the same number of technical validations) as a retiring ATCO.
- More broadly, the context; the requirements; or the drivers of the overall operating costs are not expected to be different in the final two years of RP3. Therefore, in light of the top-down and bottom-up evidence, there does not seem to be any evidence to expect that the scope for making efficiency savings would be higher in these final two years.

As such, this makes it difficult for us to be confident in the CAA's assessment of the efficient level of operating costs.

3.2.2 Our assessment of the CAA's top-down evidence

Our consideration of the top-down evidence presented in section 2.2 above strongly suggests that the scope for NERL to make one-off and ongoing efficiency savings is limited. This is consistent with the CAA's forecasts of the total market returns in its estimation of the weighted average cost of capital (WACC), which is contingent on an expectation of low productivity.³⁶ Given this, the scale of efficiency savings identified in NERL's (revised) Business Plan appear ambitious and challenging.

³⁴ 'UK RP3 CAA Decision Document (CAP 1830),' CAA (August 2019); paragraph 5.25.

³⁵ 'UK RP3 CAA Decision Document (CAP 1830),' CAA (August 2019); paragraph 5.24.

³⁶ Please see '*Assurance review and assessment of the evidence on the WACC RP3*'; Economic Insight (December 2019).

Nevertheless, in this section, we consider the CAA's evidence on the scope for NERL to make additional efficiency savings. In turn, we consider:

- in section 3.2.2.1, the evidence on NERL's historic trends related to operating costs per CSU;
- in section 3.2.2.2, the evidence on NERL's historic trends related to operating cost outperformance;
- in section 3.2.2.3, the PRB evidence on the potential for operating and capital cost efficiencies; and
- finally, in section 3.2.2.4, we present our overall assessment of the top-down evidence on the scale of additional efficiency savings identified by the CAA.

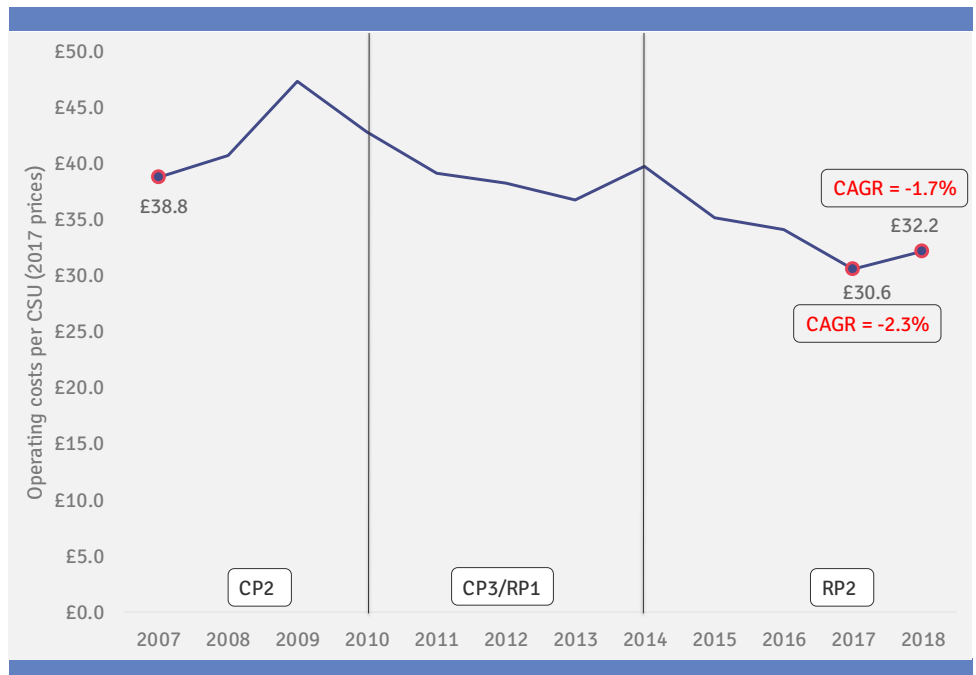
3.2.2.1 Evidence on NERL's historic trends related to operating costs per CSU

The CAA suggested that NERL could achieve more significant efficiencies of 2.3% per year over RP3 in line with the trend in its operating costs per CSU which have fallen by 2.3% per year from 2007 to 2017.

In practice, however, sensitivities around these estimates suggest that the stated 2.3% reduction is driven by: (i) unusually low operating costs per CSU in 2017; and (ii) use of CSU as the unit of traffic. Specifically:

- Trends in the operating costs per CSU between 2007 and 2017, shown in Figure 7, indicate that:
 - (i) While there is an overall downward trend in the period, there is also **considerable variation in operating costs per CSU between individual years**. For instance, operating costs per CSU increased between 2007 and 2008, and then significantly increased between 2008 to 2009. This implies that an expected linear decline in operating costs each year is not supported by this evidence.
 - (ii) **2017 is an unusual year**. Specifically, the operating costs per CSU in 2017 was the lowest it has ever been since 2007. This is, at least in part, driven by significantly higher outturn traffic compared to forecasts (11% higher). Since then, however, operating costs have increased by 5.2% between 2017 and 2018. In fact, sensitivity analyses around the estimates suggest that:
 - » The average decline in operating costs per CSU between 2007 and 2018 (calculated as the compound annual growth rate, CAGR, used by the CAA) is -1.7%.
 - » Similarly, comparing 2007 to 2016 instead, points to a much smaller 1.3% reduction per year.

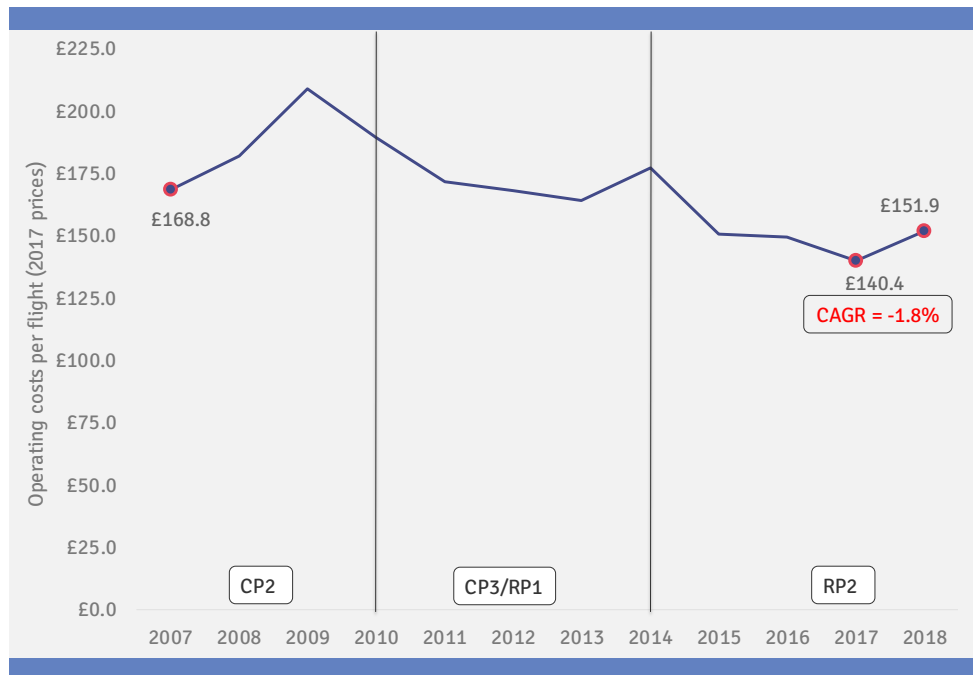
Figure 7: Trend in NERL’s operating costs per CSU (2007-2018)



Notes: Operating costs reported here include cash pension costs of the Defined Contribution scheme (but not the pension costs related to the Defined Benefit scheme). This is not equivalent to the operating costs (excluding pensions and depreciation) studied in the remainder of this report. Source: Economic Insight analysis of data from NERL’s regulatory accounts.

- Furthermore, as a further sensitivity, **using an alternative metric of traffic (number of flights as opposed to CSUs) indicates an average decline in unit operating costs equivalent to -1.8%** (as shown in Figure 8). We note here that this is not intended to recommend the use of number of flights as the appropriate measure of traffic but is an illustrative sensitivity which considers the robustness of the analysis. Nevertheless, we note that the most appropriate unit of traffic to use in this case would be the one that drives operating costs.

Figure 8: Trend in NERL’s operating costs per flight (2007-2018)



Notes: Data on number of flights between 2007 and 2010 is not available from regulatory accounts, and is therefore, based on NERL’s internal files. This may result in some minor inconsistencies in estimates.

Source: Economic Insight analysis of data from NERL’s regulatory accounts and NERL’s internal data (“034. Underlying Opex since PPP BP19_return slide Jul19.xlsx”; tab “Graph (LC)”).

Taken together, this suggests that this evidence is highly sensitive to changes in parameters. This implies that this evidence does not provide a robust basis for: (a) the additional efficiency savings identified by the CAA; or (b) the rapid efficiency savings identified by the CAA in the final two years.

3.2.2.2 Evidence on NERL’s historic operating cost outperformance

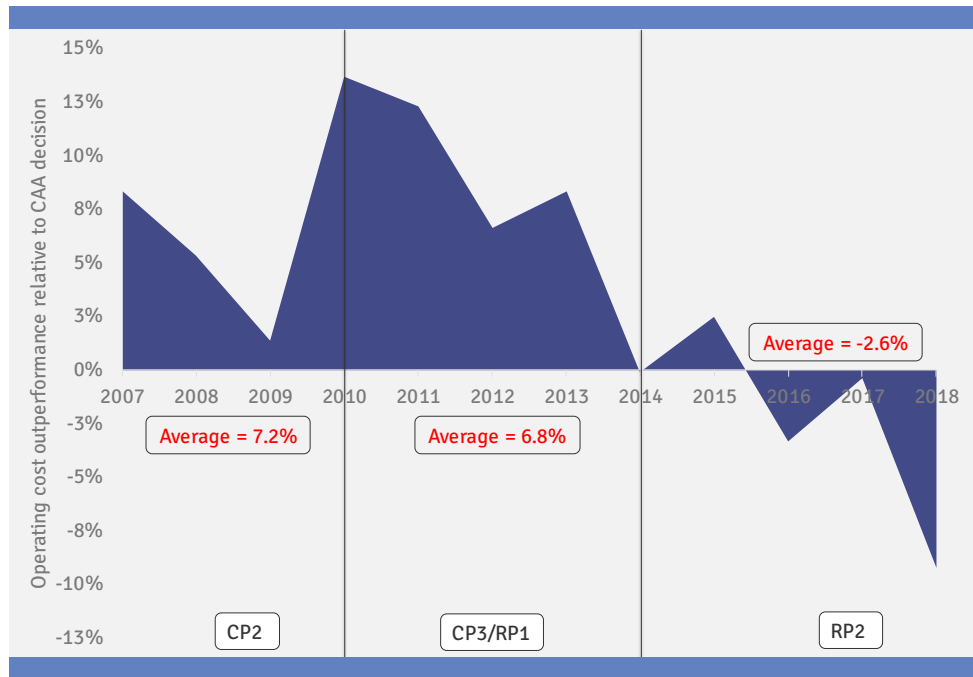
Further to its assessment of the trends in unit operating costs, the CAA’s analysis suggested that NERL’s average operating cost outperformance from 2007 to 2017 was about 5%.

However, in practice, we find that the suggested 5% average operating cost outperformance from 2007 to 2017 is substantially driven by the outperformance in CP2 and CP3/RP1. However, this outperformance has not persisted into RP2.

Specifically, as illustrated in Figure 9, the data shows that:

- the average real operating cost outperformance in CP2 was 7.2%;
- the average real operating cost outperformance in CP3/RP1 was 6.8%; while
- the average real operating cost outperformance in RP2 so far (from 2015 to 2018) has been -2.6% (negative).

Figure 9: NERL’s real operating cost outperformance relative to the CAA’s decision (2007-2018)



Source: Economic Insight analysis of data from NERL’s regulatory accounts.

The diminishing cost outperformance in each price control is consistent with NERL increasingly exhausting the scope for efficiency savings. This evidence, therefore, points towards the scope for efficiency savings at RP3 to be lower.

Based on the above, we consider that this evidence does not provide consistent basis for the additional efficiency savings identified by the CAA; and, in particular, the rapid efficiency savings in the final two years.

3.2.2.3 PRB evidence on potential for cost efficiencies

In addition to its assessment of the historic trends in NERL’s operating costs, the CAA also considered the PRB’s estimated potential for operating and capital cost efficiencies from the 2014 to 2016 baseline of 8%.

The PRB’s consultants benchmarked European ANSPs using data envelopment analysis (DEA) and stochastic frontier analysis (SFA).³⁷ On this basis, they identified that NATS Continental (including NERL) would need to reduce total costs associated with the provision of en-route services by between 1% and 16% (or, 8% on average) in order to achieve efficient production levels.

In practice, however, the stated 8% potential efficiencies does not consider the nuances of the analysis. Specifically:

- **Firstly, the analysis relates to the potential for efficiency savings on total costs.** Therefore, without further consideration regarding the potential for savings between capital and operating costs, it would be wrong to simplistically apply the 8% figure to operating costs alone.

³⁷ [‘EU-wide target ranges for RP 3 - Annex 2. Air Navigation Service Providers: Advice on benchmarking of ANSPs and EU-wide cost targets.’ PRB \(3 June 2018\).](#)

- Secondly, as the authors of the report pointed out, in the absence of standardised accounting practices amongst ANSPs, the ATM Cost Effectiveness (ACE) **data used for this analysis is not ideal for this kind of benchmarking analysis.** This results in substantial uncertainty in the results.
- **Thirdly, practically, the two modelling approaches lead to very different results.** This results in uncertainty regarding the appropriate way to combine these results. The average (the 8% quoted by the CAA) is just one of the methods. In fact, the potential for NERL to make efficiency savings on total costs could be as low as 1%.

Notwithstanding the above, the results of this analysis are consistent with our assessment in section 2.2, suggesting that the scope for NERL to make catch-up efficiency savings is limited. Specifically:

- (i) NATS Continental is one of the most efficient ANSPs. In particular, based on the DEA analysis, it's efficiency score is 0.99 (out of a maximum of 1.00); and
- (ii) the scale of efficiency savings in NERL's (revised) Business Plan (c.6% in the final year) is within the range for potential savings identified (1% to 16%).

As a result, we do not consider that this evidence provides consistent basis for the scope for NERL to make the additional efficiency savings identified by the CAA (particularly in the final two years).

3.2.2.4 Our assessment of the scope of efficiency savings based on top-down evidence

On the whole, our assessment of the top-down evidence (presented in section 2.2) suggests that the scope for NERL to make efficiency savings over RP3 is likely limited. Therefore, the efficiency saving identified in NERL's (revised) Business Plan is itself ambitious. Furthermore, as detailed sections 3.2.2.1 to 3.2.2.3, the top-down evidence considered by the CAA does not support the scope for NERL to make the additional efficiency savings of nearly 5% in the final year of RP3.³⁸ In particular, given the CAA's allowance in line with NERL's Business Plan in the first three years, the top-down evidence provides no basis for NERL to make the rapid efficiency savings in the final two years of RP3.

3.2.3 Our assessment of the CAA's bottom-up evidence

In this section, we consider the scope of efficiency savings over RP3 suggested by the CAA's bottom-up evidence developed by Steer. In particular, we consider the areas where Steer's bottom-up evidence has considered scope for additional efficiency savings over and above NERL's (revised) Business Plan. Specifically, this relates to:

- in section 3.2.3.1, the headcount for operational air traffic controllers (ATCOs) involved in providing air traffic control services;
- in section 3.2.3.2, headcount for trainee air traffic controllers (TATCs);

³⁸ We note that this figure is conservative - please see footnote 5.

- in section 3.2.3.3, headcount and salaries for air traffic service assistants (ATSAs); and
- in section 3.2.3.4, headcount for managerial support grade (MSG) and personal contract grade (PCG) staff.

Finally, in section 3.2.3.5, we present our overall assessment of the bottom-up evidence on the scale of additional efficiency savings identified by the CAA.

3.2.3.1 Evidence on headcount for operational air traffic controllers

In its model of the operating costs for an efficient operator, Steer identified the scope of efficiency savings of between £3.9m and £28.6m over and above NERL’s (revised) Business Plan through the reduction of headcount for operational air traffic controllers (ATCOs) by the end of RP3.³⁹

Specifically, as detailed in Table 7, Steer identified savings related to 28 to 104 additional operational ATCOs that NERL estimated it required by the end of RP3 in its (revised) Business Plan.

Table 7: Comparison of estimates of headcount for additional operational ATCOs

Reasons	NERL’s Business Plan	Steer’s efficient operator model
RP2 operational gap	+52	0 to +23
Traffic growth	+57	+47 to +61
Heathrow third runway	+27	0
Benefits from DSESAR	-21	-38 to -48
Additional resilience	+36	0 to +29
Overall headcount in 2024	1,018	914 to 990

Source: NERL (*‘Appendices: RP3 Business Plan 2020-2024,’ NATS (26 October 2018); Appendix K; page 85*) and Steer (*‘NERL’s forward-looking capital programme and expenditure efficiency,’ Steer (February 2019); Figure 6.6; page 63*).

As noted above, we have methodological concerns regarding Steer’s estimates of operational ATCO headcount for an efficient operator.

Firstly, Steer does not appear to have considered all the drivers of this headcount. For instance, its estimates of additional ATCOs needed to keep up with traffic growth is based on estimates of the elasticity of ATCO headcount to traffic growth. However, as detailed further in the Annex, based on NERL’s operational experience, the relationship between traffic and headcount for operational ATCOs is not straightforward. Specifically, the impact of traffic growth on headcount depends on the path of the traffic; the seasonality and the time. However, based on the evidence presented, Steer does not appear to have tested these considerations. Relatedly, Steer’s separate consideration of the individual reasons for the additional headcount

³⁹ *‘NERL’s forward-looking capital programme and expenditure efficiency,’ Steer (February 2019); chapter 6; pages 60-64 and page 83.*

implies that it is not able to consider the interactions between the impact of these drivers.

Secondly, Steer's assumptions regarding the efficiency savings it identified are not underpinned by strong evidence. To give a few examples:

- On the additional operational ATCOs that NERL predicts would be required to serve the supplementary airspace sectors as a result of **Heathrow third runway**, Steer considered that no additional operational ATCOs should be required over RP3 since the runway is not likely to open until 2026. However, practically, we understand that NERL faces significant lead times in training ATCOs on new airspace sectors. However, Steer's analysis does not appear to have taken account of this.
- On the benefits resulting from the deployment of **DSESAR**, Steer assumed 2-3% efficiency gains based on the benefits predicted by the European Pilot Common Project. Notwithstanding the issue that the source of this predicted scale is unclear, it also does not fully consider the differences between various European ANSPs. In particular, differences in their current relative operational productivity and technology may result in lower (or, higher) productivity benefits for a particular ANSP.

On the whole, we do not find Steer's analysis in relation to the headcount for operational ATCOs to provide a strong basis for the CAA's suggested additional efficiency savings, and in particular, the rapid efficiency savings in the final two years of RP3.

3.2.3.2 Evidence on headcount for trainee air traffic controllers

In its model of the operating costs for an efficient operator, Steer identified the scope for efficiency savings of between £1.9m to £7.8m beyond NERL's (revised) Business Plan through the reduction of headcount for trainee air traffic controllers (TATCs) by the end of RP3. Specifically, it identified potential to reduce NERL's TATC headcount by the end of RP3 by 15 to 58 TATCs.⁴⁰

Although Steer provides limited information in its report, it suggests that "*...represents a difference in level of between 7.5% and 30% on the additional operational ATCOs in RP3 assumed by the BP,.... The number of trainees could therefore be reduced proportionally*".⁴¹

We have two key methodological concerns regarding Steer's assessment:

- Firstly, the suggested reduction in headcount for operational ATCOs of 7.5% to 30% is not consistent with Steer's estimates of headcount for operational ATCOs (detailed in section 3.2.3.1 above) which in fact suggests a reduction in headcount for operational ATCOs of 3% to 10%.
- Secondly, Steer provides no basis for the implied assumption that there is a one-to-one linkage between the headcount for TATC and operational ATCOs in the

⁴⁰ '[NERL's forward-looking capital programme and expenditure efficiency.](#)' Steer (February 2019); pages 66 and 83.

⁴¹ '[NERL's forward-looking capital programme and expenditure efficiency.](#)' Steer (February 2019); paragraph 6.38; page 66.

same year. In practice, we understand that NERL faces TATC training lead times of 2-3 years on average. Therefore, the profile of TATC headcount would not be expected to follow the profile of headcount for operational ATCOs one-to-one.

As a result, we do not think that Steer's analysis in relation to the headcount for TATCs provides a robust basis for the CAA's additional efficiency savings, and in particular, the rapid efficiency savings in the final two years of RP3.

3.2.3.3 Evidence on headcount for air traffic assistants

In its model of the operating costs for an efficient operator, Steer identified the scope of efficiency savings of between £4.8m to £17.1m over and above NERL's (revised) Business Plan through the reduction of headcount and salaries for air traffic assistants (ATSAs) by the end of RP3.⁴² Specifically, it separately considered headcount for: (i) ATSAs directly involved in providing air traffic control services (operational ATSAs); (ii) ATSAs involved in training TATCs; and (iii) other non-operating ATSAs. We consider its evidence on potential for efficiency savings for each of these in turn below.

Evidence on headcount for operational air traffic assistants

In relation to headcount for operational ATSAs, Steer considered that there was more scope to drive efficiencies as a result of automation made possible from the deployment of new technologies.⁴³ Therefore, in its efficient operator model, Steer estimated a reduction of 5-10 operational ATSA FTEs per annum in RP3, drawing on the historical reduction of 50 FTEs over RP2.

However, we have methodological concerns regarding Steer's simple methodology of estimating potential for future efficiency savings based on historic efficiency savings.

Specifically, Steer's forecasts are based on the premise that there is a trade-off between technology and labour, such that, improved technology should result in a reduction in labour. Put another way, Steer supposes that deployment of new technologies should either: (a) increase labour productivity; or (b) replace labour, such that the overall demand for labour should decrease. This premise can be supported by economic theory, and in the case of operational ATSAs, is also reflective of NERL's operational experience (as detailed in the Annex). However, by assuming a continuation of historic trends, Steer does not appear to consider that the impact of technology on labour is specific to the nature of the technology.

In particular, as shown in the illustrative example in Figure 10, depending on the nature of technology, the profile of the impact on labour may be different. For instance:

- some technologies (such as, alternative technology 1 in the figure) may lead to a one-time impact on labour; and
- other technologies (such as, alternative technology 2 in the figure) may have a significant impact in the beginning, which significantly slows down.

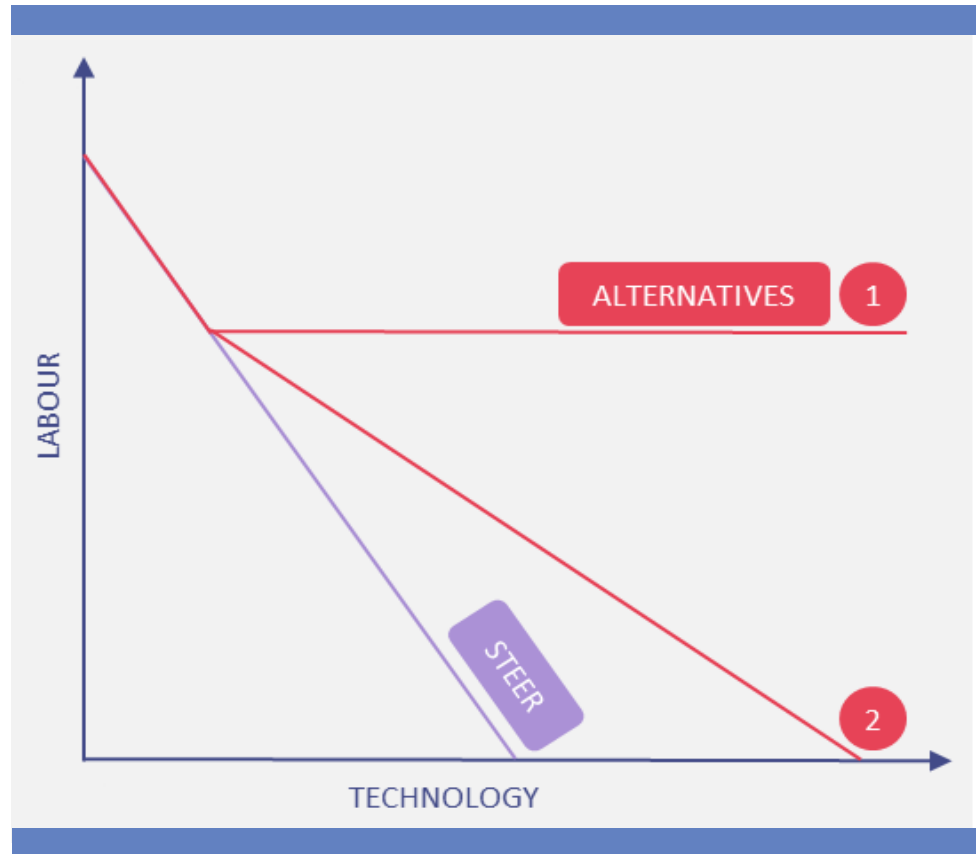
⁴² *'NERL's forward-looking capital programme and expenditure efficiency.'* Steer (February 2019); chapter 6; page 83.

⁴³ *'NERL's forward-looking capital programme and expenditure efficiency.'* Steer (February 2019); chapter 6; pages 69-70.

If the impact of the technology deployed by NERL was akin to alternative technology 1, its impact may have already been seen in the reduction in ATSA headcount since 2007. Similarly, if the impact of the technology deployed by NERL was akin to alternative technology 2, its historic impact on labour would overestimate its likely impact going forward.

Therefore, in our opinion, this analysis does not provide a strong basis for the CAA’s additional efficiency savings.

Figure 10: Illustrative example of the impact of technology on labour



Source: *Economic Insight*.

Evidence on headcount for trainer air traffic assistants

In its efficient operator model, Steer considered that the number of ATSAs supporting TATC training should move in line with the number of TATCs, equivalent to 7.5% to 30% savings over on NERL’s headcount estimates in its (revised) Business Plan.⁴⁴

However, as noted in section 3.2.3.2, there are inconsistencies in Steer’s estimates of TATC headcount which, by design, feed through its estimates of headcount for trainer ATSAs – as shown in Table 8.

⁴⁴ *‘NERL’s forward-looking capital programme and expenditure efficiency,’ Steer (February 2019); chapter 6; pages 69-70.*

Table 8: Inconsistencies in Steer’s calculations of headcount for trainer ATSAs (2024)

2024	Lower Bound	Upper Bound
Gap in headcount for operational ATCOs	3%	10%
Implied gap in headcount for TATCs	3%	10%
Implied headcount for <u>trainer</u> ATSAs	191	207
Headcount for <u>trainer</u> ATSAs reported by Steer	149	197

Source: Economic Insight analysis based on information in Steer’s report (*‘NERL’s forward-looking capital programme and expenditure efficiency.’ Steer (February 2019); chapter 6*).

Therefore, as before, this analysis does not provide a strong basis for the CAA’s additional efficiency savings, and in particular, the rapid efficiency savings in the final two years of RP3.

Evidence on headcount for other non-operating air traffic assistants

In relation to other non-operational ATSAs, Steer suggested that ATSAs involved in supporting the network management capability and the change programme could be reduced 2020 onwards, reflecting more efficient use of staff once new technology is deployed.⁴⁵ Therefore, in its efficient operator model, Steer predicted a headcount reduction on NERL’s (revised) Business Plan of approximately 4-8% (equivalent to 6 to 13 FTEs)⁴⁶ by the end of RP3.

Similar to our concerns regarding the headcount for operational ATCOs (in section 3.2.3.1) and operational ATSAs (in section 3.2.3.3), Steer’s methodology:

- (i) does not appear to be supported by any evidence; and
- (ii) predicts the impact of technology on labour without considering that this impact would depend on the nature of the technology.

Therefore, similar to the above, this analysis does not provide a strong basis for the CAA’s additional efficiency savings, and in particular, the rapid efficiency savings in the final two years of RP3.

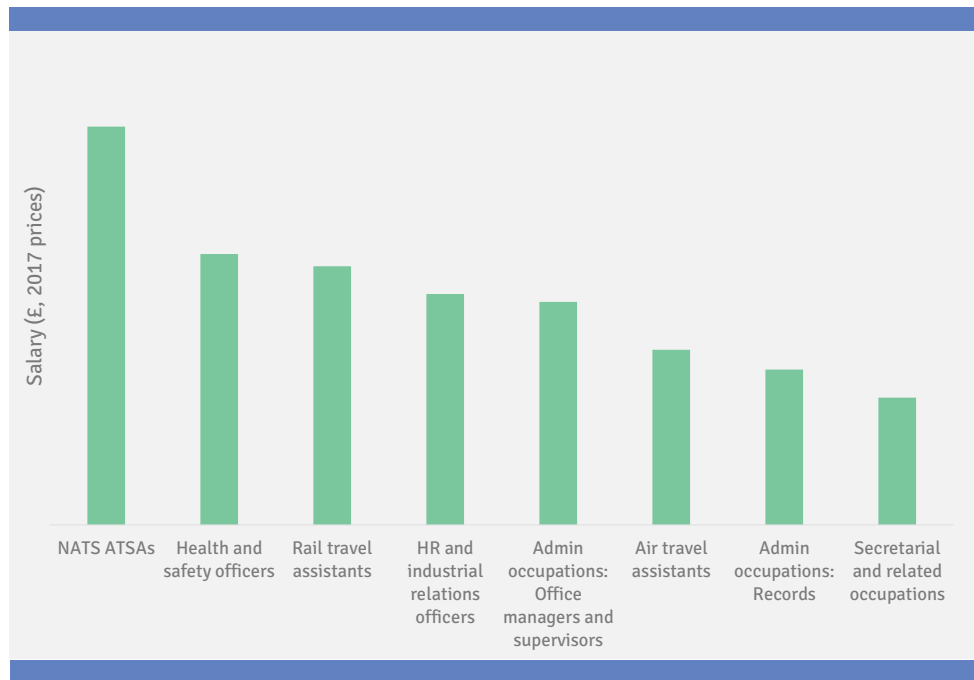
Evidence on salaries for air traffic assistants

On the basis of a comparison of the average salaries earned by NERL’s ATSAs in 2017 with the annual gross pay in similar roles reported by the ONS, as shown in Figure 11, Steer found that NATS ATSAs’ average salaries were significantly higher than comparable assistant and administration roles in other industries.⁴⁷

However, recognising the limits on NERL’s ability to adjust salaries of existing ATSA staff, Steer suggested that NERL should consider the introduction of lower salary roles for new joiners in re-classified roles (consistent with the approach taken by other UK privatised transport companies).

⁴⁵ *‘NERL’s forward-looking capital programme and expenditure efficiency.’ Steer (February 2019); chapter 6; pages 69-70.*
⁴⁶ *Based on Economic Insight calculations based on information in Steer’s report.*
⁴⁷ *‘NERL’s forward-looking capital programme and expenditure efficiency.’ Steer (February 2019); paragraph 6.58; page 71.*

Figure 11: Steer’s comparison of NERL’s ATSA salaries with salaries in other industries



Notes: Data values have been redacted from Steer’s report.
 Source: ‘NERL’s forward-looking capital programme and expenditure efficiency.’ Steer (February 2019); Figure 5.14; page 37.

In our opinion, Steer’s simplistic comparison of average salaries across industries falls significantly short of a proper benchmarking analysis required to assess the efficiency of these salaries. In particular:

- **(i) It relies on the validity of the benchmarks used.** However, in this case, Steer does not appear to have undertaken any analysis of the validity of the comparators.
- **(ii) It does not consider other drivers of difference in salaries.** Specifically, there is significant academic literature on the various drivers of pay levels, including: hours worked; education; experience; training; union status; etc.⁴⁸

Further to this, Steer’s consideration for the salaries and benefits for ATSAs appear to be at odds with its consideration of headcount for operational ATSAs. In particular, in its review of the headcount, Steer suggested that there is a technology/labour trade-off in the roles performed by ATSAs such that headcount demand for these roles should decrease with technological improvements. However, Steer’s recommendation in relation to the salaries is to reassign staff so that ATSA roles can be performed by other ‘cheaper’ staff. However, Steer has provided no evidence to support its claim that the nature of the jobs performed by ATSAs can be performed by ‘other’ (potentially untrained and less experienced) staff.

On the whole, we do not find Steer’s analysis in relation to the headcount and salaries for ATSAs to provide a strong basis for the CAA’s additional efficiency savings, and in particular, the rapid efficiency savings in the final two years of RP3.

⁴⁸ As noted in ‘Staff Operating Expenditure for Air Traffic Control: Prepared for NERL.’ NERA (21 March 2018).

3.2.3.4 Evidence on headcount for managerial support grade and personal contract grade staff

In its model of the operating costs for an efficient operator, Steer identified the scope for efficiency savings over and above NERL's (revised) Business Plan through the reduction of headcount for head-office staff. Specifically, it estimated the scope for savings: (i) between £16.4m to £21.0m through the reduction of headcount for managerial support grades (MSG); and (ii) between £9.5m to £11.5m through the reduction of headcount for personal contract grades (PCG).⁴⁹

In its model, Steer predicted the headcount for MSG and PCG staff required by an efficient operator based on estimated traffic elasticities of 0.25 to 0.75 for MSG staff and 0.20 to 0.50 for PCG staff. These estimates are based on its analysis for two airports where Steer found that the elasticity of head-office staff to traffic growth is 20%.

However, we have material concerns regarding this methodology.

Most importantly, Steer does not appear to have considered the key drivers of this headcount. In particular, as detailed further in the Annex, based on NERL's operational experience, the headcount for MSG and PCG staff is not driven only by traffic, but more broadly by: (i) the scale of its operations; and (ii) the scale of the change programme which needs to be managed.

Notwithstanding the above, there are specific concerns regarding Steer's estimates of the elasticity to traffic. In particular:

- Firstly, Steer's estimated elasticities are:
 - (i) based on airports (not air navigation service providers);
 - (ii) only based on two airports; and
 - (iii) does not assess the suitability of these airports as benchmarks for NERL.
- Secondly, given the predicted traffic elasticity of 0.20, it is not clear why Steer has interpreted this into the separate ranges of elasticities it has used in its efficient operator model (0.25 to 0.75 for MSG staff and 0.20 to 0.50 for PCG staff).

This evidence does not provide robust basis for the additional efficiency savings identified by the CAA, and in particular, the rapid efficiency savings in the final two years of RP3.

3.2.3.5 Our assessment of the scope of efficiency savings based on bottom-up evidence

On the whole, our assessment of the CAA's bottom-up evidence based on Steer's analysis of the operating costs for an efficient operator suffers from significant methodological issues. As such, this does not provide robust basis for there being scope for NERL to make additional efficiency savings over and above the efficiencies identified in its (revised) Business Plan. In particular, given the CAA's allowance in line with NERL's Business Plan in the first three years, the bottom-up evidence does

⁴⁹ ['NERL's forward-looking capital programme and expenditure efficiency,' Steer \(February 2019\); chapter 6; pages 74-76 and 83.](#)

not provide a strong basis for the feasibility of NERL being able to make the rapid efficiency savings identified by the CAA in the final two years of RP3.

3.3 Our assessment of NERL’s approach to determining operating costs

In this section, we assess the evidence developed by NERL in determining the operating costs for RP3 against our suggested framework.

On the whole, the estimates of operating costs in NERL’s (revised) Business Plan are based only on its bottom-up analysis. By design, there is a transparent connection between this evidence and the overall operating costs. However, it does not appear to consider top-down evidence on the feasibility of these efficiency savings.

In developing its bottom-up analysis, NERL’s (revised) Business Plan reflects a detailed understanding of the cost drivers by individual category of costs based on its operational expertise. In doing so, it is therefore able to consider the scope for any efficiency savings within each cost category.

For instance, NERL’s position on the headcount for operational ATCOs is based on a detailed consideration of each of the individual drivers of headcount detailed in Figure 12. On this basis, it identified the scope for savings of c.21 operational ATCOs as a result of improvements in technology (through the development of DSESAR). Similarly, it has identified scope for savings related to its technological change programme (particularly related to its deployment of DSESAR) through the use of contractors (instead of more expensive air traffic engineers) to deal with the peaks in requirements over RP3.

Figure 12: Drivers of headcount demand for operational ATCOs



Notes: Detailed explanation of the drivers of headcount for each staff category is in the Annex. Source: Economic Insight.

However, being based on its internal business planning, this does not necessarily establish the efficient level of operating costs. Put another way, in order to ensure that these costs are efficient, one has to make an assumption of efficiency in NERL’s

operations. Nevertheless, it is worth noting that our assessment of the top-down evidence on NERL’s performance against other ANSPs (detailed in section 2.2.3) and the PRB evidence (detailed in section 3.2.2.3) suggests that NERL is one of the most efficient ANSPs in Europe.

3.4 Conclusion

In conclusion, given the challenges of determining efficiency in a single firm environment, where appropriate benchmarks may not be available:

- **A robust approach to determining NERL’s efficient costs should involve: (a) a combination of bottom-up and top-down approaches; and (b) a transparent connection between this evidence and the overall allowed operating costs.**
- **In this regard, there are deficiencies in both NERL’s and the CAA’s approaches at RP3, as detailed in Table 9.**

Table 9: Our assessment of NERL and the CAA’s approach to setting operating costs

Framework	NERL’s Business Plan	The CAA’s Final Decision
Bottom-up evidence	✓	✓ (but concerns regarding robustness)
Top-down evidence	X	✓ (but concerns regarding relevance)
Link between costs and evidence	✓	X

Source: *Economic Insight*.

- **Notwithstanding the above, the evidence (discussed in Chapter 2) suggests that NERL’s (revised) Business Plan already incorporates ambitious efficiency savings which will be challenging for it to meet.**
- **In addition, the CAA’s evidence does not support the scope for NERL to make additional efficiency savings.** In particular, given the CAA’s allowance in line with NERL’s (revised) Business Plan in the first two years of RP3, **the evidence does not provide a strong basis for the rapid efficiency savings in the final two years.** Specifically:
 - (i) Due to the lack of connection between its evidence and the overall efficiency challenge, it is difficult to be confident in the CAA’s estimates.
 - (ii) The top-down evidence considered by the CAA does not support the scope for NERL to make the additional efficiency savings identified rapidly in the final two years. Specifically:
 - » The suggested historic reduction in unit operating costs of 2.3% is driven by: (a) unusually low operating costs per CSU in 2017; and (b) use of CSU as the unit of traffic.

- » The suggested 5% average operating cost outperformance from 2007 to 2017 is substantially driven by the outperformance in CP2 and CP3/RP1. However, this outperformance has not persisted into RP2.
 - » The suggested scope of efficiency savings based on the PRB's analysis: (a) relates to total costs; (b) is based on data which is not standardised for conducting such benchmarking analysis; and (c) suggests total cost savings as low as 1%.
- (iii) The bottom-up evidence developed by Steer does not provide a robust basis for the additional efficiency savings identified by the CAA rapidly in the final two years. Specifically, we have material methodological concerns regarding Steer's analysis, particularly, in relation to the identified scope for additional efficiency savings in staff costs.

4. Conclusions

In this chapter, we present our overall conclusions on the scope for NERL to make efficiency savings over RP3. In doing so, we also highlight the key considerations for the CMA in determining efficient operating costs for NERL as part of the redetermination process.

Overall, given the challenges of determining efficiency in a single firm environment, where appropriate benchmarks may not be available, a robust approach to determining NERL's efficient costs should involve: (a) a combination of bottom-up and top-down approaches; and (b) a transparent connection between this evidence and the overall allowed operating costs.

However, based on our consideration of the existing evidence, there are deficiencies in both NERL's and the CAA's approaches at RP3, as detailed in Table 10.

Table 10: Our assessment of NERL and the CAA's approach to setting operating costs

Framework	NERL's Business Plan	The CAA's Final Decision
Bottom-up evidence	✓	✓ (but concerns regarding robustness)
Top-down evidence	X	✓ (but concerns regarding relevance)
Link between costs and evidence	✓	X

Source: *Economic Insight*.

Given this, the key questions for the CMA to consider in determining the appropriate scale of efficiency challenge for NERL are:

- (a) Is the scope for efficiency savings in NERL's (revised) Business Plan ambitious and challenging given the contextual evidence available?;
- (b) Is there evidence to support the additional efficiency challenge identified by the CAA?; and

- (c) After maintaining the operating costs identified in NERL’s (revised) Business Plan in the first three years, is there evidence to support the scope for NERL to significantly reduce the operating costs in the final two years?

On these questions, in turn, our analysis suggests that:

- On (a), the scale of the efficiency challenge in NERL’s (revised) Business Plan is ambitious and challenging for it to meet. Specifically:
 - firstly, the evidence shows that NERL’s (revised) Business Plan incorporates significant efficiency savings;
 - secondly, the top-down evidence strongly suggests that the scope for NERL to make one-off and ongoing efficiency savings over RP3 is limited; and
 - thirdly, considering the specific features of NERL’s operations, the scope for it to make continuous efficiency savings in line with historic trends also appears limited.
- On (b), the evidence does not support the scope for NERL to make additional efficiency savings, of c.5% in the final year of RP3, over and above the challenging efficiencies already identified in its (revised) Business Plan.⁵⁰ Specifically:
 - firstly, due to the lack of connection between its evidence and the overall efficiency challenge, it is difficult to be confident in the CAA’s estimates;
 - secondly, the top-down evidence considered by the CAA does not provide a consistent basis to support the scope for NERL to make the additional efficiency savings identified; and
 - likewise, the bottom-up evidence developed by Steer does not provide a robust basis for the additional efficiency savings identified by the CAA.
- On (c), there is no evidence that NERL will be able to significantly cut its operating costs in the last two years of RP3. Specifically:
 - firstly, the CAA’s own assessment is that NERL will require “*additional resilience in its staffing to train operational staff on new systems and procedures*”⁵¹. Therefore, there is no evidence or reason as to why this requirement will fall away in the final years of RP3. Even if it did, the rapid workforce reduction implied by it may not be feasible and would not be costless;
 - secondly, the CAA’s argument that staff retiring provides “*scope for NERL to identify and achieve greater efficiencies*”⁵² is weak. Staff retiring is as likely to give rise to increased cost pressures associated with managing the orderly exit of existing staff members, the recruitment and training of new staff members, and the possible loss of productivity this entails; and
 - thirdly, more broadly, the context; the requirements; or the drivers of the overall operating costs are not expected to be different in the final two years of RP3. Therefore, in light of the top-down and bottom-up evidence, there

⁵⁰ We note that this figure is conservative - please see footnote 5.

⁵¹ ‘UK RP3 CAA Decision Document (CAP 1830),’ CAA (August 2019); paragraph 5.25.

⁵² ‘UK RP3 CAA Decision Document (CAP 1830),’ CAA (August 2019); paragraph 5.24.

does not seem to be any evidence to expect that the scope for making efficiency savings would be higher in these final two years.



5. Annex: Drivers of headcount for individual staff categories

In this annex, we present a detailed explanation of the drivers of headcount for NERL’s individual staff categories.

5.1 Drivers of headcount for operational air traffic controllers

In Figure 13, we summarise our understanding of the key drivers of headcount demand for operational ATCOs, based on input from NERL’s operations team.

Figure 13: Drivers of headcount demand for operational ATCOs



Source: Economic Insight.

- **1. Traffic.** The volume of traffic (i.e. the number of flights) that an ANSP has to service has a direct impact on the number of operational ATCOs it needs to do so. Importantly, however, the relationship between traffic and headcount for operational ATCOs is not linear. In fact, it is subject to the following:
 - **The path of travel.** The origin and destination of the additional flights is an important factor because it matters whether:
 - » The traffic increase relates to a new route altogether (in which case additional ATCOs may be needed to service new airspace sectors).
 - » The traffic increases within an airspace sector which has spare capacity (in which case the same number of ATCOs can handle the additional traffic).
 - » The traffic increases within an airspace sector which is already operating at capacity (in which case it would create a need for additional ATCOs to handle the increased density).

It also matters whether: (i) traffic increases on routes which have interactions with other airspace sectors; or (ii) the flight stays within the same airspace sector.
 - **Seasonality.** The seasonality of the additional traffic is also important because it matters whether the additional traffic flows in: (i) the summer months when traffic is already heavy; or (ii) other times of the year when there may be some spare capacity.
 - **Time of the week and day.** Similar to the above, traffic tends to be spread unevenly across the week and day, and therefore, the need for additional operational ATCOs turns on the time at which the additional traffic is likely to present itself.
- **2. Complexity of the airspace sector.** The ‘complexity’ of the airspace, in terms of the number of interactions each flight needs, affects the number of operational ATCOs required. This, in turn, depends on: the available capacity in the airspace; the nature of the aircrafts (i.e. lightweight aircrafts which need more interactions with the air traffic control or commercial flights); etc.
- **3. Service quality.** The service delivery standards required of the ANSP, particularly in relation to the following, have a direct impact on the operational requirement:
 - **Required level of safety performance.** The requirement to maintain the safety of operations has an impact on: (i) the distance that needs to be maintained between flights; (ii) the number of flights which can be operated within an airspace sector; and (iii) the number of interactions that an ATCO needs to have with a flight.
 - **Acceptable level of capacity delay.** The expected service quality in relation to the ATFM delay affects the pace at which an ANSP is required to move traffic. In this regard, NERL’s operations team noted that its customers are highly sensitive to delay on specific parts of the network (in particular, the London Approach). This is, however, not reflected in the CAA’s delay targets, which are set for the network as a whole.

- **4. Operational resilience standards.** The variability in operations which customers are willing to put up (for instance in relation to delay as a result of technical disruptions; bad weather; volcanic ash; etc.) has an impact on the degree of staffing flexibility that ANSPs need to maintain by way of reserve staff; planning overtime; etc. From experience, NERL understands that its customers have very low tolerance in terms of variability of operations even in times of events that NATS management has no control over.
- **5. Skills of the workforce.** Given the nature of the operations, where safety is a paramount consideration, the operational skills of the workforce is extremely key to the overall headcount:
 - **Level of experience.** The level of productivity in managing flight interactions increases with experience. Over RP3, NERL is facing a major change in the demographics of its workforce. As such, as it replaces experienced ATCOs with newly-trained ATCOs, it has to maintain a larger number of operational ATCOs in the medium term until they gain experience (which, in this case, relates to achieving the same number of validations as retiring ATCOs – NERL estimates this takes nearly 5 years).
 - **Specific skills of the workforce.** ATCOs are usually trained to deliver air traffic control services for specific airspace sectors (i.e. parts of the airspace). This lack of homogeneity of skills hinders transferability of ATCOs between various airspace sectors. Given this, the larger the number of airspace sectors that an ANSP has to service, the more specialised is its operational workforce, and the less flexibility it has in deploying its workforce across sectors. This lack of flexibility has a direct impact on the number of operational ATCOs an ANSP needs to maintain. For instance, even if an ANSP efficiently needs to maintain 2.5 operational ATCOs on sector A and 1.5 on sector B, together it may need to maintain 5 (instead of 4) operational ATCOs unless there are operational ATCOs trained on both sector A and B.
- **5. Technology.** Technological advances increase the capacity of ATCOs to handle traffic (especially the ones who are operating at airspace sectors which are at capacity). However, there is not a one-to-one trade-off between investment in assets and headcount for operational ATCOs. Put simply, technology makes existing ATCOs more productive, but cannot undo the need for more ATCOs created by the above factors. This reflects the nature of ATCO work which has a high safety risk and, therefore, can only be improved, but not, at the extreme, eliminated with technology.

5.2 Drivers of headcount for trainee air traffic controllers

The headcount demand for TATCs is driven by the gap between:

- (i) headcount demand for operational ATCOs; and
- (ii) existing supply of operational ATCOs.

NERL expects its existing supply of operational ATCOs to be affected by the losses it is likely to face as a result of:

- (a) retirements (which, given the demographic profile of its ATCOs; is expected to increase over RP3 and RP4, peaking in 2027);⁵³ and
- (b) natural attrition (as a result of medical reasons or resignations).

5.3 Drivers of headcount for operational air traffic assistants

In Figure 14, we summarise our understanding of the key drivers of headcount demand for operational ATSAs, based on input from NERL’s operations team.

Figure 14: Drivers of operational ATSA headcount



Source: Economic Insight analysis of NERL’s information.

As is clear, given the operational nature of their role, the primary drivers of headcount demand for operational ATSAs are the same as that for operational ATCOs (detailed in section 5.1 above).

However, in this case, more so than in the case of operational ATCOs, technology is an important driver of headcount demand. Importantly, technology allows an ANSP to drive efficiencies by:

- (i) improving the productivity of operational ATSAs;
- (ii) increasing the capacity of operational ATSAs; and
- (iii) automating tasks performed by ATSAs.

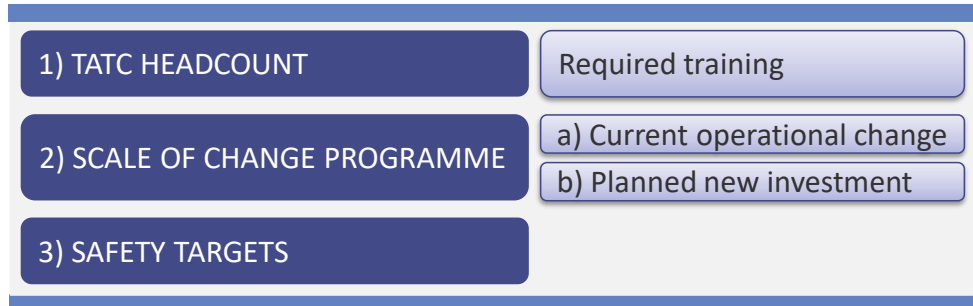
The impact of technology is, however, specific to the nature of the technology in question. It is, therefore, difficult to predict the impact of this technology on the headcount without: (a) understanding the technology in question; and (b) using expert judgement to determine the way in which it can be efficiently deployed.

⁵³ Please see ‘Appendices: RP3 Business Plan 2020-2024,’ NATS (26 October 2018); Appendix K; page 83.

5.4 Drivers of headcount for non-operational air traffic controllers

In Figure 15, we present our understanding of the key drivers of headcount demand for non-operational ATCOs, based on input from NERL’s operations team.

Figure 15: Drivers of headcount for non-operational ATCOs



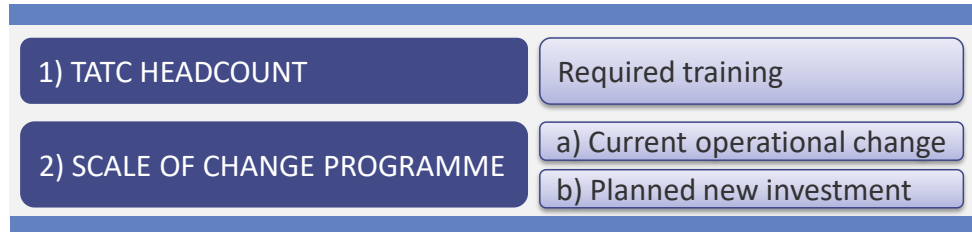
Source: Economic Insight.

- **1. TATC headcount.** Non-operational ATCOs with operational experience are required to train TATCs on the operational requirements specific to the ANSP. Therefore, the number of TATCs in training has a direct impact on the number of non-operational ATCOs required to train them. This, in turn, depends on: (i) the ratio of TATCs to a trainer; and (ii) the training time for a TATC (which varies between TATCs).
- **2. Scale of change programme.** The operational experience that non-operational ATCOs bring is important for effective design and delivery of any operational and technological change programme undertaken by an ANSP. This is important to ensure that: (i) any changes are operationally successful; and (ii) the transition is seamless such that operations are not affected in the meantime. Therefore, depending on the stage of the change, non-operational ATCOs are required to:
 - (i) Train operational ATCOs on the technological and operational change currently being deployed (for instance, for NERL in RP3, this includes DSESAR).
 - (ii) Help to design, test and deliver further planned change over RP3 (for instance, for NERL in RP3, this includes the London Airspace Modernisation Programme LAMP).
- **3. Safety targets.** Similar to the above, ATCOs’ operational experience is key to ensuring an ANSP can maintain the safety of its operations. This is particularly important for an ANSP such as NERL which faces an already complex airspace made more complex with increasing traffic. As such, it needs to continue to plan and design measures to ensure safety, which requires operational experience.

5.5 Drivers of headcount for non-operational air traffic assistants

In Figure 16, we summarise our understanding of the key drivers of headcount demand for non-operational ATSAs.

Figure 16: Drivers of headcount for non-operational ATSAs



Source: *Economic Insight*.

Similar to the headcount for non-operational ATCOs (discussed in 5.1 above), as a way to augment the roles of the more expensive ATCOs, the headcount for non-operational ATSAs is also driven by the following key drivers:

- **1. TATC headcount.** Non-operational ATSAs are usually responsible for providing TATC training during the first year in the training college (augmented by the operational experience of ATCOs as detailed in section 5.1 above). Therefore, the number of TATCs in training has a direct impact on the number of non-operational ATSAs required to train them. This, in turn, depends on: (i) the ratio of TATCs to a trainer; and (ii) the training time for a TATC (which varies between TATCs).
- **2. Scale of change programme.** Non-operational ATSAs are also required to:
 - run simulations to train operational ATCOs on the new operational environments;
 - assist in delivering further planned changes over RP3; and
 - conduct research and development activity to enhance service delivery.

5.6 Drivers of headcount for air traffic engineers

As detailed in Figure 17, the headcount for air traffic engineers (ATCEs) is primarily driven by a combination of:

- **1. The need to deliver the long-term investment plan.** The impact of this on the headcount for technical services will depend on:
 - (i) the scale of the long-term investment plan;
 - (ii) the materiality of the change which drives the need to train operational staff on the change.
- **2. The need to maintain the current operational asset base in the medium term.** The impact of this on the headcount for technical services will depend on:
 - (i) the scale of the asset base that needs to be maintained; and
 - (ii) the age of the legacy asset base.

Figure 17: Drivers of headcount for operational ATCOs



Source: Economic Insight.

5.7 Drivers of headcount for science, technical, analytical and research grades

Figure 18 summarises our understanding of the key drivers of headcount for science, technical, analytical and research (STAR) grades, based on input from NERL’s operations team.

Figure 18: Drivers of headcount for STAR grades



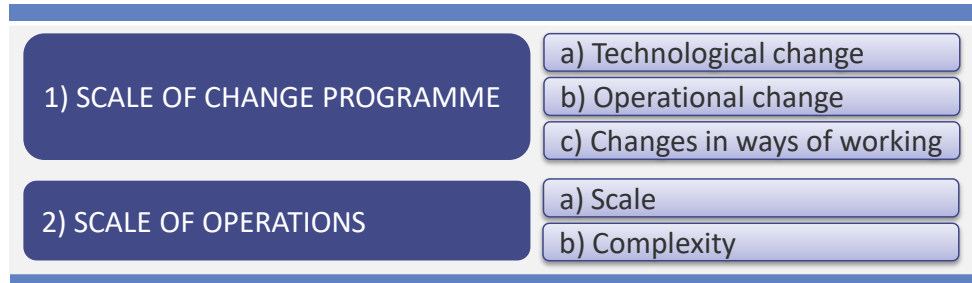
Source: Economic Insight.

- **R&D ambition.** STAR grades are responsible for ensuring the NERL can continue to develop its air traffic management capability to enhance its technological capability going into the future. Over RP3, as it increases its focus on delivering its research and development strategy, it would need STAR grades to manage and deliver these projects.
- **Service delivery targets.** Meeting service delivering targets, especially in relation to safety and delay, in an increasingly complex airspace with expanding traffic requires significant analytical input. For NERL, meeting these targets is going to become increasingly difficult over RP3, resulting in more analytical input from the STAR grades.

5.8 Drivers of headcount for managerial support grades

In Figure 19, we present our understanding of the key drivers of headcount for staff in for managerial support (MSG) grades, based on input from NERL’s operations team.

Figure 19: Drivers of headcount for MSG staff



Source: Economic Insight.

- **1. Scale of change programme.** The extent of “change” being planned in the organisation has a direct impact on the managerial input required to manage the process. This includes:
 - **(a) Technological change.** For instance, in RP3, this includes deployment of DSESAR, which requires support in delivery, training, etc.
 - **(b) Operational change.** For instance, in RP3, this includes airspace modernisation, which creates the need to communicate changes to stakeholders.
 - **(c) Changes in ways of working.** This includes change programmes within the organisation to improve efficiency, such as, roll-out of the P30 project management programme.
- **2. Scale of operations.** On a day-to-day basis, the scale of operations increases the need for corporate support. This includes, not just the volume of operations, but also its complexity. Over RP3, the primary changes in the scale of operations includes the predicted growth in traffic, which, as detailed in the sections above, increases the overall operational headcount demand.

5.9 Drivers of headcount for personal contract grades

Based on discussions with NERL’s operations team, we understand that the key drivers of headcount for staff on personal contract grades (PCG) are similar to the drivers of MSG headcount:

- (i) The scale of the change programme being implemented:
 - » technological change (such as, deployment of DSESAR);
 - » operational change (such as, airspace modernisation); and
 - » changes in ways of working (such as, new project management tools).
- (ii) The scale of operations:
 - » in terms of scale; and
 - » in terms of complexity.

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