UK Civil Aviation Authority

ARP4 Climate Change Adaptation Report

CAP 3072

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Executive Summary

The CAA has taken part in two of the three reporting cycles on climate risk known as the Adaptation Reporting Power (ARP). For ARP4, the Minister of Nature requested the CAA to produce a report. Below is an overview of the work the CAA has been doing since 2011 to ensure it is taking appropriate action to adapt and mitigate the impacts of climate change.

By engaging organisations in reporting, the Department for Environmental, Food and Rural Affairs (DEFRA) hopes to increase both capacity and awareness by making examples of good practice publicly available and encouraging organisations to make climate risk management a leadership priority.

Over the past 13 years, the CAA has embedded positive sustainability practice both within the organisation and within the wider aviation sector. This includes senior management commitments to carbon reduction targets, a sustainability strategy, a robust risk management framework capable of taking climate risks into account, and inter-sectoral collaboration projects such as the Airspace Modernisation Strategy and Jet Zero Task Force.

By taking part in ARP4, the CAA hopes to improve both its own and wider aviation sector's ability to mitigate climate risks. As part of this report, we have conducted a climate risk assessment identifying and rating the dependent, interdependent and cascading risks that face both the CAA and UK aviation. The assessment includes risks such as engine wear from the presence of silicates resulting from desertification, changes in turbulence, as well as threats from extreme weather to aviation infrastructure. Although we do not have direct regulatory responsibility for many of these risks, our role as the civil aviation regulator makes us well placed to encourage best practice within the sector.

We have also updated our climate action plan to more closely align with DEFRA's requirements, and to include additional relevant actions that the CAA has undertaken since 2015.

Chapter 1

Introduction

The Current Outlook

1.1 Almost a decade has passed between our last report and the present. In that time, attitudes towards the climate crisis have changed. The UK has declared a climate emergency, whilst 195 members of the United Nations Framework Convention on Climate Change (UNFCCC) have signed the Paris Agreement, committing signatories to a sub-2°C temperature increase.

1.2 Our climate has continued to shift. The World Meteorological Organisation (WMO) has reported 2023 as the warmest year on record, with global average near-surface temperature reaching 1.45°C (margin of uncertainty being ±0.12°C).

1.3 The United Nations Environmental Programme (UNEP) estimates the world will experience 2°C - 3°C of warming given current climate commitments[1]. The arctic is likely to reach ice-free conditions during its summer minimum at least once before 2050.[2]

1.4 There is a growing need for more ambitious climate action and adaptation measures across the UK economy.

1.5 The aviation industry faces considerable risk. Intensive storms and severe winter weather may threaten infrastructure/supply chains, increasing flight delays. Extreme heat can lead to runway and taxiway deterioration. Adaptation measures, such as de-icing, have the potential to worsen environmental impact if managed incorrectly. Mitigation measures and an increase in uncertainty resulting from climate change have the potential to raise costs and reduce quality of service for customers.[3] These issues will make aviation less sustainable and pose significant economic risk to the industry and consumers.

1.6 Whilst CO_2 emissions from aircraft are subject to the most scrutiny in public discourse, there are further contributing factors. In 2018, Effective Radiative Forcing (ERF) from non-CO_2 impact yields may have accounted for more than

[1] United Nations Environment Programme (UNEP). Emissions Gap Report 2023: Broken Record – Temperatures Hit New Highs, Yet World Fails to Cut Emissions (Again); UNEP: Nairobi, 2023. https://www.unep.org/resources/emissions-gap-report-2023.

[2] United in Science 2024 (wmo.int).

[3] Factsheet Business and economics_20200325_Clean.docx (icao.int)

66% of aviation net forcing.[4] A combination of emissions of soot, aerosols and water condensation trails may be expediting warming by increasing the amount of energy absorbed by the atmosphere. The science behind non-CO2 impacts is unclear, and condensation trails also have a cooling effect that is not fully understood. Nevertheless, changing and monitoring aviation's contribution to both CO_2 and non-CO_2 impacts is a key focus of the CAA's approach to climate adaptation.

1.7 Aviation is also a vital socio-economic and cultural asset that boosts productivity, trade, tourism and national/global connectivity.[5] As the regulator, we have a duty to consider the desirability of promoting economic growth as we deliver parts of our regulatory functions. It is important that the industry rises to mitigate the threat posed by climate change without having to abandon its important contributions to modern society. As such, we must enable a successful aviation sector which is also environmentally sustainable.

Purpose

1.8 Since 2008, the Climate Change Act has enabled the Secretary of State to direct non-departmental public bodies to report on climate risk assessments and actions. This is now the fourth successive round of climate adaptation reporting (ARP4), and our third report.

1.9 Following the first round, climate adaptation reporting under ARP4 became strictly voluntary. However, as the civil aviation regulator, the CAA is an important contributor to the UK aviation sector's resilience to climate-related impacts. At the end of 2023, the Minister of Nature asked the CAA to take part in the fourth round, in which we should consider:

"The role CAA plays in ensuring that the civil aviation sector is resilient to the climate risks that affect its regulated roles and is taking appropriate action to adapt."

Therefore, this report examines both the CAA's internal risk assessments and the broader risks within the civil aviation sector, focussing on the CAA's role as the regulator.

1.10 The publication of reports assessing the impact of the CAA's statutory functions in relation to these objectives is key to meeting the organisation's environmental aims. According to DEFRA, successive rounds of reporting encourage organisations to engage with interconnected sectors and make the identification and integration of climate risk a leadership priority. This leads to the adoption of more efficient adaptive measures that may otherwise not have been

[4] EUR-Lex - 52020SC0277 - EN - EUR-Lex (europa.eu)

[5] 2360-caa_env-sus-stategy_v6-2-front.pdf

implemented. Currently, we produce several reports to help meet the CAA's environmental commitments, including a UK Aviation Environmental Review (AER) and a biodiversity and ecosystem resilience for Wales, England and Scotland. By producing reports on climate change adaptation risk, we take an active role in contributing to the mitigation of aviation's impact on the environment and addressing the effects of climate change on aviation.

1.11 The government relies on reporting to determine climate change adaptation progress across important sectors in the UK. The information we publish in this report will be used by DEFRA to identify risks and adaptation actions across vital transport-related infrastructure. Reports such as ours are particularly relevant to the UK's Climate Change Risk Assessment (CCRA), the National Adaptation Plan and the Climate Change Committee's (CCC) Fourth Climate Change Risk Assessment (CCRA4).

1.12 The DfT is creating a transport adaptation strategy as part of consultation efforts leading up to the fourth national adaptation plan (NAP4). The DfT aims for transport infrastructure operators to identify senior ownership of climate risks and, by 2026, include adaptation in their organisational objectives. It also aims to improve risk assessment across the transport sector through reporting initiatives coordinated by DEFRA. This report is produced in part to help the DfT meet its climate risk objectives.

Objectives, Duties and Functions

1.13 As the UK's civil aviation regulator, our statutory objectives are to ensure high security and safety standards and consumer protection practices. Under section 108 of the Deregulation Act 2015, we should also consider the desirability of promoting economic growth when delivering certain regulatory functions.[6] Geographically, these duties are limited to aviation activities by UK airlines or activities that occur within UK airspace and at UK airports.

1.14 Our responsibilities are relevant to organisations across multiple aviation sectors.[7] However, there are limitations on our regulatory, advisory and commercial functions in relation to environmental impact and climate change adaptation:

[6] The growth duty does not apply to the CAA's functions under the following legislation: • Part 1 (air traffic and air navigation functions) of the Transport Act 2000 • Part 1 (airports) of the Civil Aviation Act 2012 • the Airports (Ground handling) Regulations 1997 • the Civil Aviation (Allocation of Scarce Capacity) Regulations 2007 • the Airport Charges Regulations 2011

[7] Our role | Civil Aviation Authority (caa.co.uk)

Airlines

1.15 We regulate operational airlines situated in the UK, the Channel Islands and Isle of Man to ensure, amongst other things, that they comply with UK and international safety standard, where relevant and display airfares transparently and take enforcement action against airlines who do not comply with relevant consumer law.

1.16 This includes 13 scheduled airlines, 10 charter airlines, 2 cargo airlines, 78 Type B operating license holders and 2 air transport license holders in the Channel Islands/Isle of Man.[8]

1.17 The CAA is responsible for aircraft noise certification including the aircraft used by airlines.

1.18 We do not have the legal power to force airlines to pay compensation to passengers unless pursued through the courts, regulate airfares or determine the level of Air Passenger Duty.

1.19 We do not regulate emissions produced by airlines. There is a carbon budget set by The Department for Business and Energy Strategy for the aviation industry which restricts the total amount of greenhouse gases that can be produced by domestic aviation.[9] However, this is not to be met by direct emission regulations set by the CAA.

1.20 We do not set regulations for aircraft noise. This is set by the Convention on International Civil Aviation, Law 598/2014, Law 1999/1452, Law 2008/3133 and Law 2018/785.[10] [11]

Airports

1.21 We regulate all 144 UK airports, excluding unlicensed aerodromes, to ensure they comply with UK and international safety standards.

1.22 For airports that have significant market power (Heathrow and Gatwick), we also regulate service standards and the maximum amount airlines are charged to use airports.

1.23 The CAA monitors noise surrounding UK airports, publishes noise impact information and offers guidance to the government on these effects.

[8] Airline licence holders | Civil Aviation Authority (caa.co.uk)

[9] UK Government | Civil Aviation Authority (caa.co.uk)

[10] Convention on International Civil Aviation - Doc 7300 (icao.int)

[11] Noise | Civil Aviation Authority

1.24 We do not directly regulate environmental standards for airports. These are set by government legislation.

1.25 Many airports go beyond the regulatory minimum and set their own standards to gain accreditation under the Carbon Trust Standard, ISO 14001 Environmental Standard, or the ACI Airport Carbon Accreditation Scheme. The CAA has no regulatory remit in relation to these schemes.[12]

1.26 We do not regulate airports outside the UK. Airports on the Isle of Man and the Channel Islands are regulated by two separate civil aviation authorities, the Isle of Man Civil Aviation Administration and the Office of the Director of Civil Aviation.

Airspace

1.27 We consider and decide on airspace change proposals, taking safety, efficiency and noise impact into consideration. In exercising its air navigation functions, after maintaining a high standard of safety in the provision of air traffic services, the CAA is to take account of any guidance on environmental objectives given to the CAA by the SoS under section 70(2)(d) of the Transport Act 2000.

1.28 The CAA provides a platform for aviation environmental-related inquiries and complaints in UK airspace, such as noise, which are subsequently referred to the relevant airport, air traffic control provider, or secretary of state.[13]

1.29 We do not instigate airspace changes or design flight paths. These are the remit of the aviation community and industry, such as airports, general aviation and NATS.

1.30 We do not regulate noise beyond taking its impact into account when approving airspace changes.

Aviation Capacity

1.31 We make it clear through reporting, such as the AER and the various biodiversity reports, and stakeholder consultation such as the consumer and sustainability panels, that reducing environmental impacts is necessary for sector growth, but also that aviation capacity is necessary to retain passenger choice, reduce disruption and keep airfares competitive.

1.32 We do not regulate aviation capacity to reduce environmental impact.

[12] Airports | Civil Aviation Authority (caa.co.uk)

[13] Environment | Civil Aviation Authority (caa.co.uk)

1.33 We do not decide when and where new runways are built. This decision lies with other entities such as the government, ANSPS, private investors and local authorities.

Aviation Security

1.34 We regulate security arrangements at UK airports, air carriers, cargo and in-flight suppliers. This ensures relevant entities comply with relevant international and UK safety standards.

1.35 We do not regulate security at airports outside of the UK, including UK airlines at foreign airports.

Drones

1.36 We provide permission for drone operators where required and provide general guidance to industry and public actors on how to fly drones safely without increasing risk to aviation.

1.37 We do not lead on action against the misuse of drones or have the power to pass new laws governing drones.

1.38 We do not currently regulate the environmental impact of drone usage or the use of drones for environmental monitoring.

Funding

1.39 Our regulatory activities are not funded by the UK taxpayer. Under Section 11 of the Civil Aviation Act 1982, all regulatory industry costs are covered through charges on the industry.[14] This includes charges on aerial application certificates, grant and renewal of national aerodromes licenses, and certification of air navigation service providers etc.

1.40 Funding is not provided by any charges or fines associated with environmental impact.

Travel Companies

1.41 We regulate travel companies selling flight packages to UK consumers through the ATOL scheme. This seeks to mitigate the effects of a company failure and ensures customers are protected in case of company failure.

1.42 We do not regulate service standards such as hotel quality or customer service.

1.43 We do not regulate the environmental impact of travel companies. These come from environmental regulations set by the UK government, or foreign governments in the case of travel companies situated abroad.

[14] Civil Aviation Act 1982 (legislation.gov.uk)

Environmental Responsibilities

1.44 Officially, the CAA is not an environmental regulator and does not set environmental regulations. However, we have additional statutory objectives that require us to account for the environment as part of our regulatory activities and decision making where legislation allows. These include accounting for the impact of aviation on noise, climate change, local air quality,[15] tranquillity and biodiversity. This is undertaken through our reporting duties and as part of decision-making when exercising other CAA functions where relevant.

1.45 We can challenge the industry to reduce environmental impact, but we do not have the authority to force airlines or other parts of the industry to take certain actions on air quality or other environmental impacts.

Embedding Climate Action Within the CAA

Senior Management Climate Commitments

1.46 Our Board and EXCO have made commitments to reduce our carbon footprint and improve environmental sustainability.

1.47 There is a senior management commitment transition our car fleet to electric by 2030 and to achieve net zero greenhouse gas (GHG) emissions by 2035 by reducing usage, improving efficiency and switching to sustainable resources. This will help the Government achieve its Net zero by 2050 targets and align the CAA's exposure to climate-related risks with a 1.5°C temperature increase scenario.

1.48 Our total net greenhouse gas emissions in 2023/24 financial year were 1225.8 tonnes of carbon dioxide equivalent. This represents a decrease of 33% compared 2019/20, and a 12% decrease compared to the previous financial year 2022/23. For a further breakdown, see our corporate environmental sustainability section on page 49-50 of our Annual Report & Accounts 2023-24.[16]

1.49 A significant proportion of emission reductions since 2019/20 were achieved due to energy use reductions. Energy use was reduced by 26% in 2023/24 compared to 2019/20 due to improvements in energy efficiency and an increase in hybrid working.

1.50 In 2023/2024, we brought our estate strategy further into line with net zero targets. Additionally, we recruited a corporate sustainability strategist to lead our

[15] The CAA's role on air quality is secondary to that of the government and local authorities, who are statutorily empowered to engage on air quality issues. For more information, see: Environment | Civil Aviation Authority (caa.co.uk)

[16] CAA Annual Report & Accounts 2023-24

corporate sustainability program, which includes identifying opportunities for scope 3 emission reductions.

1.51 The CAA is benchmarking against various relevant ISO standards. This currently includes ISO 14001, ISO 50001, and ISO Net Zero. It does not currently include ISO adaptation standards such as ISO 14090/91 and BS8631.

1.52 Senior management have made commitments to reducing the contribution of the CAA and aviation towards climate change, but these do not currently make explicit mention of adaptation measures.

Risk Management

1.53 The CAA's Risk Management Framework (RMF) is embedded at all levels of the organisation, as risk reporting is standard practice for all business areas.

1.54 Risks are escalated through the management chain with the support of the organisation's central risk function. The Executive Committee, Board and an Audit committee conduct periodic reviews to ensure threats are managed correctly.

1.55 The RMF is currently being expanded to become an Enterprise Risk Management Framework (ERMF). A core element of the ERMF is the categorisation of risks into Consumer and Public Risks, Strategic Risks, and Business Risks.

1.56 In the CAA's Annual Reports & Accounts, risks are categorised and linked to the CAA's strategic focus areas. Environmental and demand management risk are both linked to the 'supporting aviation to improve environmental sustainability' strategic focus area.

1.57 The CAA's central risk function considers climate change to be a potential emerging corporate risk and will continue to actively monitor the issue. As extreme weather events increase, there may be physical risks to staff and infrastructure. Adaptation may involve prioritising essential business travel to meet core regulatory functions, and minimising business travel (such as through remote-working) for CAA functions where attendance is not mandatory.

1.58 The CAA's current approach to procurement will help secure value-for-money, counterweighting higher costs associated with climate change, such as insurance and utilities.

1.59 Our central risk function does not currently considerer climate change a significant threat to our operations and viability. For more information, see 'Annual Reports & Accounts 2024'.

1.60 CAA Strategy and Policy (CSP) has identified more specific sustainability risks that can be linked to climate change and adaptation.

1.61 For emerging risks, a central Horizon Scanning Team identifies disruptive innovation and developments in the aviation sector alongside any associated threats or opportunities, such as the need to adapt existing aviation safety regulations. This includes a shift in demand for emerging technologies, e.g. alternative energy sources such as biofuels, hybrid electric or electric propulsion.

1.62 The Horizon Scanning team will be expanding its focus beyond emerging technologies, such as consumer attitudes and legislation, but does not yet have a specific focus on climate adaptation.

1.63 The CAA has developed a comprehensive crisis management plan designed to manage the effects of any crisis/catastrophic risks, including climate-related events. This plan works in conjunction with flexible working arrangements, work-from-home capabilities, and online access to information and transactions for stakeholders.

1.64 Currently, the CAA does not embed climate risks into its risk framework beyond reports published under ARP. However, as the RMF takes environmental considerations and sustainability into account, the climate risks reported on in ARP may be incorporated by the CAA's central risk function as climate change impacts become more immediately relevant over the coming years.

1.65 The CAA regularly reviews and updates its risk management framework, allowing for adaptation as new information becomes available and as the climate continues to change.

CAA Strategy

1.66 The CAA has developed five focus areas acting as strategic priorities for the Executive Committee and members of senior leadership. Annual strategic objectives are set for each focus area. For more information, see CAP2978.[17]

1.67 'Supporting civil aviation to improve environmental sustainability' commits the CAA to sustainable aviation. We will achieve sustainable civil aviation by enabling innovation, increasing transparency surrounding current environmental performance, and incentivising the sector to manage/reduce negative impacts.

1.68 Our 2024 annual environmental sustainability strategic objectives include ascertaining which standards will need to be amended as we begin to support certification frameworks for large hydrogen aircraft. This will be completed as part of our regulatory mapping project.

[17] CAP2978: CAA Strategy | Civil Aviation Authority

1.69 Our second annual objective relates to the creation of a framework for improving environmental information in civil aviation, including our own environmental performance reporting for the aviation sector.

1.70 Consideration has been given to our participation in the Regulators-Government forum and the cross-sectoral actions required to reach net-zero, as well as the potential for expanding the CAA's existing remit in areas where civil aviation has an environmental impact.

Environmental Sustainability Strategy

1.71 To meet our environmental objectives, we have modified our approach to sustainability, both within the organisation and the wider Civil aviation sector. In our previous report, we detailed our internal sustainability programme 'Greening the CAA', and our external facing environment programme 'CAA and the Environment'. These programmes have been replaced by a new Environmental Sustainability Strategy.[18]

1.72 The Environmental Sustainability Strategy has seven objectives:

1) Enabling the development of low and zero-carbon technology and innovation.
2) Co-leading modernisation of airspace.
3) Reporting on environmental performance of industry
4) Advising and supporting the UK government on domestic and international policy
5) Reducing the impact of corporate activities and operations.
6) Assessing local environmental impacts in relevant regulatory activity.
7) Take the environment into account as part of regulating and oversight.

1.73 To meet these objectives, the CAA has begun embedding sustainability specialists within leadership positions and across different departments. This includes a new Head of Sustainability as part of its sustainability team, and a Corporate Environmental Sustainability Specialist in the Corporate Services department.

1.74 The sustainability team was set up in 2021 to drive and coordinate work across the CAA. The team reports on a range of primary and secondary civil aviation data in relation to greenhouse gas emissions, noise, biodiversity and air quality. This will help the CAA and the UK's wider civil aviation industry adapt to changing circumstances and meet the highest possible standards for sustainability.

[18] CAA's Environmental Sustainability Strategy | Civil Aviation Authority

Embedding Climate Action Within Aviation

Airspace Modernisation Strategy

1.75 In our previous report, we detailed the Future Airspace Strategy (FAS), a cross-sector commitment to undertaking work to modernise airspace. The FAS has since been replaced by the Airspace Modernisation Strategy (AMS), developed in collaboration with DfT. Airspace modernisation will improve system efficiency and help achieve net zero aviation by 2050.

1.76 Environmental sustainability is a key strategic objective of the AMS. Airspace modernisation activities will assist in the deliverance of the government's key environmental objectives with respect to aviation as set out in the Air Navigation Guidance 2017.

1.77 Paragraph 1.39 in Part 3 of the AMS details that decarbonisation and adaptation will play a key part moving forward to ensure airspace is resilient to climate change effects.[19]

Jet Zero Strategy

1.78 As part of its legally binding target for the UK to reach net zero by 2050, the government has published its Jet Zero Strategy, outlining aviation's part in meeting this target.

1.79 The CAA will assist the strategy using its regulatory, advisory and commercial functions insofar as it is able given its current remit.[20]

1.80 In terms of regulation, this includes certifying new aircraft technology to established safety standards, using environmental considerations when deciding on whether to approve airspace changes, and ensuring consumers are protected during the transition to net zero.

Monitoring, Reporting and Online Presence

1.81 The CAA is developing its adaptive capacity by furthering its monitoring efforts. This will increase transparency and help assess future climate impact potential in the aviation sector.

AER

1.82 Under Assimilated Regulation (EU) 2018/1139, Article 87, the CAA must produce a triennial environmental review providing a general account of the state environmental protection as it relates to civil aviation in the United Kingdom.[21]

[19] Airspace Modernisation Strategy Part 3: Deployment Plan (caa.co.uk)

[20] Overview of our strategic approach | Civil Aviation Authority (caa.co.uk)

[21] https://www.legislation.gov.uk/eur/2018/1139/article/87

The CAA has opted to refresh this report annually whilst continuing to provide a full publication in line with the legislation.

Noise

1.83 The Department for Transport (DfT) has tasked the CAA with developing the Aviation Noise Attitudes Survey (ANAS) following the dissolution of the Independent Commission on Civil Aviation Noise (ICCAN).

1.84 A comparison study investigating the use of noise metrics as part of monitoring is planned for London Gatwick, Stansted and Manchester Airport, alongside a noise action plan and guidance review.

1.85 The CAA's Environmental Research and Consultancy Department (ERCD) monitors and predicts noise exposure around UK airports and contributes to research into the effects of aviation noise.

1.86 The CAA plans to produce a UK Annual Noise Report to reflect the impact of noise from civil aviation across the UK.

Biodiversity

1.87 Section 6 of the Environment (Wales) Act 2016,[22] Section 1 and Section 2A of the Nature Conservation Act (Scotland 2004)[23] compel the CAA to undertake biodiversity reporting. The CAA is producing biodiversity reports for England, Wales and Scotland.

Emissions

1.88 The CAA plans to produce an Annual GHG Emissions Report to serve as a central source of information that will accurately reflect the civil aviation industry's contribution to climate change within the UK.

Climate Adaptation

1.89 The current and previous reports under ARP form a part of the CAA's monitoring activities. These reports help both the CAA and the government monitor the CAA's ability to deliver its functions and services as the climate worsens, particularly regarding the quality of its organisational strategies, operational planning and risk management processes.

1.90 These reports are available on the CAA website. We are also increasing transparency and access to online resources by publishing information about our sustainability objectives, and more general information about sustainable innovation on our website.

[22] Environment (Wales) Act 2016 (legislation.gov.uk)

[23] Nature Conservation (Scotland) Act 2004 (legislation.gov.uk)

Shared Service Centre

1.91 Development of the Shared Service Centre has changed the way the CAA interacts with stakeholders through online services, making the organisation more accessible and resilient.

Sustainability Panel

1.92 An Environmental Sustainability Panel was established in mid-2022. The Panel serves as platform for criticism and support by members of the academic community, and ensures the CAA is informed on important innovations that can mitigate civil aviation's impact on the environment.

1.93 Providing access to external expertise and academic assistance improves our adaptive capacity by making us more responsive to current scientific thinking. The Panel assists in informing our policies and regulatory role as the aviation sector moves towards more sustainable activities.

Innovation Hub

1.94 Specialist resources have been made available at the innovation hub to enable novel technology. The purpose of the innovation hub is to enable new entrants in the aviation sector to progress cutting-edge concepts to the market. Innovation is vital if the aviation industry is to meet sustainability objectives and remain economically competitive.

Collaboration and External Engagement

Forums

1.95 The CAA participates in several forums, including the Regulators-Government Forum, set up following a recommendation from the Skidmore Review, and the General and Business Aviation Strategic Forum.

1.96 These forums facilitate communication between senior members in the civil aviation community, the Government and the CAA, fostering conversation regarding sustainable development and climate adaptation.

National Adaptation Plan

1.97 The CAA participates in the National Adaptation Programme (NAP) and engages with regulated airports to understand and assess their climate change adaptation strategies.

1.98 This collaborative approach helps identify interdependencies beyond the CAA's immediate organisational boundaries.

Performance-Based Regulation

1.99 Implementation of performance-based regulation (PBR), which allows for better identification and action against climate-related risks that could affect the public.[24]

1.100 Performance-based regulation involves developing a comprehensive picture of the risks within the organisations we regulate to ensure that our oversight and regulatory efforts focus on the areas where they will have the greatest impact.

[24] Performance based regulation | Civil Aviation Authority

Chapter 2

Understanding Risks and Challenges

Climate Projections and Assumptions

2.1 The CAA's climate risk assessment relies on the UK Climate Projections (UKCP) produced by the Met Office. Due to inherent uncertainty, it is difficult to predict how the climate and the weather will change over the coming years. The UKCP produces probabilistic projections by combining multiple variations of a specific climate model to simulate a wider range of potential climate outcomes (a climate ensemble).

2.2 There are projections available for multiple future emissions pathways, including RCP 2.6, 4.5, 6.0 and 8.5.

2.3 The risk assessments reported on in ARP2 relied on an earlier iteration of UKCP known as CP09. Our current assessments for ARP4 rely on UKCP18. This model utilises recent observations and improves accuracy by including a greater number of variables, such as natural inter-annual variability and a more comprehensive sampling of Earth System modelling uncertainty.

2.4 For this report, risk assessment has focused on the climate variables which are expected to impact the CAA and the wider aviation sector. These variables have been assessed under two global mean temperature scenarios for the end of the century; +2°C and +4°C of warming compared to baseline global mean temperature (1981-2000). The projection RCP 4.5 was used for the +2°C scenario, representing a change in global temperature of 2.4°C compared to baseline for the period 2080-2099. RCP 8.5 was used for the +4°C scenario, representing a change in global temperature of 4.3°C compared to baseline for the period 2080-2099. All estimates represent the median (50th percentile) estimate of the UKCP probabilistic projections, except for sea level rise, where the 95th percentile was used.

Temperature Change

2.5 For our +2°C scenario, using RCP 4.5, we assumed a mean air temperature rise of 2.3°C and a 13.8% humidity increase at 1.5 meters for the United Kingdom compared to baseline for the period 2080-2099. For our +4°C scenario, using RCP 8.5, we assumed a mean air temperature rise of 3.9°C and a 23% humidity increase at 1.5 meters for the United Kingdom compared to baseline for the period 2080-2099.

Precipitation

2.6 For our +2°C scenario, using RCP 4.5, we assumed an average summer rainfall change of -18.4% and an average winter rainfall change of +10.7%. For our +4°C scenario, using RCP 8.5, we assumed an average summer rainfall change of -27.5% and an average winter rainfall change of +17.3%.

Sea Level Rise

2.7 For our +2°C scenario, we assumed an average sea level rise of 0.83 meters for England, 0.81 meters for Wales, 0.61 meters for Scotland, and 0.64 meters for Northern Ireland by 2099. For our +4°C scenario, we assumed an average sea level rise of 1.14 meters for England, 1.13 meters for Wales, 0.9 meters for Scotland, and 0.94 meters for Northern Ireland by 2099. These figures were taken from the UKCP18 Marine Projections Report.

2.8 The UKCP projections do not currently suggest a significant change in storm surges over the coming century, albeit with a high degree of uncertainty. For this report, storm surges were not taken into consideration as a significant climate risk.

Climate Risk Assessments

2.9 As part of ARP4, DEFRA have asked the CAA to review previous climate adaptation risk assessments and bring them up to date, following the guidance for new reporting organisations as far as possible. We have updated the risk assessments submitted as part of ARP2 to align the new risk assessment template suggested by DEFRA.

2.10 The CAA has currently identified 28 climate risks associated with the organisation. These include direct risks to the organisations operability and infrastructure, and interdependent/cascading risks in the wider aviation sector that are linked to the CAA through either its regulatory role or through cascading failures.

2.11 A breakdown of each risk, including its associated climate variable (temperature, precipitation etc), a description of the risk, its impact on assets and functions, its owner, and whether it was included in the CAA's ARP2 report/ under CCRA3 (and whether it was specified as a risk for the transportation sector), can be found below under 'Climate Risks'.

2.12 Each risk was given an associated climate risk score for the present, mid-century, and two end of century scenarios (+2°C and +4°C). These scores were based on the climate data provided as part of UKCP and allow us to rank and prioritise in terms of the scale of impact that dependent, interdependent and cascading risks have on functional delivery.

2.13 These scores, and the reasoning behind these scores, can be found below under 'Climate Risks'.

2.14 For this report, the CAA has opted to use a 5x5 climate risk matrix template provided by DEFRA as part of its climate risk rating methodology. The matrix can be found Appendix B.

2.15 In addition to the climate risks identified by the CAA as part of ARP2, the CAA has incorporated several climate risks to the aviation sector identified by ICAO into its climate risk management framework.[25] These new risks focus on potential cascading effects between sectors and upstream interdependencies. A table of interdependent sectors and linked risks can be found under Appendix A.

2.16 This enhanced framework allows for better identification and assessment of climate-related risks and associated interdependencies.

Climate Risks

2.17 **Risk code: CR1**
Climate variable: Temperature change.
Risk: Temperature change may result in higher energy costs for temperature regulation. This may place strain on treasury assets and procurement services. The risk owner is the Estate Services.
ARP1/2 or CCRA3: This risk was included in ARP 1/2 as Risk 1. It was not included in CCRA3.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 15
Narrative: Increased temperature volatility means there will be greater demand for air conditioning/heating, leading to higher energy costs. This may impact the CAA's finances, potentially requiring additional budgeting to account for these changes.

2.18 **Risk code: CR2**
Climate variable: Temperature change.
Risk: Temperature change may pose a risk to health and wellbeing due to high temperatures. This may result in a productivity loss, affecting CAA services. The risk owner is Health, Safety and Security.
ARP1/2 or CCRA3: This risk was included in ARP 1/2 as Risk 1. It was included in CCRA3 as B5 and is included as a transportation sector risk.
Present: 1

[25] Microsoft Word - Factsheet Business and economics_20200325_Clean.docx

Mid-Century: 7
End of Century (+2°C): 10
End of Century (+4°C): 16
Narrative: The projected increase in wet-bulb temperature may reduce productivity at the CAA, potentially affecting its core functions due to the increased stress on systems and personnel.

2.19 **Risk code: CR3**
Climate variable: Precipitation.
Risk: Risks to infrastructure and services from river, surface water, and groundwater flooding may disrupt staff commutes, accommodation assets, and utilities. The risk owners are Health, Safety and Security and Estate Services.
ARP1/2 or CCRA3: This risk was included in ARP 1/2 as Risk 2. It was included in CCRA3 as I2 and is included as a transportation sector risk.
Present: 1
Mid-Century: 7
End of Century (+2°C): 10
End of Century (+4°C): 16
Narrative: The risk of flooding to CAA infrastructure is expected to increase, which may significantly disrupt the CAA's core functions if adequate contingency measures are not in place.

2.20 **Risk code: CR4**
Climate variable: Convective weather.
Risk: Convective weather may disrupt the enroute and terminal phases of flight. This may impact regulatory oversight functions and customer-facing services. The risk owners are the Consumer and Markets Group and the Safety and Airspace Regulation Group.
ARP1/2 or CCRA3: This risk was included in ARP 1/2 as Risk 4. It was not included in CCRA3.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 8
Narrative: Greater demand on regulatory and customer-facing services of the CAA is anticipated as flights experience disruptions. While this may result in additional workload for the CAA, it is not expected to disrupt the organization's functions.

2.21 **Risk code: CR5**
Climate variable: Sea level rise.
Risk: Sea level rise presents a risk that airport infrastructure may need to be

reinforced or re-located. This could lead to disruption or even closure of airports, with significant and long-term impacts on customers and staff. The risk owner is the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Reputational and financial risks to the CAA may arise if the UK lacks sufficient airport capacity to support the aviation industry. This could lead to a higher number of dissatisfied consumers and airlines, creating additional work for the CAA without disrupting its core functions.

2.22 **Risk code: CR6**
Climate variable: Sea level rise.
Risk: Sea level rise may affect local tourism industries and airports, particularly if airport usage is constrained or seaside territories are inundated. This may lead to a significant reduction in tourism. The risk owners are Finance and Corporate Services, Procurement, and the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as H4/B2. It is not included as a transportation sector risk.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 9
Narrative: Financial strain on airports and airlines may impact the CAA's finances, potentially necessitating additional budgeting measures to accommodate the financial implications of these changes.

2.23 **Risk code: CR7**
Climate variable: Convective weather.
Risk: Convective weather may affect procurement services of airlines, leading to higher operational costs due to flight delays and cancellations. This can place financial stress on airlines, potentially reducing flight capacity. The risk owners are Finance and Corporate Services and Procurement.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 9
Narrative: Financial strain on airports and airlines may have a similar impact on

the CAA's finances, requiring additional budgeting to manage the financial stress placed on the organization.

2.24 **Risk code: CR8**
Climate variable: Convective weather.
Risk: Convective weather may disrupt ground transportation accessibility, increasing the risk to ground services and accessibility to emergency services. The risk owner is the Safety and Airspace Regulation Group (SARG).
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as I1 and is included as a transportation sector risk.
Present: 1
Mid-Century: 3
End of Century (+2°C): 6
End of Century (+4°C): 10
Narrative: Contingency measures and direction from the CAA may be necessary if transportation links are severed. This would result in additional work for the CAA but would not disrupt its core functions.

2.25 **Risk code: CR9**
Climate variable: Convective weather.
Risk: Convective weather may affect jet engine performance and maintenance requirements due to storm damage, increasing the risk of engine fatigue and water ingress. The risk owners are the Design and Certification and Airworthiness teams.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as I12 and is included as a transportation sector risk.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: An increase in storms may require greater maintenance efforts for airport infrastructure and air traffic management. This will result in additional work for the CAA but will not disrupt its core functions.

2.26 **Risk code: CR10**
Climate variable: Convective weather.
Risk: Convective weather may lead to airport closures resulting from extreme weather events, placing financial stress on the aviation sector and increasing delays and cancellations. The risk owners are Finance and Corporate Services, Procurement, and the Consumer and Markets Group.

ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as I2 and is included as a transportation sector risk.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 9
Narrative: Financial strain on airports and airlines is likely to impact the CAA's finances, necessitating additional budgeting to cover the costs of these pressures.

2.27 **Risk code: CR11**
Climate variable: Convective weather.
Risk: Airports may be used to provide shelter and disaster relief during extreme weather events. This change in airport usage may necessitate regulatory oversight from the Civil Aviation Authority (CAA). The risk owner is the Safety and Airspace Regulation Group (SARG).
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 or CCRA3.
Present: 1
Mid-Century: 4
End of Century (+2°C): 9
End of Century (+4°C): 12
Narrative: There may be a need for regulatory oversight if airports are used as temporary accommodation during disaster relief efforts, as this scenario is currently unprecedented in the UK.

2.28 **Risk code: CR12**
Climate variable: Temperature change.
Risk: Temperature change may result in unsafe working conditions due to increased cooling or heating costs in terminals and Air Traffic Control (ATC) towers during high-heat days. This increases the risk to employee health and the likelihood of mistakes. The risk owner is Health, Safety and Security.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as H1. It is not included as a transportation sector risk.
Present: 1
Mid-Century: 4
End of Century (+2°C): 7
End of Century (+4°C): 10
Narrative: A reputational risk could arise if the CAA is unable to ensure the health and safety of those working in the aviation sector as temperatures rise. This may require additional oversight or mitigation measures.

2.29 **Risk code: CR13**
Climate variable: Temperature change.
Risk: Higher temperatures may alter demand for air travel at certain locations, potentially changing consumer demand and available routes. The risk owner is the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 9
Narrative: Financial strain on airlines may impact the CAA's finances, necessitating additional budgeting requirements to manage these financial pressures.

2.30 **Risk code: CR14**
Climate variable: Temperature change.
Risk: Changes in temperature may impact demand and subsequently affect the schedule planning of airlines and Air Navigation Service Providers (ANSPs). This could increase the risk to regulatory oversight functions.
ARP1/2 or CCRA3: The risk owner is Airspace, Air Traffic Management, and Aerodromes. This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Changes in schedule planning due to climate change may result in additional work for the CAA, although this will not disrupt its core functions.

2.31 **Risk code: CR15**
Climate variable: Temperature change.
Risk: Permafrost thawing and heat damage to air surfaces may incur repair or replacement costs, increasing the risk of airframe fatigue. The risk owner is Airspace, Air Traffic Management, and Aerodromes.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Permafrost thawing and heat damage to surfaces may increase wear on airframes. This could result in additional work for the CAA without disrupting the organization's functions.

2.32 **Risk code: CR16**
Climate variable: Temperature change.
Risk: Aircraft may not be certified for colder temperatures in northern climates during extreme temperature events. This could place financial stress on airlines and increase the risk of delays and cancellations. The risk owner is Design and Certification.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 1
Mid-Century: 3
End of Century (+2°C): 5
End of Century (+4°C): 9
Narrative: Financial strain on airlines due to extreme weather events is likely to impact the CAA's finances, requiring additional budgeting to accommodate the increased costs.

2.33 **Risk code: CR17**
Climate variable: Precipitation.
Risk: Flooding caused by precipitation may affect runways and other airport infrastructure, reducing capacity and increasing delays. This could place financial stress on the aviation sector. The risk owner is the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as I2 but is not included as a transportation sector risk.
Present: 1
Mid-Century: 3
End of Century (+2°C): 6
End of Century (+4°C): 10
Narrative: Delays resulting from severe weather may increase as a result of climate change. This would result in additional work for the CAA but will not disrupt its core functions.

2.34 **Risk code: CR18**
Climate variable: Precipitation.
Risk: Precipitation may disrupt ground transport links, preventing crew and passengers from reaching airports, thereby increasing the risk of delays and cancellations. The risk owner is the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as I1 and is included as a transportation sector risk.
Present: 1
Mid-Century: 3

End of Century (+2°C): 6
End of Century (+4°C): 10
Narrative: Similar to CR17, delays from severe weather are projected to increase with climate change, requiring additional work for the CAA but not disrupting its core functions.

2.35 **Risk code: CR19**
Climate variable: Precipitation.
Risk: Water scarcity during droughts may reduce operational capacity for aviation activities, placing financial stress on the aviation sector and reducing CAA income from charges. The risk owner is Finance and Corporate Services, Procurement.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 1
Mid-Century: 5
End of Century (+2°C): 8
End of Century (+4°C): 10
Narrative: Water scarcity, especially during droughts, may impact aviation operations, such as de-icing, potentially resulting in additional work for the CAA but not disrupting its core functions.

2.36 **Risk code: CR20**
Climate variable: Wind.
Risk: Deviation from prevailing wind direction at airports may affect runway utilization, which could place financial stress on the aviation sector, reduce CAA income from charges, and increase airspace change requests. The risk owners are Airspace, Air Traffic Management, and Aerodromes, Finance and Corporate Services, and Procurement.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 but was included in CCRA3 as I12 and is included as a transportation sector risk.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Increased wind is likely to reduce the quality of service in the aviation industry. This may result in additional work for the CAA but will not disrupt its core functions.

2.37 **Risk code: CR21**
Climate variable: Wind.

Risk: Strong winds may cause cancellations, flight delays, and damage to airport infrastructure. This may increase rejected compensation claims from airlines due to 'extra-ordinary circumstances' and place pressure on CAA customer-facing services and the legal team. The risk owners are the Consumer and Markets Group and Legal.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 but was included in CCRA3 as I12 and is included as a transportation sector risk.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Similar to CR20, increased wind is projected to reduce the quality of service in the aviation industry, necessitating additional work for the CAA without disrupting its core functions.

2.38 **Risk code: CR22**
Climate variable: Wind.
Risk: Changes in the jet stream may impact flight times and fuel costs, potentially increasing complaints from passengers and triggering airspace change requests. The risk owners are Airspace, Air Traffic Management, and Aerodromes and the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Changes in the jet stream could cause significant disruptions to flight schedules, which may result in additional work for the CAA without disrupting its core functions.

2.39 **Risk code: CR23**
Climate variable: Wind.
Risk: Clear Air Turbulence may increase in-flight injuries and damage aircraft, leading to higher complaints from passengers and potential damage to aircraft, putting pressure on customer-facing services and airworthiness functions. The risk owners are the Consumer and Markets Group and the Airworthiness team.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 but was included in CCRA3 as I12 and is included as a transportation sector risk.
Present: 2
Mid-Century: 5
End of Century (+2°C): 8

End of Century (+4°C): 10
Narrative: Climate change is likely to increase turbulence, potentially resulting in additional work for the CAA without disrupting its core functions. There may also be a need for additional resources to manage these impacts.

2.40 **Risk code: CR24**
Climate variable: Ice.
Risk: The increased use of de-icing chemicals may lead to additional phosphorus runoff, negatively impacting the environment. This may cause a conflict between environmental sustainability and safety, which could impact the CAA's safety and environmental reporting services. The risk owners are SARG and the Sustainability team.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: The use of de-icing chemicals can have a serious environmental impact, but if managed correctly, airports can mitigate runoff. This may require additional work for the CAA but will not disrupt its core functions.

2.41 **Risk code: CR25**
Climate variable: Ice.
Risk: Freezing rain and conditions may cause delays and cancellations, increasing rejected compensation claims from airlines due to 'extra-ordinary circumstances' and placing pressure on CAA customer-facing services and the legal team. The risk owner is the Consumer and Markets Group.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 but was included in CCRA3 as I12 and is included as a transportation sector risk.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Freezing conditions may become more frequent, leading to delays and cancellations. This may result in additional work for the CAA but will not disrupt its core functions.

2.42 **Risk code: CR26**
Climate variable: Desertification.
Risk: Aircraft flying over arid areas may suffer damage from sand in dust storms,

and the presence of silicates in their jet engines may increase. This may put pressure on airworthiness organizations, including the CAA's airworthiness team. The risk owners are the Airworthiness team and Design and Certification.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 4
End of Century (+2°C): 6
End of Century (+4°C): 9
Narrative: Desertification internationally may increase wear on aircraft engines, leading to additional work for the CAA but not disrupting its core functions.

2.43 **Risk code: CR27**
Climate variable: Biodiversity.
Risk: Wildlife management practices may lead to an increased presence of bird populations over flight paths. This could increase the risk of damage to aircraft, placing pressure on airworthiness organizations and the CAA's airworthiness team. The risk owner is the Airworthiness team.
ARP1/2 or CCRA3: This risk was not included in either ARP 1/2 or CCRA3.
Present: 2
Mid-Century: 3
End of Century (+2°C): 4
End of Century (+4°C): 5
Narrative: Birds pose a serious risk to aircraft, but with appropriate wildlife management, this risk can be partially mitigated, minimizing additional work for the CAA.

2.44 **Risk code: CR28**
Climate variable: Biodiversity.
Risk: Climate change may result in invasive species surviving in the UK, carried by aircraft. This may require greater regulatory oversight around aircraft designs and airports. The risk owner is the Sustainability team.
ARP1/2 or CCRA3: This risk was not included in ARP 1/2 but was included in CCRA3 as N2. It is not included as a transportation sector risk.
Present: 1
Mid-Century: 2
End of Century (+2°C): 3
End of Century (+4°C): 6
Narrative: The arrival of invasive species on aircraft may require additional work for the CAA but will not disrupt its core functions.

Action Plan

2.45 Since ARP1, the CAA has maintained a climate action plan to help mitigate climate risks identified as part of reporting and to ensure the CAA can maintain functional delivery as the climate worsens. It includes a summary of actions, timescales, current progress and an assessment of the extent that an action has mitigated a climate risk. Existing actions can be found below under 'Existing Actions'.

2.46 As part of reporting under ARP4, the CAA has updated its action plan to, where possible, clearly link actions to their associated risks.

2.47 Progress on climate risk actions is not regularly monitored at the CAA except as part of ARP, usually undertaken in a five-year cycle. This may change before ARP5 as sustainability and climate risk are more deeply embedded into the CAA's corporate strategy.

2.48 There has been progress on actions 1, 2, 3 and 4.

2.49 Any measures implemented to meet actions and maintain functional delivery in the face of climate impacts are listed under "progress".

2.50 Three new actions have been included for ARP4 to better reflect the actions the CAA is undertaking to mitigate climate risk. These actions can be found below under 'New Actions'.

Existing Actions

2.51 **Summary of action 1**: Risks from climate change to be considered in isolation and addressed with specific adaptation measures.
Timescale: Not Specified.
Progress: Specific climate risks facing the CAA and the civil aviation sector broken down as part of ARP4. More work needed on adaptation measures.
Extent action has mitigated risk: N/A.
Linked risks: All.

2.52 **Summary of action 2**: Continue to evaluate new climate information to inform future adaptation measures.
Timescale: Not Specified.
Progress: CP09 replaced with newer UKCP climate projections for the purpose of climate risk assessment.
Extent action has mitigated risk: N/A.
Linked risks: All.

2.53 **Summary of action 3**: Adaptation measures should be considered as part of the strategic planning process.
Timescale: Not Specified.
Progress: A new corporate sustainability strategist has been introduced into the organisation.
Extent action has mitigated risk: N/A.
Linked risks: All.

2.54 **Summary of action 4**: Adaptation measures should be considered as part of the accommodation strategy.
Timescale: 2024 – 2028.
Progress: The CAA is planning an additional adjustment to accommodation over the next three years. Energy usage and air conditioning/heating feasibility to be taken into account. Flexible use of multiple office spaces is being considered.
Extent action has mitigated risk: The adoption of a smaller office space will make the CAA more resilient to the cost and health impact of changes in energy usage, temperature, and humidity. The use of flexible office spaces will make the CAA more resilient to climate impacts that are disruptive to the organisation's infrastructure.
Linked risks: CR1, CR2, CR3.

2.55 **Summary of action 5**: New powers from Civil Aviation Act 2012 will enable more nimble economic regulation and the ability to publish environmental information.
Timescale: 2012 onwards.
Progress: The economic licenses for Heathrow and Gatwick include an operational resilience clause. Heathrow published an operational resilience plan in 2014, and both participated in ARP3 reporting for 2021/22.
Extent action has mitigated risk: Resilience, adaptation, and environmental reporting at airports will ensure risks are recognised by relevant authorities and enable airports to implement resilience measures.
Linked risks: CR5, CR6, CR10, CR11, CR13, CR17, CR18, CR19, CR20.

New Actions

2.56 **Summary of action6**: Airspace Modernisation Strategy
Timescale: 2023-2040
Progress: Part 3 of the AMS details that decarbonisation and adaptation will play a key part moving forward to ensure airspace is resilient to climate change effects. This means adaptation measures for airspace are being scoped out.
Extent action has mitigated risk: The scoping of airspace modernisation adaptation risks will help ensure airspace remains resilient.
Linked risks: CR12, CR14, CR20.

2.57 **Summary of action 7**: Sustainability Team
Timescale: 2021 onwards.
Progress: The CAA has a new sustainability team with a focus on the CAA's sustainability objectives.
Extent action has mitigated risk: Having a specialised resource for sustainability means the organisation has greater capacity to focus on climate adaptation risks.
Linked risks: All.

2.58 **Summary of action 8**: Reporting
Timescale: Not specified.
Progress: The CAA has committed to producing a climate risk adaptation report for ARP4. It is also committed to reporting on emissions and biodiversity.
Extent action has mitigated risk: Actively reporting on adaptation, the state of climate action, and the environment means the CAA will be better prepared for potential climate-related risks in need of mitigation/prevention actions.
Linked risks: All.

APPENDIX A

Interdependent Sectors and Linked Risks

Sector	Interdependent Risks
Air Navigation Service Providers	CR14 CR20
Air Traffic Control	CR12
Aircraft Maintenance	CR9 CR15 CR26
Airlines	CR7 CR10 CR13 CR16 CR18 CR19 CR21 CR22 CR23 CR25
Airports	CR5 CR6 CR10 CR11 CR13 CR17 CR18 CR19 CR20
Emergency Services	CR8 CR11 CR18
Environment	CR24 CR27 CR28

APPENDIX B

Risk Matrix

Risk Likelihood	Minimal Impact	Minor Impact	Moderate Impact	Major Impact	Catastrophic Impact
Almost Certain	5 / moderate	10 / major	15 / major	20 / severe	25 / severe
Likely	4 / moderate	8 / moderate	12 / major	16 / major	20 / severe
Possible	3 / minor	6 / moderate	9 / moderate	12 / major	15 / major
Unlikely	2 / minor	4 / moderate	6 / moderate	8 / moderate	10 / major
Highly Unlikely	1 / minor	2 / minor	3 / minor	4 / moderate	5 / moderate