



ICAO Ninth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/9)

Agenda Item 7 Airport Environmental Initiatives

CLIMATE ADAPTATION GUIDANCE AND TOOLS FOR AIRPORTS

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The background of the slide features a light blue, semi-transparent image of an airplane's fuselage and wing. Overlaid on the right side of the image is a large, stylized clock face. The clock has a white face with black hands and hour markers, and a black outer ring with white dashed lines. A small black silhouette of an airplane is positioned near the center of the clock face, appearing to fly towards the right. The overall color scheme is a soft, monochromatic blue.

1 CONTEXT



The Problem: A New Operational Reality

Extreme weather is no longer a forecast; it is an active threat to airport operations, safety, and economic stability.



Infrastructure Damage

Flooding, heatwaves, and cyclones cause direct harm to runways, taxiways, and terminals.



Operational Disruptions

Resulting in widespread flight delays, cancellations, and power shortages affecting ATC.



Economic Losses

Leading to significant financial damages for airports (Grounded Aircrafts) , airlines, and the wider economy.



THE GLOBAL MANDATE TO ACT



The IPCC Urges Action

The Intergovernmental Panel on Climate Change has emphasized that "Accelerated implementation of adaptation actions would reduce projected losses and damages."



The COP28 Goal on Adaptation

Sets a clear target: by 2030, all Parties are expected to conduct comprehensive climate risk assessments to inform their national plans.
Airports must act.

The background of the slide features a light blue, semi-transparent image of a large commercial airplane, specifically focusing on the wing and a large jet engine. Overlaid on the right side of the image is a large, stylized clock face. The clock has a white face with black hands and hour markers, and a black outer ring with a dashed line. A small black silhouette of an airplane is positioned near the center of the clock face, appearing to fly towards the right. The overall color scheme is a gradient of light blue and white.

2 INTRODUCTION



THE URGENCY IN OUR REGIONS

Airports are increasingly challenged by the physical impacts of climate change

There are global commitments to conducting climate vulnerability and risk assessments by 2030

Investors, regulators, insurers, and the public increasingly expect transparent and robust climate resilience planning.

ACI members have expressed a need for support to improve resilience to climate change

Australian Sustainability Reporting Standard
AASB S2
Climate-related Disclosures

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

IFRS
Sustainability

ISSB



OUR SOLUTION: THE ACI CLIMATE ADAPTATION STUDY



Targeted engagement

Study participants

All airport members

The background is a light blue-tinted photograph of an airplane's wing and tail section. Overlaid on the right side is a large, semi-transparent circular graphic that resembles a clock face or a gauge. It has concentric circles, a dashed outer ring, and a needle pointing towards the top. A small silhouette of an airplane is positioned near the center of this circular graphic.

3

COLLABORATION



DRIVEN BY COLLABORATIVE EFFORTS OF AIRPORTS



59

Airport Operators



223

Airports



27

Countries/Regions



GUIDED BY AN EXPERT TASK FORCE

Core ACI APAC & MID Team



Ken Lau
Head, Sustainability
Airports Council International
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CHANGI
airport singapore

Gerald Ng
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Changi Airport Group
(Singapore) Pte Ltd


NAA
NARITA AIRPORT

Sho Kataoka
Manager, Airport
Sustainability Office
Narita International Airport
Corporation

The background of the slide features a light blue, semi-transparent image of an airplane's engine and fuselage. Overlaid on the right side is a circular speedometer or gauge with a needle pointing towards the top. A small silhouette of an airplane is positioned near the center of the gauge. The overall aesthetic is clean and professional, with a focus on aviation and engineering.

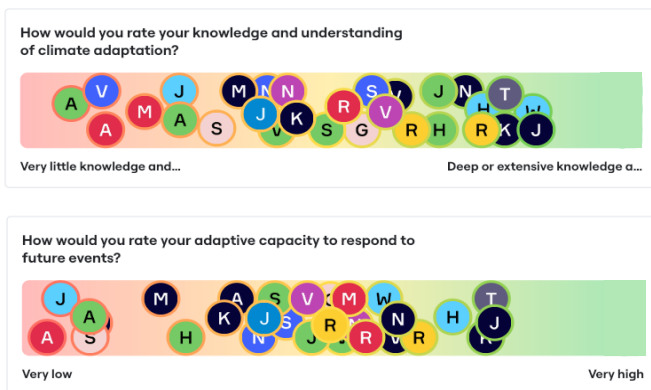
4

RESEARCH AND INPUTS TO THE STUDY



SHAPED BY DIRECT MEMBER INPUT

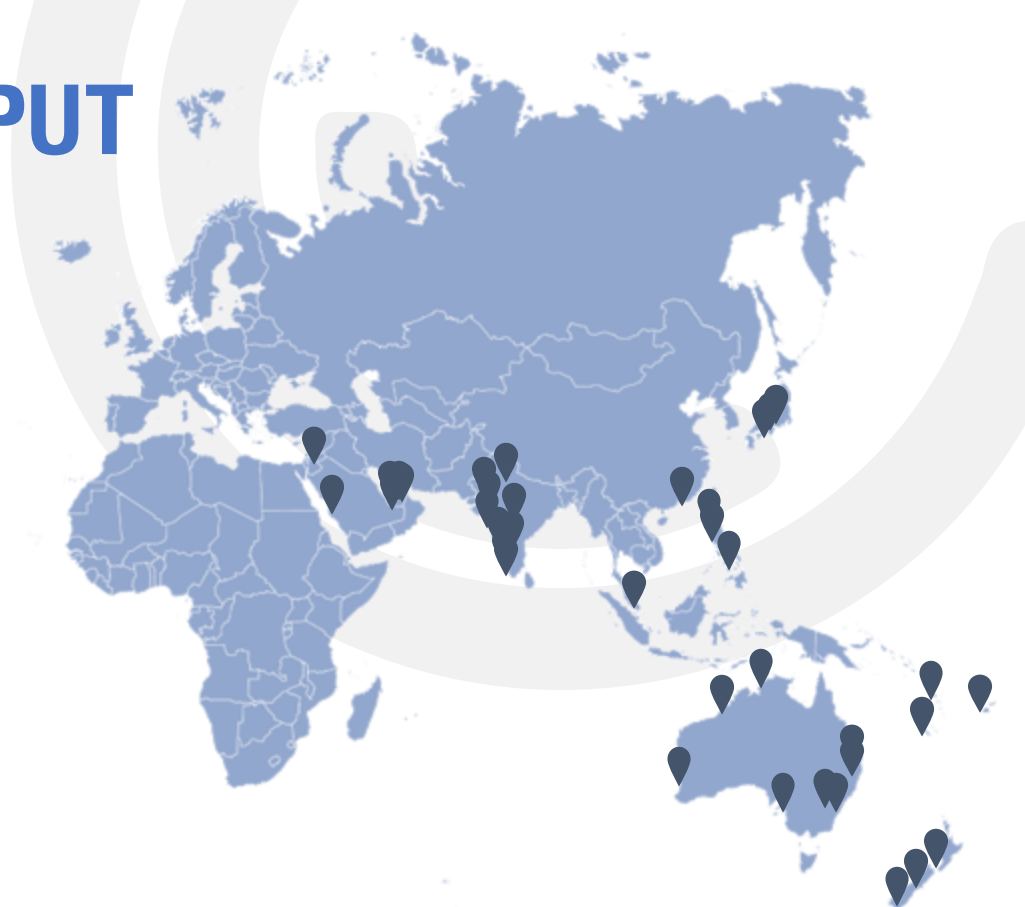
Initial inputs have been gathered from 60 contributors across ACI APAC & MID member airports.



Outputs indicated varying levels of climate knowledge and maturity across the region.



Top concerns and impacts from climate change are associated with storms, rainfall and flooding, and extreme heat.



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5

FIRST LOOK AT STUDY OUTPUTS

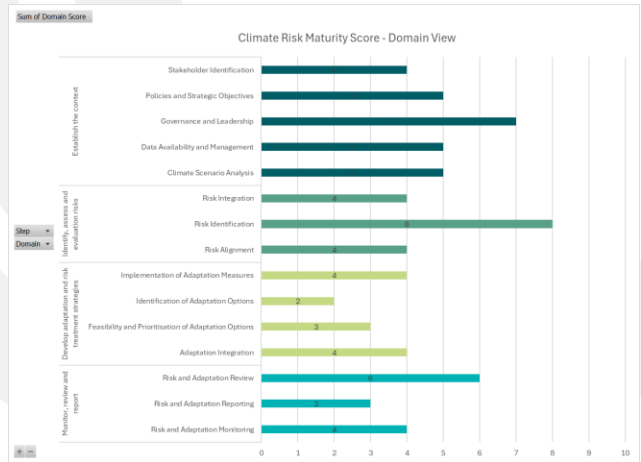
(in development)

CLIMATE MATURITY CHECK TOOL



A Tool to qualitatively assess your readiness to respond to climate-related physical risks

Step of Climate Risk Assessment	Domain	Level 1 Aware	Response	Level 2 Initiating	Response	Level 3 Developing	Response	Level 4 Advancing	Response	Level 5 Leading	Response	Additional comments	Domain score (out of 10)	Step score (out of 10)
Establish the context	Governance and Leadership	Senior leaders are aware that climate change presents a potential risk.	Yes	Climate-related roles and responsibilities are informally assigned within some teams.	Yes	Formal roles and responsibilities for climate risk management are established and documented, with sufficient resources allocated.	Yes	Senior management oversees climate risk activities and integration into wider airport strategies (e.g., investment business cases, sustainability policies, master planning).	Partly	Oversight of material climate risks and responses occurs at Board level, and climate risks drive strategic action across the organisation.	No		7	5.2
	Policies and Strategic Objectives	There is awareness that climate risks should be reflected in policies and strategies.	Yes	Climate risk language is referenced informally in some policy or strategic documents.	Partly	Climate change is explicitly included in organisational policies, risk registers, and plans (e.g., investment business cases, airport master plans, enterprise or operational risk registers).	Yes	Climate goals and targets are embedded across organisational policies and plans, with consideration for informing commercial management and financial planning.	No	Climate risk management and adaptation commitments are publicly reported, regularly updated, and used to drive innovation and collaboration within and outside the organisation.	No		5	
	Data Availability and Management	Awareness of the importance of data (e.g., climate projections, historical events, asset vulnerability) is emerging.	Yes	Key publicly available climate data sources have been identified and preliminary access obtained.	Yes	Data collection processes are underway for climate, asset, and operational exposure information.	Partly	Data is systematically integrated into planning, asset management, and decision-making processes.	No	Downscaled climate modelling for key hazards is undertaken to inform asset and operational resilience planning.	No		5	
	Stakeholder Identification	Initial internal awareness exists of the need to involve appropriate stakeholders in climate risk assessment.	Yes	Key internal stakeholders have been informally identified for future involvement.	Yes	A stakeholder mapping exercise has been conducted, including internal and external groups critical to climate risk assessment.	No	Clear protocols exist for stakeholder roles and responsibilities in climate risk work.	No	Stakeholder networks are regularly reviewed and updated to maintain relevance and inclusion in climate risk assessments.	No		4	
	Climate Scenario Analysis	Some awareness exists within the organisation about the role of climate scenario analysis in understanding future climate risks.	Yes	Preliminary internal discussions on the importance of climate scenario analysis and some awareness of global scenario frameworks (e.g., IPCC, RCPs/SSPs).	Yes	A single climate scenario is selected and used to support the identification of physical climate risks over relevant timeframes. Scenario selection is informed by guidance or publicly available data.	Partly	Multiple climate scenarios are used to test sensitivity and understand a range of possible physical risks and impacts on airport assets and operations. Scenario analysis informs decision-making for climate adaptation planning.	No	Climate scenario analysis is robust and iteratively updated using downscaled regional or local projections. Scenario outputs inform broader strategic planning and capital investment decisions.	No		5	
Assess and evaluate risks	Risk Identification	Awareness that climate change may pose risks to the airport's operations and assets. Past climate events and their impacts are identified and recognised in the organisation.	Yes	Some climate-related risks (mainly direct risks) have been informally identified, often limited to certain assets or departments.	Yes	Direct and indirect climate-related risks are systematically identified across the organisation, considering exposure, vulnerability, and criticality of key assets and operations. Existing controls are also identified.	Yes	Climate-related risk identification is integrated with strategic planning processes and includes risks that may impact achievement of strategic objectives.	Yes	Risk identification is dynamic and updated regularly to include compounding, cascading, and aggregate impacts across interconnected systems.			8	5.3
	Risk Integration	Recognition that climate risks are relevant to existing risk frameworks and registers.	Yes	Some climate risks have started to be identified and recorded within existing risk frameworks and registers.	Yes	Climate risks are assessed against the organisation's existing risk matrix and formally recorded in risk registers.		Climate change is recognised and integrated into existing risks to understand how it can exacerbate, alter, or extend financial, operational, and safety impacts.		Climate risks are prioritised alongside other enterprise risks, with regular executive oversight and influence on broader organisational risk appetite and investment planning.			4	



Results are shown in graphs to indicate potential variances in maturity and offer more granular interpretation and analysis.

Built as a questionnaire against core climate risk assessment steps and progressively seeking more mature responses.



CLIMATE CHANGE RISK ASSESSMENT GUIDELINE



A comprehensive guideline and set of instructions for completing an airport-led assessment.

Introduction

Purpose of guideline and practical application

Climate and airport context

Understand airport vulnerabilities to climate change

Climate Risk Assessment process

The four-step assessment process and core tasks

Tools and resources

Links and references to additional resources

Technical concepts defined throughout
Additional prompts provided that are contextualised for the aviation context
Cross-references to Climate Maturity Check Tool and Climate Risk Assessment Tool



CLIMATE CHANGE RISK ASSESSMENT TOOL



A Tool to conduct and record a climate risk assessment for your airport.

About this tab	This tab is where you complete the climate change risk assessment, identifying risks, controls and making an assessment of likelihood and consequence. It is here that you record your assessment, which could be conducted with stakeholder input and review. There are common/core risks which have been compiled in this tool, which you are required to review and assess. This will allow some comparison of risk ratings across the airports that use the tool. After this, you are able to refer to the optional risk list and modify risks, delete them if not relevant, and add new risks.
Instructions	Review the core risks at the top of the register - confirm relevant climate hazards and existing controls, then complete the likelihood and consequence ratings for the three timescales. Add any notes/comments to support your assessment at the end of the row. Repeat the exercise for non-core optional risks listed below the core risks. Here you can modify the risk description, delete risks that are not relevant, or add new risks underneath. Be sure to complete all columns for each risk you review.

Risk ID	Climate Hazard								Risk Description	Primary Asset Affected	Primary Consequence Type	Existing Controls	Near term (2021 - 2040)			Mid term (2041 - 2060)			Long term (2081 - 2100)			Notes/Comments
	Extreme rainfall and pluvial flooding	Riverine flooding	Storms and high wind events	Snow, ice and extreme cold	Sea level rise	Extreme heat	Wildfire	Rising average temperatures					Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	
EXAMPLE	X	X			X	X	X		CORE RISK: Damage to baggage handling systems resulting in operational disruptions and capital expenditures to repair asset.	Baggage handling systems	Operational disruption		Unlikely	Major	Medium	Possible	Major	High	Possible	Major	High	
EXAMPLE	X	X			X	X	X	X	CORE RISK: Damage to pavement surfaces from overheating or water ingress, resulting in increased maintenance, shortened lifespan and operational disruption.	Runways, Aprons and Taxiways	Increased operational expenditures		Possible	Moderate	Medium	Possible	Moderate	Medium	Likely	Major	High	

Stepped process which follows the Climate Risk Assessment Guideline and offers pre-filled climate projections, risks and adaptation measures for review.



BENEFITS OF PARTICIPATION

Improved awareness and capacity to respond to climate

Complimentary access as an ACI APAC & MID member to the climate maturity tool and climate risk assessment tool

Enhanced climate resilience for your airport and its customers

Findings can be shared with members to support further regional or site analysis, or to inform stakeholder communications



HOW TO PARTICIPATE

1

Learn how your airports can participate by connecting with Ken Lau, Head of Sustainability, ACI APAC & MID

Email : ken@aci-asiapac.aero

2

Once registered, participate in the first pilot of the Climate Maturity Check Tool.



ACTION BY THE MEETING

The meeting is invited to:

- a) Note the needs of climate resilience at airports and their ecosystem; and**
- b) Urge States to encourage their airports to actively support and engage with the *Study on Climate Adaptation Approach for APAC & MID Airports* including the use of complimentary Climate Maturity Check Tool and Climate Risk Assessment Tool to strengthen aviation preparedness and long-term resilience.**

THE VOICE OF ASIA-PACIFIC AND MIDDLE EAST AIRPORTS



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