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Climate Adaptation Strategies for California Airports will Require a Holistic Approach, Including New Governance Models

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Airports are complex social, technical, and environmental systems. Understanding their complexity is fundamental for advancing transformative climate adaptation policy. For airports to adapt, climate science must be incorporated not only into standards of specific equipment and facilities, but also into the air traffic network and its interconnected infrastructure systems (e.g., road access, ground-based communications, navigation, and surveillance systems). In addition, airport adaptation requires a shift in the way policy is designed, reinforced, and updated, which in turn relies on an understanding of airport governance models and organizational networks.

UC Berkeley researchers recently explored how airport planners and policymakers can use climate science to transform standards and update organizational values to promote climate adaptation. After assessing California airports' exposure to future coastal flooding and reviewing more than 300 policy documents, the UC Berkeley research team developed guidelines on how international, federal, and state policies can better incorporate forward-looking climate science into airport standards and policies.

Key Research Findings

In California, 39 of 43 coastal airports have assets exposed to median coastal flooding by 2100. Sixteen of these airports have assets exposed within their boundaries (e.g., runways, taxiways). The other 23 airports have interconnected infrastructure exposed outside of their jurisdiction (e.g., access roadways). The combination of extreme storm surges and sea level rise can flood these assets by two meters or more of water at different locations within and outside of the exposed airports' boundaries. In addition, most of these airport assets could be affected by a flooding event sooner than 2100, i.e., in the next 20 years. In turn, investments allocated by airport authorities to reduce near-term exposure to coastal flooding may also have substantial benefits in the near and long term. Examples of near-term adaptation investments include traditional infrastructure floodproofing (e.g., levees, floodwalls); nature-based measures (e.g., mudflat augmentation, creek to bay land reconnection, green stormwater infrastructure); as well as policy and organizational measures (e.g., updating climate science used in setting standards and protocols, revising organizational values to manage uncertainty and accommodate long-term benefits, and developing market incentives for collaborative decision-making).

Some travel corridors in California will be more affected than others by coastal flooding. Airports are part of interregional multimodal transportation corridors. After analyzing each airport's exposure and role in California's multimodal transportation corridor, researchers found that the San Francisco (SF) Bay-North Coast corridor is the most likely to suffer from coastal flooding, followed by the SF Bay-Sacramento-Northern Nevada corridor, and the SF Bay-Central Valley-Los Angeles corridor. North Coast-Northern Nevada and Sacramento-Oregon corridors are not directly exposed to flooding but can be indirectly impacted due to their high interconnectivity with other interregional multimodal corridors which are in turn highly exposed.

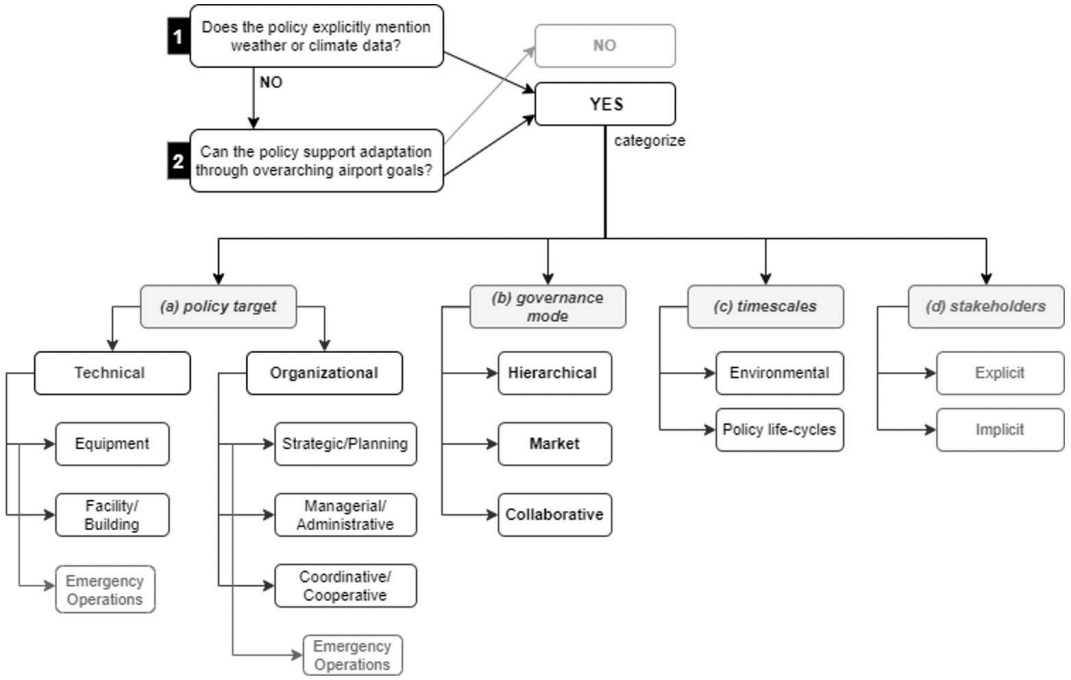

Figure 1. Policy review method to identify, describe, monitor, and prescribe airport climate adaptation governance frameworks

Airport and other infrastructure policies need to be updated to reflect forward-looking climate science and adaptation values. Figure 1 proposes a policy review method to assess whether policy is up to date with the latest climate science and adaptation strategies. It covers four key elements: (a) policy target; (b) governance mode; (c) timescales; and (d) stakeholders. UC Berkeley researchers used this method to conduct a systematic review of the Federal Aviation Administration's proceedings and the Airport Cooperative Research Program collection of documents to identify, describe, and prescribe climate-cognizant airport policies. The method can be used at other levels of government and/or for other infrastructure sectors.

Airport planners and policymakers at all levels of government must work together to influence airport adaptation. International climate change policies produce adaptation guidelines based on multilateral scientific consensus. In turn, keeping track of international stakeholders and policies is essential for ensuring that airport adaptation policies reflect the best available climate science and pioneering adaptation practices worldwide. National airport policy has the highest potential for advancing adaptation policies through regulatory and strong market incentives but must be updated to reflect the latest climate data. At the state level, California can help operationalize airport adaptation through leadership in environmental quality control and land-use planning regulations, as well as through existing climate adaptation coalitions.

Further Reading and More Information

This policy brief draws from the peer-reviewed articles, "Decoding climate adaptation governance: A sociotechnical perspective of U.S. airports" featured in the Journal of Cleaner Production (Vol. 334, 2022) by Sarah Lindbergh, PhD; Jackson Reed; Matthew Takara; and Jasenka Rakas, PhD, and "Cross-sectoral and multiscalar exposure to advance climate adaptation policy: the case of future coastal flooding of California's airports" featured in Climate Risk Management (Vol, 38, 2022) by Sarah Lindbergh, PhD; Yang Ju, PhD; Yiyi He, PhD; John Radke, PhD; and Jasenka Rakas, PhD. For more information about the findings in this brief, contact Jasenka Rakas at jrakas@berkeley.edu.

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