U.S. Department of Transportation

Climate Action Plan for Resilience
2022 Progress Report

Agency	U.S. Department of Transportation (USDOT)
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Agency Climate Adaptation Website	USDOT Climate Action Plan for Resilience | US Department of Transportation

SECTION 1. UPDATES ON PRIORITY ACTIONS

A. Priority Action Progress Summary

Priority: Incorporate Resilience into USDOT Grant and Loan Programs

Current Status: In Progress
Estimated Date of Completion: Ongoing
Brief Description of Progress: USDOT is including consideration of climate resilience in discretionary grant program evaluation criteria, as appropriate and consistent with existing law.

Priority: Enhance Resilience Throughout the Project Planning and Development Process

Current Status: In Progress
Estimated Date of Completion: Ongoing
Brief Description of Progress: Initiated a review to ensure that climate resilience is included in USDOT programs and policies. Developing multi-modal climate resilience guidance to provide overall direction for USDOT-funded projects and highlight relevant resources and tools to assist project sponsors**.**

Priority: Ensure Resiliency of USDOT Facilities and Operational Assets

Current Status: In Progress
Estimated Date of Completion: Ongoing
Brief Description of Progress: Development of a management framework, and a climate resilience assessment tool, to assign climate risk scores to each mission critical USDOT facility or operational asset (includes IT systems and facilities) will be completed in end of 2022, followed by training and data collection through FY 2022.

Priority: Ensure Climate-Ready Services and Supplies

Current Status: In Progress
Estimated Date of Completion: Ongoing
Brief Description of Progress: Completed multiple projects that address energy supply resilience. Initiated updates to acquisition management systems, guidance documents and acquisition professionals' training to incorporate climate resilience.

Priority: Improve Climate Education and Research on Resilience

Current Status: In Progress
Estimated Date of Completion: Ongoing
Brief Description of Progress: Established a subgroup of the USDOT Climate Change Center to focus on climate education for USDOT employees and working with the National Oceanic and Atmospheric Administration (NOAA) to develop climate education materials and training. Completed a Consensus Study on Resilience Metrics and developed a Resilience and Disaster Recovery (RDR) Tool Suite for field testing. Working to post all USDOT-funded resilience research to the National Transportation Library's Repository and Open Science Access Portal (ROSA-P) to improve public access.

B. Priority Action Progress Examples

Example 1. Incorporate Resilience into USDOT Grant and Loan Programs.

- To ensure USDOT investments are future proofed to the extent possible, USDOT is including consideration of climate resilience in discretionary grant Notices of Funding Opportunities, as appropriate and consistent with existing law.
- Applications for funding should consider climate resilience in the planning stage and in project delivery, such as through incorporating specific design elements that address climate change impacts and including approaches consistent with the Federal Flood Risk Management Standard.

Example 2. Improve Research on Resilience.

- Consensus Study on Resilience Metrics completed in Fall 2021 with National Academies of Science/Transportation Research Board. Follow-on effort under development in 2022 to address recommendations from Consensus Study on Resilience Metrics, including promoting the use of benefit cost analysis.
- Resilience and Disaster Recovery (RDR) Tool Suite developed by Volpe field tested with Hampton Roads Metropolitan Planning Organization in FY 2021; additional state and local agencies field testing in FY 2022.

Example 3. Improve Climate Education.

- USDOT has reinstituted the Climate Change Center and established a subgroup focusing on climate education for USDOT employees and the development of standard language for use in performance plans for staff engaged in climate change activities.
- Working with NOAA to develop climate education materials and training.

- Re-established the USDOT Resilience Task Force, to include representatives from all modal operating administrations and key offices within the Office of the Secretary, to collaborate on climate resilience research and policy needs.
- FHWA released four one-hour web-based training courses focused on resilience to climate change and extreme weather events. The courses introduce climate change science, future climate conditions and datasets, including future sea levels, modeling tools for temperature and precipitation change, system level vulnerability assessment, and methods for conducting project-level resilience assessments.
- FHWA pilot-tested a three-day instructor led training course, addressing Resilience in Highway Project Development and Preliminary Design, in North Carolina. The course is expected to be available through the National Highway Institute beginning the Fall of 2022. It includes modules focused on addressing resilience in project development and methods for addressing resilience in four engineering disciplines. The audience includes engineers, project planners and environmental staff; it is also relevant to regional planners, asset managers, and policy staff.

Example 4. Ensure Resiliency of USDOT Facilities and Operational Assets.

- USDOT developed a climate resilience assessment tool that uses critical system vulnerability data, historical exposure data from the Federal Emergency Management Agency's (FEMA)'s national risk index, and projected exposure to heat and precipitation data from downscaled global climate models to calculate site-specific climate-risk scores for Departmental facilities and operational assets.
- USDOT has completed multiple projects at mission-critical facilities to ensure energy supply resilience, including energy system upgrades to increase capacity, redundant power supply, and protect back-up generators.

Example 5. Ensure Climate-Ready Services and Supplies.

- FAA initiated plans and requested additional resources to update Acquisition Management System (AMS) clauses and guidance documents by FY 2023 to include the latest resiliency clauses, as well as sustainability and environmental justice requirements. FAA also plans to produce training for personnel involved in the acquisition process including purchase request development and approval as well as contract solicitation and review.

SECTION 2. UPDATES ON OTHER INITIAL PLAN TOPICS

A. Climate Risk Reduction

Since 2016, USDOT has employed a structured method to assess operating risk to climate hazards for Departmental facilities and operational assets. Operating administrations are required to identify mission-critical assets and report climate hazard vulnerabilities through a

custom resilience assessment tool that uses the climate hazard exposure data to calculate a climate-risk score that can be used to prioritize adaptation projects. However, the resilience assessment tool uses downscaled climate projection data, and there is uncertainty about how projected precipitation will translate into flood exposure at USDOT sites.

The Department is currently exploring ways to incorporate financial risk into its resilience assessment tool for USDOT facilities and operational assets. USDOT has assessed options for using facility replacement cost or annual operating costs as a proxy for financial risk. The assessment revealed several barriers: 1) data are not regularly updated and are not considered accurate, and 2) vulnerability to different climate hazards can vary significantly for an asset. Additionally, in most cases, exposure to climate hazards does not lead to a total loss of the asset.

Since October 2021, USDOT has updated the 2016 vulnerability assessments of mission-critical facilities to identify interim actions that have reduced climate vulnerabilities. USDOT has also engaged agency stakeholders and developed a climate resilience assessment tool to calculate climate risk for mission critical USDOT operational assets. Over the next year, USDOT will complete assessments for the top priority mission-critical facilities using the new resilience assessment tool. The results will inform decisions about which USDOT adaptation projects have the highest potential to reduce climate-related financial risks for the Department.

In addition to USDOT's work to reduce climate risks to its own facilities and operational assets, USDOT is assisting stakeholders and recipients of federal funding in assessing and reducing the risk of climate change to the transportation system and the communities it serves. USDOT is including consideration of climate change resilience in discretionary grant programs, as appropriate and consistent with existing law. In addition, USDOT is developing multi-modal climate resilience guidance to provide overall direction for USDOT-funded projects and highlight relevant resources and tools to assist project sponsors. This guidance will build on modal resources—such as FHWA's climate data and vulnerability assessment tools—in order to assist project sponsors applying for USDOT discretionary grants and recipients of formula grant funding to ensure that infrastructure projects are resilient to the impacts of climate change and extreme weather.

B. Climate Vulnerability Assessment

For USDOT facilities and operational assets, the Department completed initial climate vulnerability assessments of mission critical assets in 2016, with an update in 2021 to reflect interim activities. For the next round of assessments, USDOT will deploy a custom climate resilience assessment tool to calculate climate-risk scores using a consistent method across the Department. USDOT expects the updated assessments to be completed in FY 2023 for the top priority mission-critical facilities, to support prioritization of adaptation projects with the greatest potential to reduce vulnerability.

In addition to developing tools to assess the vulnerability of USDOT facilities and operational assets, USDOT continues to assist transportation agencies and other stakeholders in assessing the vulnerability of the transportation system to climate change. For example, the FHWA has partnered with State DOTs, MPOs, and others across the country to develop and refine a framework for vulnerability assessment and adaptation. The framework provides information on a range of applications, from small qualitative studies to complex, quantitatively driven analyses, and from the State or regional systems level analysis down to corridor- or project-specific analyses.

C. Climate Education

USDOT has initiated several efforts to address climate education throughout the Department and the transportation community. For example, USDOT is working to develop, in partnership with NOAA, a broad climate education and training program via the USDOT Climate Change Center. The USDOT Climate Change Center provides an opportunity for staff to foster a culture of knowledge and practice on climate resilience and adaptation—through information sharing and bi-weekly meetings that include guest speakers from other Federal agencies, the academic community, non-profits, and others. USDOT continues to provide technical assistance and training to our external partners on climate resilience and adaptation, allowing employees to put their knowledge into practice.

The Federal Highway Administration's National Highway Institute (NHI) released four one-hour web-based courses focused on resilience to climate change and extreme weather events. The four courses provide an introduction to past and expected future environmental conditions, future sea levels, climate datasets and modeling tools for temperature and precipitation change, system level vulnerability assessment, and methods for conducting project-level resilience assessments. The target audience includes engineering, project planning and environmental staff. The series is also relevant to regional planners, asset managers, and others seeking to integrate climate change considerations into their practices. NHI completed development of a new three-day in-person course, Addressing Climate Resilience in Highway Project Development and Preliminary Design, which will be available beginning Fall 2022.

D. Tribal Engagement

The USDOT seeks to foster and facilitate positive government-to-government relations between the Department and all Federally-recognized Indian tribes. The USDOT Climate Action Plan for Resilience is a high-level plan that focuses on internal decision-making within the Department to incorporate climate resilience and adaptation. While USDOT did not seek tribal engagement in the overall USDOT Climate Action Plan for Resilience, the individual components that intersect with tribal interests will consider tribal interests including tribal treaty rights and consideration of indigenous traditional ecological knowledge, where appropriate.

For example, when a notice of funding opportunity (NOFO) for tribal grants is issued, USDOT will evaluate the language in the NOFO to determine if additional explanation or language changes are needed. In addition, evaluation of climate resilience and adaptation in the project proposals could consider indigenous traditional ecological knowledge in addition to climate science in evaluating if the proposed project includes benefits to climate change and resilience.

E. Climate Change Impacts, Equity, and Environmental Justice

Following Executive Order 14008, USDOT is analyzing our programs through an equity lens to determine how our projects have and will impact vulnerable communities. This analysis extends to our efforts to incorporate climate resilience into our projects, policies, and actions. It is important when analyzing impacts of USDOT actions, that these communities are identified and there is meaningful public involvement to educate and learn from stakeholders about the potential impacts and create solutions that will mitigate impacts from the transportation actions and from climate change.

By considering climate equity, USDOT is working to ensure that all people can benefit equally from climate solutions and to diminish the disproportionate burden of climate impacts that some communities endure. For example, when making investments in transportation facilities, USDOT considers the potential impacts on disadvantaged communities and the environment. Where applicable, USDOT prioritizes sites that offer robust transportation options, including walking, biking, and transit, while minimizing greenhouse gas emissions and impacts on disadvantaged communities. In addition, by considering procurement actions and equity, the Department is working to ensure all people can benefit from our decisions to diminish the disproportionate burden of climate impacts that some communities endure.

F. Partnerships

The Department continues to advance partnerships on climate adaptation and resilience in its facilities and operational assets, including ongoing pursuit of new partnerships with utilities and energy services companies to enhance site resilience through conservation measures and other best practices. For example, FHWA awarded a utility energy service contract (UESC) for implementation of energy and water conservation measures. MARAD plans to partner with the U.S. Army Corps of Engineers to scope a sufficiency and resiliency study examining measures to improve operational resilience, efficiency, and sustainability for the reserve fleet sites. In addition, the Department participates actively in many sustainability and resilience focused workgroups. The Department is also creating a new partnership with NOAA to develop a climate education and training program for staff.

SECTION 3. TOPICS FROM EXECUTIVE ORDER 14057 (Federal Sustainability)

A. Policy Review

With the release of its Climate Action Plan for Resilience in 2021, USDOT has started a systematic review of its policies governing the design, major renovations, as well as facility operation and maintenance to ensure climate-resilient investment. Specifically, USDOT updated processes to use a climate resilience assessment tool to assess operating risk to climate hazards for facilities and assets which will eliminate maladaptive practices and promote climate-ready investments. The Department expects the climate resilience assessments to be completed in FY 2023 for the top priority mission-critical facilities, to support prioritization of adaptation projects with the greatest potential to reduce vulnerability. Additionally, USDOT has released net-zero emission guidance to its Operating Administrations to ensure its buildings and facilities continue to implement forward-leaning, climate-resilient investments.

The Department has also initiated a review to determine the extent resilience is considered in USDOT and modal operating administration programs and policies that more broadly impact the transportation community. As part of this review, USDOT will look to identify policies and funding programs that may be maladaptive to climate change, and that may put federal investments in our transportation system, as well as the communities it serves at risk. The review will also explore the extent to which benefit cost analysis, managed retreat, and nature-based solutions are considered in USDOT policies and programs.

USDOT will use this information in the development of multi-modal climate resilience guidance to provide overall direction for DOT-funded projects and highlight relevant resources and tools to assist project sponsors**.** This guidance will build on FHWA and other modal resources, that assist project sponsors applying for USDOT discretionary grants, as well as recipients of formula grant funding, in ensuring that infrastructure projects are resilient to the impacts of climate change and extreme weather. USDOT will also look to further develop and enhance tools to support the transportation community in assessing the impacts of climate change and supporting climate adaptation planning and efforts to improve resilience.

B. Climate Scenario Analysis

USDOT is developing climate risk information for Departmental facilities and operational assets, as well as assisting transportation agencies and other stakeholders in identifying and using climate information to inform their decision-making. USDOT has developed a climate resilience assessment tool by combining climate projections (heat and precipitation data) from downscaled global climate models with critical system vulnerability data and historical exposure data from FEMA's national risk index in order to calculate a more robust site-specific climate-risk score for Departmental facilities and operational assets. The climate-risk scores will inform

USDOT decisions on how to prioritize adaptation projects to reduce vulnerability to climate change.

USDOT has relevant historical climate risk data and projections for heat and precipitation data for its sites, but there is uncertainty in how projected precipitation will translate into flood exposure. USDOT is evaluating whether private data sources can fill this gap; however, the annual subscription costs would be significant for all sites. Another data gap is projections for maximum wind speeds that agencies should use for vertical structure design. A federal source of flood and wind projection data for all USDOT facilities would significantly improve the Department's ability to assess risk and reduce vulnerability to future climate conditions.

In addition to working to incorporate climate projections and data into the decision-making for its facilities and operations, USDOT continues to assist transportation agencies and other stakeholders in identifying and using climate information to inform their decision-making. For example, FHWA has developed and continues to refine a range of procedures, tools, and guidance documents to help transportation agencies address climate change when designing roads, bridges, culverts, and drainage infrastructure. This includes revising estimates associated with severe storms, floods, and other events. These resources include:

- Highways in the River Environment: Floodplains, Extreme Events, Risk, and Resilience (Hydraulic Engineering Circular No. 17, 2nd Edition). This guidance document presents detailed technical guidance and methods for assessing the vulnerability of transportation infrastructure to extreme flood events in riverine environments. It includes information about downscaling climate data for use in hydraulic engineering.

- Highways in the Coastal Environment (Hydraulic Engineering Circular No. 25, 3rd Edition). This document presents tools for the planning, design, and operation of highways in the coastal environment, focusing on roads near the coast that are influenced by coastal tides and waves constantly, or occasionally during storms. A primary goal is the integration of coastal engineering principles and practices in the planning and design of these roads and bridges to make them more resilient.

- Nature-Based Solutions for Coastal Highway Resilience: An Implementation Guide. This document summarizes the current literature on the benefits and costs of nature-based solutions. From there it follows the steps in the transportation project delivery process, providing information on planning, site assessment, design, permitting, construction, monitoring, maintenance, and adaptive management of nature-based solutions in the transportation context.

- CMIP Climate Data Processing Tool. The Coupled Model Intercomparison Project (CMIP) Processing Tool Version 2.1 is a web-based software package that processes readily available downscaled climate projections at the local level into relevant statistics for transportation planners and designers.