

Planning and Environment Linkages: Climate Change



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DRAFT

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About the NADO Research Foundation

Founded in 1988, the NADO Research Foundation is the nonprofit research affiliate of the National Association of Development Organizations (NADO). The NADO Research Foundation identifies, studies, and promotes regional solutions and approaches to improving local prosperity and services through the nationwide network of regional development organizations (RDOs). The Research Foundation shares best practices, offers professional development training, analyzes the impact of federal policies and programs on RDOs, and examines the latest developments and trends in small metropolitan and rural America. Most importantly, the Research Foundation is helping bridge the communications gap among practitioners, researchers, and policymakers. Learn more at www.NADO.org and www.RuralTransportation.org.

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Cover– Southwest Region Planning Commission

Introduction

Planning and Environment Linkages (PEL) is an approach used by transportation planning agencies to integrate environmental considerations and community input into transportation planning. PEL can help identify and address potential environmental impacts of transportation projects, including those related to climate change. Climate change refers to long-term shifts in temperatures and weather patterns. These shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. Since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil, and gas.¹

Climate change can affect transportation systems in several ways, including through sea level rise, increased frequency and severity of extreme weather events, and changes in temperature and precipitation patterns. PEL can help transportation planners consider these potential impacts and identify strategies to mitigate them. PEL can also help identify transportation projects that support sustainable modes of transportation, such as public transit, biking, and walking, which can help reduce greenhouse gas emissions (GHG) and mitigate the impacts of climate change.

Greenhouse gases (also known as GHGs) are gases in the earth's atmosphere that trap heat. During the day, the sun shines through the atmosphere, warming the earth's surface. At night the earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the greenhouse gases in the atmosphere.

This issue brief will address climate change issues in transportation planning, agency experiences such as RTPO/RPO or MPO with incorporating PEL into climate change issues, and descriptions of lessons learned about how PEL could have been incorporated.

*What is an RTPO/RPO?
Regional Transportation Planning Organizations (RTPOs) generally operate in non-metropolitan areas to conduct outreach to the public and local officials and provide transportation planning support under contract to state departments of transportation (DOTs). A Governor may establish and designate federally recognized RTPOs to enhance the planning, coordination, and implementation of the long-range statewide transportation plan and STIP, with an emphasis on addressing the needs of nonmetropolitan areas of the State. Whether formally designated or not, regional rural planning partners can benefit state and local stakeholders. Sometimes, such organizations are also called Rural Planning Organizations (RPOs), and some states may refer to them as Regional Planning Affiliations, Regional Transportation Planning Agencies, or simply as general-purpose Councils of Governments or Regional Planning Commissions who have a rural transportation planning program. They generally exist to assist state DOTs with completing their requirements for statewide planning in rural areas and to enhance the outreach conducted to local officials and the public.*

To prepare this brief, NADO Research Foundation staff reviewed United States Department of Transportation website, Transportation Research Board publications, and several state departments of transportation (DOT) climate change policies and regional agency documents.

Climate Change Issues in Transportation Planning

Climate change will have significant impacts on transportation, affecting the way U.S. transportation professionals plan, design, construct, operate, and maintain infrastructure. The challenges and implications for transportation agencies: the need to support major GHG reductions, the need to meet changing public expectations, the need to adapt transportation infrastructure to rising sea levels and other climate impacts, the need to prepare for major changes in vehicle technologies and fuels, the need to adjust transportation’s revenue base to changes in vehicles and fuels, and the need to do so while meeting the mobility needs of a growing population in a global economy.²

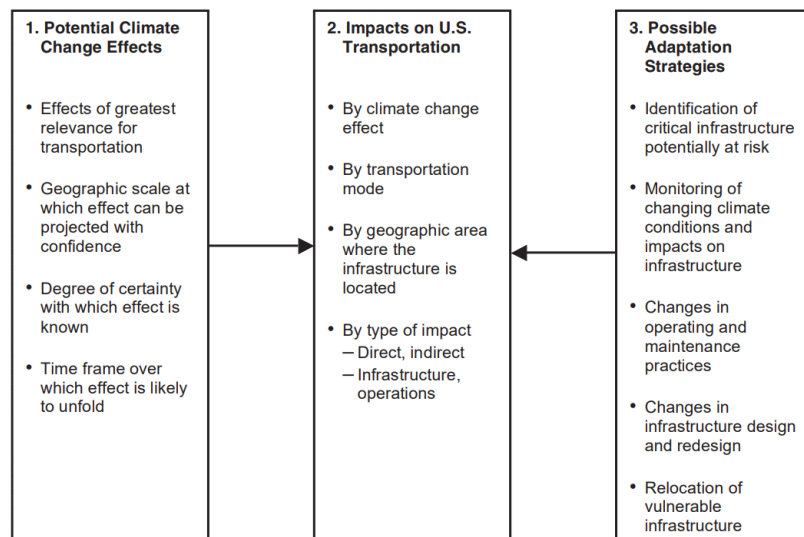
The U.S. transportation sector is responsible for more greenhouse gas emissions than any other sector of the economy. In 2019, transportation accounted for 33% of emissions in the United States—and that statistic does not even account for the full lifecycle of transportation-related emissions, such as the emissions from building transportation infrastructure.³

The range of impacts from climate change may include flooding and damage to highways and subway tunnels, limited waterway access, buckled runways, and weakened structures such as bridges. Severe conditions may reduce the life of capital assets, increase operational disruptions, and create the need for new infrastructure such as evacuation routes. Some consequences may require changes in the design, construction, siting and maintenance of infrastructure. Interruptions to emergency routes or infrastructure failure can make travel conditions unsafe. They jeopardize national investment in transportation infrastructure, weaken mobility and economy, and compromise the safety of the traveling public.⁴



*Source: Bi-State Regional Commission
Quad Cities Iowa/Illinois MPO: Extreme Weather and Transportation Resilience Report*

The Transportation Research Board Special Report 290 on Potential impacts of Climate Change on U.S. Transportation explained in detail various tasks involved in identifying climate change issues in transportation and possible adaptation strategies as shown in the below image. The first task is to identify potential climate change effects, focusing on those of greatest relevance for transportation. This task also includes indicating what is known from climate scientists about the certainty of these effects, particularly at the regional and local levels, and the time frame over which they are likely to unfold. The second task involves describing the impacts of the effects of climate change on transportation. These impacts can be considered in several different ways—by type of climate change effect (e.g., sea level rise, temperature extremes), by transportation mode, by geographic area, and by type of impact. With regard to the latter, impacts on transportation can be direct (i.e., affecting the physical infrastructure as well as the operating performance of the system) or indirect (e.g., affecting the location of economic activities or levels of pollution). Finally, these impacts will be influenced by changes in the environment in which the infrastructure is situated. For example, changes in temperature and precipitation will affect soil moisture and runoff, which in turn will affect peak stream flows, sediment delivery to coasts, and the sustainability of the landforms upon which the infrastructure is built, with considerable regional variability. Tasks 1 and 2 require good communication among climate scientists, transportation professionals, and other relevant scientific disciplines. The final task requires developing possible adaptation strategies. A range of approaches is suggested—from the identification of at-risk critical infrastructure to the monitoring of conditions (both climate and infrastructure), to changes in operating and maintenance practices, to changes in infrastructure design and redesign, to relocation of vulnerable infrastructure. The strategies listed in task 3 require action primarily by transportation decision makers—planners, designers, engineers, and operating and maintenance personnel.⁵



Source: Transportation Research Board Special Report 290 on Potential impacts of Climate Change on U.S. Transportation

Incorporating PEL into Climate Change Issues

PEL is a voluntary process that is implemented by individual agencies in the United States. While the Federal Highway Administration (FHWA) encourages the use of the PEL process, it is up to each transportation agency to adopt and implement PEL into climate changes issues in their transportation planning. PEL is an approach that seeks to integrate transportation planning and environmental considerations, including climate change, from the early stages of the planning process. It aims to collaborate and improve the decision-making process by considering environmental factors upfront, rather than as separate or later-stage assessments.

PEL can be implemented for a specific study, and/or can be implemented in entire/parts of planning process. PEL can be utilized in transportation planning processes to refine purpose and need, to eliminate unreasonable alternatives, to accelerate the project delivery process, to increase stakeholder involvement, to identify priorities, to justify funding for projects, to strengthen planning process by increasing coordination with the public and other agencies early in planning, and to inform National Environmental Policy Act (NEPA) decision.

Although there is no federal mandate to consider climate change in transportation planning, state DOTs, MPOs, and some RPOs have been integrating climate change into transportation planning by considering both mitigation and adaptation strategies. Mitigation of climate change means reducing the major cause of climate change: GHG emissions released by human activities. Adaptation to climate change means minimizing the potential impacts on the transportation system from climatic changes such as rising average temperatures, increased intensity of storms, rising sea levels, and increases in overall climatic variability.⁶

Some state DOTs, MPOs, and RPOs have developed climate action plans or similar strategic documents that outline their goals and strategies for reducing greenhouse gas emissions and adapting to climate change. Some agencies are implementing various strategies to reduce emissions from transportation, such as promoting the use of alternative fuels and advanced vehicle technologies, encouraging modal shifts to public transportation and active transportation modes, and adopting policies to improve vehicle fuel efficiency. This can include supporting the deployment of electric vehicles (EVs), investing in EV charging infrastructure, and incentivizing the use of cleaner fuels.

Some State DOTs, MPOs, and RPOs have been incorporating sustainability principles into the design, construction, and maintenance of transportation infrastructure. This can involve using environmentally friendly construction materials, implementing green stormwater management practices, and integrating renewable energy sources into transportation facilities. Some agencies are increasingly embracing multimodal transportation planning, which prioritizes the integration of different transportation modes, including public transit, walking, and cycling.

Case Studies

The implementation of the PEL process can vary depending on the size, complexity, and potential impacts of the transportation project, as well as the unique needs and preferences of different stakeholders. It has been proven that PEL can be implemented for a specific study and PEL can be implemented to different parts of planning process such as scoping, eliminating unreasonable alternatives, prioritizing projects, accelerating project delivery, and increasing stakeholder involvement.

Case Study #1: Piedmont Triad Climate Resiliency Toolkit; Clean Cities Coalition Effort; Piedmont Triad Regional Council (PTRC), North Carolina.

The Piedmont Triad Regional Council (PTRC) is a voluntary association of local governments—urban and rural—and one of the largest regional councils in North Carolina, serving 75 members in and around the Greensboro / Winston-Salem / High Point metro area. Twelve counties and 63 municipalities comprise the Piedmont Triad Regional Council. Through the Piedmont Triad and the Northwest Piedmont Rural Planning Organization, the PTRC is responsible for transportation planning in eight rural and suburban counties.

The *Piedmont Triad Climate Resiliency Tool Kit* is a resource for the region's member communities and provides the background knowledge necessary to begin working towards a more resilient future. It summarizes existing climate data, discusses the likely local and regional impacts, and provides resources and recommendations to assist local communities in addressing these challenges. The report was intended to raise awareness and understanding and better equip Piedmont Triad communities to tackle complex issues that climate change presents. It has been identified that emergency access can also be impeded, creating threats to human safety if transportation corridors become unnavigable. This problem is exacerbated by the fact that many areas of the Piedmont Triad have aging infrastructure and limited budgets for replacements and upgrades. It was clearly determined in this toolkit that there could be substantial costs if local governments do not begin taking the steps necessary to proactively address these concerns. The *Climate Resilience Tool Kit* offers the region and member local governments information on how climate resilience can be prioritized in transportation planning, implementation, and operations.⁷



The U.S. Department of Energy created the Clean Cities Coalitions to reduce reliance on petroleum products and improve air quality. The PTRC signed a resolution in support of a new Clean Cities Coalition and became a stakeholder with the North Carolina clean energy technology center. By joining the Clean Cities coalition as a stakeholder, the Northwest Piedmont RPO and Piedmont Triad RPO will be supporting clean fleets, alternative fuels, and sustainable transportation across North Carolina. With the help of this initiative, successful EV stations were installed at five locations in rural areas.

Through the development of the tool kit and participation in the Clean Cities Coalition, PTRC and the two Rural Planning Organizations that it administers are taking steps related to both planning and implementation of transportation efforts. In addition, the toolkit and coalition represent progress the agency is making in both climate adaptation in the face of threats to infrastructure resilience, and mitigation as alternative fuel efforts reduce GHGs.⁸

[Case Study #2: Evaluating and planning for rural resilient rural dirt roads; Project prioritization process, Pioneer Valley Planning Commission \(PVPC\), Massachusetts](#) Pioneer Valley Planning Commission has been the designated regional planning body for the Pioneer Valley region, which encompasses 43 cities and towns in the Hampden and Hampshire County areas comprising small, rural towns with populations of less than 1,000 residents, to large urban centers which are home to over 150,000 residents.

The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) rolled out a grant program to help municipalities conduct climate change vulnerability assessments and resiliency planning. The Municipal Vulnerability Preparedness (MVP) Program offers technical assistance for towns and cities to complete climate change vulnerability assessments, develop action-oriented resiliency plans, and implement top priority climate change resilience projects.



Location of Cone Road, Midfield showing series of downpours in complete despair

PVPC received funding to conduct a regional assessment of the vulnerability of rural dirt roads within the context of climate change for three Western Massachusetts Hilltown's: Blandford, Chester, and Middlefield. The climate change concerns addressed through this project are the two that most impact dirt roads: precipitation events characterized by increasing frequency of downpours; and warming temperatures, specifically in winter months, which will lead to greater frequency of freeze-thaw cycles. The incorporation of nature-based solutions and strategies is the end goal of this project. This assessment is helping communities with identifying overall challenges and eventually prioritizing specific areas of the rural dirt roadway.⁹

PVPC helped with developing a prioritization process with the guidance from Joint Transportation Committee for evaluating transportation projects. Environment and climate change is considered as one of the criteria with a total of 12.5 assigned points. The sub-criteria for this include: preserving floodplains and wetlands (1 point); promoting green infrastructure and low impact development to reduce stormwater impacts (2 points); reducing impervious surfaces (0.5 point); protecting or enhancing environmental assets (0.5 point); supporting brownfield redevelopment (0.5 point); improving air quality (2 points); improving fish and wildlife passage (1 point); supporting green communities (0.5 point); improving storm resilience (3 points); carbon reduction program (0.5 point); and improving habitat community (1 point).¹⁰

This prioritization helps PVPC's transportation planning process incorporate early consideration of environmental impacts, including climate change mitigation and adaptation impacts, as potential projects are identified and prioritized.¹¹

Case Study #3: Regional Transportation Plan 2040 and 2023 Transportation Outlook, Peninsula Regional Transportation Planning Organization (PRTPO), Washington

PRTPO is the Regional Transportation Planning Organization (RTPO) for the Peninsula region of Washington State. The Peninsula region includes all of Clallam, Jefferson, Kitsap, and Mason Counties, encompassing the Kitsap and Olympic peninsulas. PRTPO is a cooperative intergovernmental forum for coordinated transportation planning in that four-county region. The Peninsula region had a 2020 population of 446,810 people. About 32 percent of the region's population lives in incorporated jurisdictions, with the other 68 percent living in unincorporated rural areas. Ten Indian Tribes have lands in the Peninsula region. Five of those tribes have an active Interlocal Agreement with PRTPO: Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Makah Nation, Skokomish Tribe, and Squaxin Island Tribe.

The 2020 adopted Regional Transportation Plan (RTP) includes a chapter summarizing what PRTPO heard from its outreach on the draft plan and how it will respond in 2040 RTP. The draft RTP itself was developed in a time of transition, and it was not until the public review process that PRTPO learned it didn't acknowledge climate change or emphasize the need for greater resilience. Therefore, PRTPO summarized in "Chapter 7: Next Steps" on public comments about lack of climate response and resiliency considerations, among other important matters, and how it intended to address this in its work. Public comments include how silent the current plan is on climate change and reducing greenhouse gas emissions. Climate change considerations added by PRTPO entail a stronger focus on active transportation, intercity transit and passenger-only ferry connections, demand management, and electric vehicle infrastructure as well as pragmatic pursuit of system resilience and adaptation measures.¹²

The Fiscal Year 2024-2025 Unified Planning Work Program (UPWP) identifies enhancing regional resilience and increasing EV (Electric Vehicles) awareness in the region as important tasks. As part of this, PRTPO launched the EV Resource Portal, <https://www.prtpo.org/ev-resources>. The portal has an inventory of existing resources for use by members and other stakeholders to increase the region's electric vehicle readiness. This includes plans, studies, forecasts, and funding efforts supportive of battery electric vehicles and fuel cell electric vehicles. It pertains to public agency fleets, personal vehicles, electric retail utility providers, electric vehicle supply equipment (EVSE) businesses, and building and parking codes. It is concerned with all modes of travel. An EV Infrastructure Exchange Group supports information sharing and coordination among PRTPO's members and their partners. It includes cities, counties, tribes, transit agencies, ports, non-profits, WSDOT, and other stakeholders working together in the Peninsula Region and beyond to support greater use of zero emission vehicles. PRTPO developed this work program activity to advance the region's EV readiness in support of the 2040 Regional Transportation Plan.¹³

The PRTPO transportation project priority characteristics include increasing resiliency and reducing environmental/GHG impacts in the region, as shown in the image below. These are not prioritized in any way but are instead local projects that members would like to highlight for various reasons. These are intended primarily as an educational outreach tool for use with legislators and others, not as a ranking tool, although the project characteristics also briefly communicate basic information about each project’s purpose and need, including how it contributes to resilience or reducing GHG impacts. Moving forward, PRTPO will continue to work with its partners to assess ways that this list can better inform legislators about funding needs across the region.¹⁴

Transportation Outlook 2023
 Peninsula RTPO Transportation Investment Priorities



Project	Agency	LD#	PRTPO Priority Project Characteristics										
			Multiple Modes	Shovel-ready	Economic Chokepoint	System Preservation	Improve Safety	Special Needs Mobility	Increase Resiliency	Connecting IWA	Reduces Enviro/GHG Impacts	Included in Local TIP	Total Cost
Johns Prairie Road and SR 3 Intersection Improvements <i>Reconstruct skewed, sub-standard major T-intersection to modern standards, realigning, grading, and channelizing for safety & efficiency</i>	Mason County	35	*	*		*	*	*			*	\$15 M - \$20 M	\$0
SR 3 and North Bay Road Intersection Improvements <i>Design & construct modern intersection that benefits multiple modes of travel, improves economic chokepoint, and improves safety & resiliency</i>	Mason County	35	*	*		*	*	*				\$5 M - \$10 M	\$0
SR 108/Old Olympic Highway Safety Project <i>Install (2) compact roundabouts at US 101/SR 108 ramp terminals and construct non-motorized pathway with lighting through interchange</i>	Squaxin Island Tribe / WSDOT	35	*			*					*	\$ 3.3 M	\$0

Case Study #4: Prioritization of projects, Southwest Connects: Southwest Region Transportation Plan, Southwest Regional Planning Commission, New Hampshire

Southwest Region Planning Commission (SWRPC) is one of New Hampshire’s nine regional planning commissions (RPCs), which serve as regional planning partners for the state’s rural and urban regions. SWRPC is an association of member municipalities in its service area, which covers 34 towns and approximately 1,000 square miles. *Southwest Connects: Southwest Region Transportation Plan 2014-2035 (Southwest Connects)*, the long-range plan for the Region considers climate change issues as part of performance-based criteria for evaluating projects that are included in the plan. *Southwest Connects* projects are listed in its regional transportation improvement program (RTIP), a section of the plan, which describes transportation projects intended to address the needs and goals of the Region. Every other year, towns and other regional stakeholders are invited to submit projects to evaluate and consider for the RTIP using federal funding that is apportioned to the nine RPCs by New Hampshire Department of Transportation (NHDOT). The RTIP evaluation process follows the project evaluation criteria used for NHDOT’s Ten-Year Transportation Improvement Plan (TYP), a fiscally constrained capital improvement plan that identifies projects and their funding sources for a 10-year period statewide every 2 years.¹⁵

SWRPC’s RTIP synchs with the TYP in that it mirrors regionally significant projects from the SWRPC Region in the TYP.

In New Hampshire, climate change impacts are evaluated for the RTIP (and by extension the TYP) using several criteria under the headings “equity, environmental justice & accessibility impacts”, “natural hazard resiliency impacts” and any “emergent need issues” (as part of support in the table shown below).

Potential climate change-related issues associated with a project—such as impact of the project on air quality (projected on road source emissions), whether the project will adapt to or mitigate anticipated natural hazards associated with the project area (such as flood risk), and whether the project aligns with any locally or regionally supported climate related goals- are among the climate change/PEL related criteria used to evaluate the projects.

The eight criteria and fourteen sub criteria for evaluating transportation projects by NHDOT are shown in the image below.

CRITERION	SUB-CRITERIA
Economic Development	Local & Regional; Freight Movement
Equity, Environmental Justice, & Accessibility	Equity & Environmental Justice; Accessibility
Mobility	Mobility Need & Performance; Mobility Intervention
Natural Hazard Resiliency	Hazard Risk; Hazard Mitigation
Network Significance	Traffic Volume; Facility Importance
Safety	Safety Performance; Safety Measures
State of Repair	State of Repair; Maintenance
Support	n/a

Southwest Region Planning Commission

There are a variety of data sources that SWRPC and the other RPCs use to evaluate these criteria. For example, SWRPC has access to data that evaluates the fluvial geomorphic compatibility of culverts and bridge crossing areas at risk of flooding and washouts. A Statewide Model presents scores on culverts throughout the state, providing RPCs an important risk evaluation tool for projects nominated for *Southwest Connects*. The resource <https://www.nhsades.com/stream-crossing-viewer> shows data on stream crossings throughout the State of New Hampshire that have been completely assessed thus far.¹⁶

The criteria and the data that support them, such as risks of flooding and washouts, are tools for SWRPC to analyze potential climate change risks to transportation infrastructure. Having

such data available ensures that regional plans such as *Southwest Connects* reflect that climate risk at the plan level, as well as at the project level.

Case Study #5: Climate Change policies and Transit performance measures in Regional Transportation Plan & Active Transportation Plan; Project rating criteria in the Regional Transportation Improvement Program, Mendocino Council of Governments (MCOG), California

MCOG is a Joint Powers Agency comprising of the County of Mendocino, and the cities of Fort Bragg, Point Arena, Ukiah, and Willits, with a total population of 86,749.

MCOG incorporated climate change policies in the 2022 Regional Transportation Plan & Active Transportation Plan. The objectives include: coordinating transportation planning with air quality planning; investing in transportation projects and participating in regional planning efforts that will help Mendocino County residents to proportionately contribute to the California greenhouse gas reduction targets; ensuring transportation improvements are subject to adequate environmental review and standards; and improving resiliency of the region's transportation system to climate-related impacts.¹⁷

Climate change issues are included in additional transportation performance measures for the Public Transit Service element as well. The performance measures include: average vehicle age; percent of zero emission buses (ZEB); reduction in VMT based on average trip length and number of passengers; and reduction in greenhouse gas emissions based on average trip length and number of passengers.

MCOG GOAL FOR CLIMATE CHANGE & THE ENVIRONMENT (CCE)

Build a combination of transportation facilities that, when evaluated as a group, will result in improved air quality, reduced transportation-related air toxins and greenhouse gas emissions, reduced vehicle miles traveled (VMT), and a more resilient multi-modal transportation network in Mendocino County. This goal supports the Governor's Executive Orders EO N-19-19 (greenhouse gas reduction goals) and EO-79-20 (zero emission vehicles).

<https://www.mendocinocog.org/files/653d21e36/2022+RTP-ATP+Feb+2022-Final+Adopted.pdf>



One of the bike/ped and sidewalk project identified in the active transportation plan

SB 45

SB 45 was major transportation legislation in the late 1990s that changed the whole structure of how the State of California distributed funding to regions. Prior to SB 45, regional transportation planning agencies such as MCOG did not have the authority to program STIP funds. SB 45 gave 75% of STIP funds to regional transportation planning agencies for regional and local projects (as programmed and allocated by the California Transportation Commission), and 25% to the State).

Since the passage of SB 45, MCOG has conducted a competitive and inclusive project selection process for utilizing funds available through the State Transportation Improvement Program, with few exceptions. MCOG's technical advisory committee prioritizes projects submitted for STIP funding and air quality/environmental benefit is one of several ranked categories. The project rating criteria is being updated in 2023, and MCOG's Executive Committee had recommended ten points to be assigned to the Climate Change and Environment category. This category assigns points based on the degree of impact the specific project has on improving air quality, reducing greenhouse gases, protecting/improving water quality, encouraging mode shift, reducing VMT and/or mitigating for other projects, and any other environmental enhancement.¹⁸

AIR QUALITY/ENVIRONMENTAL BENEFIT (10 points possible) PREVIOUSLY 15

To what degree does this project improve air quality, reduce greenhouse gasses, or provide other environmental enhancement? Are there sensitive receptors (schools, hospitals, day-care, senior care facilities) which will benefit by this project? Will the project help protect or improve water quality with drainage/stormwater improvements? Will the project encourage mode shift to reduce GHG emissions, reduce VMT and/or mitigate for other projects?

SCORE: High (7-10 pts)	Med-High (4-6 pts)	Med-Low (1-3 pts)	None (0 pts)
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Summary

Climate change and transportation planning are closely interconnected, as transportation is a significant contributor to greenhouse gas emissions and plays a crucial role in shaping sustainable and resilient communities. Addressing climate change requires a multi-faceted approach that considers the specific needs and challenges of the communities. This includes supporting sustainable agriculture practices, promoting water conservation and management strategies, investing in resilient infrastructure, strengthening community networks, and ensuring equitable access to resources and services. Collaboration among stakeholders, including governments, local communities, academia, and nonprofit organizations, is essential for developing and implementing effective climate change mitigation and adaptation strategies.

PEL can involve conducting comprehensive assessments of climate change risks and vulnerabilities at the project or regional level. PEL can support the development of sustainable transportation systems that reduce greenhouse gas emissions and promote climate-friendly modes of transportation. PEL emphasizes stakeholder engagement and collaboration to ensure that diverse perspectives, including those of communities and environmental experts, are considered in the planning process and to inform NEPA decision. This allows for better integration of climate change considerations and helps identify innovative solutions and sustainable practices. PEL encourages long-term planning horizons that account for climate change impacts and promote resilience. This involves considering the long-term viability of infrastructure projects in the face of changing climate conditions, adopting adaptive management strategies, and integrating climate change projections into infrastructure design and operation.

Resources

Transportation practitioners and stakeholders can find more information from the following resources:

American Association of State Highway and Transportation Officials, Center for Environmental Excellence: <https://environment.transportation.org>

Colorado DOT (2016), Planning and Environmental Linkages Handbook, Version 2 (PDF): <https://www.codot.gov/programs/environmental/planning-env-link-program/pel-handbook-january-2016>

FHWA, Planning Environment Linkages: https://www.environment.fhwa.dot.gov/env_initiatives/PEL.aspx

American Association of State Highway and Transportation Officials Center for Environmental Excellence
Practitioners Handbook 10 - Transportation Planning Process to Support NEPA Process
https://environment.transportation.org/wp-content/uploads/2021/05/practitioners_handbook10.pdf

U.S. Department of Transportation, Federal Highway Administration
Environmental Review Toolkit: PEL Peer Exchange August 14 – 15, 2019
https://www.environment.fhwa.dot.gov/env_initiatives/pel/publications/PEL_Peer_Exchange_DC_Aug2019.aspx#va

U.S. Department of Transportation, Federal Highway Administration
Integrating Climate Change into the Transportation Planning Process
https://www.fhwa.dot.gov/environment/sustainability/energy/publications/integrating_climate_change/index.cfm

U.S. Department of Transportation, Federal Highway Administration
The Transportation Process Planning Briefing Book
https://www.fhwa.dot.gov/planning/publications/briefing_book/

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- ¹⁰ Pioneer Valley Planning Commission (2020), Regional Transportation Plan, <https://www.pvpc.org/sites/default/files/%E2%80%8CFinal%20RTP-Full%20Document.pdf>.
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- ¹⁴ Personal communication with Thera Black, Peninsula Regional Transportation Planning Organization, WA, June 2023.
- ¹⁵ NH Ten Year Plan: Regional Project Review (2020), New Hampshire's Ten-Year Plan, https://www.swrpc.org/wp-content/uploads/2021/03/TYP-Criteria_final.pdf.
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- ¹⁸ Personal communication with Loretta Ellard, Mendocino Council of Governments, CA, July 2023.