

SEVERE WEATHER COMPROMISES INFRASTRUCTURE RESILIENCY

Climate change effects -- such as heat waves, sea level rise, and heavy downpours -- are being felt now, and will accelerate in future, threatening human health, agriculture, livelihoods, and transportation. Increasingly frequent extreme weather has devastated infrastructure across the U.S., adding a burdensome cost for transportation agencies.



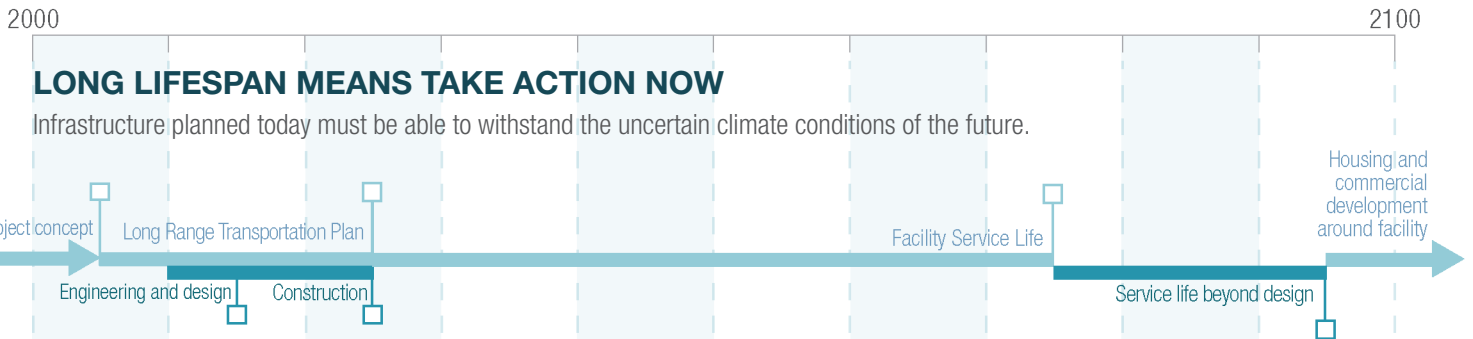
Burning fossil fuel releases heat trapping pollution, altering climate patterns
Credit: U.S. DOT Volpe Center



Roadway collapse from flooding from heavy rain in Minnesota
Credit: Minnesota DOT



Hurricane Damage from Wave Action to Highway 90 in Bay St Louis, MS
Source: Illinoisphoto.com

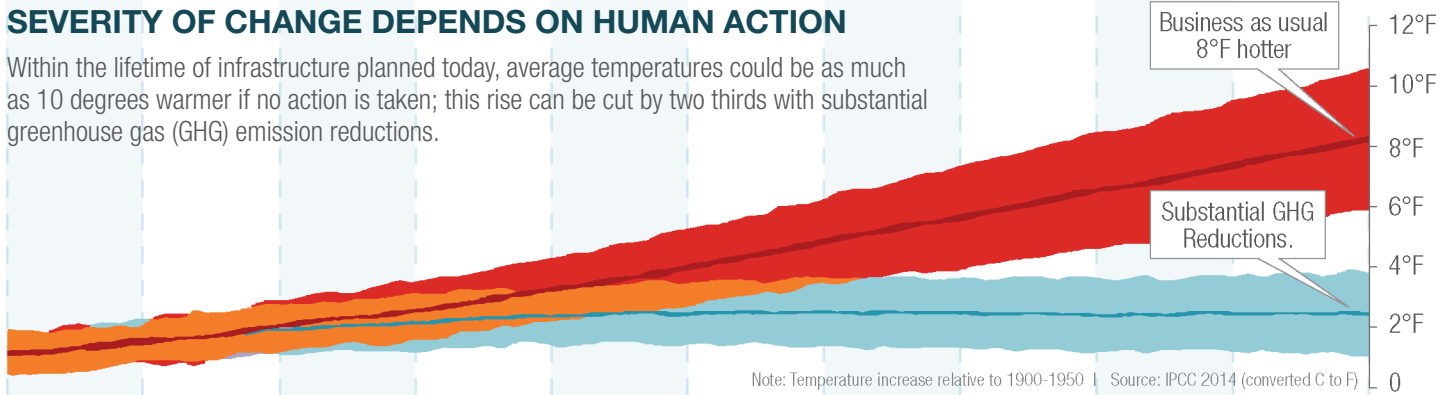


LONG LIFESPAN MEANS TAKE ACTION NOW

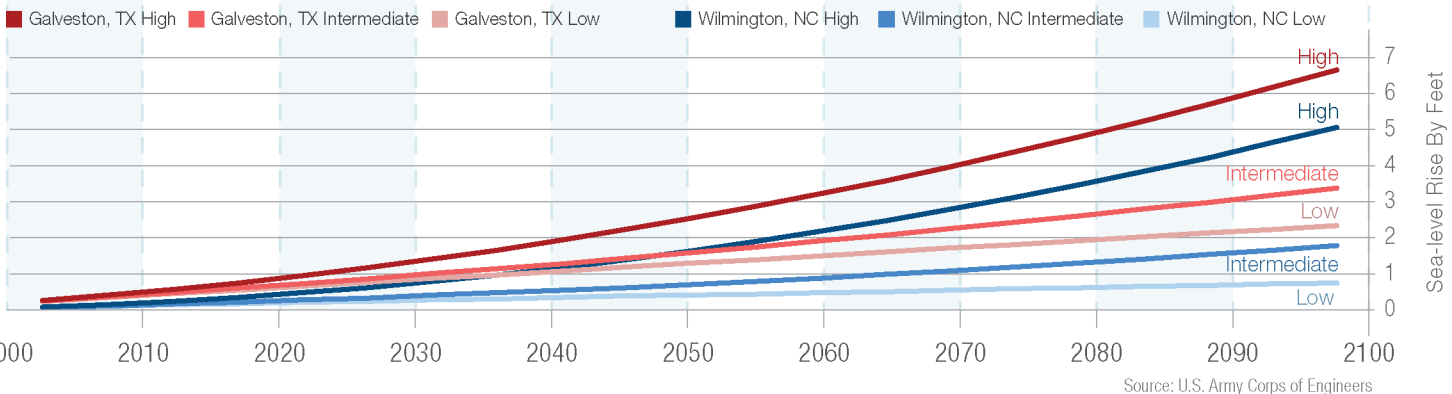
Infrastructure planned today must be able to withstand the uncertain climate conditions of the future.

SEVERITY OF CHANGE DEPENDS ON HUMAN ACTION

Within the lifetime of infrastructure planned today, average temperatures could be as much as 10 degrees warmer if no action is taken; this rise can be cut by two thirds with substantial greenhouse gas (GHG) emission reductions.



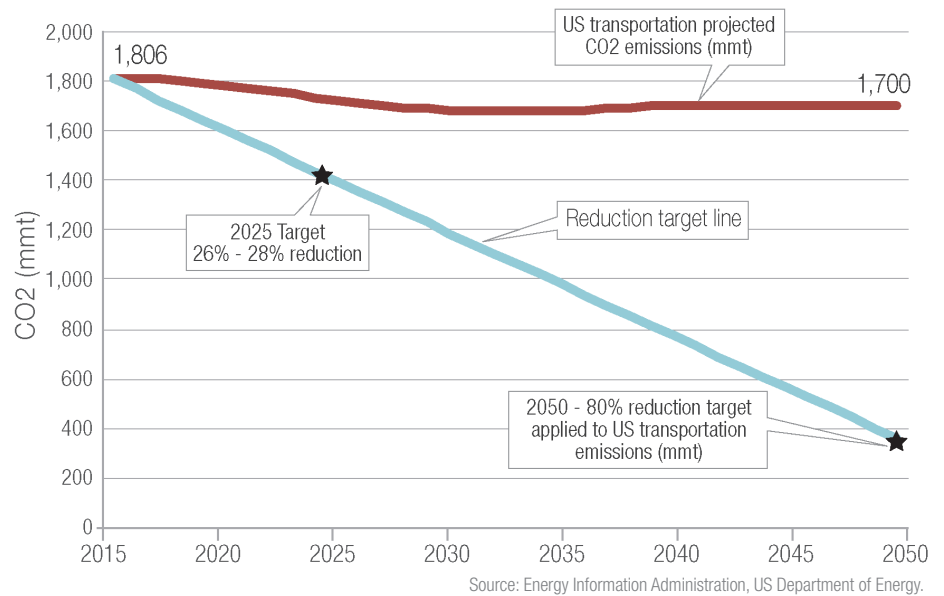
Global sea-level is projected to rise 1 to 6.6 feet by 2100. Local sea-level rise varies. In the U.S. the Gulf Coast is the most vulnerable, followed by the East Coast.



TRANSITION TO LOW CARBON POSSIBLE BUT BIG CHALLENGE

To avoid the worst impacts of climate change and meet international targets, the U.S. has pledged to reduce greenhouse gas (GHG) emissions 26-28 percent by 2025 and 80 percent or more by 2050. Transportation accounts for nearly a third of US GHG emissions.

US transportation carbon emissions are projected to remain relatively flat in the future, as fuel economy standards counterbalance increases in freight and passenger travel. Reaching an 80% reduction target requires additional action.



TAKE ACTION: EMISSIONS MITIGATION STRATEGIES

The transportation sector has three ways to reduce emissions in an effort to mitigate the extent of climate change.

Alternative Fuels and Vehicle Efficiency:
Transition to electric vehicles, low-carbon fuels, and high efficiency engines.



FHWA is working with states on studying electric vehicle charging infrastructure deployment.
Credit: FHWA

Travel Efficiency: Reduce travel through compact land use, pricing, public transit, and low-carbon freight movement.



Washington State DOT modeled GHG reduction strategies using an FHWA tool and found that a combination of aggressive strategies came close to meeting the state's target.
Credit: FHWA

System Efficiency: Optimize construction, maintenance, and operation.



FHWA's Infrastructure Carbon Estimator helps transportation agencies calculate the carbon footprint of their construction and maintenance projects and analyze strategies to reduce emissions.
Credit: Ohio DOT

TAKE ACTION: CLIMATE ADAPTATION STRATEGIES

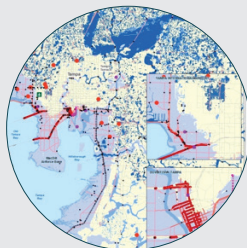
States and regions can improve the resiliency of their transportation systems by integrating climate change considerations into agency actions.

Know your vulnerabilities



Minnesota DOT used FHWA's Vulnerability Assessment Framework to identify areas of the state highway network vulnerable to flooding.
Credit: Minnesota DOT

Use the transportation planning process



The MPO for Tampa, FL included climate resilience analysis in their transportation plan, finding that adaptation actions would cost \$31M, but avoid \$265M in losses.
Credit: Hillsborough Metropolitan Planning Organization

Incorporate climate risks into engineering design



FHWA developed a climate-informed design process and tested it on assets in Mobile, AL.
Credit: FHWA

Enhance operations, maintenance, and emergency preparedness



Iowa DOT used climate and hydrological models to project flood frequencies. The data will be used in Iowa's bridge watch warning system.
Credit: FHWA

