



U.S. Department of Transportation  
Federal Transit Administration



# Transit and Climate Change Adaptation: Synthesis of FTA-Funded Pilot Projects

## Background

Public transit agencies play a critical role in providing safe, reliable, and cost-effective transportation to the communities they serve, and climate change-related issues place substantial operating and financial burdens on these agencies. In the face of increased frequency and intensity of extreme weather events, several agencies have taken the initiative to adapt their systems to make them more resilient to changing climate conditions, and a growing number of public transit agencies that are aware of the climate risks they face have identified their vulnerable assets and are prioritizing improvements to develop a more robust and resilient system.

The Federal Transit Administration (FTA) invests billions of dollars every year in transit assets across the U.S., many of which are threatened by the adverse impacts of climate change. Reducing the impacts of weather events and long-term climate change on transit service is a key goal for transit agencies and FTA. In 2011, FTA announced its Climate Change Adaptation Initiative and committed just over \$1 million in research funding to pilot projects in seven geographically-diverse locations involving nine transit agencies: San Francisco Bay Area Rapid Transit (BART), Chicago Transit Authority (CTA), Gulf Coast (Houston Metro, Tampa HART, and Island Transit), Los Angeles County Metropolitan Transportation Authority (LACMTA), Metropolitan Atlanta Rapid Transit Authority (MARTA), Southeastern Pennsylvania Transportation Authority (SEPTA, Philadelphia), and Central Puget Sound Regional Transit Authority (Sound Transit, Seattle).

## Objectives

The main objective of the pilot projects is to advance the state of practice for adapting transit systems to the impacts of climate change. Each of the studies sought to identify current and future climate hazards, assess transit system vulnerabilities, and develop adaptation strategies, as appropriate to their geography and their system, in the following primary areas:

- Flooding and extreme precipitation
- Extreme heat
- Sea-level rise
- Tropical storms and hurricanes

## Findings and Conclusions

*The impacts of climate change are expected to increase in the next 20–50 years, and transit system vulnerabilities from these climatic hazards are being addressed in a variety of ways by the pilot study systems.*

This report is a synthesis of the seven climate change adaptation pilot projects' final reports:

- An Integrated Approach to Climate Adaptation at the Chicago Transit Authority (CTA)
- A Vulnerability and Risk Assessment of SEPTA's Regional Rail
- Gulf Coast Climate Change Adaptation Pilot Study
- LACMTA Climate Change Adaptation Pilot Project Report
- San Francisco Bay Area Rapid Transit District (BART) Climate Change Adaptation Assessment Pilot
- Sound Transit Climate Risk Reduction Project
- Transit Climate Change Adaptation Assessment/Asset Management Pilot for the Metropolitan Atlanta Rapid Transit Authority (MARTA)

Evident in the pilot study analyses are that the impacts of flooding and extreme precipitation (of varying forms), heat-related effects, rising sea levels, and an increase in tropical storms and hurricanes are expected to grow in the 20- to 50-year time horizon. System vulnerabilities from these climatic hazards are generally similar for each of the studied areas and include suspension of and delays in service and damage to infrastructure (rail, buses, equipment, right-of-way, and facilities). Among the adaptation strategies identified are:

- Developing disaster operations plans
- Proactively designing new facilities and infrastructure and reassessing existing facilities
- Working with local public works departments
- Proactively inspecting and maintaining assets
- Adding backup power/generator capacity
- Relocating critical assets prior to damage or impact
- Upgrading cooling systems
- Improving storm drain capacity
- Communicating plans and information with the public and stakeholders
- Documenting and sharing institutional knowledge
- Integrating the adaptation and analysis solutions identified into current management practices.

## Benefits

As a result of these pilot studies, transit agencies can be in a better position to understand and prepare for climate change effects while providing cost-effective service to their customers over the life of their assets. These pilot projects provide a positive step towards accounting for and integrating climate affects into regular transit agency practices.

### Project Information

#### FTA Report No. 0069

This synthesis report was written by Brian Alberts, Mazhar Ali Awan, and Kimberly Gayle of the FTA Office of Budget. For more information, contact Kimberly Gayle, Director, FTA Office of Policy Review and Development, at (202) 366-1429, [kimberly.gayle@dot.gov](mailto:kimberly.gayle@dot.gov). All FTA research reports can be found at [www.fta.dot.gov/research](http://www.fta.dot.gov/research).