

Connecticut's Statewide Long-Range Transportation Plan 2018-2050



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ACRONYMS

ADA – Americans with Disabilities Act

AV – Autonomous Vehicles

BAB – Build America Bonds. The American Recovery and Reinvestment Act of 2009 created the new Build America Bond program. This new program is intended to assist state and local governments in financing capital projects at lower borrowing costs and to stimulate the economy and create jobs.

BRT – Bus Rapid Transit

C&D – Conservation and Development

CAA – Connecticut Airport Authority

CBPAB – Connecticut Bicycle and Pedestrian Advisory Board

CCCAP – Connecticut Climate Change Action Plan

CES – Comprehensive Energy Strategy

CGS – Connecticut General Statutes

CMAQ – Congestion Mitigation and Air Quality Improvement Program

COG – Council of Government

CORE-CT – Connecticut State government's integrated human resources, payroll, and financial system

CSS – Context Sensitive Solutions

CTDOT – Connecticut Department of Transportation

CV – Connected Vehicles

DAS – Department of Administrative Services

DEEP – Connecticut Department of Energy and Environmental Protection

DMV – Department of Motor Vehicles

DOT – Department of Transportation

EDS – Economic Development Strategy

EPA – United States Environmental Protection Agency

ER – Emergency Relief

FAQ – Frequently Asked Questions

FAST Act – Fixing America’s Surface Transportation Act

FFY – Federal Fiscal Year

FHWA – Federal Highway Administration

FIRE – Finance, Insurance, and Real Estate

FTA – Federal Transit Administration

GHG – Greenhouse Gases

GO – General Obligation

GPS – Global Positioning System

HSIP – Highway Safety Improvement Program

HTF – Highway Trust Fund. *A dedicated federal transportation fund which receives money from a per-gallon federal fuel tax on gasoline and diesel fuel.*

ITS – Intelligent Transportation Systems

JFK – John. F Kennedy International Airport

LOTCHIP – Local Transportation Capital Improvement Program. *A program of CTDOT that provides State funds to urbanized area municipal governments in lieu of Federal funds otherwise available through Federal transportation legislation.*

MAP-21 – Moving Ahead for Progress in the 21st Century Act

MPO – Metropolitan Planning Organization

MTP – Metropolitan Transportation Plan

MVR – Motor Vehicle Receipts

NECR – New England Central Railroad

NHL – New Haven Line

NHPP – National Highway Performance Program

OE – Other Expenses

OPM – Connecticut Office of Policy and Management

OSC – Office of the State Comptroller

P&W – Providence and Worcester Railroad

PS – Professional Services

PTC – Positive Train Control

RPO – Regional Planning Organization

SBC – State Bond Commission

SHSP – Strategic Highway Safety Plan

SLE – Shore Line East

SRTS – Safe Routes to School

STBGP – Surface Transportation Block Grant Program

STCC – Standard Transportation Commodity Code

STEAM – Science, Technology, Engineering, Arts, and Mathematics

STF – Special Transportation Fund

STIP – Statewide Transportation Improvement Program

STO – Special Tax Obligation bonds. The main source of state funding for the CTDOT's capital program to fund new and ongoing transportation infrastructure improvements.

TAM – Transportation Asset Management

TIP – Transportation Improvement Program

TOD – Transit-Oriented Development

TPM – Transportation Performance Management

TAMP – Transportation Asset Management Plan

TTI – The Texas Transportation Institute

USDOT – United States Department of Transportation

VMT – Vehicle Miles Traveled

ZEV – Zero-Emission Vehicles

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1. INTRODUCTION

The State of Connecticut has a great diversity of transportation assets that connect its varied places—from vibrant, storied cities to thriving, historic towns and iconic New England villages. These assets include more than 21,000 lane miles and over 5,000 bridges that parallel scenic coastlines, traverse bustling river valleys, and wind their way through green hills and farmlands.

As the gateway to New England, this highway network carries more than 31 billion vehicle trips per year. Connecticut’s transportation system also includes some of the busiest commuter rail lines in the nation, including three major commuter rail lines with 37 rail stations, and bus networks that produce more than 40 million bus trips each year. The state also boasts strategically located deep water ports and a modernized international airport.

This robust transportation network not only connects densely populated urban centers within Connecticut, but also connects the state to the economic centers of New York City and Boston, and to markets around the globe. Nearly every resident, visitor, business, industry, and institution in the state is dependent upon this complex and interconnected system of roads, rail lines, airports, ports, and transit for daily needs.

But Connecticut is at a critical crossroad. As the state now positions itself to capture talent and businesses in the emerging knowledge-based and digital economies, it is also striving to create a transportation system that works for everyone, from the bike commuter in downtown Hartford, to the long-distance truck driver on I-395 in Putnam, to the inner-city transit user in Bridgeport. For the state to maintain its prominent status in education, commerce, and industry—and as a desirable place to live and raise a family—the transportation system must support our urban and rural communities and better connect people and services to neighboring states, to regional economies, and to the global marketplace. This requires a multimodal system that is safe, reliable, modern, and efficient.

While the state is innovating and competing for business and talent, we face the challenge of reconstructing our aging infrastructure, which suffers from years of deferred maintenance and underinvestment. These realities are exacerbated by the economic and social impacts caused by significant traffic congestion, an aging population with potentially reduced mobility choices, and diminishing sources of revenue.

The Connecticut Department of Transportation (CTDOT, or “the Department”)—which operates and maintains much of the state’s transportation infrastructure—is facing these challenges by working to create a state transportation system that is safe and efficient for today’s needs, as well as by planning ahead to 2050. The Department created this Long-Range Transportation Plan (Plan) as a framework for near- and long-term decision-making. To develop this Plan, we reached out to our public- and private-sector partners and communities throughout the state regarding what our system needs to accomplish in the years ahead. We also conducted a comprehensive assessment of our transportation system’s condition and performance through in-depth analyses of our transportation financial future. Out of these discussions and analyses, the Department developed policies and implementation strategies that will guide the state and its partner agencies toward meeting common goals and objectives.

The vision requires improvements to all modes—highways and bridges, rail, bus, airports, ports, urban systems, and regional trails. Businesses, shippers, and industries that rely on efficient and reliable movements of their products demand that the system perform at a high level and with minimal delay. The motorists, transit riders, pedestrians, and bicyclists who travel within our communities expect and deserve a highly accessible and safe system, augmented with accurate and timely information. The system we build also must be flexible enough to adapt and evolve with the automated technologies that we know are coming.

Over time, the Department will continue to improve our business practices, explore options for more sustainable funding, implement environmentally and community-friendly practices, and prepare our organization to address the transportation needs of the future. We will also continue to reach out and engage our partners and the public throughout the implementation of this Plan. Working together, we can maintain and improve a transportation system that Connecticut needs and deserves.

1.1 Developing the Statewide Long-Range Transportation Plan

State departments of transportation (DOT) are required to prepare long-range transportation plans pursuant to federal law (23 USC 135). This Plan is compliant with that section and is an update of 2009 Strategic Long-Range Transportation Plan 2009-2035. The development of this Plan was initiated as TransformCT and later “Let’s Go CT!.” TransformCT was launched in 2014 and rebranded as *Let’s Go CT!* in 2015. Both initiatives are part of the planning process that developed this long-range transportation plan. This Plan utilized the most extensive outreach campaign that the Department has ever undertaken. It included public meetings, stakeholder focus group meetings, and interviews to develop a long-range vision for the next 30 years. By incorporating the public outreach process, this Plan supports a vision of a transportation system that fosters economic development; is safe, efficient, and resilient; and provides multimodal options.

The Plan fully embraces a performance based approach to investing in transportation infrastructure by identifying performance measures to be tracked or monitored and by using the best practices of asset management. The planning process for the preparation of this Plan began in 2014. Data points and references to meetings, documents, and materials span a 4-year period, 2013-2017. The Plan is not financially constrained and is not intended to be prescriptive in the way it is effectuated through policy. Rather, it presents policy recommendations to achieve a common vision developed with stakeholders, businesses, and other federal and state partners. Because the planning horizon used for state transportation plans is long-range—and funding, revenue, and political leadership vary greatly over the planning period—assumptions and a certain amount of judgment have been applied to assess the effects of current trends, forecasts, and technology over the next 20-30 years. To illustrate this point, as this Plan is being written, the state is facing a transportation funding crisis with ramifications for the Special Transportation Fund (STF) that are unprecedented in the state’s history.

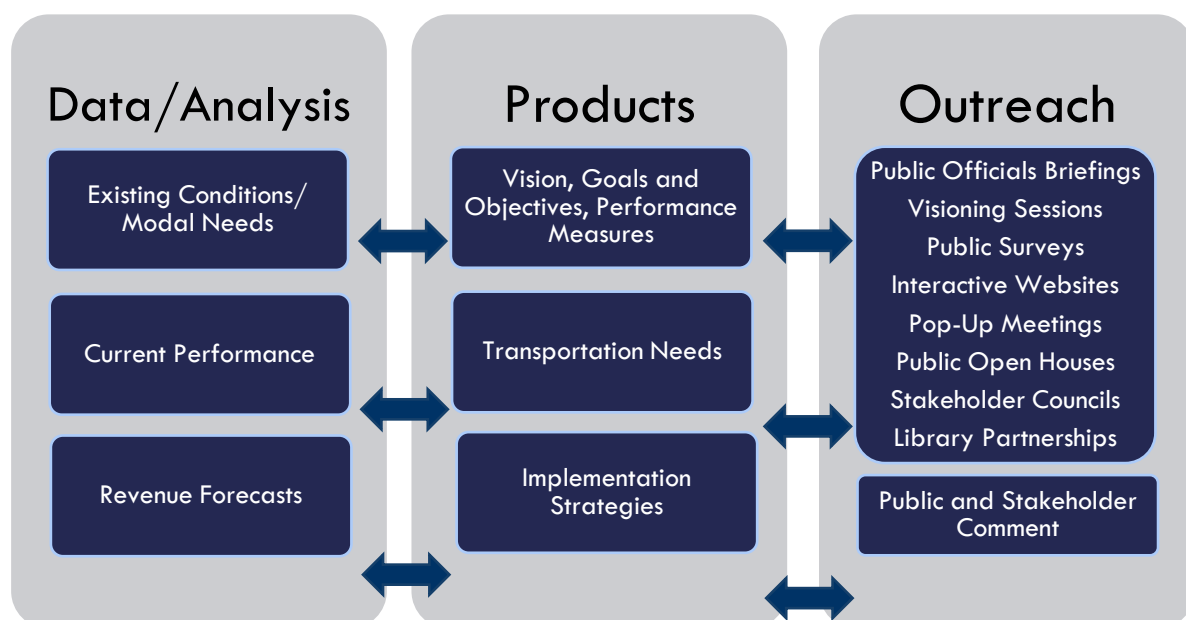
In accordance with the most recent federal transportation authorization act, Fixing America’s Surface Transportation Act (FAST Act) (Pub. L. No. 114-94), state transportation plans must look ahead at least 20 years and incorporate technical analyses and policy reviews, be conducted using extensive public outreach, and consider the following:

- **Legal and Regulatory Requirements** — Federal law mandates that each state maintain an up-to-date, 20+ year transportation plan that considers eight key planning process factors and serves as the primary mechanism for performance and outcome-driven policy making and cooperative transportation decision-making.

- **Strategic Direction** — The Plan reflects a consensus about what the transportation system should achieve in the years ahead. The Plan’s vision, goals, and objectives reflect that consensus, as articulated by Connecticut’s residents and transportation stakeholders.
- **Existing System Review** — The Plan assesses the composition, condition, and performance of the state’s transportation system. It is based on data, analysis, and hundreds of encounters with everyday transportation users, as well as expert stakeholders from public agencies and the private sector.
- **Needs Analysis** — Starting from the strategic direction and existing conditions assessment, the Plan forecasts future maintenance, preservation, modernization, and expansion needs for state highways and bridges, freight and passenger rail, ports and waterways, aviation, trucking, public transportation, and non-motorized transportation.
- **Public and Partner Outreach** —The Plan documents and describes how public involvement incorporates input from public agencies, key modal stakeholders, and the public.
- **Funding Transportation in Connecticut** — The Plan describes the sources and uses of funding to pay for transportation and presents options for the state’s transportation funding future.
- **Recommendation Development** — The Plan identifies investments and implementation strategies to improve transportation.

Figure 1.1 displays the Plan’s development process, which consists of three overlapping development processes. The *Data and Analysis* process involved reviewing and assessing information about the condition, extent, and performance of the transportation system, and about factors that influence demand. An extensive *Outreach* process provided opinions, observations, and preferences of thousands of residents and stakeholders and helped the team understand what individuals and businesses who use the transportation system every day need to improve their mobility. The *Products* of this Plan—including goals and objectives, findings, and strategies—emerged from the synthesis of the analysis and public outreach processes and are founded on both empirical data and insights into the needs and desires of the public.

Figure 1.1: Long-Range Transportation Plan Development Process



1.1.1 Report Organization

The Plan is organized into the following chapters:

- **Chapter 1** introduces the Plan, presents the purpose and **development** of the Plan, and describes how the report is organized.
- **Chapter 2** summarizes why investing in transportation is important.
- **Chapter 3** identifies the shared vision for the plan, as well as the goals and objectives.
- **Chapter 4** describes the network of related and mutually supporting transportation planning efforts around the state.
- **Chapter 5** describes the public involvement process that informed the Plan.
- **Chapter 6** summarizes the existing conditions of all modes, as well as current and emerging trends that will shape transportation.
- **Chapter 7** describes transportation needs and critical investments.
- **Chapter 8** describes the financial plan, including how transportation is funded.
- **Chapter 9** presents the next steps after the completion of the Plan.
- **Chapter 10** presents the Department's existing and potential new performance measures in accordance with *Moving Ahead for Progress in the 21st Century (MAP-21)* and the FAST Act.

1.2 Plan Highlights

32-year Horizon Plan

- The Plan identifies funding needs and policies to accomplish ambitious goals and objectives over a 2018-2050 time horizon.

Multimodal

- The Plan covers all modes including highways and bridges, freight and passenger rail, ports and waterways, aviation, trucking, public transportation, and non-motorized transportation.

\$100 Billion in Needs

- The Plan identifies roughly \$100 billion in transportation needs for all modes, with a heavy emphasis on preservation of the existing system.

FAST Act Compliant

- The Plan is federally compliant (FAST Act), incorporating federal guidance in statewide planning process factors.

CTDOT Initiatives

- The Plan recognizes and furthers the Department's performance management initiatives.

1.3 Summary

The Plan recognizes that Connecticut has a pivotal role in the world's largest economy. Connecticut's exceptional academic, entrepreneurial, industrial, and commercial workforces and strategic location on the Eastern seaboard between two of America's largest cities positions the state to capitalize on an ever-changing and increasingly competitive global marketplace.

A safe and well-connected transportation system is a fundamental need for Connecticut's residents and businesses. This Plan provides recommendations for improving and maintaining this system. It requires the joining together of our urban cores, suburban communities, and rural areas into a single system that incorporates and maximizes all modes to enable economic growth and improve personal mobility.

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2. WHY INVEST IN TRANSPORTATION?

2.1 Introduction

Transportation provides for the movement of people and goods and directly affects the state's economic health and the residents' quality of life. The state's transportation system also significantly influences economic activity and patterns of growth. By providing access to land uses, transportation affects safety, security, air quality, environmental resources, urban growth, and economic development, the transportation system also plays a major role in people's choices about where they live and work.

Understanding how Connecticut's cities, towns, and neighborhoods function—both now and in the future—and the degree to which the state's transportation systems are integral to the function of its communities—is at the core of the Plan. Nearly everything residents wear, eat, and use every day arrives via the state's transportation system. Strengthening and improving this system will lead to greater long-term economic productivity and international competitiveness and help improve the state's fiscal health.

This big picture view of transportation is particularly important at this critical juncture in the history of the state's modern transportation system. Fifty to 60 years after much of it was first constructed, and after periods of under-investment, Connecticut's transportation infrastructure needs significant improvements, and in some cases, reconstruction or replacement, to bring the system to a state of good repair, mitigate congestion, and take advantage of the latest technologies for design, traffic management, and infrastructure management. This is true for all aspects of the state's transportation infrastructure: highway systems, rail and freight, bicycle/pedestrian, air, maritime, and public bus systems.¹

Currently, 41 percent of all state and local roads are considered to be in poor condition. Within Connecticut's highway network, 32 percent of roadway bridges are safe but functionally obsolete or structurally deficient. Connecticut's commuter rail network is even older than the state's highway network and requires continual repairs to remain operational. Four movable bridges on the New Haven Line, the nation's busiest passenger commuter rail line, are over 100 years old, frequently causing disruptions in the busy Northeast Corridor. Seventy-eight percent of Connecticut's rail bridges are rated below good condition, with 22 percent of commuter rail bridges in poor condition.²

The state's bus systems are aging and are constantly challenged to respond to current demands. They are in need of technological enhancements to improve the convenience of transfers and payments and to provide better information to travelers. Bus options for travel between Connecticut's cities are limited; this increases travel costs and increases the inconvenience of travel.

Perhaps most important, a lack of investment has resulted in significant traffic congestion on the highways and delays and travel disruptions across the state's rail system, creating daily bottlenecks on Connecticut's most traveled corridors, leading to increased air emissions and costing the state's citizens and businesses

¹ "Transportation Finance Panel, Final Report," presented to Governor Dannel P. Malloy, State of Connecticut. January 15, 2016.

² *Ibid.*

wasted time, money, and aggravation. The problems associated with underinvesting in transportation have reached a dimension that is now affecting the well-being of the state's economy.³

2.2 Outcome of Investing Prudently

Investing prudently in transportation can produce positive outcomes for residents and businesses.

2.2.1 Less Road Congestion

A well-connected transportation network means faster, more reliable travel times for both people and goods. Time spent in traffic not only wastes fuel, resulting in higher out of pocket costs for businesses and households, but also wastes time that could be spent engaged in more productive activities. The Texas Transportation Institute (TTI) estimates that the average Connecticut commuter lost 42 hours in 2015 stuck in traffic.⁴ Particular areas across the state face considerably higher lost time. In total, TRIP, a national transportation research group, estimates that deficient and severely congested roads and bridges are costing Connecticut's drivers \$5.1 billion annually: \$1.6 billion in additional vehicle operating costs, \$2.3 billion in congestion-related delays, and \$1.2 billion in insufficient safety features that lead to serious traffic accidents and further delays.⁵ Well-maintained roads, coupled with access to public transportation and other driving alternatives, can lower traffic congestion and accident rates, which not only save time and money but also save lives.⁶

2.2.2 More Reliable Freight Shipments

Businesses prize predictability for managing costs and deploying resources because unreliable travel times due to increased congestion increases their costs. When shipping becomes more unpredictable and takes longer, businesses must re-orient their supply chains, hold more inventories, or build more distribution centers. The trucking industry is particularly hard hit by congestion; the Federal Highway Administration (FHWA) calculates that highway bottlenecks cause more than 243 million hours of delay each year, at a cost of \$7.8 billion annually.⁷

2.2.3 Higher Land Values and Local Economic Development

Infrastructure investment can also raise property values, particularly if these investments bring about improvements in local living standards, such as shorter commute times and greater proximity to amenities. For example, research suggests that proximity to public transit raises the value of residential and commercial real estate.⁸ This land value premium is contributing to the success of transit-oriented development (TOD) across the country, where property owners, private investors, and developers construct new or refurbished mixed-use development adjacent to transit terminals.

2.2.4 Immediate Job Creation

While the most important economic impact of the right types of infrastructure investment comes from long term competitiveness, productivity, innovation, lower prices, and higher incomes, infrastructure investment also creates many thousands of jobs, in the near-term, that are directly linked to the Connecticut economy.

³ Ibid.

⁴ Schrank, David et al, "2015 Urban Mobility Scorecard," The Texas A&M Transportation Institute and INRIX, August 2015. www.mobility.tamu.edu

⁵ TRIP, a national transportation research group, "Bumpy Roads Ahead: America's Roughest Rides and Strategies to Make our Roads Smoother," July 2015. www.tripnet.org

⁶ National Economic Council and the President's Council of Economic Advisers, "An Economic Analysis of Transportation Infrastructure Investment," July 2014. Pg. 5. www.whitehouse.gov/sites/default/files/docs/economic_analysis_of_transportation_investments.pdf

⁷ White, K. and Grenzeback, L.R., "Understanding Freight Bottlenecks," Public Roads 70(5) (March/April 2007). www.fhwa.dot.gov/publications/publicroads/07mar/05.cfm

⁸ Ibid, Pg. 6.

These jobs span across a wide variety of activities, including construction (road, bridge, and transportation facilities); sales and manufacturing of construction equipment; sales of gasoline or diesel to run the machines; production of cement, gravel, and asphalt; transit vehicle manufacturing; and various professional services (surveyors, engineers, architects, site managers, and accountants).⁹

2.2.5 Lower Household Costs

Residents spend between 16 and 19 percent of their household incomes every year just to get around. For the average family, transportation expenditures rank second only to housing expenditures.¹⁰ Investing in transportation and providing more high-quality transportation choices, such as improved bus and rail transit and connected bicycle and walking routes, provides Connecticut families with options that save time and money, so that they can use more of their income for other purposes and spend more time with their families, rather than spending time in traffic.

Public investments that lower the cost of transportation could have a meaningful impact on families' budgets, particularly for middle class and lower income families, where transportation expenditures absorb a considerably higher percentage of their income than families whose household income is above the median. Reducing fuel consumption, decreasing the need for car maintenance due to poor road conditions, and increasing the availability of affordable and accessible public transportation systems would allow residents to spend less money on transportation.¹¹

2.2.6 Lower Vehicle Operating and Maintenance Costs

Improving Connecticut's transportation system can save families money by reducing the costs associated with congestion and the additional wear and tear caused by poor road conditions. TRIP, a national transportation organization, notes that deteriorated roads accelerate the depreciation of vehicles and the need for repairs. Similarly, tire wear and fuel consumption increase as roads deteriorate due to additional friction between the road and the tires.¹² TRIP estimates that deficient and severely congested roads and bridges are costing Connecticut's drivers \$1.6 billion annually and that nationally, the average motorist pays \$377 each year in additional vehicle operating costs as a result of driving on roads in need of repair.¹³

2.2.7 Improved Health and Safety

The stop-and-go traffic associated with road congestion results in a higher incidence of vehicle collisions and increased levels of harmful emissions from motor vehicles. According to the U.S. Environmental Protection Agency (EPA), transportation accounts for one-third of all carbon dioxide and other greenhouse gas (GHG) emissions from fossil fuel combustion. These emissions are particularly harmful to the health of children and the elderly (especially those living in urban areas) and contribute to climate change. But the impact of the transportation system on the health of residents also extends beyond traffic crashes and air quality to quality of life. This is because traffic congestion can increase stress and time spent in traffic can mean less time for healthy activities, such as physical exercise.¹⁴

⁹ National Economic Council and the President's Council of Economic Advisers, "An Economic Analysis of Transportation Infrastructure Investment." July 2014. Pg. 5.

¹⁰ Bureau of Labor Statistics, Consumer Expenditure Report, August 2017.

¹¹ National Economic Council and the President's Council of Economic Advisers, "An Economic Analysis of Transportation Infrastructure Investment." July 2014, pg. 13.

¹² *Ibid*, pg. 14

¹³ TRIP, a national transportation research group, "Bumpy Roads Ahead: America's Roughest Rides and Strategies to Make our Roads Smoother," July 2015. www.tripnet.org

¹⁴ National Economic Council and the President's Council of Economic Advisers, "An Economic Analysis of Transportation Infrastructure Investment," July 2014. Pg. 15.

2.2.8 Economic Growth and Jobs

A well-functioning transportation system produces direct and indirect benefits that ripple throughout the economy. Shorter and more reliable travel times and improved connectivity help attract and retain jobs in Connecticut and allow businesses to expand. Connecticut families benefit as consumers from lower priced goods and as workers, by gaining better access to jobs. Investments produce both the short-term benefits associated with the construction of transportation systems (jobs) and the longer-term benefits of improved competitiveness and productivity, lower prices, and higher incomes.

2.3 Conclusion

It is clear that under-funding Connecticut's transportation network will result in lost opportunities with direct and indirect cost impacts to citizens, but there is a larger problem. An unreliable system can drive both business and economic investment from the state, ultimately threatening both employment and income in the future. These costs, then, affect, not only individual drivers, but also Connecticut's businesses and the overall economy. Rather than serving as a conduit to help facilitate commerce, the state's transportation infrastructure will become an unacceptable constraint on Connecticut's economic potential.¹⁵

If the state fails to rise to these challenges, citizens can expect a pattern of stagnation—deteriorating highways and bridges, ever greater congestion and lost work time, insufficient rail service that fails to address the growing congestion, disconnected bus systems, and constant emergency “band aid” fixes to try to keep a declining system operating. The costs of doing nothing far outweigh the costs of a sufficient level of investment.¹⁶

Addressing these challenges statewide—in a comprehensive, coordinated, and incremental manner—will promote better transportation options and access for travelers. It will also promote economic growth by reducing costs on current businesses and creating a positive environment for new businesses to locate in Connecticut.

¹⁵ “Transportation Finance Panel, Final Report,” presented to Governor Dannel P. Malloy, State of Connecticut. January 15, 2016.

¹⁶ *Ibid.*



3. A SHARED VISION

The 2018-2050 Long-Range Transportation Plan identifies how transportation partners and stakeholders can focus transportation investments towards a prosperous and growing future.

A foundational element of the Plan is its need for input and feedback from a broad spectrum of partners, stakeholders, and citizens. Through numerous outreach meetings, visioning workshops, forums, on-line engagements, and interviews, many voices have spoken on the critical issues, challenges, and opportunities that Connecticut must address to ensure that transportation continues to support the livelihoods and improve the quality of life of all citizens. The Plan development team has heard about residents' desires for economic prosperity and for more livable and sustainable communities, as well as about the value of Connecticut's natural and built environments.

Out of these conversations, value statements that describe how the state's transportation system should function and what it should be able to accomplish for the state's residents and businesses have emerged. These value statements have been translated into the Strategic Plan's Vision, Goals, and Objectives:

- **Vision:** The Plan's vision is a forward-thinking statement of the ideal Connecticut that businesses, commuters, and citizens desire. It answers the question "what are we trying to achieve?" but it is not intended to answer, "how will we achieve it"?
- **Goals:** The Plan's goals build on the vision statement and address broad, long-term needs for the transportation system in areas of critical importance, such as safety, preservation, mobility, livable and sustainable communities, environmental protection, and economic vitality. The goals are not simply reactions to past trends but are intended to provide guidance as the state continually addresses new challenges.
- **Objectives:** The Plan's objectives describe more specific actions that the Department can take to achieve the broader goals and vision statements. The degree to which these objectives have been achieved and the steps taken to achieve them can be reviewed and communicated on a regular basis, following the Plan's adoption.
- **Performance Measures:** The objectives are measurable and will initially be used to provide a basis for assessing plan implementation. Objectives will also be used in the formulation of performance measures that indicate how progress is being made toward a goal. In effect, performance measures "operationalize" the objectives and define how, when, and where objectives will be measured, monitored, and reported.

The Plan's vision, goals, and objectives represent **guiding principles** that will inform its strategic planning framework and decision-making process and ultimately guide its implementation:

3.1 The Long-Range Transportation Plan Vision

- The **economy is strong** because improved and sustained multimodal and intermodal transportation contribute to an environment in which businesses and people thrive.
- **Travel is safe** and high safety standards are sustained on all modes of transport.
- Transportation infrastructure is in a state of good repair.
- Transportation services provide **efficient mobility** for people and goods, both within and beyond state borders.
- Congestion is managed.
- The natural **environment** is protected, **air quality** is good, and **energy** is conserved.
- Urban, suburban, and rural centers are transformed into **livable communities** that provide opportunities for walking and bicycling and are enhanced by accessible transportation systems.

3.2 Plan Goals and Objectives

The goals of the Plan are organized under four categories:

- A. Economic
- B. Deliverability
- C. Quality of Life
- D. Livability and Resilience

These four categories provide structure to the goals and capture the critical ideas set forth in the vision statement.

The Plan's objectives are tightly bound to goals and link the more conceptual elements of a long-range plan to programs and project implementation. They define the specific actions that the Department needs to undertake to achieve each goal. Each goal can have multiple, associated objectives.

The following goals and objectives describe general actions that the Department can take to achieve citizen's broad vision for transportation.

A. Economic

Goal A.1 Economic growth with efficient and effective transportation for people and goods.

Objectives:

- Manage travel to reduce traffic congestion and improve reliability.
- Support development of a robust, integrated multimodal passenger transportation system.
- Support improved airport facilities for both passenger and air cargo.
- Support innovation and emerging technologies in the transportation industry.

Goal A.2 Connectivity to national and global markets to make Connecticut more competitive.

Objectives:

- Enhance connections to New York City and Boston to improve business travel and attract new employers.

- Improve connectivity between regional centers in Connecticut.
- Improve intermodal connectivity for people.

Goal A.3 Infrastructure in a state of good repair to improve reliability and reduce costs to users.

Objectives:

- Restore and maintain Connecticut's multimodal transportation system in a state of good repair.

Goal A.4 Reduced business costs through improved goods movement.

Objectives:

- Improve truck freight travel times/travel time reliability.
- Increase rail freight capacity.
- Restore the viability of waterways and ports for freight movement.
- Support better connections among all freight modes.
- Improve freight connectivity to national and global markets.

Goal A.5 Revitalized urban centers with enhanced transportation options.

Objectives:

- Focus transportation investments in existing population and employment centers.
- Make more efficient and effective use of existing infrastructure.

B. Deliverability

Goal B.1 Delivery of projects and services **more quickly**, cost-effectively, and with greater customer satisfaction.

Objectives:

- Streamline administrative processes (agreements, procurements, etc.), reduce the time and cost of project delivery, and increase the local use of state construction funds.
- Continuity of staff skill-base achieves and maintains a high level of technical proficiency, creativity, and capacity.
- State-of-the-art financial management and project reporting systems.
- Reduce the time and cost of project delivery through new design and construction methods (accelerated bridge construction, design-build, etc.).
- Reduce infrastructure life-cycle costs with prudent asset management practices, including more timely and effective treatments.
- Ensure that staff have the skills and work in an organizational structure to address the travel needs of the future.
- Utilize public-private partnerships as effective support for the Department.

Goal B.2 Improved communications and responsiveness with system users, residents, and businesses.

- Continue to strengthen public outreach and involvement activities to enable the full range of stakeholders and the public to provide input on key decisions.

Goal B.3 Foster collaboration and improve program delivery through **strong partnerships** with state and federal agencies and local governments.

Objectives:

- Improve partnerships with local governments to seek long-term transportation solutions.
- Improve partnerships with other transportation services, such as Metro North and Amtrak.
- Improve partnerships with neighboring states.

C. Quality of Life

Goal C.1 Safe and **secure** travel for people and goods for all modes.

Objectives:

- Significantly reduce travel related fatalities and injuries, crashes, and derailments.
- Reduce work zone related accidents.

Goal C.2 Mobility and **accessibility for all users**, particularly (the aging population) and people who can't drive or have limited access to autos.

Objectives:

- Develop a transportation system that recognizes and accommodates the changing socioeconomic diversity of the state.
- Expand transit systems to improve access to jobs, reduce household transportation costs, and decrease traffic congestion.
- Improve the effectiveness of all transportation modes and facilities to allow for “aging in place” populations.

Goal C.3 Convenient and **reliable** travel choices.

Objectives:

- Improve travel choice where it is most cost-effective to do so.
- Increase communication to users in system interruptions, both planned and unplanned.
- Utilize emerging technology across all modes to provide users with real-time information on system performance.

Goal C.4 Integrated transportation and **land use** for more travel options to connect people and places.

Objectives:

- Facilitate TOD that concentrates mixed-uses around transportation nodes and along major transportation corridors.
- Encourage policies that support quality housing at a broad range of prices, especially workforce housing accessible to transit.
- Make public transportation cheaper and faster than single occupant vehicles (SOV) for travel to dense, mixed use destinations.

D. Livability and Resilience

Goal D.1 Livable, healthy, and environmentally sustainable communities.

Objectives:

- Provide more walking and bicycling opportunities in community centers.
- Support community efforts to create vibrant, mixed-use neighborhoods that are less highway-centric.
- Coordinate transportation policy with local and state development plans and policies.

Goal D.2 Enhanced bicycling and walking accommodations and opportunities.

Objectives:

- Accommodate demand for pedestrian and bicycle travel.
- Fully integrate the Department's Complete Streets policies into design and programming.
- Establish regular communication between the Department and municipalities for early input on upcoming projects.

Goal D.3 Environmentally friendly transportation that is affordable.

Objectives:

- Develop realistic, affordable alternatives to automobile use that help to reduce resource and energy use and impacts on communities and the environment.
- Support transportation technologies that increase efficiency, reduce congestion, and produce environmental benefits.

Goal D.4 Resilient transportation systems.

Objectives:

- Improve reliability of the transportation by addressing vulnerabilities in the system.
- Integrate 'green' transportation practices into all the Department activities from planning to design and construction to operations.

3.3 Next Steps

The Plan identifies a set of long-range outcomes for transportation in the state. This vision and its goals and objectives are intended to be used to inform investment and service decisions by all agencies responsible for transportation planning, construction, and delivery in Connecticut. The Plan is a continual planning effort and this vision and guiding principles will need to be revisited over time as society, technology, the environment and the economy change. The vision and guiding principles will be reviewed with subsequent updates of the Plan.

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4. A FAMILY OF PLANS

This long-range transportation plan is a multimodal plan with a thematic and broad long-term focus. The Department will utilize the Plan to formulate policy and make investment decisions for different time horizons and on mode specific topics such as pedestrian safety and rail transportation. Additionally, Connecticut state agencies formulate transportation policies to advance desired outcomes in areas such as energy, environment, housing, and economic development.

The planning process included the review of transportation initiatives within the Department that are related to this initiative. The Plan development team also reviewed other agency plans to ensure that the Plan is compatible and consistent with them and considers their relevant recommendations.

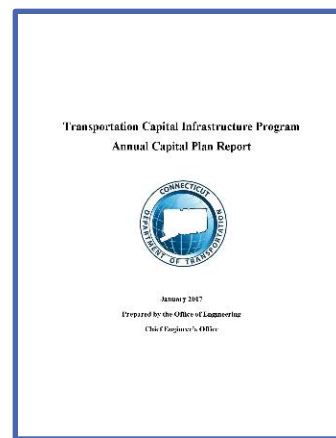
4.1 Related CTDOT Planning Efforts

Transportation Capital Infrastructure Program Annual Capital Plan Report (2017-2021)

Prepared by: Connecticut Department of Transportation

Date: January 2017

Summary: The Department's Capital Program's goal is to "...gather and spend every available dollar of capital funding to rebuild, replace, or improve the state's transportation infrastructure..." to achieve the Department's mission. The Capital Program is developed each year to "...design road, bridge, public transportation and other transportation facilities to acquire the necessary property interests and to construct those projects in a way that uses or leverages all of the available state and federal funding."



The Capital Program is a 5-year capital plan that:

- Reflects the Department's recommended program for allocating all available state and federal capital funding to meet the state's most critical capital needs for the next 5 years.
- Includes lists of projects, by mode and by year, that the Department plans to fund with its state and federal capital funds.
- Is a cooperative effort between the Department's operating bureaus, regional planning agencies, and the Capital Services Division within the Bureau of Finance & Administration to prioritize projects and come up with a plan that utilizes available funds in the most efficient way.
- Accounts for the costs and schedules of planned projects, as well as the eligibility rules of the available funding sources.

The Capital Program is the means of funding phases of projects identified in long-range regional and state transportation plans.

Additional Information: Information regarding the current Capital Plan is located at <http://www.ct.gov/dot/cwp/view.asp?a=1383&Q=454340>

2018 Statewide Transportation Improvement Program

Prepared by: Connecticut Department of Transportation

Date: 2017

Status: The Department has prepared a draft Statewide Transportation Improvement Program (STIP) in accordance with the provisions of Title 23, Section 135 of the United States Code; as amended by the FAST Act. The Department has requested comments on the draft. Comments were due no later than July 31, 2017.

Summary: The STIP lists all highway and public transit projects proposed to be undertaken utilizing FHWA and Federal Transit Administration (FTA) funding. The STIP "...encompasses various projects that the Department intends to pursue during the next four years and covers all towns within the State." The current STIP covers Federal Fiscal Years (FFY) 2018, 2019, 2020, and 2021 and represents the Department's anticipated future year investments. The Department and the Bureau of Policy and Planning, developed the STIP in cooperation with the eight metropolitan planning organizations (MPO) and in consultation with the two rural planning regions.



Since the STIP is multimodal, it includes investments in various modes.

The STIP for FFY 2018-2021 contains 299 projects in 33 federal funding categories. It programs \$3.225 billion in federal funds, which will be matched by \$1.284 billion in state funds and \$61.922 million in local funds, for a total program cost of \$4.570 billion. Of the \$1.284 billion in state funds, \$5.862 million is programmed for public transportation operating assistance. Within the transportation modes, a total of \$3.105 billion (67.40 percent) will be used for highway and bridge capital programs and a total of \$1.502 billion (32.60 percent) will be used for transit (rail, bus, and rideshare) capital and operating costs.

The STIP is the "...means of implementing the goals and objectives identified in Long-Range Regional and State Transportation Plans."

Additional Information: Information regarding the status of the STIP is located at <http://www.ct.gov/dot/cwp/view.asp?a=3529&q=447186>

Connecticut Statewide Freight Plan

Prepared by: Connecticut Department of Transportation

Date: November 2017

Status: The Department's FAST Act Compliant Freight Plan was approved by FHWA in January 2018. Comments were due no later than September 20, 2017.

Summary: The Connecticut Multimodal Freight Plan reviews the state's "...multi-faceted and interconnected freight system and sets a direction for policies, technologies and investments...." The Freight Plan provides an overview of freight transportation and is developed "...in conjunction with Connecticut's long-range transportation plan.

The Freight Plan emphasizes the need to include recommendations that "...encompass policy, infrastructure and technology elements, and address larger, system-wide goals. The Freight Plan details goals, objectives, and performance measures, and "...guides project investments that will enhance the efficiency and effectiveness of the transportation system." **Figure 4.1** illustrates the crosswalk and alignment of the Freight Plan goals with national freight goals and this Plan.



Figure 4.1: Comparing the Freight Plan Goals to the Statewide Transportation Plan

Comparison of National and State Freight and Transportation Goals

	Economic	Safety	Technology/ Operations	System Preservation	Sustain- ability	Delivery
National Freight Goals	Economic Competitiveness & Economic Efficiency	Safety, Security & Resilience	Advanced Technology	State of Good Repair	Reduced Environmental Impacts	Performance, Innovation, Competition & Accountability
CT Statewide Freight Plan Goals	Economic Competitiveness	Safety	Optimized Operations & Mobility	State of Good Repair	Environmental Protection & Conservation	Program & Service Delivery
CT Statewide Transportation Plan Goals	Economic Growth & Efficient Mobility	Safety	Optimized Operations	State of Good Repair	Livability & Resilience	Program & Service Delivery

Source: Connecticut Statewide Freight Plan, 2017

Additional Information: Information regarding the Department Freight Program and the status of the Freight Plan is located at <http://www.ct.gov/dot/cwp/view.asp?a=4719&Q=561266>

Connecticut State Rail Plan (2012-2016)

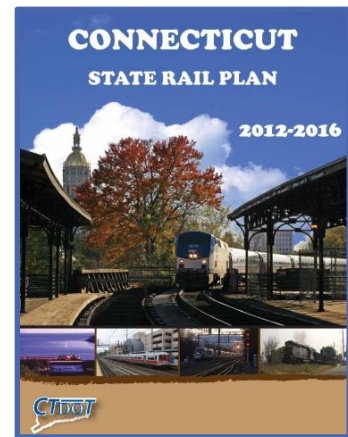
Prepared by: Connecticut Department of Transportation

Date: 2012

Summary: The Connecticut State Rail Plan contains the mission, vision, and values for rail transportation's role in an intermodal network. The Rail Plan provides an overview and inventory of the commuter, intercity, and freight rail system and facilities; the services provided; and the condition and constraints. It aims to support developing "...a growing, interconnected rail system with adjoining states and to advance high-speed, intercity and freight investments in the region." It includes strategies and programs focused on ensuring existing passenger and freight rail infrastructure is maintained in a state of good repair, as well as investments aimed at maximizing rail services.

The Rail Plan outlines a long-range service and investment program utilizing a 20-year planning horizon (2012-2032) that provides the full extent of the state's rail program including costs, strategies, and steps for maintaining and expanding the system. By emphasizing the need to develop goals consistent with the Department's mission statement, vision, and values, the Rail Plan is consistent with this Plan.

Additional Information: Information regarding the Department State Rail Plan is located at <http://www.ct.gov/dot/cwp/view.asp?a=1386&q=437648>



Connecticut Statewide Bicycle & Pedestrian Transportation Plan Update (2017) DRAFT

Prepared by: Connecticut Department of Transportation

Date: July 2017

Status: The development of the 2017 Plan Update occurred over an 18-month period in 2016 and 2017. Funding was provided by FHWA and the Department.

Summary: The purpose of the 2017 Connecticut Bicycle and Pedestrian Transportation Plan Update (2017 Plan Update) is to present recent accomplishments in bicycle and pedestrian planning, as well as the updated vision, goals, action strategies, and implementation options for use in the areas of policies, programs, and infrastructure investments. The 2017 Plan Update was developed to carry out the near- and long-term goals of the state. It was developed through a collaborative effort with stakeholders, the Department, and network users.

The three goals of the 2017 Connecticut Bicycle and Pedestrian Transportation Plan Update are shown in **Figure 4.2**.

Figure 4.2: 2017 Connecticut Bicycle and Pedestrian Transportation Plan Update Goals



Source: Connecticut Statewide Bicycle & Pedestrian Transportation Plan Update (2017) DRAFT

Additional Information: Information regarding the 2017 Connecticut Bicycle and Pedestrian Transportation Plan Update is located at <http://www.ctbikepedplan.org/>

Connecticut’s Strategic Highway Safety Plan (2017-2021)

Prepared by: Connecticut Department of Transportation

Date: July 2017

Summary: Connecticut’s Strategic Highway Safety Plan (SHSP) identifies the vision, mission and goal to provide Connecticut with a safe transportation system, so “...all users will arrive safely at their destinations.” The SHSP emphasizes the need to utilize “...partnerships to coordinate education, enforcement, engineering, and emergency response initiatives.” It includes a review of the current state of safety, challenges to reducing roadway crashes, and a plan of action to overcome these challenges. The SHSP identifies “emphasis areas.” The six emphasis areas of the SHSP are shown in **Figure 4.3**.

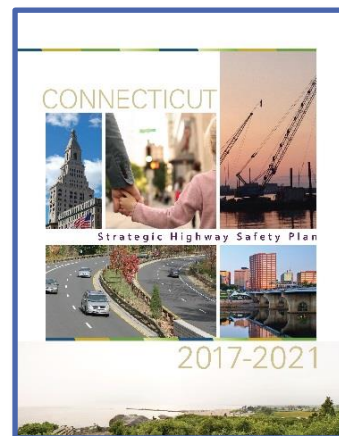
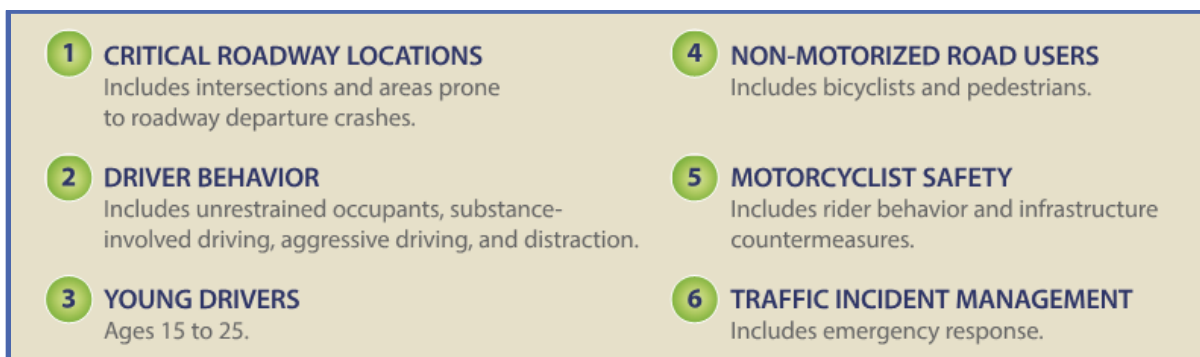


Figure 4.3: Strategic Highway Safety Plan’s Emphasis Areas



Source: Connecticut’s Strategic Highway Safety Plan (SHSP), 2017

By developing emphasis areas, the SHSP details the most pressing safety issues and strategies to reduce crashes and describes Connecticut’s plan to implement the strategies and evaluate the results. The SHSP is consistent with the goals and objectives of providing all the users of Connecticut’s transportation system with a safe and efficient system.

Additional Information: Information regarding the SHSP is located at www.t2center.uconn.edu/shsp.php

Economic Development Strategy

Prepared by: Connecticut Department of Economic and Community Development

Date: 2015

Summary: The Economic Development Strategy (EDS) identifies the vision, mission and objectives to increase Connecticut's economic competitiveness. The EDS "...targeted priority investment areas including healthcare/bioscience, insurance and financial services, advanced manufacturing, digital media, tourism, and green technologies...." To build on the established strengths, invest in growth and emerging sectors, the EDS identifies objectives. The four objective areas of the EDS are shown in **Figure 4.4**.



Figure 4.4: 2015 Economic Development Strategy Objectives

Grow the Business Clusters that Drive Connecticut's Economy and Encourage Entrepreneurial Development

- Retain and grow our existing job base
- Facilitate ecosystems for industries to strengthen, connect, and collaborate
- Support entrepreneurial activities
- Build exports and encourage foreign direct investment
- Promote Connecticut's brand effectively nationally and international

Ensure a Workforce that Meets the Needs of the Future

- Understand the future needs of employers
- With education partners, grow and enrich our talent pool and develop both short and long range initiatives to invest in our institutions around the key STEAM (science, technology, engineering, arts, and mathematics) skills

Create Livable, Vibrant Communities

- Create vibrant neighborhoods through innovation, art, culture, and historic preservation
- Ensure quality housing at a broad range of prices

Invest in Infrastructure and Support Systems that will Foster Business Growth

- Continue to strategically invest in transportation infrastructure
- Work to reduce or offset the cost of energy while reducing greenhouse gas emissions
- Continue efforts to create a more responsive government that reforms the regulatory environment and makes it easier to do business in the state
- Encourage environmentally-friendly, modern, and resilient development

Source: Connecticut's Economic Development Strategy, 2015

After developing the objectives, the plan details the action necessary to address the objectives, responsible agency or partner to serve as the lead agency, and the metrics used to evaluate each objective. To promote Connecticut's economic competitiveness, the Plan is supportive of the goals and objectives of the EDS.

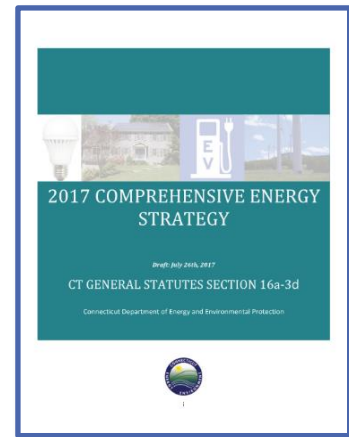
Additional Information: Information regarding the EDS is located at <http://www.ct.gov/ecd/site/default.asp>

Comprehensive Energy Strategy

Prepared by: Connecticut Department of Energy & Environmental Protection (DEEP)

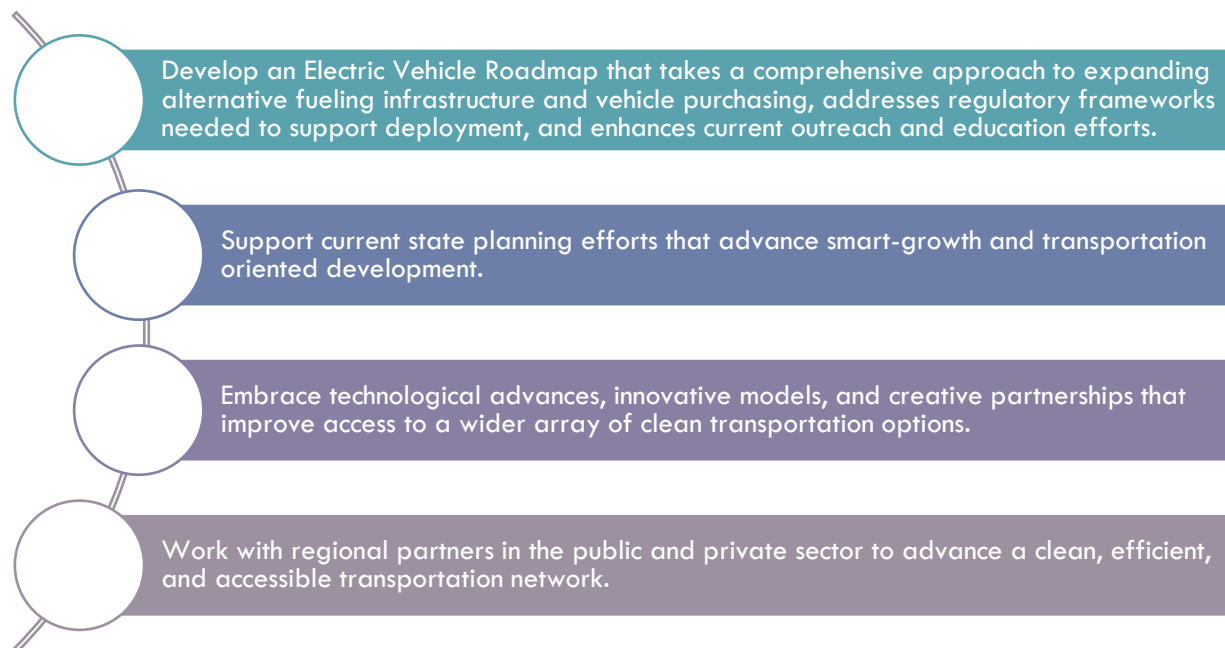
Date: February 2018

Status: In 2012, DEEP developed the first-ever Comprehensive Energy Strategy (CES) for the State of Connecticut—an assessment and strategy for all residential, commercial, and industrial energy issues, including energy efficiency, industry, electricity, natural gas, and transportation. By statute, DEEP is required to periodically update the CES. In 2017, DEEP has prepared an update to the CES and the issuance of the final CES is scheduled for February 2018.



Summary: The goal of the CES is to provide Connecticut with “cheaper, cleaner, and more reliable energy” for residents and businesses. The CES identifies a “...series of goals and strategies that reflect lessons learned and respond to new conditions within the three energy end-use sectors: electricity power, buildings, and transportation. These strategies and goals advance the state’s long-term vision by calling for continued investment in clean energy resources, grid-modernization, increasing energy efficiency in buildings and transportation, and accelerating progress to decarbonize the energy sector.” The strategies developed for the transportation sector support the goal by providing clean and assessable transportation options. The four key transportation sector strategies in the CES are shown in **Figure 4.5** and the identified transportation goals and strategies are shown in **Figure 4.6**.

Figure 4.5: Comprehensive Energy Strategy: Key Transportation Sector Strategies (2017-2020)



Source: *Comprehensive Energy Strategy, DRAFT 2017*

**Figure 4.6: Comprehensive Energy Strategy:
Identified Transportation Goals and Strategies**

Goal 1: Put the State on a strategic pathway to decarbonize the transportation sector	
T.1.1	Develop an Electric Vehicle Roadmap to accelerate the adoption of low and zero-emissions vehicles and strengthen alternative fueling infrastructure.
T.1.2	Advocate for the implementation of federal vehicle fuel economy standards and maintaining LEV, ZEV, and GHG programs.
T.1.3	Educate and engage citizens and employers on the benefits of clean and efficient transportation options.
Goal 2: Facilitate state planning to advance smart-growth, transit-oriented development, and mixed-use planning that leads to energy and emissions reductions.	
T.2.1	Implement Let's Go CT! initiatives and its long-term vision to create a best-in-class transportation system.
T.2.2	Encourage and support smart-growth, transportation-oriented development, mixed-use planning, and development efforts that improve connectivity and accessibility to public transit.
Goal 3: Develop and support strategic partnerships to improve access to a wider array of transportation options	
T.3.1	Embrace technological advances, shared mobility services, and transportation demand partnerships that improve mobility and access to clean modes of transportation.
T.3.2	Participate in regional partnerships and initiatives to advance a clean and efficient transportation network throughout the region.

Source: *Comprehensive Energy Strategy, DRAFT 2017*

According to the CES, the transportation recommendations provide:

“...solutions that go beyond adding roadway capacity to address population growth and economic expansion, but rather, aim to put Connecticut on a clear path to achieve state emission reduction targets, increase connectivity, user flexibility, and equitable access to efficient and clean transportation options, improve resilience to fuel price volatility, enhance economic growth, and create desirable communities.”

By developing principals, goals, and strategies to address these goals, the CES details the transportation sector’s role regarding Connecticut’s energy plan. This plan and the CES are consistent with the goals and objectives of providing cheaper, cleaner and more reliable transportation options.

Additional Information: Information regarding the CES is located at http://www.ct.gov/deep/cwp/view.asp?a=4405&q=500752&deepNav_GID=2121

Conservation & Development Policies: The Plan for Connecticut (2018-2023) (Draft)

Prepared by: Office of Policy and Management (OPM)

Date: May 2017

Status: Connecticut General Statutes (CGS) requires the OPM to revise the State Conservation and Development Plan every 5 years. In summer 2016, OPM began the update and submitted the document to the General Assembly by December 31, 2017.

Summary: Connecticut's Conservation and Development Policies Plan (State C&D Plan) identifies the planning framework; application of the State C&D Plan to state agencies for consistency with new statutory requirements; and adherence to the "cross-acceptance process." This plan emphasizes that it is advisory to municipalities and is "built" around six growth management principals. The six growth management principals of the State C&D Plan are shown in **Figure 4.7**.

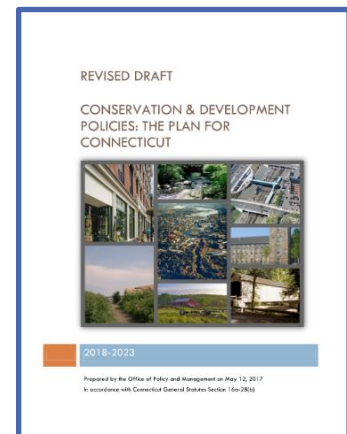


Figure 4.7: Conservation and Development Policies Plan's Growth Management Principles



Source: *Conservation & Development Policies: The Plan for Connecticut (2018-2023), DRAFT 2017*

In addition to the growth management principles, the State Conservation and Development Plan identifies performance indicators and relevant principles of Smart Growth. As with all plans conducted by state agencies, the Plan must be consistent with the six growth management principles in the State C&D Plan.

Additional Information: Information regarding the C&D Plan is located at <http://www.ct.gov/opm/cwp/view.asp?a=2990&Q=587532&PM=1>

Connecticut Airport Authority Strategic Plan

Prepared by: The Connecticut Airport Authority (CAA)

The CAA is a system of six airports, meeting the needs of passengers, businesses, and general aviation. To meet those needs, the CAA provides airside, terminal, and landside infrastructure that allows safe and convenient access for citizens of Connecticut, passengers and users from the surrounding Northeast region, and for visitors coming to the area.

CAA airports have a variety of airside, terminal, and landside infrastructure assets that together reflect years of prudent capital investment and ongoing maintenance by the CAA. Across our system of airports, the airfields remain in good condition. With the forecasted increase in passengers accessing the terminal, parking lots and roadways, the CAA has embarked on an aggressive capital development program to meet future demand and provide the state-of-the-art facilities, amenities, and concession opportunities that today's passengers deserve.¹⁷



4.2 Additional CTDOT Planning Efforts

4.2.1 MPO Long-Range Transportation Plans

In Connecticut, as required by CGS, all regional planning organizations are structured as regional councils of governments (COG).¹⁸ Regional COGs are statutorily created political subdivisions of the state. CGS § 4-124j provides that local communities are authorized to organize a membership and create a “Regional Council of Governments.” Each municipal member of the council is entitled to one representative who casts a single vote (CGS § 4-124k). COGs must adopt by-laws and annually elect a chairman, a secretary, a treasurer, and other officials from among the representatives (CGS § 4-124n). In Connecticut, the regional COGs function as the host agencies for MPOs; COG personnel perform the transportation planning activities for the MPOs and the rural planning regions.

Urbanized areas with populations greater than 50,000 must be represented by an MPO to conduct regional transportation planning and to select projects for federal funds. In nonurbanized areas, this responsibility falls to the Rural Planning Organizations (RPO). While the Department has the primary role of administering the expenditure of these federal funds, all federally funded transportation projects must be approved by the MPOs and reviewed by the RPOs.

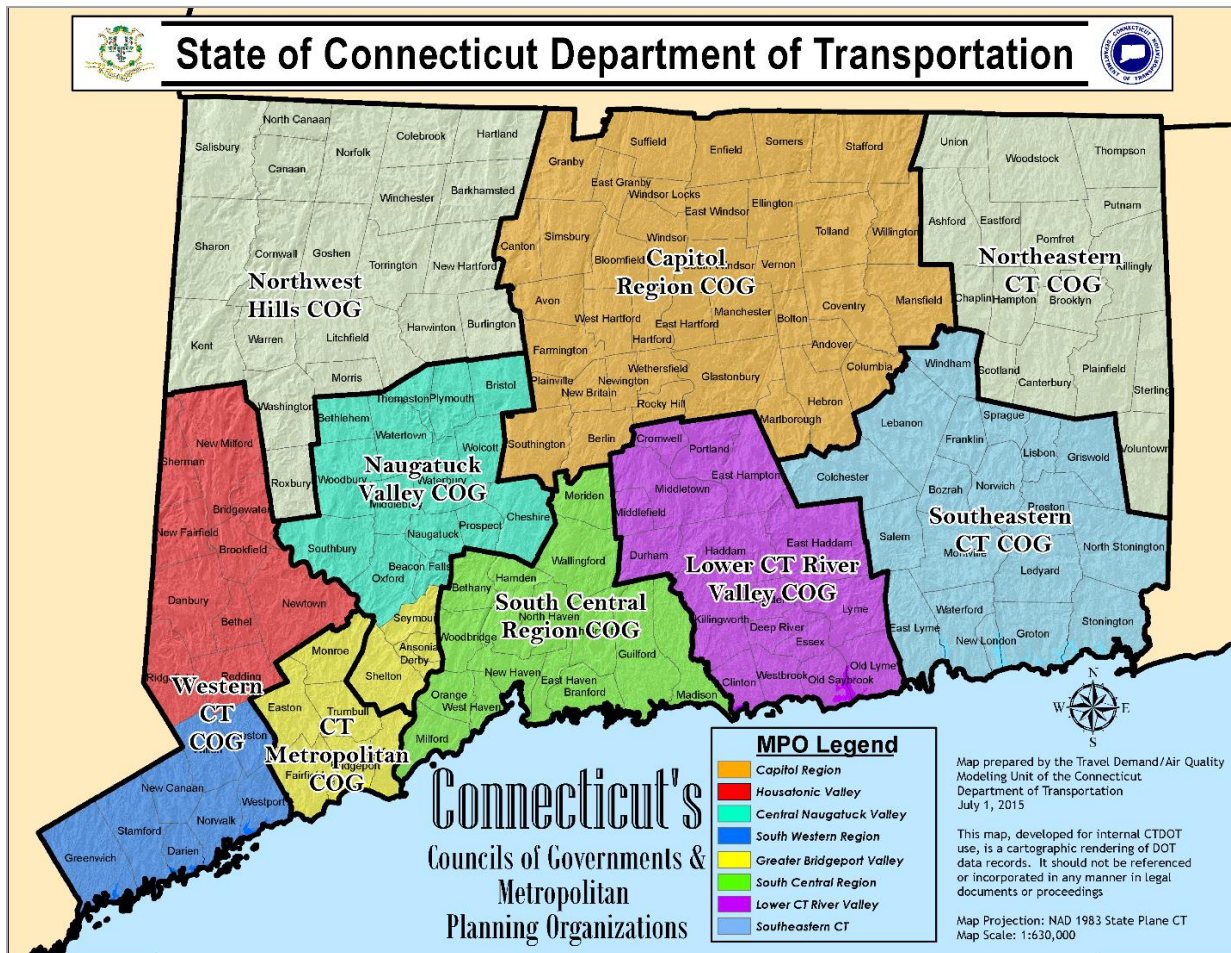
As illustrated in **Figure 4.8**, nine COGs in Connecticut host the MPO or the RPO:

- Capitol Region COG
- Connecticut Metropolitan COG
- Lower Connecticut River Valley COG
- Naugatuck Valley COG
- Northeastern Connecticut COG
- Northwest Hills COG
- South Central Regional COG
- Southeastern Connecticut COG
- Western Connecticut COG

¹⁷ <http://www.ctairports.org/wp-content/uploads/2017/05/BDL-Strat-Plan-C2.pdf>

¹⁸ Connecticut General Statutes Section 8-31b of the 2014 Supplemental (PA 13-247, Sec. 250) requires that any regional planning agency or regional council of elected officials be reconstructed to form a regional COGs by January 1, 2015.

Figure 4.8: Connecticut MPOs



Federal transportation funds may be used for many different types of projects:

- Bus purchases
- Bike and pedestrian improvements
- Road construction projects
- Intersection improvements
- Bridge repairs and replacements
- Railroad crossing safety projects

COGs conduct many planning studies to collect data and to analyze, develop, and evaluate projects to address transportation needs. Connecticut's MPOs and the Department will be working cooperatively in the coming years to establish performance targets and to integrate asset management principles into the STIP/Transportation Improvement Program (TIP) process. Some of the key planning and funding activities that MPOs conduct are described below, in the remainder of Section 4.2.1.

Metropolitan Transportation Plan (MTP)

The MTP provides a 25-year overview of major transportation investments and addresses long-range solutions to meet the greatest transportation needs. This plan must be updated every 4 years.

Transportation Improvement Program

The TIP is a list of all federally funded projects that will be undertaken over a 4-year period. This list can be amended at any time, but a full update must be undertaken at least every 4 years. Amendments to the TIP are considered by the MPO's Board.

Corridor Planning

COGs occasionally conduct specialized studies for transportation corridors. Traffic conditions and land use are analyzed, and a plan is developed to address any problems identified.

Transit Planning

Some COGs may also be instrumental in transit planning and TOD planning by evaluating new and existing transit routes and services; implementing amenity programs, such as bus shelters and signs; prioritizing projects; and encouraging development around transit services.

Bicycle and Pedestrian Planning

Some COGs may prepare bicycle and pedestrian plans that provide recommendations or implement improvements that make towns in their region more bike- and pedestrian-friendly.



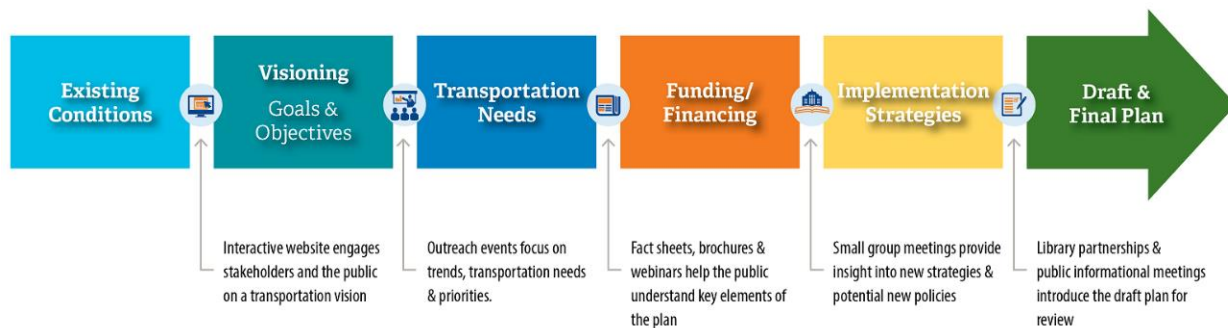
5. PUBLIC INVOLVEMENT

A well-functioning transportation system must be responsive to people’s needs and resilient enough to adapt to changing demands. Connecticut’s long-range transportation plan is built on the input of partners, stakeholders, and citizens from all walks of life. As mentioned in the introduction, the public outreach campaign for this Plan includes the outreach efforts undertaken with its Strategic Long-Range Transportation Plan, originally branded as TransformCT, and later as *Let’s Go CT!* The effort includes data points and references to public meetings, documents, and materials that span a 4-year period, 2013-2017. During this process, the Department sought out and listened to people who use the transportation system every day and who have ideas about how to make it work better. The Plan team used multiple avenues of communication and various media and held nearly 100 meetings across the state. **(Figure 5.1)** By far, this was the Department’s largest outreach campaign ever.

This robust public outreach process included:

1. Face-to-face meetings including visioning sessions, public open houses, public official briefings, informational and town hall meetings, and informal, small group meetings with various organizations and advocacy groups.
2. Non-traditional outreach events within communities, including pop-ups, informal meetings, and library partnerships.
3. On-line engagement including MindMixer, the Plan website and dashboard, webinars, and social media.
4. Media engagement and public relations, including press releases, fact sheets, public service announcements, radio interviews, press conferences, and informational brochures.
5. Household telephone survey.

Figure 5.1: Overview of the Public Involvement Process for the Strategic Plan



Source: CTDOT and CDM Smith

Public engagement conducted throughout the Plan aims to:

- Lower barriers to participation and encourage more people and more diverse voices to participate in the planning process.
- Establish ongoing, inclusive, meaningful, and responsive two-way communication with stakeholders, public officials, and the public.
- Develop practicable and recommendations built upon a solid base of public support.

5.1 Face-to-Face Meetings

There is no substitute for face-to-face meetings for people who have the time and interest to participate. The Plan team reached out to residents, interest groups, and community leaders via visioning sessions, public open houses, stakeholder council meetings, and small group meetings throughout the state, to understand how transportation can be improved and to gauge the level of interest in the ideas and initiatives considered in the Plan.

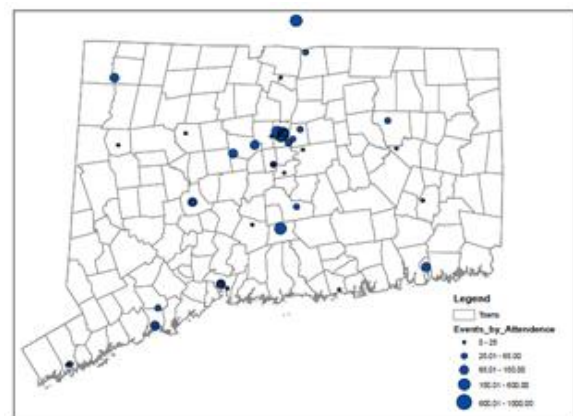
5.1.1 Visioning Sessions

The Plan gathered people in many ways to hear the best, most-forward-thinking ideas about what transportation should do for workers, residents, and businesses in Connecticut (**Figure 5.2**). Participants in these visioning sessions discussed a variety of trends and issues that ultimately shaped the Plan's goals, objectives, and vision and contributed to a better understanding of the state's transportation needs. These visioning sessions included:

- A full-day workshop composed of spirited, small group meetings among the Department leadership, transportation advocates, transportation user groups, and representatives of various economic, development, and business organizations. Each of these stakeholders contributed to the conversation, bringing their diverse ideas and backgrounds regarding highways, transit, freight, complete streets and trails, intercity travel, and the economy. The forums also covered issues involving energy and transportation and the integration of transportation and development. (Refer to **Appendix B** for notes from these meetings).
- Additional visioning workshops were held for state agencies involved with housing and economic development, where participants described what transportation means to the missions of their agencies and to explore partnering and collaboration opportunities. (Refer to **Appendix B** for notes from these meetings).

Governor Dannel Malloy spearheaded efforts to bring attention to transportation needs in Connecticut as part of Let's Go CT! In press conferences, face-to-face sessions with heads of state agencies, sessions with the Transportation Committee of the Legislature, and other venues, he presented a collective transportation vision of the state and shared details of transportation investment priorities.

Figure 5.2: Strategic Plan Visioning Sessions



Source: CTDOT and CDM Smith

- Through a series of internal workshops, the Department also held visioning sessions with its own leadership, asking “how does the transportation system need to improve?” and “how can we work better as an organization to meet the transportation needs facing the state?”
(Refer to **Appendix B** for notes from these meetings).



5.1.2 Public Open Houses

Armed with facts and figures about transportation in Connecticut, in 2014 the Plan team traveled to five public open house events around the state and invited everyone with an interest to visit, view the exhibits, and share their ideas. Each meeting had identical content and used a hands-on, open-house style meeting format that included a brief presentation and a Q&A session. Before and after the presentation, attendees wandered through multi-media informational displays and engaged in conversations with state transportation officials.

The Plan team asked visitors to think about how they hope to use transportation in the future and how their communities could be improved through better integration of transportation, land use, and the environment. They could also see and offer feedback on the draft vision statement, the draft goals and objectives, comments from the MindMixer website, and facts and figures about the current state of transportation in Connecticut.

5.1.3 Public Official Briefings

The Plan team briefed local public officials and officials within each COG or MPO around the state regarding the Plan investment package and initiated two-way conversations about needs and resources. These officials could share these conversations with their constituents to amplify awareness of the Plan. A list of meetings held with Connecticut MPOs and COGs follows.



MPO Board Meetings – Commissioner’s Presentation on *Let’s Go CT!*

- WestCOG – March 17, 2016, 12:30 p.m.
- Naugatuck NVCOG – April 8, 2016, 10:00 a.m.
- CT MetroCOG – April 21, 2016, 10:00 a.m.
- NortheasternCT COG – April 29, 2016, 9:00 a.m.
- Southeastern COG – May 17, 2016, 8:30 a.m.
- Lower CT River Valley COG – May 25, 2016, 9:00 a.m.
- Capital Reg. COG – May 25, 2016, 12:00 p.m.
- NorthwesternCT COG – June 9, 2016, 8:00 a.m.
- South Central Reg. COG – September 28, 2016, 10:00 a.m.

5.1.4 Meetings with Transportation Advocates and Organizations

The Plan team met with a variety of transportation advocates, as well as business, civic, cultural associations, and other interest groups throughout the state to discuss the current state of transportation in Connecticut and their views on transportation needs and priorities. The input received during these small group meetings played a vital role in helping to shape the vision and strategies outlined in the plan.

“We need a strategic game plan...a comprehensive, long-term plan to improve transportation infrastructure - to reinvent it, to better connect, to be more intermodal and to move more people.”

– Comment provided by an attendee of a small group meeting

5.1.5 Presentations and Discussions with the Transportation Finance Panel

In 2015, Governor Dannel P. Malloy formed a Transportation Finance Panel composed of bi-partisan experts in transportation, finance, and economic development. The group was charged with examining options and developing recommendations to fund the \$100 billion vision, which is a part of the Plan, *Let’s Go CT!* The Transportation Finance Panel convened a total of seven public meetings before issuing their final recommendations. Each of these meetings were open to the public and many of them were televised or recorded. The Department staff and leadership provided data to the Transportation Finance Panel to assist the panel in completing their final report.



5.1.6 Informational and Town Hall Meetings

In addition to the public open houses, the Plan team conducted a series of informational and town hall style meetings in 2015 and 2016. These meetings, which were held throughout the state, were held to discuss the needs and priorities outlined in the 32-year Plan vision and the 5-year ramp-up plan. Governor Malloy and/or the Department’s Commissioner, James P. Redeker, led these meetings. The Plan team also engaged in similar informational and town hall meetings throughout the state to share and discuss the contents of the draft Plan.

5.1.7 Non-Traditional Outreach Events

Pop-Ups and Informal Outreach Events in Communities

The Plan team captured candid input from thousands of new stakeholders and commuters, in places where they normally meet or travel, through a series of creative, “pop-up” events conducted around the state. These events occurred in a variety of settings, including a downtown Hartford on-street parking space converted to a public forum as part of Park(ing) Day; in university and corporate cafeterias; in exhibit spaces at the Big E (Eastern States Exposition) and the Durham Fair; in neighborhood community centers; in transit center waiting areas; on-board Shore Line East and Metro-North commuter trains; and at business expos and tradeshows.

By going to a variety of relaxed settings where people gather, the Plan team reached new audiences and collected personal stories



about transportation. These personal testimonials provided insight into new strategies and potential new policies that the state should consider implementing the Plan’s vision for the future of transportation in Connecticut.

Library Partnerships

To raise awareness of the Plan, the development team partnered with libraries in economically distressed communities around the state (**Figure 5.3**). Each partnering library provided a link to the MindMixer and *Let’s Go CT!* websites on library terminals and displayed printed informational materials, including bookmarks and brochures. The library partnerships yielded notable participation from traditionally hard-to-reach populations.

On-Line Engagement

The Plan team deployed electronic media to reach a large and diverse audience representing many socio-economic backgrounds through social networking, analytics, websites, dashboards, and webinars. Each of these applications were designed and utilized to attract and conveniently engage people in sharing and learning about transportation in Connecticut.

MindMixer

The Plan team utilized MindMixer, an interactive social media platform, to collect ideas about how transportation in Connecticut can improve, and to respond to ideas posted by other community members. The frequently changing and informal survey questions on MindMixer prompted creative and thoughtful responses from the thousands of visitors who came to the site. Residents and organizers who attended public meetings for the Plan were also encouraged to remain engaged by participating in the on-line conversation.

Analytics

The Plan team utilized various forms of analytics embedded in the MindMixer on-line platform, as well as Google Analytics, to better understand the characteristics, demographics, and preferences of on-line audiences who visited the MindMixer and the Plan websites (**Figure 5.4**). The team used this information not only

to track on- line activity, but also to improve how information is displayed and to adjust the Plan’s overall outreach efforts to be more effective in reaching and engaging more people.

Figure 5.3: Libraries that Partnered with the Department on *Let’s Go CT!* Plan

Municipality	Library Branch
Waterbury	Silas Bronson
Hartford	Downtown
New Britain	New Britain
Bridgeport	Burroughs
Naugatuck	Howard Whittlemore
New London	New London
Ansonia	Ansonia
Windham	Willimantic
Plainfield	Aldrich Free
Derby	Derby
Torrington	Torrington
Killingly	Killingly
Bristol	Bristol
North Canaan	Douglas
Sprague	Sprague
New Haven	Ives Main
East Hartford	East Hartford
Meriden	Meriden
Enfield	Central
Winchester	Beardsley
West Haven	Main
Groton	Groton
Putnam	Putnam
Montville	Raymond
Plymouth	Plymouth

Figure 5.4: Strategic Plan Outreach Materials



Source: CTDOT and CDM Smith

Other Social Media

The Plan posted meeting alerts and drove on-line traffic to MindMixer and other resources via Twitter, Facebook, and YouTube.

5.1.8 Study Website

A companion Plan website hosted study fact sheets, internet versions of live presentations; responses to frequently asked questions (FAQ); copies of published documents such as the 5-year ramp-up plan; links to Connecticut Transportation Finance Panel recommendations; Plan-related press releases; and copies of draft and final versions of the Plan. Throughout the public outreach process, meeting announcements and news flashes were posted on the site and were accessible from the MindMixer website and from the Department's official website www.ct.gov/dot, as well as from an on-line dashboard for Governor Malloy's initiative, *Let's Go CT!*

5.1.9 The Ramp Up Program Dashboard

An interactive dashboard was developed and launched in 2016 as a new, interactive, online tool for the public, legislators, state agencies, media, and other stakeholders to track the progress of the Governor's Ramp-Up program (Figure 5.5). The dashboard provides important information about each of the ramp-up initiatives and their status, including financial statistics, project descriptions, and timeframes. Summary and drill-down information is also provided by state fiscal year, by mode of transportation, and by transportation corridor (area of the state).

A press release was issued at the launch date of the dashboard to raise awareness of its purpose and availability. In addition, the Plan team presented the contents of the dashboard at many outreach events and various Department presentations around the state to draw new visitors to the on-line tool. Visitors are encouraged to check back often, as the dashboard is updated on a continual basis (quarterly) as projects progress.

5.1.10 Webinars

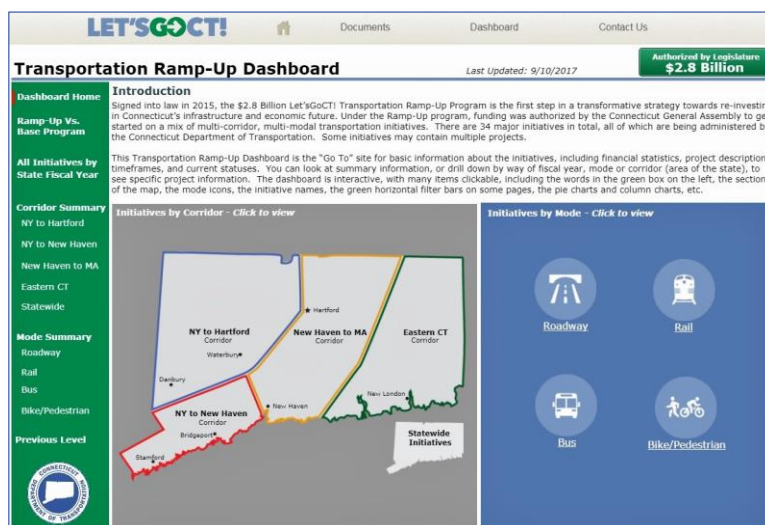
Webinars were used during the visioning and drafting of the Plan as an outreach tool to engage multiple stakeholders and collect their feedback.

5.1.11 Household Telephone Survey

A random household survey of 1,000 Connecticut households asked people about how they use transportation, how they perceive the quality of the state's transportation systems, and how the systems could be improved. The results of this survey informed the development of the Plan and helped to prioritize the plan's initiatives.

A summary of the survey results appears in **Appendix C**.

Figure 5.5: CTDOT Interactive Dashboard



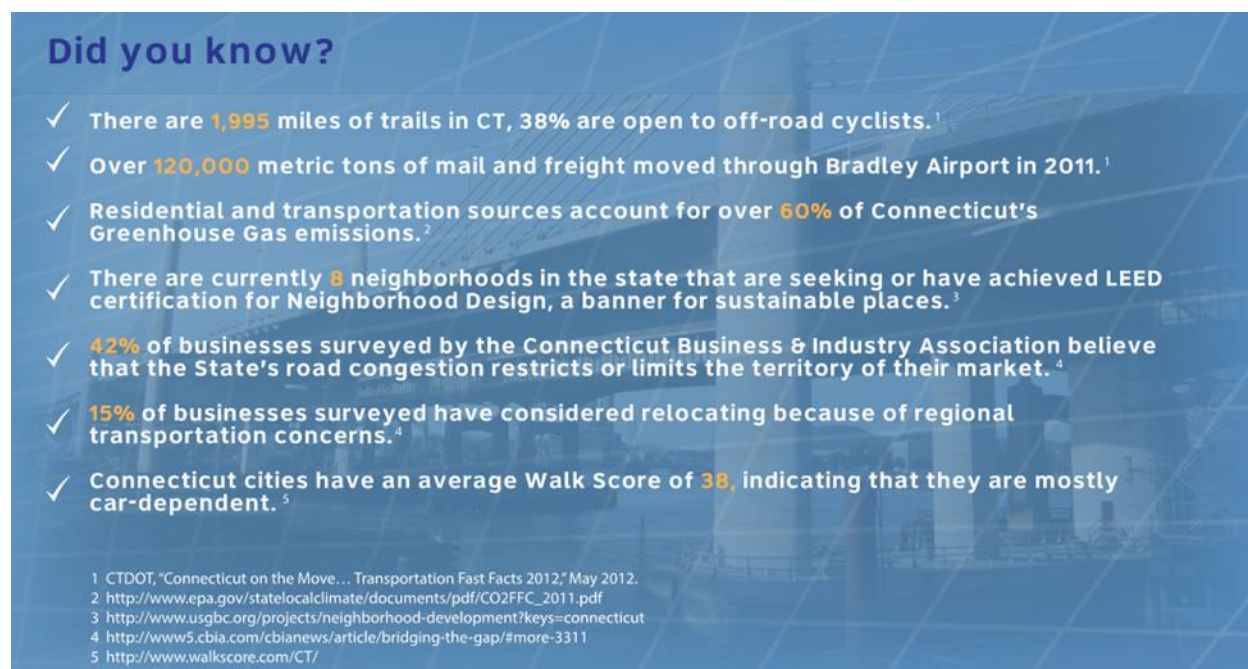
Source: CTDOT

5.2 Media Engagement and Public Relations

5.2.1 Fact Sheets

A series of fact sheets distributed to the media as press releases and through other outlets provided an at-a-glance summary of some of the analysis, research, and current Department initiatives that helped shape the Plan (**Figure 5.6**). These fact sheets and press advisories conveyed the Plan's key elements, such as transportation funding versus needs.

Figure 5.6: Example of Plan Fact Sheet



Did you know?

- ✓ There are **1,995** miles of trails in CT, 38% are open to off-road cyclists.¹
- ✓ Over **120,000** metric tons of mail and freight moved through Bradley Airport in 2011.¹
- ✓ Residential and transportation sources account for over **60%** of Connecticut's Greenhouse Gas emissions.²
- ✓ There are currently **8** neighborhoods in the state that are seeking or have achieved LEED certification for Neighborhood Design, a banner for sustainable places.³
- ✓ **42%** of businesses surveyed by the Connecticut Business & Industry Association believe that the State's road congestion restricts or limits the territory of their market.⁴
- ✓ **15%** of businesses surveyed have considered relocating because of regional transportation concerns.⁴
- ✓ Connecticut cities have an average Walk Score of **38**, indicating that they are mostly car-dependent.⁵

1 CTDOT, "Connecticut on the Move... Transportation Fast Facts 2012," May 2012.
2 http://www.epa.gov/statelocalclimate/documents/pdf/CO2FFC_2011.pdf
3 <http://www.usgbc.org/projects/neighborhood-development?keys=connecticut>
4 <http://www5.cbia.com/cbianews/article/bridging-the-gap/#more-3311>
5 <http://www.walkscore.com/CT/>

5.2.2 Brochures

Brochures and posters helped introduced the Plan to Connecticut residents and businesses. Brochures were distributed to partnering libraries and to stakeholder groups to share with their members or constituents. They were also handed out at conferences, public workshops, and small group meetings.

5.2.3 Public Service Announcements

The Plan team published announcements in various newspapers across the state with the dates, locations, and times of public open houses, informational meetings, and other live public events. The Plan team also engaged radio media to announce some of these events in languages other than English.

5.2.4 Newspaper Articles, Radio Interviews, and Press Conferences

The Plan team and Department leadership engaged mass media to raise awareness and articulate the vision, goals, and objectives of the Plan. The team also used media to promote dialogue on transportation needs and funding options. These engagements included letters to the editors of newspapers, televised press conferences, and AM and FM radio interviews. Each of these engagements served as a forum to discuss and emphasize the need for implementing and preserving an enhanced, best-in-class transportation future for Connecticut.

5.3 The Draft Long-Range Transportation Plan

The Department policy and federal legislation define the Plan's review and approval process. On December 18, 2017, the Department distributed a press release announcing the availability of the Draft Long-Range Transportation Plan (Draft Plan) and detailing how the public could access it for review and comment. A 45-day comment period began on December 18, 2017. On Wednesday, January 16, 2018, two identical public information meetings were held at the Department's headquarters building at 2800 Berlin Turnpike, Newington to present an overview of the Draft Plan and to record public comments on it. The first meeting was held from 12:30 p.m. to 3:00 p.m.; the second identical meeting took place from 6:30 p.m. to 9:00 p.m.

The dates, locations, and times of these meetings were posted on the Department's events calendar and the project web page. The 45-day comment period for reviewing and submitting comments on the Draft Plan ended on February 1, 2018. Public input received on the Draft Plan was reviewed by the Plan team and considered in the development of the Final 2018 Long-Range Transportation Plan.

5.4 The Final Long-Range Transportation Plan

The Department submitted the Final Plan to FHWA and FTA at the end of December 2017. The Final Plan has been posted on the Department's web site, <http://www.letsgoct.com>. The Department has issued a press release that announces the completion of the Plan and its availability on the Department's web site. The Department has notified stakeholders—MPOs, COGs, transit districts, elected officials, heads of state agencies, representatives of appropriate federal agencies, public libraries, and individuals who provided the Department with e-mail addresses during the initial public input period—of the Final Plan's release.



6. WHERE ARE WE TODAY?

Connecticut's transportation system is a comprehensive network of highways, streets, railroads, marine ports, transitways, pedestrian walkways, bicycle paths, airports, and ancillary facilities. This system brings people and products together, determines how we move from place to place, and influences the patterns of growth and development of Connecticut's cities and towns.

A principal goal of the Plan is to restore and maintain Connecticut's multimodal transportation system in a state of good repair to improve system reliability and reduce costs to users. Currently, maintenance and renewal of Connecticut's transportation infrastructure systems accounts for most of the state's transportation expenditures. Allowing roads, bridges, and transitways to slip into disrepair ultimately costs significantly more than the cost of regular, timely repair. Deferred maintenance increases safety risks, hinders economic prosperity, and burdens taxpayers. The maintenance backlog will grow as the transportation assets age and costs rise.

This description and assessment of Connecticut's transportation system infrastructure and demographic, economic, and societal trends:

- Creates a baseline of current conditions.
- Establishes an understanding of the costs and priority of maintaining Connecticut's infrastructure to achieve a state of good repair.
- Describes current demand for various modes of transportation (automobile, truck, rail and marine freight, bus transit, commuter rail, and pedestrian and bicycle travel) and where there may be gaps in routes or service levels and inadequate capacity.
- Traces trends that will influence future transportation demand to formulate plans to augment, expand, and interconnect our transportation systems.

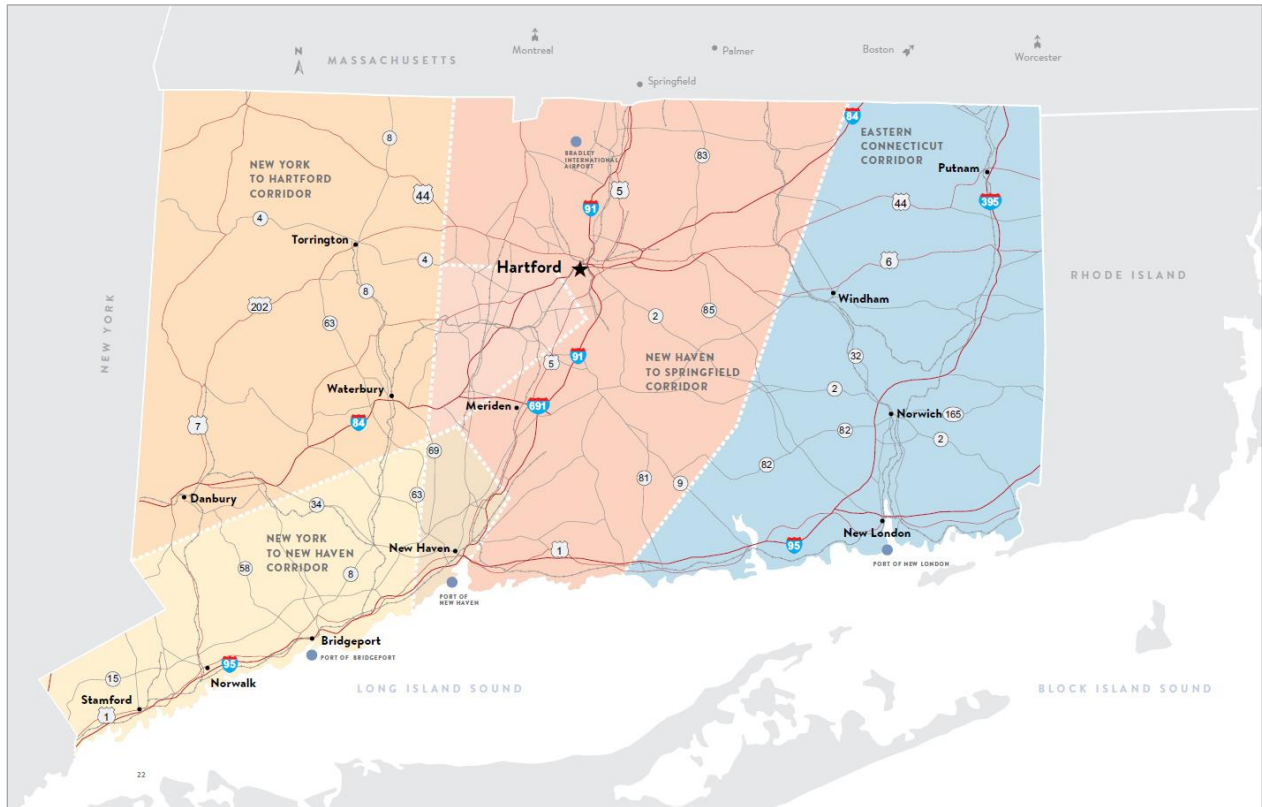
These "Where are we today snapshots" provide insights into the extent and condition of Connecticut's transportation infrastructure, as well as commuting patterns and demographic and economic characteristics and trends. Key points of this review include:

- Large portions of the transportation system that were constructed over 50 years ago are in need of rehabilitation or reconstruction as they reach the end of their useful life. The interstate system is in good condition, but bridges and viaducts need replacement, as do portions of the non-interstate system. The portions of the network that have not been rebuilt require increased maintenance, impose higher operating costs on travelers, and cause periodic service disruptions or capacity losses.
- The system is struggling to keep up with current demand, particularly on highways, bridges, and transit systems that are congested, in particular areas of the state.

- Demand for transportation is forecast to grow roughly in proportion to population growth, but there are reasons to believe it may grow faster.¹⁹

6.1 Connecticut's Corridors

Figure 6.1: Principal Corridors in Connecticut



Source: CTDOT and Arch Street Communications

6.1.1 The New York to New Haven Corridor

The New York-to-New Haven corridor is home to three of the state's largest cities—Stamford, Bridgeport, and New Haven. The transportation network in this corridor is a tightly knit concentration of interstate routes, state highways, parkways, rail lines, and ports, most notably Interstate 95 and the Merritt Parkway which parallel the coast. The busiest commuter rail line in the nation (The New Haven Line) parallels I-95. The corridor is served by two major seaports, Bridgeport and New Haven, which is the busiest port between Boston and New York City. State Routes 7 and 8 and other major roads connect this coastal corridor to the nearby cities of Danbury and Waterbury, approximately 30 miles inland.

Despite the density of transportation assets, this corridor is Connecticut's most congested corridor, which is restricting economic growth in the corridor and the state. Residents and businesses in the corridor have expressed a desire to enhance and improve access to New York City. The nature and importance of this corridor requires a comprehensive, multimodal strategy to reduce congestion. The strategy for this corridor aims to not only restore existing infrastructure but also expand and enhance highway, rail, and bus systems.

¹⁹ Woods and Poole and Connecticut statewide travel demand model forecasts.

6.1.2 The New York to Hartford Corridor

The New York to Hartford corridor shares a long expanse of border with New York. It includes a dynamic mix of densely populated urban and suburban communities along I-84 and rural townships to the north. A network of state highways (principally State Routes 7 and 8) connect the corridor's largest cities, Danbury and Waterbury, to the coastal cities of Stamford, Norwalk, Bridgeport, and New Haven. In addition, the Danbury and Waterbury Branch Lines provide commuter rail links from this corridor to the New Haven Line and the Northeast Corridor along the Connecticut coast. The strong transportation assets of this corridor link Connecticut to the national economy. They also link the Danbury, Waterbury, and Hartford economic regions.

Essential to economic growth is a reduction in traffic congestion on I-84 by fixing major bottlenecks and restoring and replacing major viaducts in Hartford and Waterbury, as well as other infrastructure. Since the corridor is also tied to the Bridgeport-Stamford economic area, it is vital to improve rail and highway linkages to the New Haven Line and to I-95.

6.1.3 The New Haven-Hartford-Springfield Corridor

This north-south corridor includes two of the most populous cities in the state, Hartford, the state capital, and New Haven, the busiest port between Boston and New York. The corridor also includes New England's second largest airport, Bradley International Airport. The corridor developed along the Connecticut River Valley, which links New Haven and Hartford, to Springfield, Massachusetts and other markets in Vermont, New Hampshire and Canada, to the north. I-91 and the Hartford Line are the transportation backbone of the corridor and connect the region to significant transportation assets in Massachusetts—I-90 and the CSX rail line that parallels it. I-84 bisects the corridor from west to east; it links Hartford to the New York City metro area to the west and Boston to the east.

6.1.4 The Eastern Connecticut Corridor

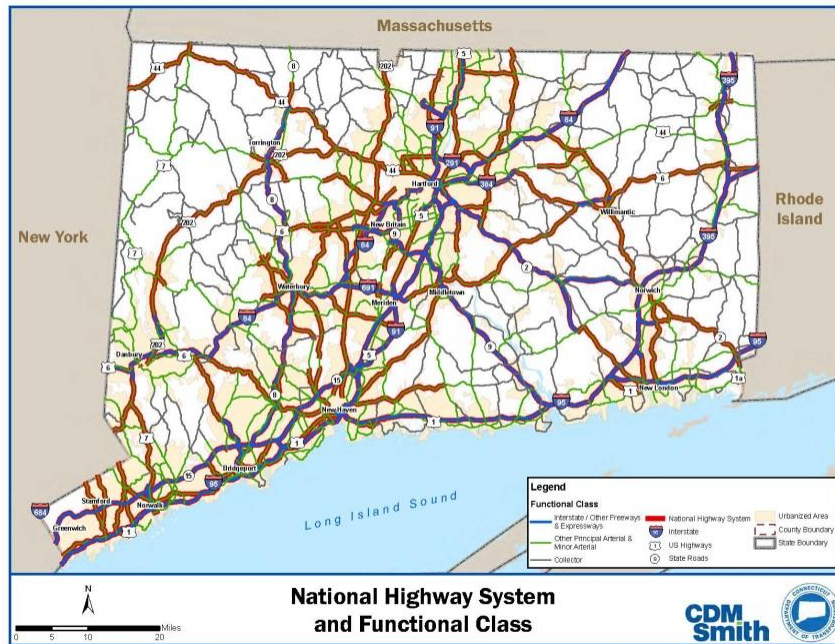
Eastern Connecticut borders Massachusetts in the north and Rhode Island to the east. The corridor includes a significant manufacturing sector dominated by General Dynamics Electric Boat in Groton and a large tourism industry comprising Mystic Seaport, Mystic Aquarium, major casinos, and coastal recreation. I-95 and the Northeast Corridor rail line link this corridor to New Haven and New York City to the west and Providence and Boston to the east. I-395, which traverses the corridor north-south, links eastern Connecticut's largest cities (New London and Norwich) to Worcester, Massachusetts and to I-90. The strategy for this region reflects its less urbanized nature and the importance of tourism and manufacturing. It focuses on making major improvements to I-95 and to passenger rail service on the Shore Line East (SLE), freight rail lines on the New England Central Railroad (NECR), the Providence and Worcester line (P&W), and the Port of New London.

6.2 Highways

Connecticut's highway system includes 21,430 miles of public roads (**Figure 6.2**). The Department owns and operates the interstate system and large portions of the roads that connect Connecticut's regions and towns, amounting to 3,734 miles of roads. Thirty-five percent of the system was built before 1950, 44 percent between 1950-1980, and 21 percent has been built (or re-built) since 1980.

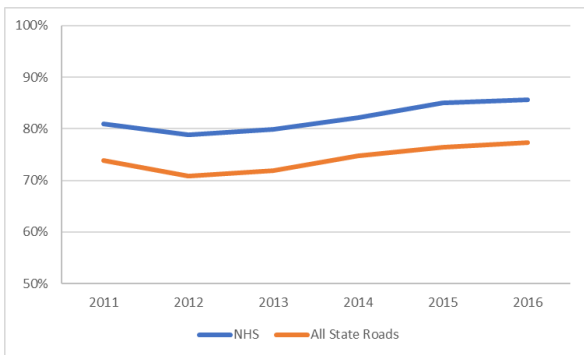
The pavement condition of Department-maintained roads has steadily improved with increased funding in recent years. Pavement conditions on Connecticut's highest volume roads, National Highway System (NHS) roadways, continued to improve, as 86.8 percent of these NHS miles had an acceptable or better ride quality (**Figure 6.3**) in 2016. For all state-maintained roads, the trend is the same: one of steadily improving ride quality (**Figure 6.4**).

Figure 6.2: National Highway System in Connecticut



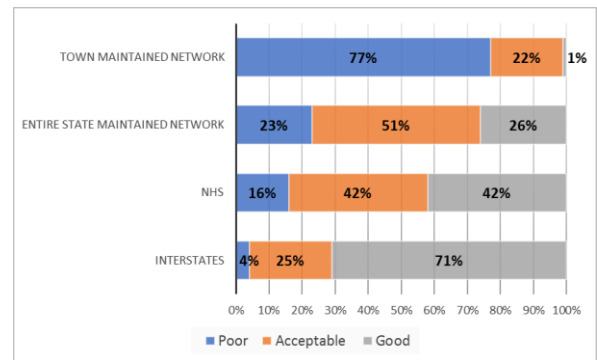
Source: CTDOT

Figure 6.3: Pavement Smoothness on State-Maintained Roads, Adequate or Better Condition



Source: CTDOT

Figure 6.4: Pavement Condition on all Connecticut Roads



Source: CTDOT

Resources for restoring and reconstructing roadways are stretched thin, despite a current ramp-up in transportation spending, initiated in 2015. Pavement conditions on lower-volume roads and especially on municipal roads cannot be maintained at the same level as the interstate system and NHS roads. Pavement on 77 percent of town-maintained road system mileage is in poor condition, while a significant, but much lower proportion of the state-maintained system (23 percent) is in poor condition (Figure 6.4).

The Department is responsible for the maintenance and operation of 4,016 roadway bridges and three tunnels. The Department inspects 1,290 additional bridges that are owned and maintained by towns or municipalities.

Nearly 94 percent (93.8) of state-maintained bridges are in a state of good repair (fair or better condition) (**Figure 6.5**). Bridge condition has improved due to additional staff and budget resources allocated to bridges over the past several years, along with improved project delivery time from initial project identification.

Most state-maintained bridges are in fair or better condition. However, the maintenance cost profile is far from desirable (**Figure 6.6**). Approximately 13.1 percent of bridges owned and maintained by towns or municipalities are in poor condition, and 6.2 percent of state-owned and maintained bridges are in poor condition.

To maintain safe conditions, the state and municipalities must expend more capital dollars for spot repairs and more frequent fixes for bridges in fair and poor condition, as compared to bridges in good condition. Long-term bridge management costs are lower when replacements and reconstructions are funded and implemented at the right time in a bridge's life-cycle.

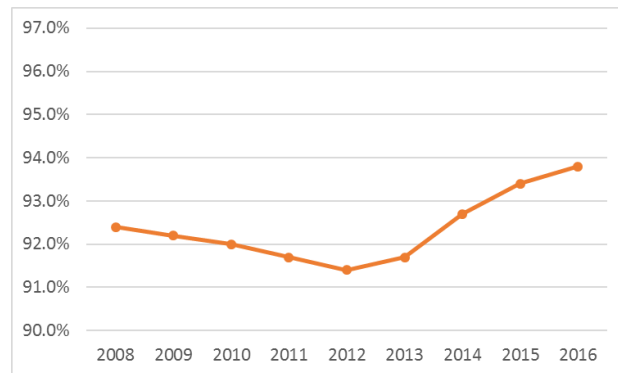
The 2008 recession caused a severe downturn in economic activity in Connecticut, and in the U.S. in general. Between 2008 and 2013, Connecticut experienced an annual decline in highway travel of 0.59 percent. In 2015, Connecticut recorded a 1.3 percent growth in vehicle miles traveled (VMT). This was the second year of growth in highway travel since 2013 and reversed the trend of declining travel between 2007 and 2013. As shown in **Figure 6.7**, the U.S. and Connecticut show similar patterns in highway travel growth.

Demand for highway travel reflects Connecticut's development patterns, which trace the interstate system in Connecticut. **Figure 6.8** shows that demand for highway travel is concentrated along the I-95 corridor from New York to New Haven, along the I-84 corridor from Danbury to Hartford, and along the I-91 corridor from New Haven to Windsor. Among the highest VMT-generating localities are Greenwich, New Haven, Waterbury, and Hartford.

In 2016, 311 people were killed in motor vehicle crashes in Connecticut. This figure matches the number of traffic fatalities recorded in 2006 and is the highest number since 2005. Reflecting national trends, fatality rates have also begun to rise as the economy has improved and driving has increased. (**Figure 6.9**)

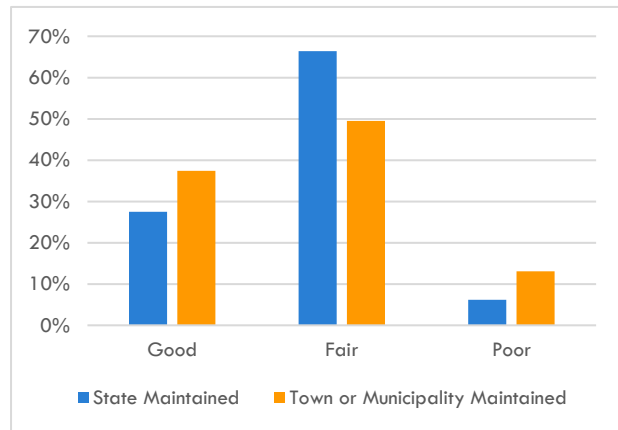
Connecticut is challenged to meet different mobility needs for the variety of people served by the transportation system. Most workers drive alone, but a significant percent of the population use and need alternative travel options.

Figure 6.5: State Maintained Roadway Bridges (4,016) in State of Good Repairs



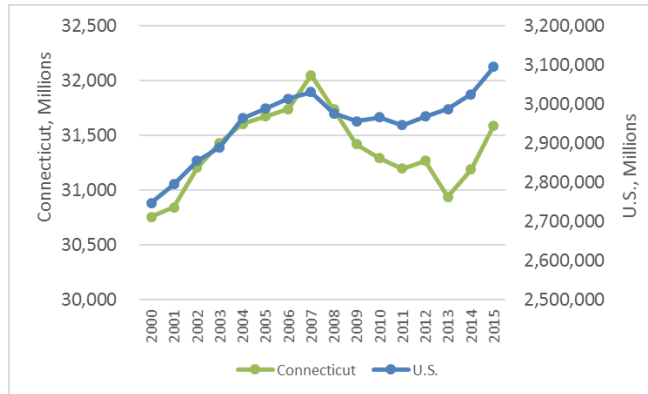
Source: CTDOT

Figure 6.6. Roadway Bridge Condition, State Maintained, and Town or Municipality Maintained Bridges



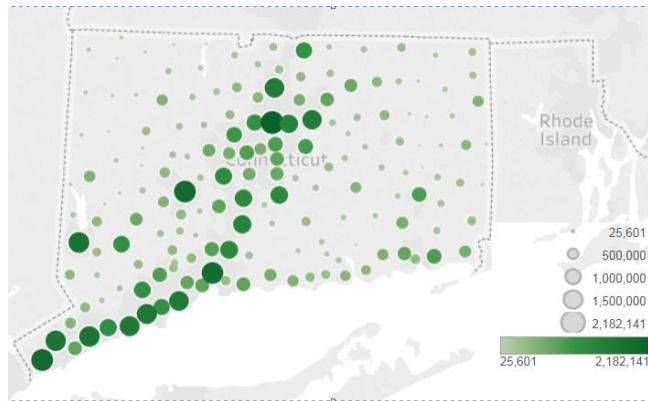
Source: CTDOT - 2016 Inventory Data

Figure 6.7: Vehicle Miles Traveled, Connecticut and the U.S.



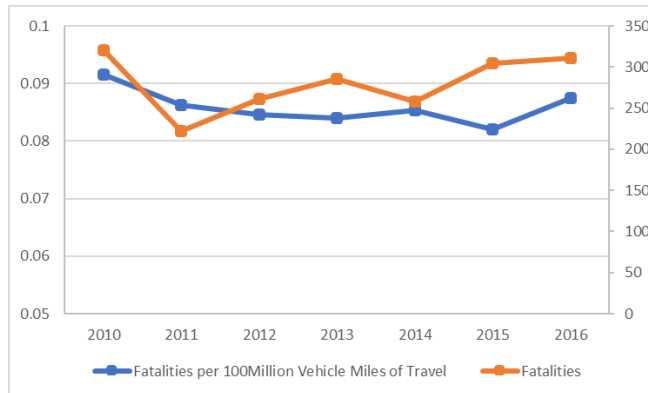
Source: Connecticut DOT and CDM Smith

Figure 6.8: Daily Vehicle Miles of Travel, 2016



Source: Connecticut DOT and University of Connecticut

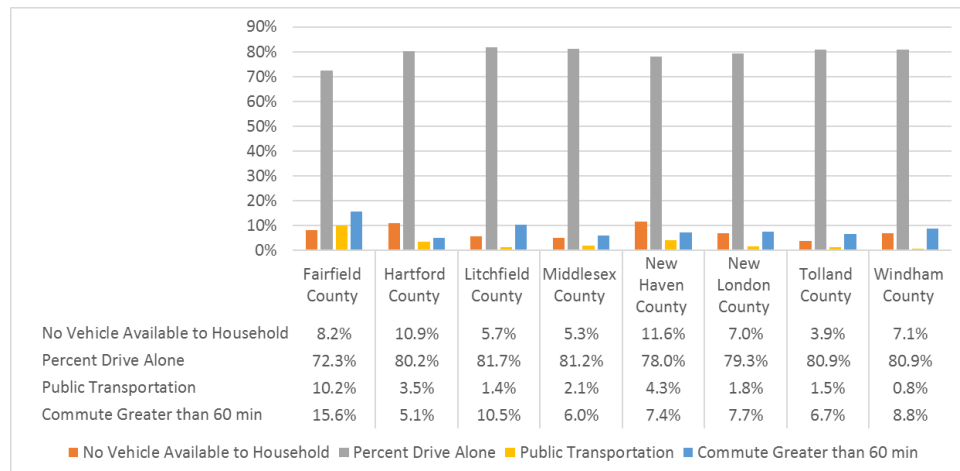
Figure 6.9: Fatalities, 2010-2016



Source: CTDOT and CDM Smith

The western region of Connecticut relies more on public transportation and experiences longer commutes than other parts of the state (**Figure 6.10**). In Fairfield, the county with the greatest economic ties to New York City, 10.2 percent of workers rely on public transportation, a large share of which is commuter rail, for their commuting. At the same time, one in six Fairfield workers spends more than an hour each day commuting to work. Over 10 percent of households in New Haven and Hartford report that they do not have access to a personal vehicle.

Figure 6.10: Selected Household and Commuting Statistics, Connecticut Counties



Source: U.S. Census and CDM Smith

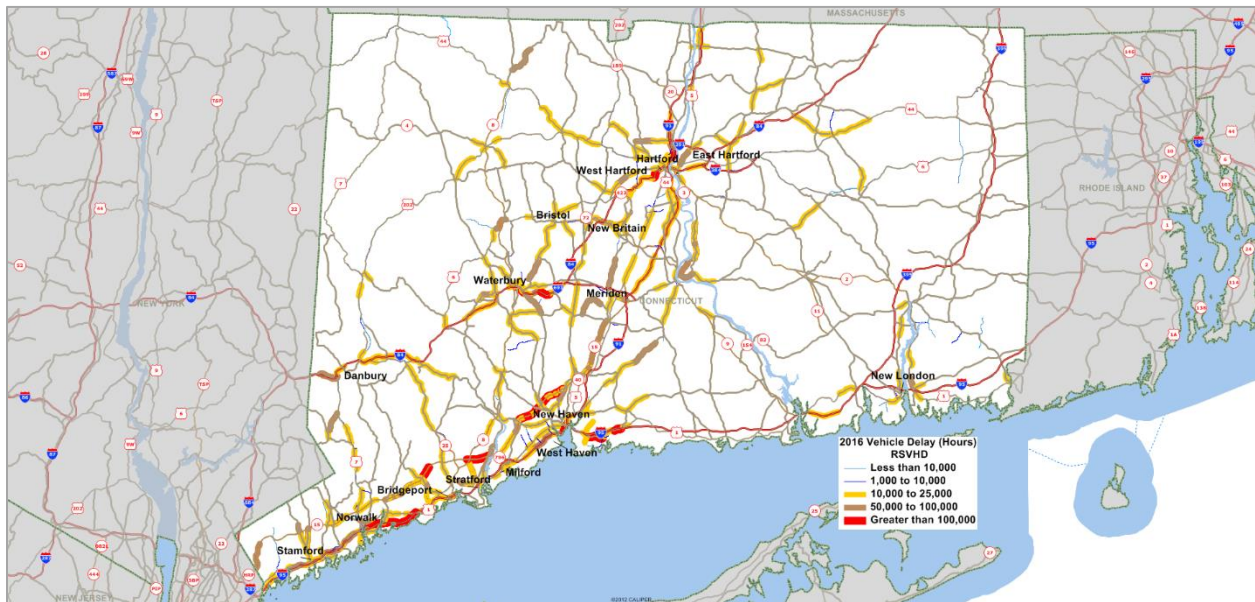
In 2016, Connecticut roads on the NHS, including the interstate system, accommodated 24 billion vehicle miles of travel. In 2016, the locations at which passenger vehicles and trucks experience the most severe congestion are:

- I-95, from New York to Bridgeport
- I-95, from West Haven to New Haven
- I-95 from Old Lyme to East Lyme
- I-84, from New York to Danbury (CT-7)
- I-84, from east of Danbury (US-202 to CT-34)
- I-84, West of Waterbury (CT-188 to CT-63)
- I-84 in Waterbury, (CT-847 to 3 miles east)
- I-84, from West Hartford to US 44 in Hartford
- I-91 from North of CT-3 to Charter Oak Bridge ramps (East Hartford)
- CT-5, from Berlin to CT-175

This review corroborates the Department’s emphasis on the need for congestion relief and the reconstruction of sections of I-95 and I-84. However, last-mile connector issues, as well as operational, state of good repair, and vehicle information issues exist as well, as the Plan team learned through conversations with the public and public agency stakeholders.

Figure 6.11 presents the most significant locations of vehicle delay in 2016. Sections of I-95 west of New Haven, Route 15, I-84, and portions of I-91 around Hartford are among the locations that experienced the highest levels of vehicle delay in 2016.

Figure 6.11: High Congestion Locations, 2016



Source: FHWA and CDM Smith

Quick Facts

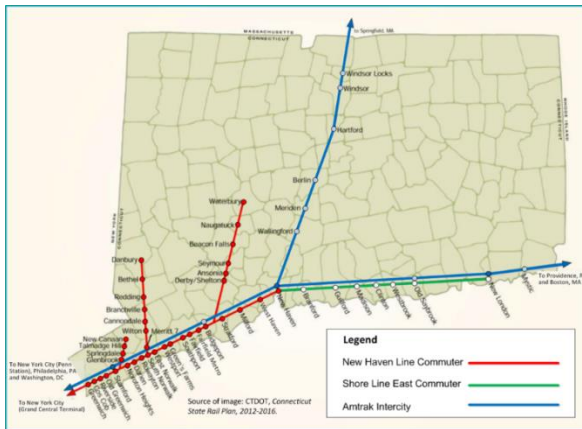
- I-95 has the highest daily usage of the interstates in Connecticut, followed by I-84 and I-91.
- Only 14 percent of all road miles are approaching capacity or are over capacity. Nearly 30 percent of limited access highways are near capacity or over capacity.
- Motorists incur \$2.6 billion in operating costs, fuel, and accidents caused by deficient roads and bridges every year.²⁰
- Connecticut motorists also incur \$1.6 billion in costs due to time and fuel wasted in congestion.

6.3 Public Transportation

The Department is one of the few state DOTs in the nation that directly owns and operates or subsidizes nearly all of the state's public transportation services. Public transportation in Connecticut consists of commuter rail service, urban public transportation, and rural transportation providers (**Figure 6.12** and **Figure 6.13**). There are numerous providers of bus, paratransit, and commuter and passenger rail service in Connecticut; however, there are still areas where service is lacking or inadequate to meet demand. In addition to bus, van, and rail services, the state provides grants, assistance, and incentives for other commuter programs, including telecommuting and ridesharing.

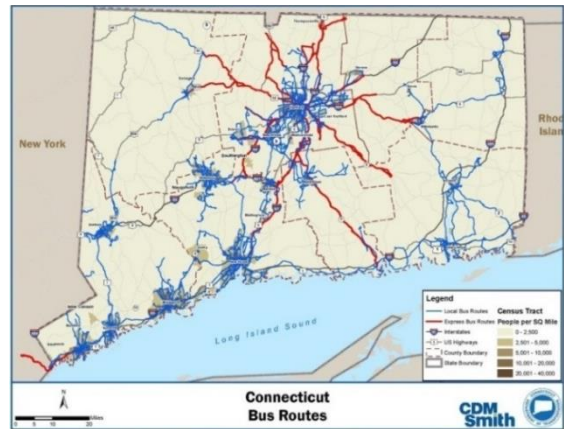
²⁰ Connecticut's Bold Vision for a Transportation Future, February 2015, CTDOT.

Figure 6.12: Passenger Rail Lines in Connecticut



Source: CTDOT and CDM Smith

Figure 6.13: Bus Services in Connecticut

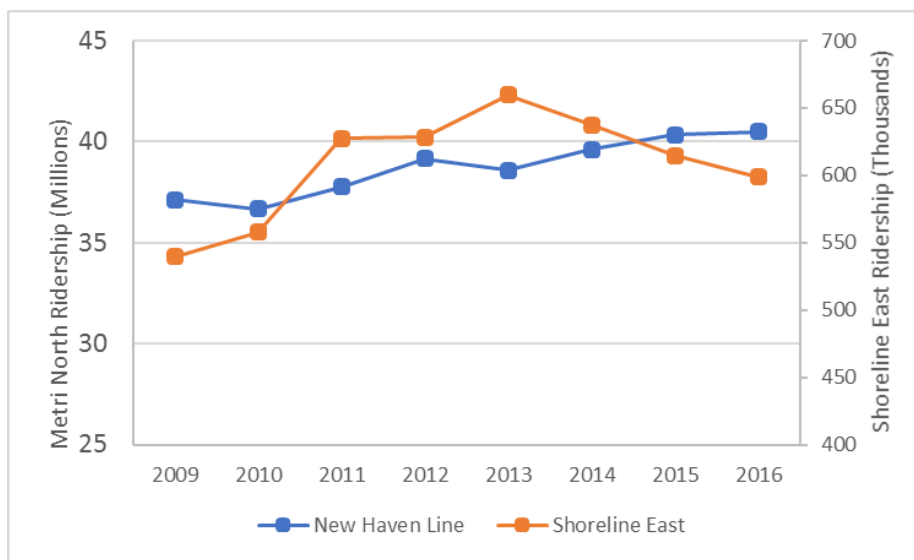


Source: CTDOT and CDM Smith

In recent years, Connecticut has invested in commuter rail service expansion, producing increases in mileage and ridership. Since 2009, New Haven Line ridership (despite decreases in 2012) has increased by 9 percent, while Shoreline East’s ridership has increased 11 percent (**Figure 6.14**). There are solid indications that there is unmet demand for additional fast, convenient, and reliable commuter rail service.

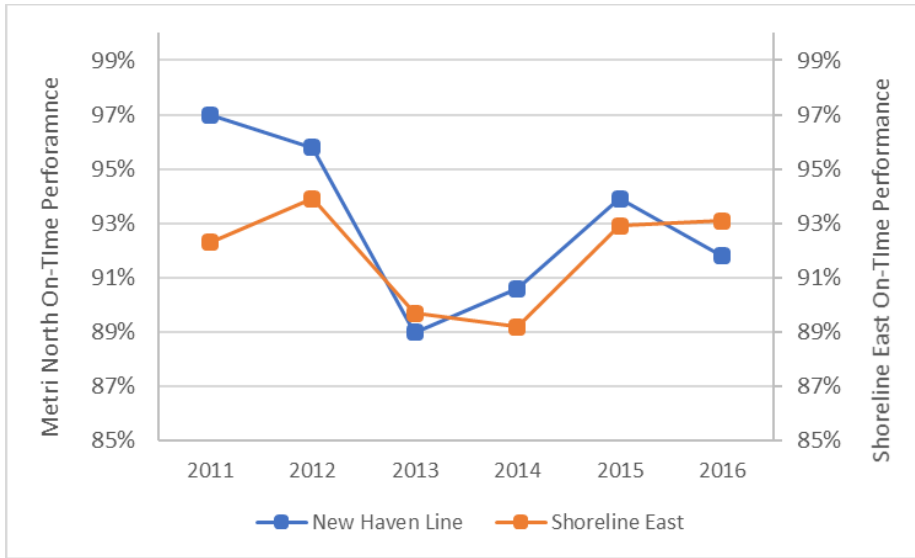
Connecticut’s commuter rail service on-time performance is at or near goal thresholds, despite slippage in 2016 (**Figure 6.15**). However, diesel locomotive reliability decreased between 2011 and 2016 and the fleet is aging and in need of replacement. Connecticut is in the midst of a multi-year effort to replace locomotives and rail cars.

Figure 6.14: Commuter Rail Service and Ridership, 2010-2015



Source: CTDOT

Figure 6.15: Commuter Rail On-Time Performance, 2011-2016

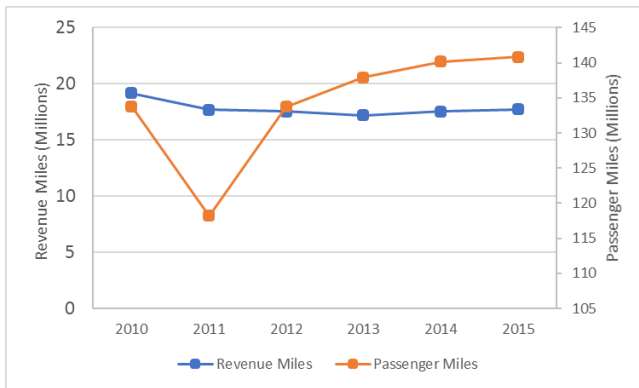


Source: CTDOT

Statewide, while the number of bus passengers between 2010-2015 decreased by three-quarters of 1 percent, the number of passenger miles increased by 5.25 percent (Figure 6.16). The amount of service provided also decreased by 7.4 percent. As the economy has improved, some riders may have found other means of transportation, while those without other alternatives may rely on bus for travel over longer distances.

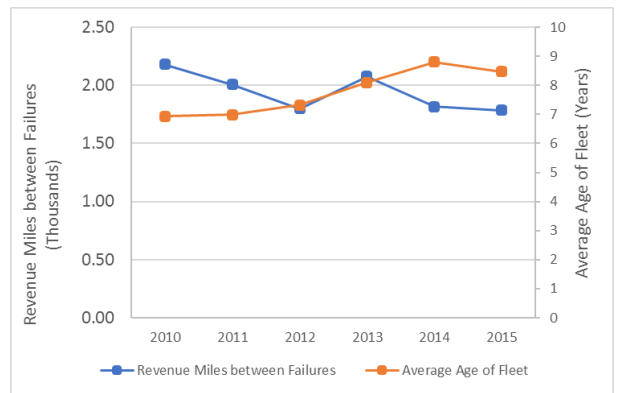
Connecticut's is replacing its bus fleet to stay on par with national averages but the system has seen a decrease in reliability. Between 2010 and 2015, the average age of a bus increased from 6.9 to 8.5 years, near the national average of 8.1 and well below the replacement threshold of 12 years (Figure 6.17). The average of service miles between breakdowns decreased from 2,280 to 1,790 miles. The decrease in reliability mirrors the trend of decreased passenger trips and reduced bus service miles between 2010 and 2015.

Figure 6.16: Bus Service and Ridership (All Providers), 2010-2015



Source: CTDOT

Figure 6.17: Bus Failures and Age (All Providers), 2010-2015



Source: CTDOT

Quick Facts

- The service area covered by Connecticut's entire public transportation (bus, van, and commuter rail) system and ridership shrank between 2010 and 2015, with the service area population decreasing by 12.1 percent and service area size decreasing by 6.3 percent. Ridership increased slightly, by 0.1 percent.²¹ Between 2010 and 2015, the state population rose by 0.1 percent.
- By 2040, Connecticut's population segments ages 70-74 and 75-79 are projected to increase over 87 percent and 110 percent respectively.²² These large increases in aging residents portends growth and reliance on safe, affordable and convenient public transportation and costly paratransit services.
- The state's population is expected to grow by approximately by 12.2 percent or by 0.34 percent per year, between 2016 and 2040.²³
- The New Haven Line (NHL) is one of the nation's busiest commuter rail lines providing a vital intercity connection on the Northeast Corridor linking New Haven with Boston, New York, and Washington DC.
- NHL service, which is operated by Metro-North under contract to the Department, extends through the state's most congested travel corridor and captures the majority of work trips bound for NYC.
- Reverse commuting trips on the NHL out of New York City, as well as the number of travel trips that do not begin or end in the city, has risen sharply in recent years.
- Amtrak's Northeast Corridor is one of the busiest rail lines in the U.S., linking all major cities in the Northeast. By the year 2030, 3,600 passenger trains are expected daily, an increase of 44 percent. This does not include freight trains, which number roughly 50 per day.
- The average utilization of parking spaces at the commuter rail stations in Connecticut is approximately 80 percent.
- CTfastrak, a bus rapid transit (BRT) system operating in central Connecticut, opened in 2015. It served a total of 395,199 corridor passenger trips in March 2016.

6.4 Pedestrian and Bicycle Transportation

Over the last few years, improvements in Connecticut's pedestrian and bicycle transportation network have become a focus for the Department. The Department has been working with its partner agencies, especially DEEP and the Connecticut Bicycle and Pedestrian Advisory Board (CBPAB), to develop bicycle and pedestrian policies, programs, and facilities. In 2014, the Department enacted a new 'Complete Streets' policy designed to promote safe access for all users by providing a comprehensive, integrated transportation network, including motor vehicles, bicycles, pedestrians, and public transportation. **(Figure 6.18)**

²¹ National Transit Database, accessed at: <http://www.ftis.org/iNTD-Urban/Reports.aspx>

²² Woods and Poole.

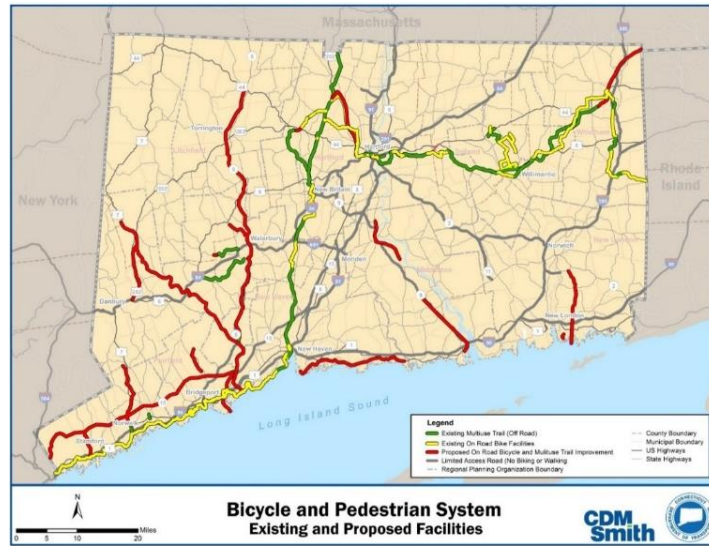
²³ US Bureau of the Census and Woods and Poole.

The Department has also joined the national Safe Routes to School (SRTS) program to help communities make walking and bicycling to school a safe and routine activity.

Quick Facts

- Most biking in Connecticut takes place on roadways shared with automobiles. In most cases, a bicycle lane is not officially designated, but bicyclists are legal road users.
- There are more than 60 off-road, multi-use trails open in Connecticut. In addition, more than a dozen other trails are in the planning or design stages.
- During 2011 through 2015, approximately 3 percent of workers in the state commuted to work by walking and 0.3 percent commuted by bike.²⁴

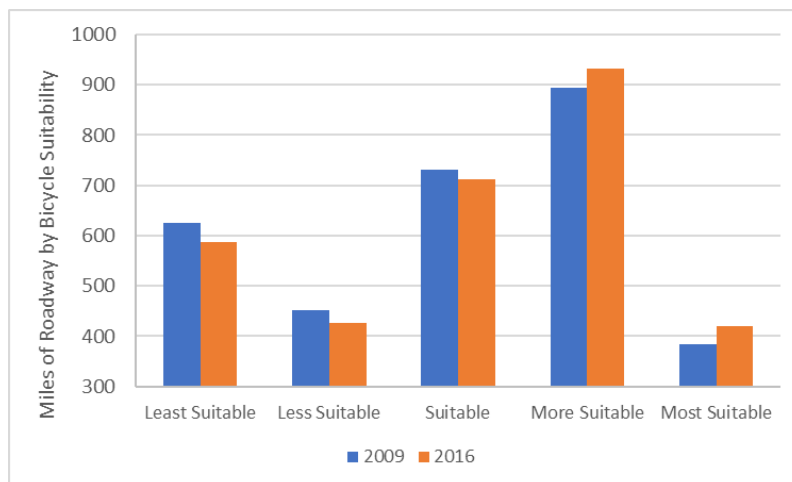
Figure 6.18: Connecticut Bicycle and Pedestrian Transportation Network



Source: CTDOT Connecticut Statewide Bicycle and Pedestrian Transportation Plan

Connecticut has taken steps to improve the connectivity and safety of the statewide bicycle network, and as **Figure 6.19** shows, the quality of the network has improved. Connecticut has recognized the importance of bicycle and pedestrian transportation as a tool for economic development and has increased funding support, enacted a complete streets policy and implemented a state TOD program to improve the non-motorized environment in dense, pedestrian-rich areas.

Figure 6.19: Roadway Bicycle Suitability Ratings, 2009 and 2016



Source: CTDOT 2016. Draft Connecticut Statewide Bicycle and Pedestrian Transportation Plan

²⁴ U.S. Census Bureau, 2011-2015 American Community Survey.

6.5 Freight Rail, Trucking, Ports, and Air Cargo

Connecticut's system of roads, railroads, airports, ports, and waterways is the physical conduit for nearly everything that is consumed and produced in the state (**Table 6.1**). A significant amount of goods moves through Connecticut, primarily by truck; however, most of it originates at ports or airports located outside of Connecticut.

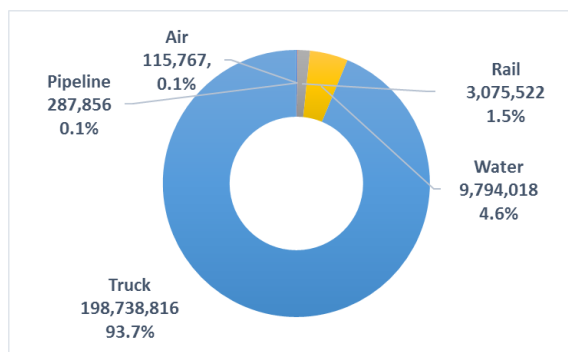
Table 6.1: Freight Transportation in Connecticut at a Glance

COMPONENT	KEY STATISTIC
Trucking	94 percent of freight within, to, and from Connecticut moves via trucks
Rail	Eight freight rail operators, 3.1 million gross tons annually
Waterway Transportation	Trade worth \$8.7 billion in 2016; imports accounted for 78 percent of the total
Air Cargo	Bradley International Airport handled approximately 114,000 tons valued at \$16.5 billion in 2014

From a freight traffic perspective, Connecticut is a bridge state connecting the New York metropolitan region and Mid-Atlantic states with the rest of New England (primarily Boston, Massachusetts). A significant proportion of freight traversing the transportation network of Connecticut is truck-based through traffic. In fact, the through truck traffic, by either tonnage or value, almost amounts to the remainder of all other modal directional combined. And, regardless of direction, the highway network is the predominate mode for freight movements, with 93.7 percent of all tonnage (**Figure 6.20**) and 92.4 percent of all freight value.²⁵

Connecticut is part of a national network and a gateway for freight, connecting some of the nation's most productive population centers just beyond our borders to the north and south with the rest of the nation. Forty-four percent of freight movements in Connecticut are through trips. However, Connecticut's roads, and especially the interstate system, carry a disproportionate burden of this through traffic—trucks transport over 99 percent of the freight that passes through Connecticut.

Figure 6.20: Freight Mode Share, within, from, and to Connecticut, 2014



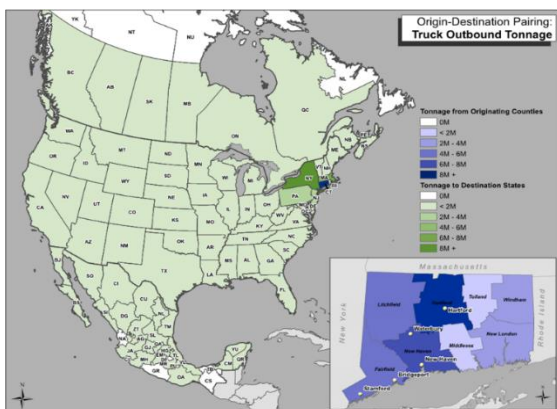
Source: 2014 IHS Transearch Data

Truck movements destined for out-of-state travel originate primarily from Hartford County (8.5 million tons, 25.4 percent), New Haven County (7.0 million tons, 20.9 percent), and Fairfield County (6.0 million tons, 17.8 percent). Nearly two-thirds of Connecticut's out-of-state shipments are destined for a neighbor state. The major destinations of outbound freight are New York (10.2 million tons, 30.3 percent), Massachusetts (7.8 million tons, 23.3 percent), and New Jersey (3.5 million tons, 10.4 percent) (**Figure 6.21**).

²⁵ As TRANSEARCH® is limited to NAFTA-related movements only, the airborne and waterborne freight data reported is a subset of what actually traverses the airports and ports. A comprehensive comparison with alternative data sources would supplement such modal-specific freight movements reported herein from TRANSEARCH®; however, the general conclusions regarding trucking dominance is likely to retain.

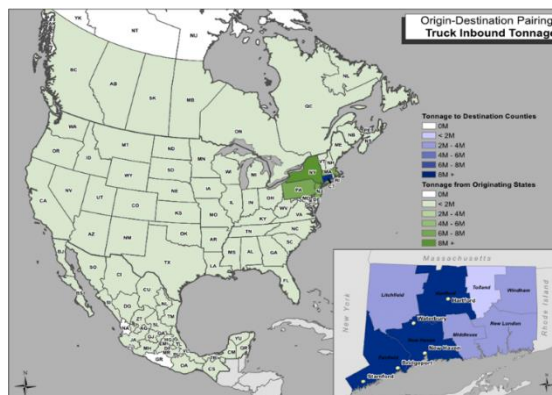
Over half of all truck movements originate from a nearby state: New York (11.2 million tons, 23.0 percent), Massachusetts (7.7 million tons, 15.9 percent), and New Jersey (6.5 million tons, 13.4 percent). The primary destinations of inbound truck shipments are Hartford County (14.0 million tons, 28.8 percent), Fairfield County (11.7 million tons, 24.0 percent), and New Haven County (10.5 million tons, 21.6 percent) (Figure 6.22).

Figure 6.21: Destination of Truck Freight Originating in Connecticut, 2014



IHS Transearch, 2014 and CDM Smith

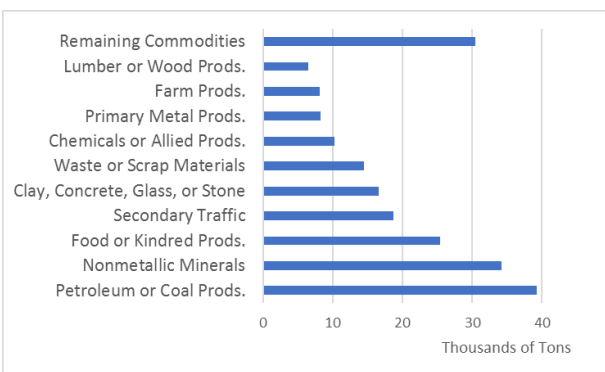
Figure 6.22: Origin of Truck Freight Originating in Connecticut, 2014



IHS Transearch, 2014 and CDM Smith

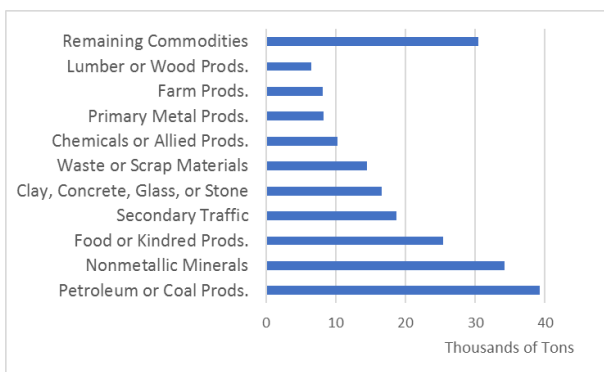
There are notable commodity movements (Figure 6.23 and Figure 6.24).

Figure 6.23: Commodities by Weight, 2014



Source: CTDOT and CDM Smith

Figure 6.24: Commodities by Value, 2014



Source: CTDOT and CDM Smith

- Petroleum or Coal Products (STCC 29)** – This is the largest tonnage and fourth-largest valued Standard Transportation Commodity Code (STCC) commodity for all modes and directions, at 39.3 million tons (18.5 percent of all freight), worth \$33.1 billion (9.0 percent). Approximately 16.7 million tons of the Petroleum and Coal Products traverse Connecticut as through movements (42.6 percent of commodity direction); 14.0 million tons are inbound (35.5 percent); and 8.6 million tons are either outbound or intrastate movements (21.9 percent). Most of the commodity movements are by truck, followed by ports.

- **Nonmetallic Minerals (STCC 14)** – This is the second largest tonnage STCC commodity for all modes and directions, at 34.3 million tons (16.2 percent of all freight). However, with a very small value per ton of \$15, the entire Nonmetallic Mineral freight movement is only worth \$512 million, representing just 0.1 percent of total freight values.
- **Food or Kindred Products (STCC 20)** – Food or Kindred Products is the third largest tonnage and value commodity movement, with 25.4 million tons, worth \$34.1 billion and representing 12.0 percent and 9.3 percent of total freight tonnage and value, respectively. Almost the entirety of Food and Kindred Products move by truck.
- **Electrical Equipment (STCC 36)** – Electrical Equipment is the major commodity movement by value, with \$42.7 billion dollars, representing 11.7 percent of all freight value movements. As the commodity has relatively high value per ton, at \$12,335, the tonnage is comparability small, relative to total movements, with 3.5 million tons, representing just 1.6 percent of all freight tonnages. This commodity is moved by truck for the most part.

Quick Facts

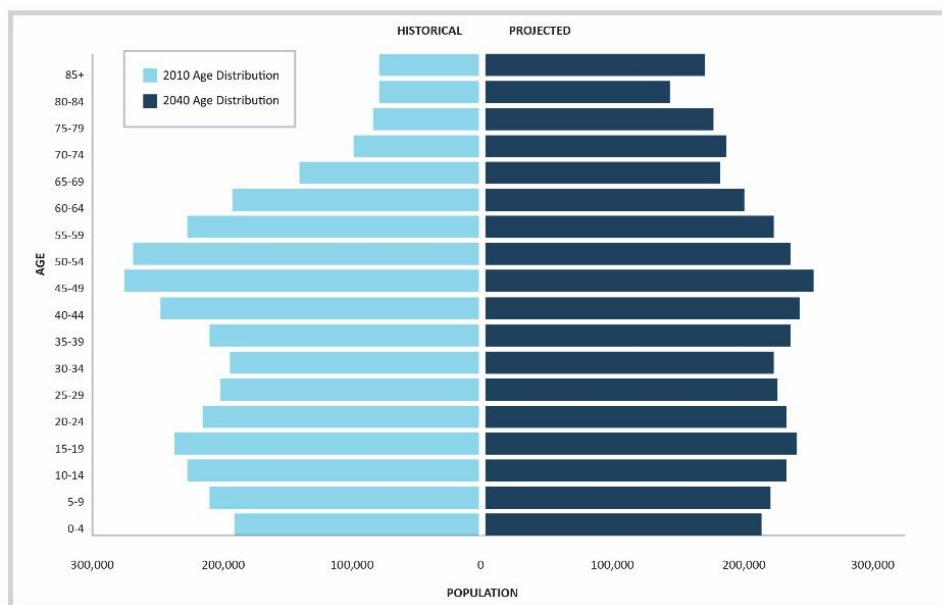
- Trucks encounter significant delay in the peak hours of travel on interstate roads around Connecticut's urbanized areas.
- Trucks move over 84 percent of the fuel oil that is shipped to the state.
- Trucks encounter significant delay in the peak hours of travel on interstate roads around Connecticut's urbanized areas. In 2016, truck delays were greatest along I-95 between New York and New Haven, and I-84 near Danbury, Waterbury, and Hartford.
- The Port of New York and New Jersey is the major conduit for waterborne freight to/from Connecticut by truck.
- John F. Kennedy International Airport (JFK) is a major source of air cargo that travels to and from Connecticut by truck.
- Rail accounts for a relatively small share of freight by weight. Two-thirds of Connecticut's rail freight shipments consist of wood products, gravel, chemicals, plastics, fuel, and scrap metal.
- Clearance restrictions, weight restrictions, and low operating speeds diminish the effectiveness of Connecticut's 648 miles of freight rail right-of-way.
- The nearest freight rail crossing of the Hudson River connecting Connecticut with New York and all points further west is located 140 miles north of New York City at Selkirk, New York.
- Connecticut's pipeline system brings 97 percent of the state's natural gas shipments into the state. The pipeline system is limited in its capacity to meet growing demand.
- Scrap metal is Connecticut's largest single export commodity by weight. Half is exported through Port of New Haven to international destinations. The balance is exported by truck to New England states.
- In 2013, over \$1.7 billion worth of fuel oil was shipped through the Port of New Haven.

- Bradley International Airport shipped over \$172 million in high-value goods in 2014, consisting of high value components such as aircraft components, electrical and machinery parts, and consumer goods.
- In 2016, over \$2.3 billion worth of petroleum products, including fuel oil, were shipped through the Port of New Haven.

6.6 Demographic and Economic Profile

Connecticut has experienced slow population growth and this trend is projected to continue over the next 30 years. Connecticut’s estimated population in 2016 was 3,574,097, a decrease of 1,000 people, as compared to 2010. The population is forecast to grow by 0.35 percent per year, reaching 4.07 million by 2040. Similar to trends across the country, Connecticut residents age 70-85+ are projected to increase in population faster than other age groups in the state, accounting for almost 10 percent of the total population by 2040 (**Figure 6.25**). Although the younger population groups will continue to account for a large portion of the population, residents age 35 to 59 are projected to decrease relative to the older age groups.

Figure 6.25: Age Distribution of Connecticut Residents, 2010 and 2040



Source: U.S. Bureau of the Census and CDM Smith

Quick Facts

- Connecticut residents over the age of 25 are, on average, more highly educated than the typical U.S. resident; 36.4 percent of Connecticut residents have a college degree, compared with 28.6 percent of U.S. residents.
- In 2011-2015, the median household income for Connecticut was \$71,346, as compared to \$55,775 for the U.S. in the same year. Connecticut ranks fifth among states in average household income.
- Connecticut’s occupations with the largest employment involve sales, healthcare delivery, office administration, and management.

Much of the state’s population is concentrated in the central and southwestern parts of the state, paralleling I-95 and I-91 and centered in the cities of Hartford, Waterbury, New Haven, and Bridgeport (Figure 6.26).

As shown in Figure 6.27, the education/healthcare sector is projected to add 69,000 jobs between 2011-2040 while business/professional services add 63,000. The number of jobs in government and construction is also projected to grow in future years—by 54,000 and 58,000, respectively—while employment in manufacturing is expected to fall by 39,000.

Figure 6.26: Population Density by Census Tract, 2016

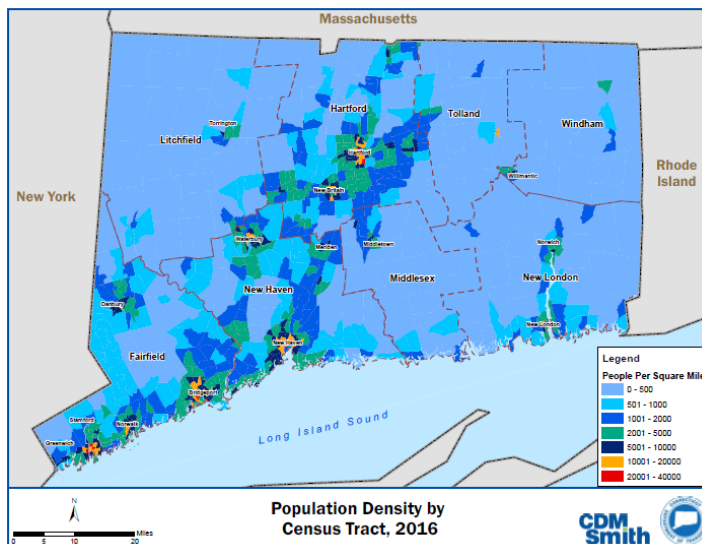
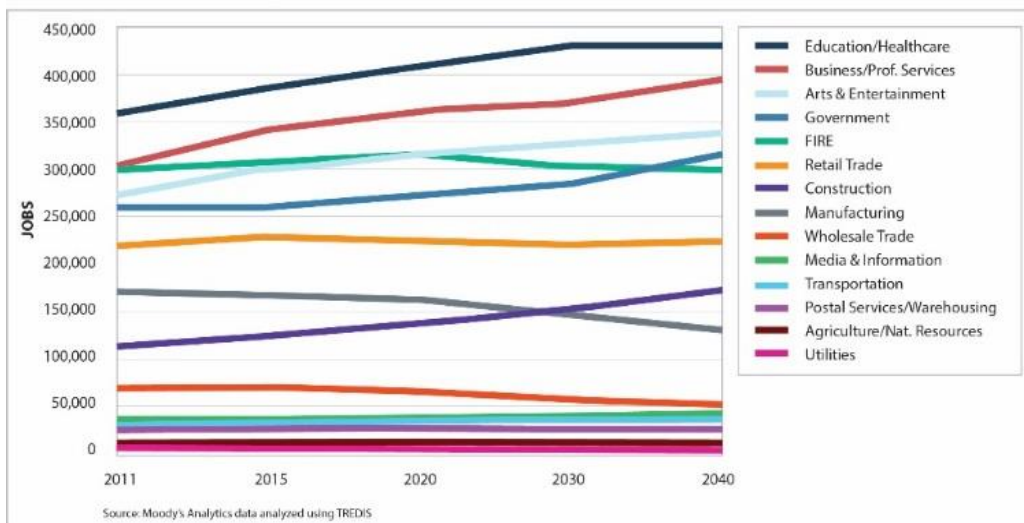


Figure 6.27: Projected Employment by Major Industry Sector in Connecticut, 2011-2040



Source: Moody’s Analytics data and EDRG

- Manufacturing is projected to experience the greatest increase in output over the next 2 to 3 decades (even in the face of declining employment), followed by FIRE industries (finance, insurance, and real estate) and arts and entertainment.
- By 2040, the value of manufacturing output in Connecticut is expected to exceed \$160 billion, a \$71 billion increase over its 2011 level. Specifically, it is projected that this growth will be driven by expansions in chemical; metal; plastics and rubber; computer, electronic, and appliance; and transportation equipment manufacturing—Connecticut’s existing specialties.

6.7 Special Topics

Connecticut's transportation system will always consist of roads, bridges, rail systems, airports, and ports, but the pace of change around how transportation is provided, how it is funded, and our approach to managing it is accelerating. This section addresses:

- Emerging transportation technologies
- Climate change
- Livability
- Project prioritization
- Transportation funding

6.7.1 Emerging Technology Trends that will Impact Transportation

In the last few years, the automobile and technology industries have seen dramatic innovations in vehicle technology, smart infrastructure advancement, and shared-use mobility concepts. Several major automakers are working towards fully autonomous vehicles (AVs) available to the public within the next decade. While current opinion suggests that the anticipated increase in AV and connected vehicles (CV) will enhance safety and efficiency, the effects on choice of travel mode, the supply and location of parking, and the amount and distance of travel are not understood.

The transportation industry is rapidly changing with advances in technology. Transportation network companies continue to grow and can help solve the problem of getting freight and people from and to the last and first mile of their trip. Technology can help transportation providers understand the condition and use of the system, and to pinpoint opportunities for improvements. Technology is perhaps the category with the greatest potential to change the transportation system and how people and goods move. State and federal regulations will change and adapt as advances in vehicle technology and operations alter the way we use transportation.

Autonomous and Connected Vehicles

AV and CV are two terms for advances in vehicle technology that is aimed at making roadway travel safer and more efficient. CVs utilize short range communications and cellular networks so that a vehicle can exchange information with other vehicles [Vehicle to Vehicle (V2V)] or to the transportation network [Vehicle to Infrastructure (V2I)]. CVs are not necessarily self-driving AVs. AVs use internal sensors, cameras, global positioning systems (GPS), and advanced software to operate all or some functions of a vehicle without driver assistance.

Although much of the public discussion surrounding AV has focused on passenger cars, many observers believe that the commercial trucking industry is likely to be the first widespread adopter of AV due to its potential for significant cost savings and safety benefits. The development of autonomous trucks continues to advance significantly. In fact, one logistics industry CEO recently predicted that virtually all trucks on the nation's highways will be



autonomous within 10 years, noting that every truck manufacturer is now including autonomous features in their future plans. Several of these vehicles employ a technology that enables the driver to switch control over to the truck's automated system after entering the flow of traffic and reaching 50 miles per hour. This technology uses a combination of vehicle-to-vehicle Wi-Fi communication, radar, and cameras for autonomous operation.

Potential Implications

- There are many unanswered questions around what the advances in vehicle technology mean for how we use transportation:
- How will consumers behave during the transition period and will they give up traditional cars to share a ride?
- What industries will be most impacted by AVs and what happens to displaced workers like truck drivers and car mechanics?
- What type of roadway infrastructure will be needed to make AVs work and how will it be paid for?
- How will transit systems respond?
- Will the technology work and can it survive glitches, hacks, or fatal errors?
- What role will governments and regulations play and what limits may be needed and when?
- Who is liable in crashes and who pays for insurance coverage?

Software developers, vehicle manufacturers, experts, research organizations, and even the federal government are in the midst of ongoing research, development, and testing, and mobility companies, have begun to deploy AVs in general traffic. What is known is that this technology has the potential to disrupt the transportation industry as it currently operates.

AV/CV in Connecticut

In June 2017, Public Act No. 17-69 was signed into law to create a pilot program allowing manufacturers and fleet service providers to test fully autonomous vehicles in Connecticut.²⁶ The law establishes strict standards for testing under the program and requires participating municipalities to enter into agreements with AV testers. The pilot program will be managed by the OPM, in consultation with the Departments of Motor Vehicles (DMV), Transportation, and Emergency Services and Public Protection. Up to four municipalities will be selected by the Secretary of the Office of Policy Management. At least one municipality must have a population between 120,000 and 124,000. A second municipality must have a population of at least 100,000.

Public Act No. 17-69 also establishes a task force to study fully autonomous vehicles. The task force consists of 15 appointed members and is charged with the following:

- Evaluate the standards established by the National Highway Traffic Safety Administration regarding state responsibilities for regulating fully autonomous vehicles.

²⁶ <https://www.cga.ct.gov/2017/ACT/pt/2017PA-00069-R00SB-00260-PA.htm>

- Evaluate the laws, legislation, and regulations proposed or enacted by other states to regulate fully autonomous vehicles.
- Prepare recommendations on how the state should regulate fully autonomous vehicles through legislation and regulation.
- Evaluate the AV pilot program.

Connecticut joins at least 25 states that have enacted rules and regulations for the use of AVs.

Intelligent Transportation Systems and Innovation

As technology advances, real time data on parking availability, congestion, and road and weather conditions can be transmitted between vehicles, roadside units, and traffic management centers. Additionally, the Department will continue to use innovative project delivery methods, including accelerated bridge construction and public-private partnerships.

Roadway volumes continue to increase and technological advances in dedicated smart infrastructure have the potential to optimize and improve the transportation network. Specifically, advances in Intelligent Transportation Systems (ITS), such as dedicated truck lanes and AV, may change the safety and efficiency of people and goods movements. Variable message boards/signs are one component of ITS currently used in urban areas to monitor highway conditions and inform drivers of traffic slowdowns, delays, and incidents.

In addition, applications can include advanced emergency management that aims to reduce congestion on major roadways through monitoring traffic incidents with closed circuit television cameras, dispatching vehicles to remove debris or hazardous materials, communicating the most direct routes to emergency vehicles to help them arrive more quickly at accident scenes, and displaying information on dynamic message signs to alert travelers of any issues.

6.7.2 Climate Adaptation and Sustainability

Sustainability in the context of transportation refers to accounting for climate change in bridge, pavement, and rail design and construction. Consideration of sustainability and climate adaptation furthers the Department's mission to provide a safe and efficient intermodal network and enable decision-makers to more confidently make cost-effective long-range decisions based on weighing the potential risk against the probability of extreme events. It also aligns with many of DEEP's goals.

The Department endorses DEEP's Comprehensive Energy Strategy, including the recommendations to increase the number electric vehicles, electric vehicle charging stations, and decarbonizing the transportation sector. Transportation can be part of the solution to improving the environment by encouraging walking, biking, and public transit; access to affordable mobility options like ride pooling; electric buses, delivery vans, and trucks; affordable housing located near transit services; and incentives to make electric vehicles affordable for average families.

Sea Level Rise and Land Subsidence²⁷

Between 1901 and 2010, the global average rate of sea level rise was approximately 7.5 inches.⁴ In the northeast, average sea level rose by 1.2 inches per decade, largely due to land subsidence.^{5,6} It is estimated that most U.S. shorelines are subsiding in a range of a few inches to over 2 feet per century.⁷ By 2100, sea level is projected to rise an additional 1 to 4 feet.⁸

²⁷ Additional citations and references for this section are in Appendix A.

Much work is being done on the area of climate science and in developing the tools needed to project increases in sea level rise. A recent study by the University of Connecticut²⁸ suggests that sea levels in Connecticut may rise anywhere from just under 2 feet to just under 7 feet by 2100. While such studies demonstrate the uncertainty around the magnitude of impact, the direction of impact is clear: constantly increasing sea levels with potentially severe impacts for coastal areas.



Rising Temperatures

The last decade was the warmest on record in the U.S. and the world,⁸ and 2016 was the hottest year on record, the third record year in a row.⁹ Average temperatures in the continental U.S. have risen nearly 0.14°F per decade since 1901, with a more pronounced increase of 0.29 to 0.46°F per decade since 1979.¹⁰ Since 1970, the northeast U.S. has seen an average annual temperature increase of 2 to 4°F, depending on the season.⁷ The northeast is projected to see continued warming, in 2085 temperatures are expected to increase by 3.5 to 8.5°F.⁵

Frequency and Intensity of Precipitation Events

Across the continental U.S., average annual precipitation has increased by approximately 7 percent during the 20th century and intense precipitation (the heaviest 1 percent of daily precipitation totals) increased by 20 percent.³ In the northeast specifically, average annual precipitation increased by more than 10 percent between 1895 and 2011.¹¹ Between 1958 and 2012, intense precipitation increased by 71 percent in the northeast region.⁸ The frequency of precipitation events is projected to decrease; however, the intensity of the events are expected to increase.^{12,13} As a result, the average annual precipitation totals are expected to increase as well.⁸

Transportation Sector's Contributions to Climate Change

GHGs, which trap radiation from the sun and thereby warm the Earth's surface, are a leading contributor to climate change. The transportation sector is an increasing contributor of GHG emissions. In the U.S., the transportation sector accounted for nearly 10 percent of total U.S. GHG emissions in 1990; by 2012, the transportation sector contributed 28 percent to the total.¹⁴ In Connecticut, the transportation sector accounted for 36 percent of total state GHG emissions in 1990, and 40 percent in 2010.¹⁵ Nationally, the transportation industry is the second largest contributor, behind electricity.¹⁶ Statewide, transportation is the leading contributor, more than double the next largest sector (residential).¹⁵

Possible Implications of Climate Change for Transportation Infrastructure

Climate conditions impact all aspects of transportation infrastructure: its design, construction, safety, operations, and maintenance.^{17,18} The degree to which the network can withstand changing temperature, sea levels, and precipitation events directly affects its long-term safety and reliability.

Projected rises in sea levels and increases in precipitation intensity would lead to increased flooding and frequent, if not permanent, inundation of vulnerable, low-lying infrastructure, as well as resulting in increased erosion and land subsidence.^{19,20} For example, infrastructure that conveys stormwater may become overwhelmed, leading to further flooding and damage to transportation assets. Increasingly

²⁸ <https://circa.uconn.edu/2017/10/19/sea-level-rise-projections-for-the-state-of-connecticut-webinar-recording-available/>

saturated soil can cause shifting and degradation of the structural integrity of the roadways, bridges, railbed support structures, and airport runways.^{7,19, 20} In addition, as water levels rise, the clearance under waterway bridges reduces, and access to ports and marinas may be inhibited.^{12,19}

Prolonged exposure to extreme heat quickens the degradation of roadways, bridges, and other infrastructure. It can cause rutting or buckling of pavement and railway tracks, softening of asphalt, and a quickened degradation of asphalt seal binders, resulting in cracking, potholing, and bleeding.^{7,17,19} In addition, it can cause undue contraction and expansion of bridge joints.²¹

The consideration of a network's functionality and responsiveness to external events can build its resiliency and result in a system becoming more sensitive to change but not vulnerable to it.¹² Resiliency is a factor in asset management, as it seeks to optimize performance at the lowest cost. An "enhanced resilience" strategy seeks to avoid reduce catastrophic losses by taking action to reinforce structures now, rather than waiting for an extreme event to occur and paying for recovery afterward.²³ Though the U.S. Government Accountability Office admits that it may be difficult to justify current costs of resiliency efforts for potentially less certain future benefits, extreme weather events have cost the U.S. billions of dollars in damages—\$9.1 billion dollars per fiscal year from 2007 to 2013.²³ Accounting for climate change enables appropriate budgeting and forecasting to minimize risk of "facing a large fiscal exposure at any time."²³

Current Connecticut Adaptation and Mitigation Strategies and Policies

Together, adaptation and mitigation strategies reduce and manage the risks of climate change.²⁴ Adapting infrastructure to be more climate-resilient will enable the transportation network to maintain high functionality even when it is most strained during extreme weather events. In addition, mitigating the transportation sector's contributions to GHG emissions will help avoid worst-case scenario climate change projections. Connecticut already has developed or is in the process of initiating several adaptation and mitigation plans and strategies, several of which are highlighted below.

Adaptation Policies and Strategies

The *Connecticut Climate Change Preparedness Plan*, published in 2011, includes adaptation strategies for infrastructure vulnerabilities and calls for further studies to establish accurate and useful risk assessments and to prioritize adaptation strategies or mitigation measures for the most vulnerable segments of the transportation sector.²⁵

Key transportation initiatives in the *Connecticut Climate Change Action Plan* (CCCAP) call for implementing a package of transit improvements and incentives to achieve a 3 percent reduction in VMT below a 2020 baseline, based on six complementary elements:

- Double transit ridership by 2020.
- Consider potential funding mechanisms for new transit investments.
- Establish a coordinated, interagency program to promote responsible growth in Connecticut.
- Redirect at least 25 percent of new development (based on forecast population and employment) to growth-appropriate locations.
- Study a potential road-pricing pilot project and implement the pilot project if it is shown to be effective.
- Consider complementary VMT reduction incentives, such as commuter choice, location-efficient mortgages, and mileage-based insurance.²⁶

The Department recently conducted the state's first vulnerability assessment as part of the FHWA's Climate Resilience Pilot Program. The study focused on bridge and culvert structures in the northwest area of the state, to evaluate current storm-event design standards and to determine how these standards will hold up against projected increases in rainfall. In addition, the state is involved in the NY-NJ-CT Hurricane Sandy Follow-up and Vulnerability Assessment and Adaptation Analysis Project, which seeks to systematically incorporate climate change vulnerability and risk in transportation decision-making. The Department and the MetroCOG (formerly the Greater Bridgeport Regional Council) are participating in this initiative.

Mitigation Policies and Strategies

The CCCAP recommends actions for the transportation and land-use sector to reduce GHG emissions. Subsequently, the CES, first prepared in 2013 and updated in 2017, built upon the ideas presented in the Action Plan.²⁷ The CES developed a foundation for quantifying the state's energy use and provided recommendations for five priority areas, including transportation. The CES seeks to reduce GHG emissions and increase energy savings and proposes that a formalized strategy will expand mobility and increase transportation choice for residents while decreasing congestion and improving air quality.

To further the goals outlined in the CCCAP and the CES, the *State Zero-Emissions Vehicle Programs Memorandum of Understanding* was signed in 2013 and the *Multi-State ZEV Action Plan* was released in 2014.^{28, 29} This plan outlines several strategies currently underway to promote zero-emission vehicles (ZEV), such as the development of a workplace vehicle charging education and technical assistance program, strategically locating ZEV chargers throughout the state, and a ZEV Dealer Recognition Program. DEEP, in partnership with the Department, launched the EVConnecticut program to provide grants, rebates, and other incentives to promote ZEV ownership. As of October 2017, there are 397 public and private alternative fuel stations throughout the state.³⁰

In addition, the CCCAP recommended reducing VMT to reduce GHG levels. Relative to transportation, the CCCAP also suggested several potential initiatives, such as increasing transit ridership, investing in new transit, and establishing an interagency program to promote smart transportation and land-use decisions to help achieve GHG reduction goals. The CES advanced these recommendations by advocating TOD and intermodal accessibility and connectivity.

Adaptation and Mitigation Strategies, Policies, and Constraints

Adaptation strategies increase resiliency, thereby reducing the vulnerability within the network, whereas mitigation measures serve to decrease the need for resiliency by slowing or inhibiting global climate change. Transportation adaptation strategies include vulnerability and risk assessments, building redundancy within the network, relocating or elevating vulnerable assets, revising design standards to better address climate change, reassessing stormwater infrastructure capacity, and incorporating climate change projections into the earliest stages of planning and decision-making.

Transportation mitigation strategies include increasing efficiencies in the transportation system through better traffic signal synchronization, as well as continuing and enhancing the state's commitment to promote and increase ZEV use and other low-emission vehicle use. Other goals include increasing transit options. These and other mitigation strategies identified in the CES are already being implemented or proposed by the Department.

Funding is a major impediment to the development of adaptation and mitigation strategies. Few options are available for resiliency enhancements. Of note, FHWA's Emergency Relief (ER) Program allows for in-kind repair of facilities damaged by a federally declared disaster. In 2013, the program recognized that climate change resiliency and adaptation were emerging fields, and stated that resiliency features should be considered;^{31,32} however, more detailed guidance has not yet been issued.

6.7.3 Livability, Transportation, and Connected Communities

Livability, in the context of transportation, results from improving the quality and location of transportation facilities to improve access to jobs, affordable housing, and education. Emerging strategies that improve the integration of transportation and land use—such as Complete Streets, Context Sensitive Solutions (CSS), focus on walking and bicycling modes of travel, intermodal transportation planning, TOD, Smart Growth, and other land use forms that enable people to live closer to jobs—serve to support healthier, more economically viable, and more vibrant places to live and work by connecting communities.²⁹

Connected communities are important because they have good quality, efficient public transportation and a community design that offers residents and workers a full range of transportation choices. Connected communities strategically connect all modes of travel—bikeways, pedestrian facilities, transit services, and roadways into one, seamless network.³⁰

The potential direct and indirect benefits of connected communities are numerous, and include:

- Improved access to quality and diverse housing.
- Safer, more walkable and bikable streets and communities.
- Lower costs of transportation for families.
- Less auto-centric communities (less space devoted to parking, less sprawl, greater preservation of open space/farmland/forests).
- Reduced congestion (reduced fuel consumption, less GHG, and improved air quality).
- Greener, more livable streets.
- Enabling more active lifestyles (higher levels of walking/cycling lead to improved health).
- Improved accessibility and mobility (better access to jobs/enable people to live closer to their workplace).

The following sections discuss each of the emerging strategies that contribute to connected communities in Connecticut.

Complete Streets

Complete Streets is a transportation policy and approach whereby facilities are planned, designed, operated, and maintained to provide safe mobility for all users, regardless of age, ability, or mode of transportation.³¹ Complete Streets principles can be applied to rural, suburban, and urban areas and are sensitive to the character or context of the community.

The Complete Streets approach to designing transportation projects is changing the emphasis of roadway design in Connecticut so that non-motorized users are considered on a par with motorized users. Specific Complete Streets strategies or improvements include safer roadway design features such as sidewalks, crosswalks, signage, and pedestrian control signals; traffic-calming measures such as curb extensions, pedestrian refuge islands, and vehicle lane width reduction or road diets where the width of vehicle travel lanes is reduced both to encourage lower traffic speeds and to accommodate wider sidewalks or bike lanes; and improvements that make transit more convenient and welcoming, such as well-appointed bus shelters and bus pull-outs. The intent of these strategies and improvements is to make travel safe and accessible for pedestrians, bicyclists, public transportation riders, and motorists.

²⁹ <http://www.fhwa.dot.gov/livability/>

³⁰ Department of Transportation, the Federal Highway Administration and the Federal Transit Administration; *Livability in Transportation Guidebook—Planning Approaches that Promote Livability*; http://www.fhwa.dot.gov/livability/case_studies/guidebook/livabilitygb10.pdf

³¹ *Complete Streets Report – Executive Summary*; State of Connecticut Department of Transportation; Fall 2013. http://www.ct.gov/dot/lib/dot/documents/dbikes/completestreets/execsummary_transcommrrepcomplst_v0_2013.pdf

The Department has embraced the Complete Streets philosophy and has begun the process of formalizing this through its activities relating to:

- 1) Policies and practices (refer to the Department's new Complete Streets policy statement³²)
- 2) Infrastructure improvements
- 3) Alternative systems such as off-road, multi-use trails³³

The Department is also developing alternative standards for the design and implementation of multimodal projects and the incorporation of Complete Streets principles through revisions to its Highway Design Manual.



Context Sensitive Solutions

CSS considers the scale and character of the project location, such that new improvements respect existing development patterns and integrate with the unique character or context of communities. This approach preserves and enhances scenic, aesthetic, historic, cultural, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.

The CSS process is a collaborative, interdisciplinary, holistic approach to the development of transportation projects. It differs from traditional infrastructure design processes in that it considers a range of goals that extends beyond the transportation problem—such as goals related to community livability and sustainability—and seeks to identify and evaluate diverse objectives earlier in the process. Public outreach and involvement is essential to CSS. Involving all stakeholders, including community members, elected officials, and interest groups, provides the means to understand community needs and ensures that site specific issues are considered and addressed to mitigate any adverse impacts.³⁴

Focus on Walking and Bicycling Modes

Increasingly, Connecticut residents demand communities where streets are safe, accessible, and comfortable for all users, including those traveling on foot and by bicycle.³⁵ Importantly, this renewed focus on non-motorized transportation enables the Department and communities to meet the growing needs of more vulnerable residents, such as children and pedestrians with disabilities. Streets that are pedestrian- and bicycle-friendly have many benefits, including:

- Safer streets with fewer conflict points between pedestrian, bicyclists, and motorists, where all street users are less likely to be in a traffic collision or get injured.
- More choices for everyone—including people with disabilities—providing better access to more destinations without relying on a car.

³² http://www.ct.gov/dot/lib/dot/plng_plans/bikepedplan/cs-exo31-signed.pdf

³³ *Ibid.*

³⁴ *Context Sensitive Solutions Primer*; U.S. Department of Transportation Federal Highway Administration; http://www.fhwa.dot.gov/context/css_primer/docs/fhwa_css_primer.pdf

³⁵ http://safety.fhwa.dot.gov/ped_bike/ped_cmnty/ped_walkguide/residents_guide2014_final.pdf

- Improved opportunities to be physically active, which can improve health and overall quality of life.
- The decline in walking and bicycling has led to traffic congestion and air quality degradation around schools, a decrease in safety for pedestrians and bicyclists, and a sedentary lifestyle that can contribute to childhood obesity.



The Department is responding to a growing demand for improved pedestrian and bicycle travel with several initiatives and investment programs, including:

- As part of the Department's American's with Disability Act (ADA) transition plan, steps are being taken to evaluate and improve accessibility for handicapped persons, as necessary, at all state-maintained traffic control signals.
- The Connecticut SRTS Program is designed to empower schools and communities to make walking and bicycling to school a safe and routine activity. Walking or biking to school plays a critical role in keeping children physically active and healthy. The SRTS program makes funding available for a wide variety of programs and projects, from building safer street crossings near schools to establishing programs that encourage children and their parents to walk and bicycle safely to school. Since the SRTS Program inception in 2006, the Department has programmed approximately \$12 million for these projects.
- The Department has updated and redesigned its Bicycle and Pedestrian Travel Needs Assessment Form. The form prompts early consideration of bicyclists and pedestrians in the development of every project.
- For non-motorized transportation user, sidewalks are important components of the transportation system. Recently, the Department updated its policy on sidewalks to allow greater flexibility in the funding of this critical component of the state's non-motorized infrastructure. Moreover, exclusive sidewalk projects are now allowed and are prioritized along with traditional road projects.
- Bicycle use is becoming increasingly popular with transit riders. The Department is making it more convenient for bicycle commuters to utilize transit by providing bicycle lockers or storage racks at train stations and by installing bicycle racks on the new commuter rail cars and on all buses in the Connecticut Transit (CTtransit) fleet. The CTfastrak BRT system is also designed with amenities friendly to bicyclists, pedestrians, and persons with disabilities, and CTfastrak buses will accommodate bicycles.
- The Department has increased its focus on and investments in off-road, multi-use trails that improve safety, accessibility, and connectivity for non-motorized transportation users. These travel systems offer safe and functional alternative travel options that link neighborhoods and communities and provide recreational opportunities.

Improved Transit and Intermodal Connectivity

Transit systems are critical assets that improve access to markets (both in-state and out-of-state), jobs, education, recreation, and other daily activities for a large segment of the state's population. To fully leverage the ability of transit to generate new economic growth, policy-makers at the state and local levels need to improve connections to transit from other modes of travel. They also need to better integrate land use and transportation within transit corridors and around transit terminals so that development adjacent to transit networks complements investments in transportation (see next section on TOD).

While improved access to the New York and Boston metropolitan area markets is a key transportation goal for the state, it is even more essential that intrastate access and improved connections between Connecticut's cities and towns are strengthened to improve economic activity.

The strategies for public transit therefore should focus on a hierarchical approach that links different modes of travel to best serve the mobility needs of the urban areas of Connecticut and respond to a variety of travel patterns. This hierarchy of modes should be planned as a single, integrated network with seamless, high quality interchange throughout. This allows travelers to move easily from each mode to the next—from rail through an urban transit network on main routes to a wide, fine-grained bus network and local walking and cycling facilities. The fluidity of this integrated network is dependent on having excellent physical interchange and high-quality passenger facilities and information (or transit hubs).



Experience in other states shows that transit hubs can be effective drivers of new office, commercial, and residential development. Regional coordination will be needed to maximize state investments in transit infrastructure. In particular, transit service upgrades or new investments that effect mode shift by increasing transit ridership result in positive economic, environmental, and social impacts including: reduced GHG as a result of regional reductions in VMT, reduced traffic congestion, and reduced energy and land consumption. Also, residents that utilize transit can realize substantial economic savings resulting from reduced car ownership and time savings.

Partnering among regional transit districts, intercity bus providers, Amtrak, and Metro-North can improve the integration of transit service between cities and encourage local and long-distance transit travel with more frequent and reliable service, while relieving pressure on highways and improving travel options for residents.

Making it more convenient for commuters and other travelers to reach transit stations by automobile, on foot, or by bicycle is another important strategy that improves intermodalism and facilitates practical connections to transit. The "last mile" is a term used to describe ways that people travel from their homes to bus or railway stations and, once their transit commute ends, onward to their final destination, such as a workplace in another city. This important link to and from transit stations could include walking, bicycling, taxis, shuttles, or local bus connections. Specific strategies that could improve intermodal connectivity and the "last mile" include:

- Coordinate fare payments on multiple transit modes through a universal pass program or transit smart cards.
- Provide state-of-the-art, real-time transit information (schedules, routes, and location or status of specific transit vehicle) for smart phone apps, at transit terminals, and at bus shelters.
- Improve parking supply at transit terminals.
- Provide express bus service that links cities and town centers that lack regional or interstate transit routes with bus and commuter rail terminals in other cities.
- Provide shuttles between commuter parking lots or satellite parking lots and transit stations.
- Provide secure and sheltered bicycle parking at bus and commuter rail terminals.
- Improve walking and cycling routes (e.g. Complete Streets improvements and bicycle lanes) between residential areas and transit terminals and between transit terminals and downtowns or other centers of activity or employment.
- Encourage employers to incentivize use of transit by their employees.
- Provide more amenities such as restaurants, cafes, and convenient services adjacent to transit terminals.
- Encourage apartments and other housing adjacent to or within walking distance of transit terminals (refer to TOD section, below).
- Encourage private transportation providers such as car rental companies, shared vehicle operators (e.g. Zip Cars), taxi operators, and shared bicycle networks to locate facilities or rental outlets adjacent to transit terminals.

Transit-Oriented Development

TOD is characterized by compact, mixed-use development within walking distance to a major transit facility, such as a commuter rail station or a bus terminal. TOD consists of:

- a) A public realm of Complete Streets and transit that creates safer, more walkable, and bicycle-friendly districts; reduces traffic congestion; and improves intermodal connections and transportation choice.
- b) A private realm of vibrant, diverse land uses that fosters community, revitalizes downtowns, improves housing choice, reduces land consumption, and maximizes opportunities for transit use for work trips, entertainment, or daily life.

This Plan recognizes that Connecticut can become more sustainable by capitalizing on its impressive and multi-faceted transportation systems, by enhancing modal connections, and by making its cities more accessible to alternative transportation and more conducive to non-motorized travel (e.g., walking and biking). By promoting the use of transit, TOD also reduces reliance on automobiles, resulting in energy cost savings and improved air quality. TOD can be created in a downtown or urban core or a regional activity center to create more appealing, livable neighborhoods with high-quality housing that is integrated with restaurants and shops. Once-declining districts can become vibrant, diverse, and sustainable business and residential environments by leveraging the public's investment in transit.

Quality, compact development near transit stations provides dynamic places for people to live, work, shop, and play in an environment that does not require car trips for daily activities. TOD allows cities and towns to attract investment, use their land and natural resources wisely and enhance the long-term quality of life for residents.

Experience from other cities demonstrates that implementing TOD can result in significant benefits to individuals, communities, and entire regions by improving the quality of life for people of all ages, including:



- Helps to reduce automobile reliance by reducing travel times, shortening journeys, and improving transit and non-motorized trip options.
- Creates more pedestrian- and bicycle-friendly districts and increases pedestrian/bicycle originated transit trips.
- Improves health and promotes healthy lifestyles by providing infrastructure that supports walking and biking.
- Provides convenient transit options to many desired destinations by integrating land use and transportation systems. By creating “activity nodes” linked by transit, TOD provides much needed mobility options for young people, the elderly, and people who do not own cars or prefer not to use a car for the trip.
- Improves housing choice and helps to meet the growing demand of millennials and aging baby boomers for housing that is proximate to jobs, shops, restaurants, health care, community centers, and cultural facilities.
- Development of appropriate areas near transit stations reduces pressure to build conventional development and infrastructure on Greenfields that consumes acres of farmland or forests.
- Facilitates redevelopment of underutilized urban areas through urban infill, Greyfield and Brownfield site reuse, and repurposing historic structures.
- Optimizes the use of existing infrastructure and lowers infrastructure construction and maintenance costs.
- Improves local economic development by helping to revitalize neighborhoods and enhancing tax revenues.
- Increases land values: locations with access to transit can enjoy increases in land values in comparison to locations away from transit stops.
- Increases public safety by creating active places that are busy through the day and evening and by providing additional “eyes on the street.”
- Increases disposable household income by reducing the costs of owning and operating a vehicle.

One of the primary objectives of the Plan's identified transportation investments is to act as a catalyst for TOD around transit stations. Investments in TOD will help Connecticut achieve many of its sustainability, land use, and transportation goals and objectives. The Department believes that TOD helps make cities and urban villages along its transit lines more vibrant and economically viable. The Department is working with municipalities to leverage investments in transportation infrastructure and create local development benefits.

In a recent address at the site of the proposed Meriden Transportation Center on the Hartford Line, Governor Dannel P. Malloy stated, "This TOD project will foster economic development in the various towns and surrounding regions by supporting local projects that connect state residents to job opportunities, housing, cultural centers and more." The significant transportation investments in Meriden are emblematic of that state's intent to provide transportation infrastructure that will allow municipalities to capitalize on the increased transit connectivity and incentivize public-private partnerships to re-vision and revitalize their urban centers.

Responsible Growth (Smart Growth)

According to a recent report by the State of Connecticut Office of Responsible Growth, "Responsible Growth is economic, social, and environmental development that uses land and resources in ways that enhance the long-term quality of life for Connecticut's current and future generations. Responsible growth supports a vibrant and resilient economy and preserves the natural resources upon both of which that quality of life depends. Responsible growth maximizes previous investments in existing infrastructure while preserving distinctive landscapes, historic structures, landmarks, and villages."³⁶



The report identifies key strategies to achieve Responsible Growth, including:

- Focus on redevelopment, reuse, and rehabilitation of existing infrastructure rather than the construction of new infrastructure in undeveloped areas to revitalize Connecticut's central cities and take advantage of existing infrastructure.
- Encourage inter-local cooperation to promote equitable sharing of the benefits and burdens of development, diminish the competition for revenue that biases land use decisions, and streamline regulatory and permitting processes.
- Expand housing opportunities by supporting the rehabilitation and construction of housing to meet the needs of all people regardless of abilities, income levels, and household types; coordinating the provision of housing with the location of jobs, transit, and services; and promoting a range of attainable housing choices that provides housing for people who work in the area and that leads to diverse communities.

³⁶ Report of the Responsible Growth Task Force to Governor M. Jodi Rell, February 4, 2008.
http://www.ct.gov/opm/lib/opm/igp/org/rgtf_report_2-4-08.pdf

Additionally, the state's current plan of conservation and development (Conservation & Development Policies: The Plan for Connecticut, 2013-2018) is organized around six growth management principles that echo many of the goals, objectives, or strategies associated with responsible growth, TOD, and connected communities, including:³⁷

- Concentrate development to conserve land, integrate uses, foster a sense of place, and create walkable districts in or adjacent to existing centers.
- Concentrate development around transportation nodes and along major transportation corridors to improve transportation choices, such as increased access to public transit, bicycling, and walking.
- Conserve natural resources; reduce waste, energy use, and reduce GHG; increase our supply of renewable energy; expand land conservation and protected open space; and protect and restore water resources, biodiversity, environmentally sensitive lands, food security, wildlife habitats, and cultural and historic landscapes.
- Plan regionally to encourage development projects, land and water conservation, transportation, and housing that have a regional or multi-community benefit.
- Increase job opportunities by attracting new businesses and supporting the growth of existing businesses, expanding access to educational and entrepreneurial opportunities, and strengthening sustainable production of goods and services.

Potential Policies to Implement Connected Communities

- Align the state's Plan of Conservation and Development with transportation policies by defining typologies of multimodal centers, incentivizing TOD and Smart Growth, and instituting intermodal solutions that are compatible with various scales, densities, and design sensibilities of Connecticut communities to improve linkages among housing, employment and transportation.
- Codify or institutionalize Complete Streets and CSS policies by adopting detailed multimodal street design guidelines that address the scale and character of the community and the context and function of the street to improve safety and travel choice on a local level.
- Prioritize transportation investments based on cost-benefit analyses that not only consider improved mobility but also consider the more qualitative, secondary benefits that accrue from connected communities (e.g. health impact assessments, reduced environmental impacts, and reduced sprawl).



³⁷ Conservation & Development Policies: The Plan for Connecticut, 2013-2018; prepared by the Office of Policy and Management of the State of Connecticut.

http://www.ct.gov/opm/lib/opm/igp/org/cdupdate/2013-2018_cd_plan.pdf

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7. WHERE SHOULD WE BE?

7.1 Where Should We Be? (Multimodal Needs Assessment)

From the nation's oldest continuously running ferry service to one of New England's largest airports and the busiest commuter rail line in the nation, the Connecticut transportation system serves millions of travelers and moves millions of tons of freight by road, rail, air, ship, and highway every year. Connecticut faces:

- Aging infrastructure: More than half of the 20,000 miles of public roadways, were built before 1962.
- Significant, recurring, congestion along the I-95, I-84, and I-91 corridors: Drivers face costs estimated at nearly \$1.6 billion in lost time and fuel, and \$2.6 billion in higher operating costs, fuel, and accidents.
- Unmet demand for improved rail and bus service: This would reduce demands on the highway system and improve the state's economic competitiveness.

"Transportation is essential to everything we do, from connecting with family, friends, and loved ones to getting an education and earning a living."

GOVERNOR DANIEL P. MALLOY

For the state to remain competitive on a regional, national, and global scale and remain a desirable place to live and raise a family, the transportation system must support urban and rural communities and improve connections to neighboring states. Additionally, the state's airports and deep water ports that connect to global markets must be enhanced and improved.

While Connecticut's population is expected grow at a modest pace over the next 30 years, the demand for transportation could increase faster than population growth would indicate. This is because:

- a) Rising incomes boost demand for travel.
- b) Commuter patterns and economic may require many workers to travel longer distances between home and the workplace.
- c) Connecticut's location between significant regional markets will very likely continue to result in increased 'through-state' traffic along freight transportation corridors.
- d) Automated vehicle technologies could decrease the cost of travel, and historically, decreased costs have increased travel.

This Plan identifies the investments needed to sustain the current system in a state of good repair and describes an enhanced system that will produce greater efficiency, improved mobility and increased customer satisfaction.

7.2 Needs Based on Citizen Input and Analysis

The Plan has reached out to residents, business leaders and agency partners across the state to hear ideas about current and future transportation needs. Here's a summary of the needs that citizens articulated most often:

- A comprehensive, long-term solution to fix the consequences of deferred maintenance of the transportation infrastructure.
- Decreased congestion and increased mobility on our highways and transit systems.
- Ability to attract and retain a young, high-quality workforce.
- Ease of movement for people and goods.
- Quality-of-life improvements through walkable, bikeable, sustainable communities and development around transportation centers.
- Sustainable transportation systems with real choices.
- Efficient and innovative implementation of transportation projects.
- Vibrant, transportation-friendly urban centers that will grow the economy and attract business across the state.
- Convenient and affordable access to high-quality air service covering a wide variety of national and international destinations.

In recent years, the Department has invested heavily in management information systems to track the performance and condition of its transportation system, and to forecast future needs for preservation and system expansion. These systems collect, manage, and analyze large volumes of information to understand current and future transportation needs from the transportation engineers' perspective. This perspective focuses on maintaining safe travel conditions and providing mobility as efficiently and effectively as can be achieved with the resources available, but it also focuses on defining new transportation investment strategies that can foster growth and strengthen economic linkages with the U.S. and global economies.

7.2.1 A Statewide Strategy

Connecticut's transportation needs encompass all modes: highways and bridges, rail, bus, airports, ports, urban systems, and regional trails. Local roads, bridges, sidewalks, and bicycle and transit networks provide access to our urban centers and mobility within communities, and their needs are an important part of the Plan. The Plan defines needs as the 32-year funding levels required to achieve a high-performing transportation system in the areas of preservation, safety, mobility, operations, and administration. The Plan organizes investments around three basic categories: preservation, enhancement, and operations.

It should be noted that the individual projects included and identified in *Let's Go CT!*, are not the only projects that can achieve the goals articulated in this Plan. As systems continue to age, trends change, and technology and project designs advance, the projects presented in *Let's Go CT!* can and will change, but the broader goals and strategies therein will continue to be advanced.

7.2.2 Preservation Needs

Preservation consists of work that is planned and performed to improve or sustain the condition of the transportation system in a state of good repair. Preservation activities generally do not add capacity but

do restore the overall condition of the transportation facility. Timely preventive maintenance and preservation activities are necessary to ensure proper performance of the state's transportation infrastructure. Preventive maintenance has proven to be a cost-effective way of extending the service life of transportation facilities and allows Connecticut to increase the return on our infrastructure investment.

Over the past 50 years, an accumulation of state of good repair needs has created a backlog that must be addressed to complete the massive reconstruction program that the state needs. Many of the system's bridges, viaducts, and other structural components have reached the end of their useful lives and must be replaced. Failing to replace them will drive up the costs of annual maintenance, result in possible closures, and in the end, prove to be far more costly than replacing structural components at the appropriate time in their life-cycles.

The replacement of these major components represents more than two-thirds of the total program. It should be noted that, while these maintenance and replacement projects will not expand the transportation network, the Department will look for creative and appropriate ways to enhance the performance of a transportation facility. Improving safety, pedestrian and bicycle access, and access to transit systems are examples of this.

Features of the Plan's preservation needs include:

(For a full list of preservation needs see *Let's Go CT! 30 Year Vision*: <http://www.LetsGoCT.info>)

Roadways

- Reconstructing or restoring all major bridges and pavement to safety and reliability (quality) standards that exceed federal guidelines, in effect to be "Exceptional, Fit for the Future."³⁸
- Increasing assistance to towns and municipalities for infrastructure preservation, especially for bridges and pavement.
- Modernizing outdated ramp designs throughout the state.

Rail

- Restoring and replacing rails, locomotives, and rail cars to attain reliable service and state of good repair.
- Modernizing rail stations.
- Constructing new rail stations on the Hartford Line.
- Upgrading power delivery systems for electric powered trains.
- Replacing rail bridges.

Bus

- Modernizing state bus and rail maintenance facilities.
- Improving inter-regional services including shuttles, new BRT systems, and additional dial-a-ride services.
- Replacing bus fleets on schedule to maintain an average age of 8 years, using low- and no-emission technologies.

³⁸ "Exceptional, Fit for the future" grade mean that "...the infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events," *Infrastructure Report Card*, American Society of Civil Engineers, 2017. (<https://www.infrastructurereportcard.org>)

Airports

- Rehabilitating the main taxiway system serving the airport's runways and terminal.
- Maintaining and creating growth opportunities for the state's general aviation airports.

Ports

- Renovating piers, reconstructing and modernizing warehousing infrastructure, and conducting ongoing and regular maintenance dredging.

Freight

- Upgrading highway bridges to meet the national standard of 80,000 pounds.
- Upgrading rail line facilities to the national standard of 286,000 pounds, especially in key rail corridors.
- Reducing congestion on the highways.

7.2.3 Expansion Needs

Preserving and rehabilitating Connecticut's existing system is a priority of the Plan, but stakeholders have told the Department that the state must also make new, bold investments to drive the economy towards economic growth and an improved quality of life. The long-term vision includes transportation enhancement projects that will create a best in class transportation system for Connecticut, including:

(For a full list of preservation needs see *Let's Go CT! 30 Year Vision*: <http://www.LetsGoCT.info>)

Roadways

- Congestion relief by adding a third lane to parts of the interstate system, fixing operational deficiencies, closing interchanges, building service roads, and using travel demand management strategies including variable congestion pricing.
- Implementing corridor management strategies, including limited capacity expansion on major non-interstate roads that serve regional connections.
- Expanding the express bus system for all of Connecticut and beyond with a system of express busways and CTfastrak-like service that serves major cities and employment centers.

Rail

- Expanding high frequency, high capacity, fast service to/from New York City.
- Expanding station access through parking, bus, shuttle, bicycle, and pedestrian investments.
- Expanding and modernizing branch lines with improved service, new equipment, upgraded stations, parking expansion, bus connections, and equipment storage.
- Expanding rail service between New Haven and Springfield-Boston, and to Montreal.

Bus

- Expanding the existing bus system by 25 percent, by expanding coverage and frequency of bus service, using low- and no-emission technologies.
- Extending CTfastrak east, north, and south from Hartford.
- Implementing coastal express priority bus service in the southwest.
- Integrating services and customer information statewide, including consolidated and coordinated paratransit services.
- Installing real-time multimodal information kiosks and smart card fare collection systems.

Aviation

- Constructing a new Bradley International Airport ground transportation center connected directly to the terminal facilities.
- Creating an express bus or rail service to Bradley International Airport.
- Constructing a new, state-of-the-art Bradley International Airport terminal to allow for expanded domestic and international service capacity.

Port

- Adding cranes and warehouses to expand freight handling capacity.
- Improving rail freight intermodal linkages.

Freight

- Expanding overnight parking for trucks.
- Implementing a fully automated wide and heavy loads permitting system for trucks.
- Improving rail freight intermodal linkages.
- Upgrading or eliminating at-grade crossings across the state.

Bicycle and Pedestrian

- Completing gaps in the regional trail system.
- Creating or completing bike/pedestrian connections to train stations and other major destinations.
- Encouraging municipalities to construct pedestrian and bike improvements.

7.2.4 Long-Range Transportation Plan Funding Needs

The total amount of capital to achieve the vision over the 30-year timeframe of the program is estimated to cost more than \$100 billion. Both preservation and enhancement projects positively impact the economy and improve the quality of life for residents.

The mix of transportation development required to keep the state competitive on a regional, national, and global scale will rely on a multimodal transportation system designed to leverage the diversity among the various rural, urban, suburban, and coastal regions of the state. All modes are important. The non-motorized modes of bicycle and pedestrian will enhance local mobility and connectivity, while roadway and rail will connect Connecticut regionally and nationally, and the state's airports and deep water ports will connect Connecticut to global markets. All modes must be continually enhanced and improved because advantages are not a given; they must be sustained through supporting investments.

By developing needs across all modes, and focusing on key areas, Connecticut's Transportation Plan is laying the foundation for a 21st century multimodal transportation system that is safe, reliable, and efficient.

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8. FUNDING TRANSPORTATION IN CONNECTICUT

This chapter describes current and future transportation funding in Connecticut, including transportation funding sources, programs, needs, scenarios, and estimates.

8.1 Introduction

A variety of state and federal sources provide transportation funding to Connecticut. As is the case with all public agencies, the Department must align its financial resources with its responsibility to achieve its mission and address the transportation needs of the state. However, in the absence of significant new or enhanced funding, the Plan forecasts a substantial and widening gap between the Department's ability to meet its responsibilities and the funds available to do so.

8.2 Current Transportation Program

The current, multimodal transportation program in Connecticut is managed by the Department using sound fiscal planning. The Department's goal is to utilize all available funding to plan for, design, build, and maintain the state's transportation system. By optimizing funding for all its transportation modes, the Department strives to maximize benefits for each dollar expended.

8.3 Transportation Capital Infrastructure Program Funding

It is the Department's responsibility to develop and implement a transportation capital infrastructure program (capital program). This includes planning, engineering, and construction services, as well as property acquisition and management, research, and material testing.

8.3.1 The 5-year Capital Plan

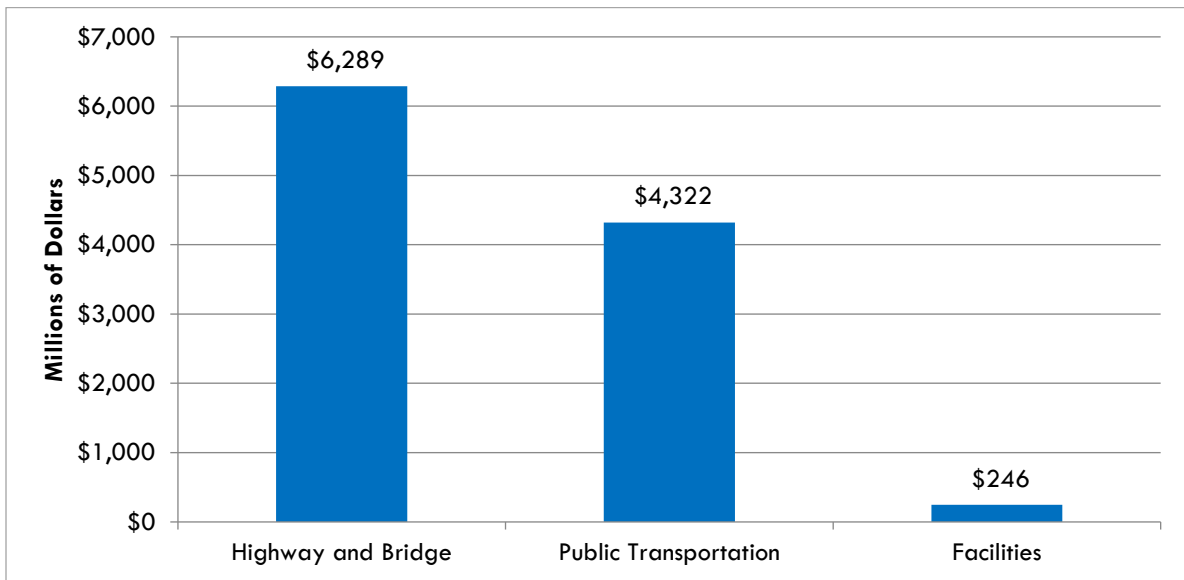
Each year, the Department develops a 5-year capital plan for the design of road, bridge, public transportation, and other transportation facilities, to acquire the necessary property interests and to construct those projects in a way that uses or leverages the available state and federal funding for capital. The 5-year capital plan includes the planned list of specific capital projects and initiatives that will be funded over a 5-year period.

The Department's 5-year capital plan places a great deal of emphasis on projects and initiatives which preserve the transportation system in a state of good repair. Depending on funding availability, the Department also invests in some system enhancements, specifically intended to increase capacity or improve service.

Over the 5-year period between fiscal years 2017-2021, the Department's total capital plan is approximately \$11 billion. Nearly 58 percent, or approximately \$6.3 billion, of funding in the 2017-2021 capital plan is slated for highway and bridge infrastructure improvements. Nearly 40 percent or approximately \$4.3 billion is slated for bus and rail infrastructure improvements. The remaining \$245.8 million, which amounts to approximately 2 percent of the capital plan, will support general facility

upgrades and expansions, etc. **Figure 8.1** shows estimated capital plan program amounts for FY 2017-2021.

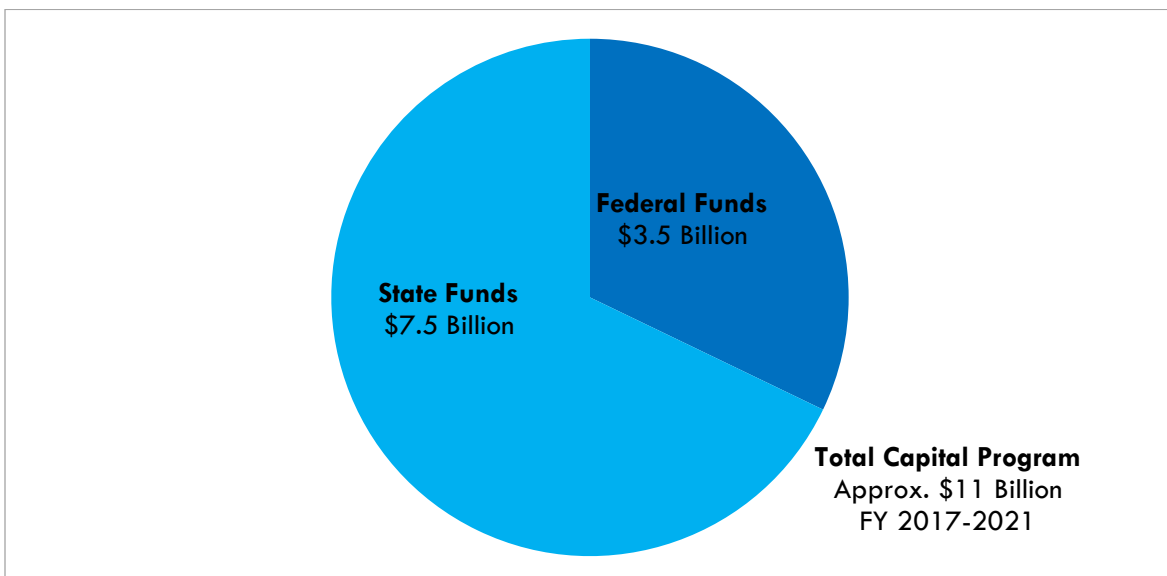
Figure 8.1: FY 2017-2021 Estimated Capital Plan Program Amounts



8.3.2 Capital Program Funding

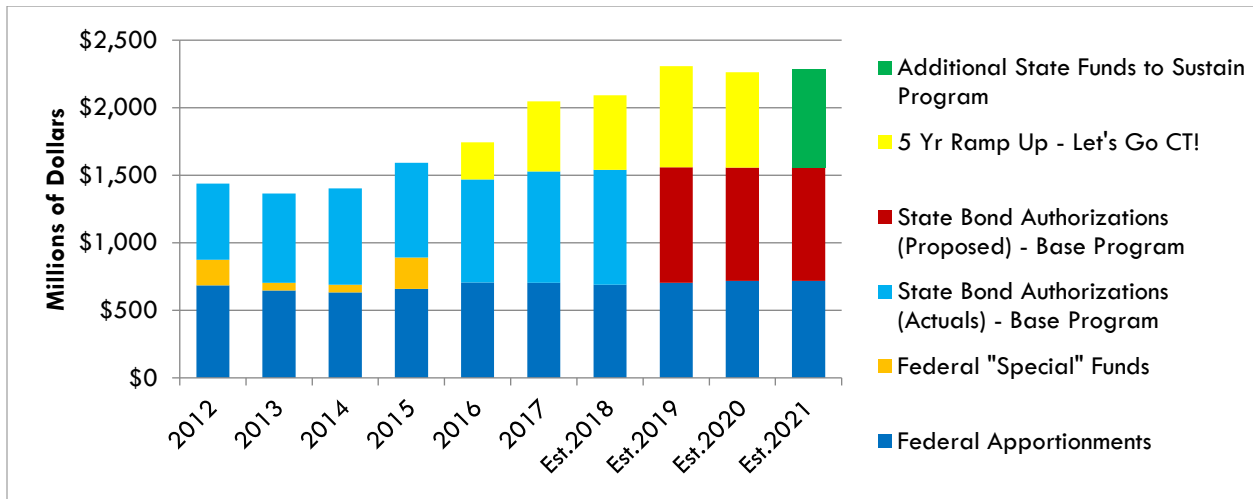
The capital program is funded with a mix of state and federal funding. Historically, federal funds have accounted for 70-80 percent of the Department’s capital program. However, this has changed over the last decade with an influx of state bond funding for programs such as the Fix-it-First Road and Fix-it-First Bridge programs and the Local Transportation Capital Improvement Program (LOTICIP). Additionally, increased state investments in transportation have occurred as a result of the 2015 Legislative *Let’s Go CT!* Ramp-Up initiative. These additional state investments have increased the state’s participation to roughly two-thirds of the total capital program funding. **Figure 8.2** shows the current share of capital program funding from federal and state sources.

Figure 8.2: Capital Program Funding Sources State vs. Federal FY 2017-2021



It is common for funding to be obligated for use on specific projects that may take multiple years to construct, or for items such as rail cars or buses that may take several years to be delivered after a purchase is initiated. Therefore, the Department may not spend all available capital funds within a given year. Available capital program funding can also include funds released from previously completed projects; these funds are available for re-use. **Figure 8.3** shows actual and projected Transportation Capital Program Funding sources FY 2012-2021.

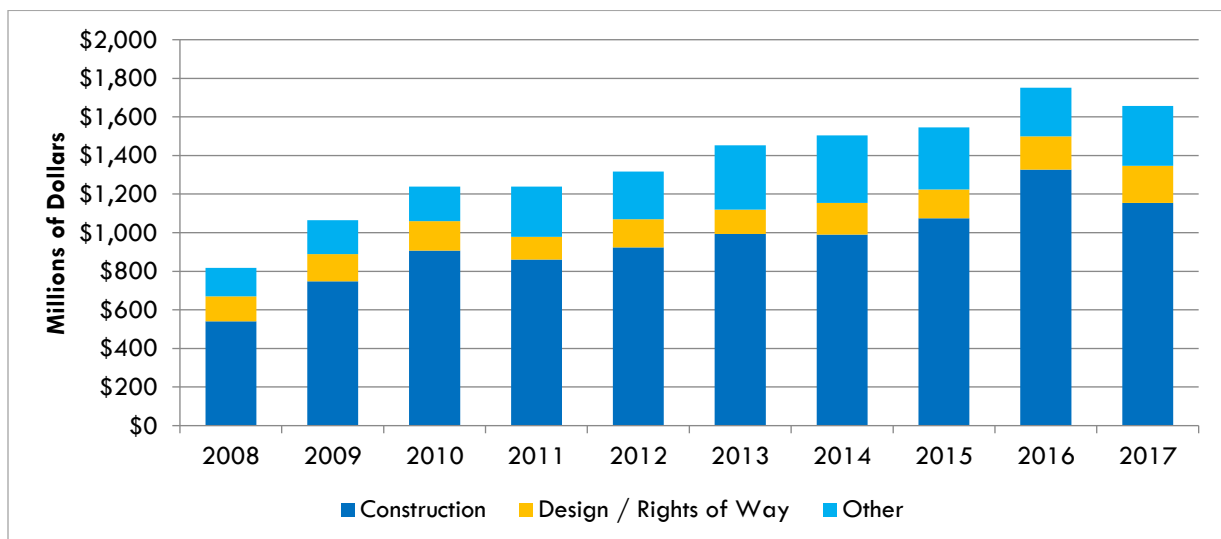
Figure 8.3: Transportation Capital Program Funding Sources FY 2012-2021



8.3.3 Capital Project Expenditures

Over the last 5 years (FY 2013-2017), approximately \$8 billion, or an average of \$1.6 billion per year, has been expended on capital projects. This includes both federal and state funds utilized for the capital program. Approximately 50 percent of expenditures in FY 2013-2017 were funded with federal funds and 50 percent with state funds. During this period, 78 percent of expenditures were for capital construction and procurement costs, 10 percent for engineering and rights-of-way, 5 percent for municipal grants, and 7 percent for planning and training projects/other. **Figure 8.4** shows the Department's historical capital project expenditures from FY 2008-2017.

Figure 8.4: Connecticut's Historical Capital Project Expenditures FY 2008-2017



8.4 Role of State Funds in Capital Program

Approximately two-thirds of the FY 2017-2021 capital program is funded with state dollars. Special Tax Obligation (STO) bond authorizations are the main source of state funding for the Department's capital program. Below is an outline of the bonding process.

1. The bonding process begins when the state legislature passes bond authorizations that allow the Department to utilize bond funds for transportation purposes.
2. Before the Department can utilize the bond funds, the State Bond Commission (SBC) must allocate the funds at one of its monthly meetings.
3. After the SBC has approved the allocation of funds, the Department can request the funds be allotted to a specific project, through the submission of an allotment request to the OPM.
4. Once OPM has approved the allotment request and forwarded it to the Office of the State Comptroller, where it is posted in the Connecticut State government's integrated human resources, payroll, and financial system (CORE-CT), the funds are available for expenditure.

The Department's practice is to ensure that authorization, allocation, and allotment have occurred prior to advertising and awarding projects. The Department seeks to have 100 percent of construction funds approved before advancing into the construction phase.

It is important to note that the four steps outlined above do not directly result in the actual sale of bonds. The sale of bonds occurs annually at amounts required to fund estimated annual aggregate expenditures in all STO Bond funded projects. Bonds are sold to investors and bond proceeds are used to pay for the annual capital project costs. The annual STO Bond sale typically includes bonds with maturity dates of 20 years with interest payments payable twice per year. After each bond sale, the state makes monthly debt service payments to a trustee to fund the interest and principal costs which will be due to investors. The debt service for the capital program is paid for with revenue from the STF. Further discussion on debt service, the STF, and the transportation revenues that pay for the debt service and other expenditures is continued later in this chapter.

8.5 Role of Federal Funds in Capital Program

While state funding has taken on a more prominent role in recent years with the increase in state bonding authorizations, federal funds still play a critical role in the Department's capital program. Approximately one-third of the total capital program between FY 2017-2021 is funded with federal dollars.

Connecticut has three major, continuing, annual sources of federal funding, administered by the United States Department of Transportation (USDOT):

1. FHWA
2. FTA
3. National Highway Traffic Safety Administration (NHTSA)

In December 2015, Congress passed the FAST Act. This new law provides \$305 billion nationwide for surface transportation programs during federal fiscal years (FFY) 2016-2020. Nationwide, compared with the previous federal transportation authorization law enacted in 2012, MAP-21, the FAST Act provides over \$20.2 billion in additional funding for highway investments, as well as an additional \$12.6 billion in funding for public transportation and increases for non-motorized transportation.

Although the authorization act (currently, the FAST Act) establishes the authorized level of federal funds, these funds are not available for use in each state until a second piece of legislation is passed, called an appropriations bill. In the annual appropriations bill, Congress authorizes the exact amount of federal funding being made available. The appropriations bill also provides the obligation limitation, or authority to obligate funds. Note this only applies to FHWA funds. FTA and NHTSA funds are exempt from obligation limitation. More information about obligation limitation is described under Management of FHWA Funds for Capital Program.

In several respects, the FAST Act builds on many of the provisions included in MAP-21. The FAST Act takes additional steps to streamline the environmental review process and speed the delivery of transportation projects, continues to make transportation investment decisions more accountable to performance principles and creates new programs for freight.

Featured FAST Act programs and provisions include:

- **Asset Management and Performance Management** requirements for states to develop and update asset management plans and demonstrate attainment or significant progress towards attaining performance standards for safety, state of good repair and congestion.
- A new **National Multimodal Freight Program** that provides a funding stream for addressing freight needs on multimodal freight networks.
- A new **Nationally Significant Freight and Highway Projects Program**, a competitive grant program, intended primarily for large projects.
- **National Highway Performance Program (NHPP)**, which is intended for maintaining and improving the core highway **system**, the NHS, to achieve performance targets.
- **Surface Transportation Block Grant Program (STBGP)**, which increases funding targeted to metropolitan areas with populations greater than 200,000 to 55 percent of the total program, for transportation **improvements** (up from 50 percent), including improvements for bicycle and pedestrian projects.
- Re-establishment of a **competitive** grant program for bus purchases, the **Bus and Bus Facilities Competitive Program**.
- **Re-authorization of Amtrak**, additional funding for deployment of **positive train control** systems (PTC), and a new account for **Northeast Corridor** rail improvements.
- A new competitive grant program to evaluate the efficacy and feasibility of alternatives to the gas tax for raising transportation revenues, the **Surface Transportation System Funding Alternatives** program.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)**, a flexible program designed to help state and regional governments improve air quality and meet National Ambient Air Quality standards for several types of pollutants.
- **Highway Safety Improvement Program (HSIP)**, designed to fund highway safety improvements (including new technologies) and to demonstrate their effectiveness, including highway-rail crossings improvements.

- Reauthorization of a **credit** assistance program, the **Transportation Infrastructure Finance and Innovation Act**, and establishes the **Innovative Finance Bureau** to help states establish and administer public-private partnership agreements.

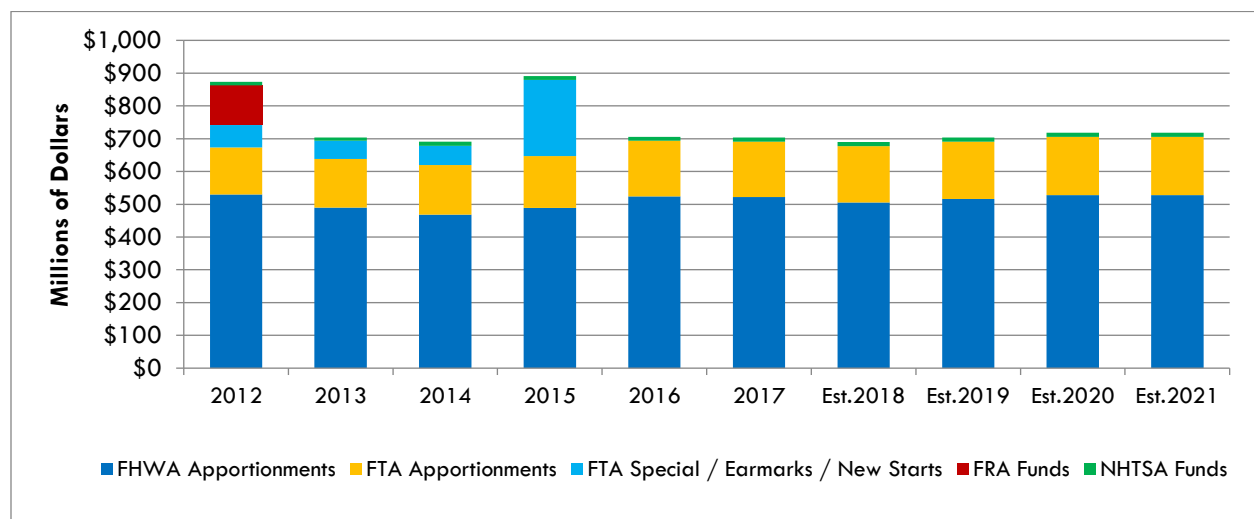
In Connecticut, the FAST Act provides the state with predictable federal formula funding (apportionments) for 5 years FFY 2016-2020. The FAST Act funding enables the Department to better manage long-term assets and address the backlog of SOGR needs. Under the FAST Act, Connecticut receives on average, a little more than \$700 million in FHWA and FTA apportionments and NHTSA funds each year. These funds grow by approximately 3 percent per year.

In addition, although federal formula funding (apportionments) serve as the basis for most of Connecticut’s federal dollars, federal earmarks and discretionary program funding also have played a significant role in Connecticut’s capital program in the past. Examples of major projects in Connecticut that received federal discretionary dollars are listed below. Note, although Connecticut has received a good amount of federal earmark and discretionary dollars, these dollars are not a predictable source of federal funds from year to year.

- Pearl Harbor Memorial Bridge (Q Bridge) (\$77.7 million)
- Q Corridor (\$128 million)
- New Haven-Hartford-Springfield Rail Program (Hartford Line) (\$190,900,000 [FRA - High Speed Intercity Passenger Rail])
- CTfastrak fixed guideway and stations (\$275,300,000 [FTA New Starts] \$25,922,162 [FTA Section 5309 Bus Earmarks])
- Power Upgrade Project in New Haven Yard (\$8,978,750 [FTA Emergency Relief Program – Hurricane Sandy])
- WALK Moveable Bridge Replacement (\$160,979,022 [FTA Emergency Relief Program – Hurricane Sandy])

Figure 8.5 shows the breakdown of Connecticut’s historical and projected federal funds from FFY 2012-2021.

Figure 8.5: Connecticut’s Historical and Projected Federal Funds FFY 2012-2021



8.6 Management of FHWA Funds for Capital Program

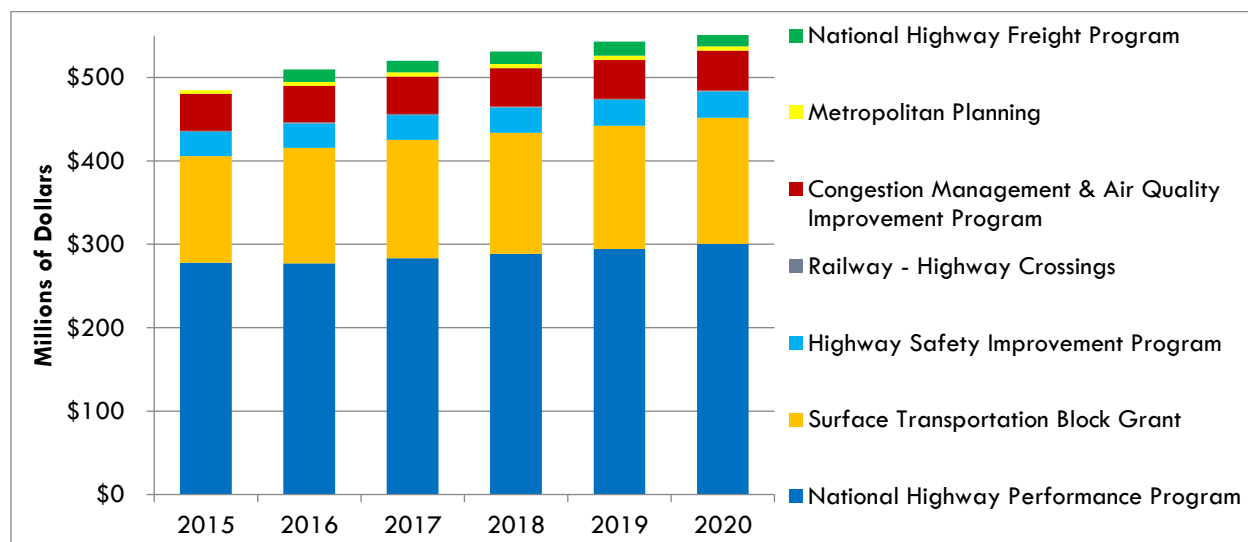
The FHWA is the largest, recurring annual federal funding source for the Department’s transportation program and is the primary federal funding source for highways and bridges in Connecticut. With annual apportionments from FHWA at around \$500 million, the strategic management and utilization of FHWA funds is critical to the Department’s capital program.

Note, although Connecticut’s FHWA apportionments are around \$500 million per year, each year the federal appropriations bill(s) places a ceiling on the amount of FHWA funds that can be obligated each year. This controls or limits total spending but provides the state with flexibility to decide which program apportionments to obligate using their obligation limitation or ceiling for the year. The limit of FHWA funds is usually 90-95 percent of the appropriated or apportioned amount. For example, of the approximately \$500 million of FHWA apportionments Connecticut receives each year, about \$460 million of that amount would be made available to obligate. Any unused apportionments carry forward in to the next fiscal year. FTA and NHTSA funds are exempt from obligation limitation.

In addition, FHWA regulations require the Department to “obligate” or commit all regular formula funds authorized for use in any given FFY in that specific year, and historically the Department has obligated all of its available federal funding. When it obligates its federal funding, the Department is eligible to request and receive additional FHWA funds. Over the last 5 years, the Department has received and obligated \$142 million in additional FHWA funds that has come from other states in unused obligations and federal holdbacks. In FFY 2016 and FFY 2017, the Department received and obligated \$45 million and \$47 million over and above its original allocation of FHWA funds.

Under the FAST Act, Connecticut’s FHWA apportionments will grow by approximately 15 percent between FFY 2016-2020. **Figure 8.6** shows Connecticut’s actual and anticipated FHWA apportionments by highway program under MAP-21 (FFY 2015) and FAST Act (FFY 2016-2020).

Figure 8.6: Connecticut’s FHWA Apportionments by Program under MAP-21 and FAST Act



Note, pursuant to Section 1438 of the FAST Act, in FFY 2020, there will be approximately a \$7.6 billion rescission of FHWA apportionments, which will be based on states’ September 30, 2019 unobligated balances. This rescission is not reflected in the above figure. Estimates provided by FHWA, based on states’ FFY 2016 and 2017 year-end balances, indicate that Connecticut’s share of the rescission in FFY 2020 will range between **\$107 and \$124 million**. Given that unobligated balances will continue to

change until September 30, 2019, these estimates are for illustrative and planning purposes only. Actual rescission amounts by state or program may be higher or lower than the estimated amounts. It is important to note that while a rescission of this magnitude will undoubtedly have an impact on Connecticut's capital program, it is apportionment that is being rescinded, not an obligation limitation, so the actual impact on the state's ability to spend will likely be less than the actual rescission amount.

8.7 Management of FTA Funds for Capital Program

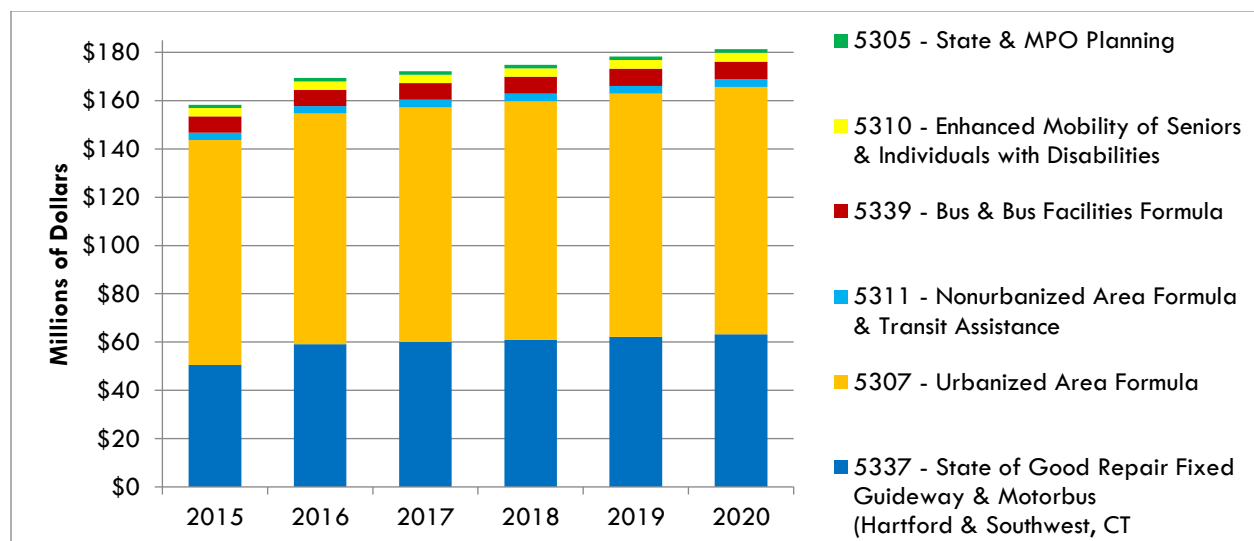
The FTA is the dominant federal funding source for the Department's Public Transportation Infrastructure program. With annual funding from FTA exceeding \$170 million, the strategic management and utilization of FTA funds, including paying close attention to funding eligibility requirements, is critical to the Department's Public Transportation capital program.

The Department is the designated recipient for all FTA programs and is responsible for service and planning decisions for rail, fixed-route bus, and complementary paratransit service in the urbanized areas of the state.

For most regular formula funds authorized, FTA allows 3 years for funds to be obligated; therefore, the funding may be carried forward. This allows for larger projects to be financed with 2 or more years of apportionment. Additionally, as the designated recipient, the Department programs and plans the formula funding from Section 5307 (the largest FTA source of funds) and creates a funding pool from which capital projects in regions around the state are funded. The Department does not utilize a formula to reallocate Section 5307 formula funds to the bus operators, rather the funding pool allows for a cooperative, nondiscriminatory allocation of funds to different regions based on annual needs. The disbursement of these funds is approved by the MPOs in the STIP. Sub-area split agreements that reflect the annual disbursement of funds by region are created by the Department and executed by the operators from each region. This program allows local transit operators to fund major projects for which they may otherwise have never accumulated adequate funds.

In FFY 2015, Connecticut received approximately \$158 million in FTA apportionments. In comparison to FFY 2015, FTA apportionments to Connecticut will grow by approximately 15 percent under the FAST Act, between FFY 2016-2020. **Figure 8.7** shows Connecticut's actual and anticipated FTA apportionments by transit program under MAP-21 (FFY 2015) and FAST Act (FFY 2016-2020).

Figure 8.7: Connecticut FAST Act FTA Apportionments by Program



8.8 Operations & Maintenance Program Funding

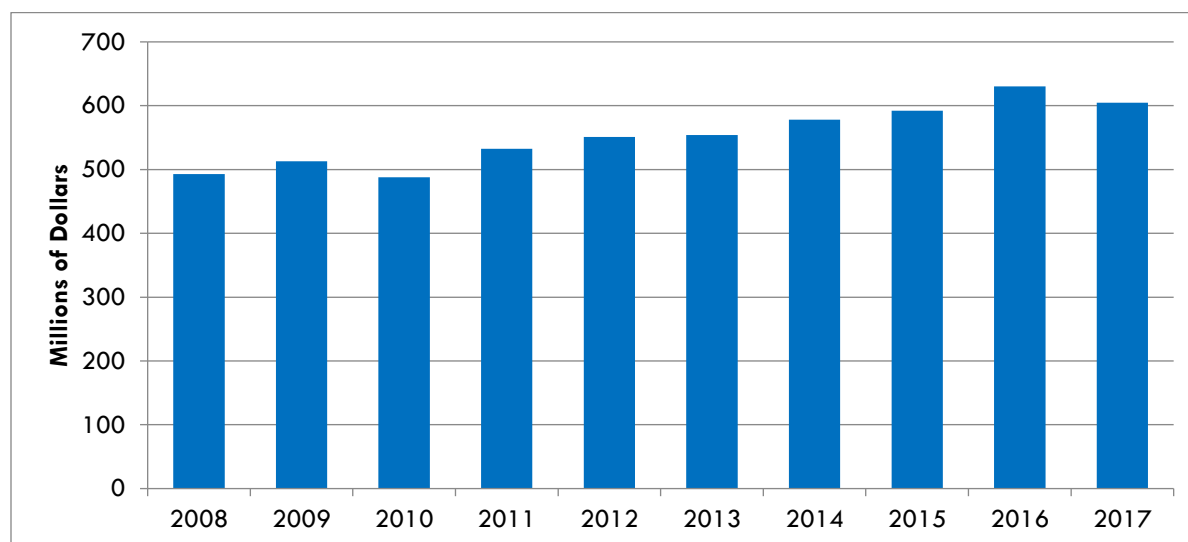
In addition to making capital improvements to the state's transportation system, it is also the Department's responsibility to maintain the state's transportation system in a safe, efficient manner balanced with the needs of the traveling public, including highway and bridge maintenance such as vegetative management, snow and ice control, incident management, and oversized/overweight vehicle permitting. As a multimodal agency, it is also the Department's responsibility to provide a statewide public transportation system of bus transit, ridesharing programs, rail operations, and ferries.

The Department's operations and maintenance programs are funded almost entirely with state funds appropriated by the legislature each year from the state's STF. In general, operating and maintenance costs are not eligible for federal funding. The exceptions are that federal highway funds can be used to fund the highway operations centers, and federal CMAQ funds can be used to fund the first 3 years of operating expenses for a new bus or rail service.

8.8.1 The Department's Historical Operations & Maintenance Expenditures

Over the last 10 years, the Department has spent between \$490 and \$630 million annually towards operating and maintaining the state's transportation system. **Figure 8.8** shows a breakdown of the Department's operational and maintenance expenditures from FY 2008-2017. Note, these values exclude other costs for the Department, such as employee pension contributions, fringe benefits, and debt service, as well as other agency expenditures which are funded under separate accounts in the STF. These other costs are discussed in more detail below.

Figure 8.8: Department's Operations & Maintenance Expenditures FY 2008-2017



8.8.2 Description of the Department's Operations & Maintenance Program Expenditures

State funding provided by the STF for the Department's operations and maintenance program is broken up into different categories. These include Personal Services, Other Expenses, Equipment, and various specific appropriations dedicated for rail operations, bus operations, and pay-as-you-go transportation projects. Descriptions for each of these categories are included below.

- **Personal Services** – In FY 2018, nearly 30 percent of the Department's appropriations are designated for personal services (PS) to fund a majority of the Department's payroll costs. This

includes regular salaries, various employee allowances, differential pay, and overtime primarily for winter storm response. The breakout of PS funding by program area shows about 50 percent dedicated to highway and bridge maintenance, 11 percent for snow and ice removal, and 14 percent for engineering, property acquisitions, and construction. Other program areas including administrative services, public transportation, planning, and ferry operations make up the remaining 25 percent. Of note, the PS appropriation does not cover Department payroll costs directly related to work on projects; those are funded via the Department's capital program. Typically, about 65 percent of the Department's total payroll costs are funded by PS, while the remaining 35 percent are covered with a combination of other Department appropriated monies, federal funds, and/or state bond funds.

- **Other Expenses** – Funds appropriated to state agencies in the Other Expenses (OE) category typically cover various essential supplies and contractual services. For the Department, funds appropriated in OE primarily provide for commodities and services required to maintain safe state roads, including winter materials such as road salt and liquid chlorides, plow blades, contractual meals for staff, and the services of contractor plow trucks to assist in response times when snowfall is significant. Snow-related items collectively make up approximately a quarter of the Department's OE budget. Another major expense in the Department's OE is electricity and other utilities to power over 100 facilities, and to illuminate state highways. Other operational expenditures include motor vehicle fuel for the Department's fleet of 634 dump/plow trucks and other heavy-duty bridge and highway maintenance equipment; equipment repair costs; highway maintenance and electrical commodities like guiderail, safety barriers and light poles; premises operating costs; and technology costs.
- **Public Transportation** – More than half of the Department's appropriated funds are dedicated to public transportation services. Over the past 8 years, funding dedicated to rail and bus transit services represents over 50 percent of the Department's appropriated funds. The funding in the Department's Rail Operations and Bus Operations SIDs primarily provide subsidies to the various providers of rail and bus service. "Subsidy" is the difference between the costs to run the service and the amount of revenue collected from fares.

The Department's appropriation for rail operations primarily consists of a subsidy to Metro-North Railroad for operation of the NHL, which provides mainline rail service between New Haven and New York City, as well as three branch lines in Connecticut. The state of New York also provides a subsidy for their side of the Metro-North rail service. The rail appropriation also provides subsidy to Amtrak to operate SLE rail service between New Haven and New London and for service between Newington and Springfield. In 2018, a rail subsidy will be provided for the new passenger rail service called the CTrail Hartford Line, operating between New Haven and Springfield, Massachusetts.

Funding in the Bus Operations SID primarily provides a subsidy to CTtransit-branded services and regional transit operators. Annual funding is also dedicated to the ADA Para-Transit Program. The ADA of 1990 requires transit agencies to provide special transportation services to people with disabilities who cannot use the fixed route services. Comparable paratransit service must be provided within three-quarters of a mile of a fixed route bus services. Appropriated funds have also been dedicated for a state-funded municipal grant program for Non-ADA dial-a-ride services. Transportation to Work funds, previously appropriated to the Department of Social Services, are included for transportation services that provide improved access to employment for low-income workers who meet certain eligibility requirements.

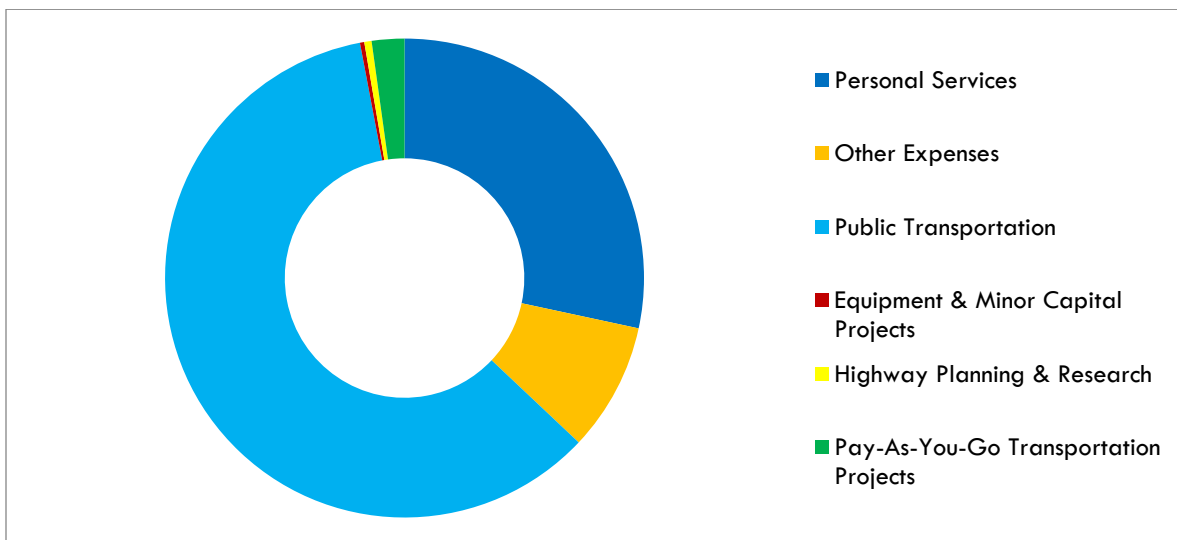
- **Minor Capital Projects** – Minor Capital Projects funds are provided for minor facility improvements such as roofing, boilers, and fuel storage tank upgrades.

- **Highway Planning & Research** – The state appropriation for Highway Planning & Research primarily provides the state match to federal funds dedicated to transportation planning programs. Although this match amount on average is less than 1 percent of the Department’s total operations and maintenance budget, these funds are critical, as they enable the state to conduct transportation planning, which is a requirement for the utilization of federal funds from USDOT. Without these highway planning and research funds, the Department would not be able to meet federal transportation planning requirements, which would jeopardize the approximately \$700 million in federal funds the Department receives each year for capital improvements.
- **Pay-As-You-Go Transportation Projects** – The Pay-As-You-Go Transportation Projects account is designated for non-bondable transportation infrastructure maintenance and improvements, including projects related to bridge inspection and pavement preservation, as well as funds to match federal monies to run highway operations incident management centers.

8.8.3 The Department’s Current Operations & Maintenance Budget

The Department’s operations and maintenance budget in FY 2018 totals approximately \$620 million, which comprises approximately 40 percent of the total projected expenditures from the STF in that year. Personal services, bus operations, and rail operations combined comprise over 80 percent of the Department’s projected operational expenditures. In FY 2019, the Department’s operations and maintenance budget totals \$656 million. The increase in funding in FY 2019 is primarily for public transportation expenditure increases. All the other categories maintain level funding from FY 2018. **Figure 8.9** shows a breakdown of the Department’s operations and maintenance budget for FY 2018.

Figure 8.9: Department’s Operations & Maintenance Budget, FY 2018



8.9 How Connecticut Pays for Capital & Operational Expenditures

The Department pays for its capital and operating expenses from a variety of state and federal sources. These sources are described in greater detail below.

8.9.1 The Current State Financing Program

The issuance of bonds to finance a significant portion of the state’s transportation infrastructure needs has a long-standing history in Connecticut. The issuance of STO bonds was first authorized in Public Act 84-254 in September of 1984. The bonds issued for the infrastructure program are special obligations of the state

and can only be paid from the revenues of the state pledged for the bonds, called “pledged revenues” and discussed in greater detail below.

The pledged revenues offer bondholders a secure source of funds for the debt service obligations that must be met over the life of the several series of bonds issued by the state over many years. Not only do the bonds issued by the state benefit from this secure funding of the STF, but there are several provisions related to the bonds that enhance their attractiveness to investors. These include:

- A 2 times annual debt service coverage requirement for senior and second lien bonds of pledged revenues to debt service.
- A stream of pledged revenues that are diversified.

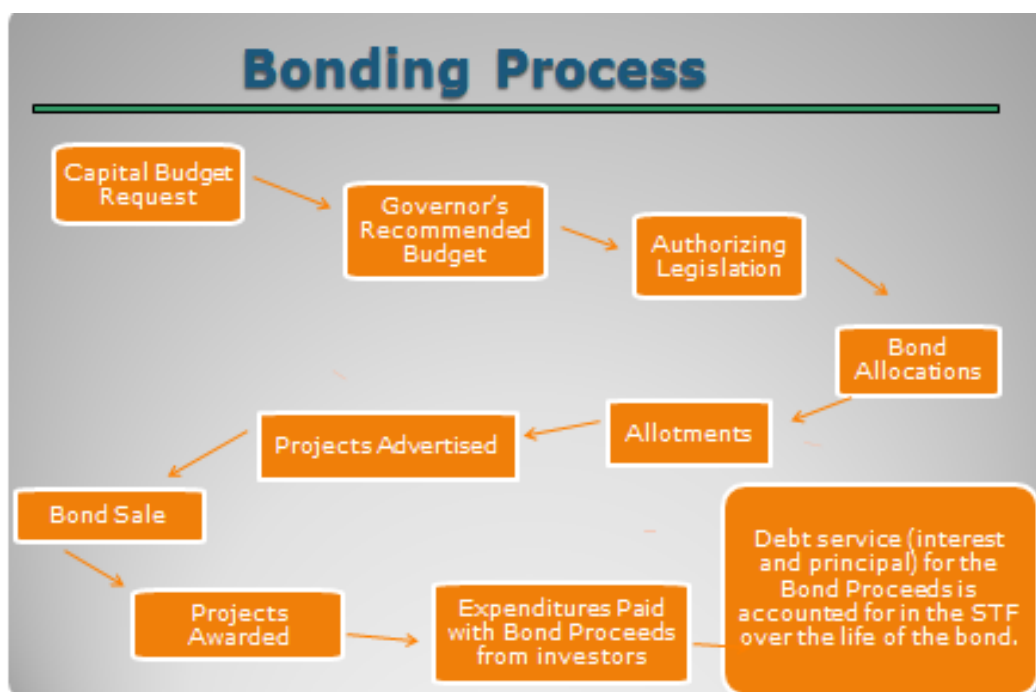
These, and other factors, have led to investor appeal and solid ratings from the three major credit rating agencies (Moody’s: Aa3; S&P: AA; Fitch: AA). As of 2017 there were over \$5 billion in outstanding STO bonds.

8.9.2 Debt Service

As presented earlier, the Department sells bonds annually to investors and utilizes the bond proceeds to pay for capital project costs. To account for the payback of interest and principal to the investors, the state makes monthly debt service payments from STF funds to a trustee. This monthly debt service payment covers obligations relating to all outstanding bonds which have been sold over the last 20 years. Since the capital program is much larger now than it was 20 years ago, each year the state is adding more debt to the older debt that is being paid off. As a result, the STF debt service amount has been rising and is projected to continue to rise in the future. It is important to remember that the bond sales in each year are required to fund ongoing work, which was likely authorized by the state legislature in previous years.

Figure 8.10 provides a pictorial view of the bonding process which generally encompasses a period of over 25 years when debt service is taken into consideration.

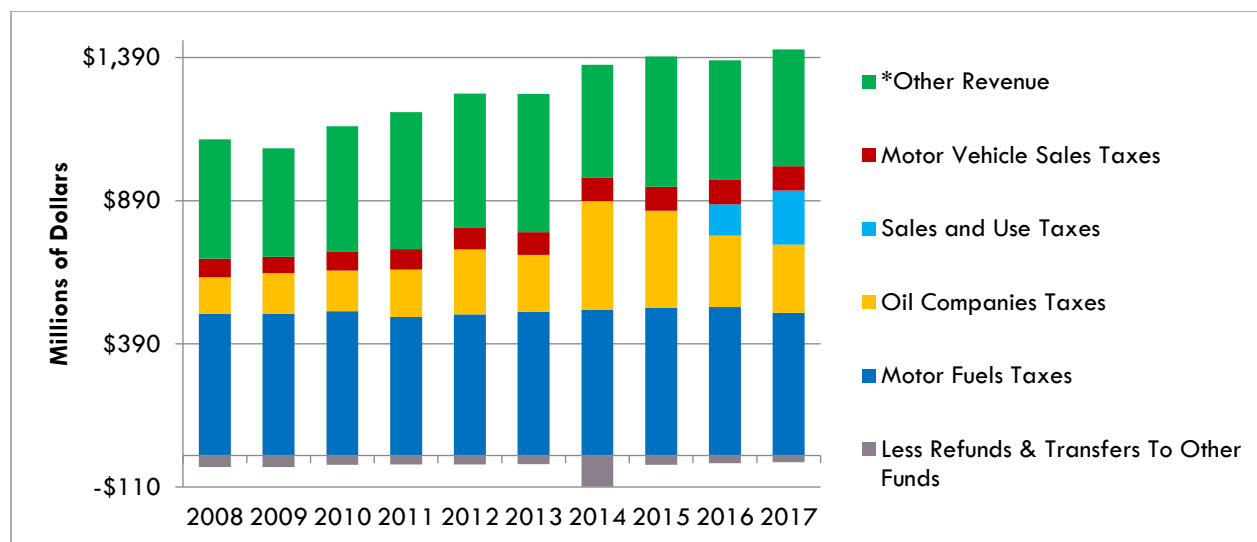
Figure 8.10: State Bonding Process



8.9.3 STF Revenues

STF revenues are derived from a variety of state transportation taxes, fees, and income on motor vehicle fuels; motor vehicle sales; gross receipts on retail, rents, and services; motor vehicle receipts; driver's licenses and permits; interest; etc. The first call on these revenues (pledged revenues) must be used for debt service on STO bonds and to pay for certain transportation projects. Remaining funds after paying for STO bonds must be used to pay for general obligation (GO) bonds issued for transportation projects and then to pay for budget appropriations for DEEP, OPM, DMV, Department of Administrative Services (DAS), and Office of the State Comptroller (OSC). **Figure 8.11** shows a breakdown of STF revenues collected each year over the last 10 years, from FY 2008-2017.

Figure 8.11: Historical STF Revenues FY2008-2017



*Other Revenue includes revenues from motor vehicle receipts; license, permits and fees; interest income; federal grants; and transfers from other funds into the STF.

Below is a list describing each of the STF's revenue sources:

- Motor Fuels Taxes** – The motor fuels tax is collected on motor fuel used or sold in Connecticut. This includes taxes on gasoline, diesel, gasohol, propane, or any combustible gas or liquid that generates the power needed to propel a motor vehicle. The motor fuels tax is the single largest source of revenue for the STF. Revenues collected from this tax were first deposited into the STF beginning in FY 1985. Over the last 10 years, these revenues averaged approximately \$500 million per year. The current state motor fuels tax consists of:
 - 25 cents per gallon tax on gasoline
 - 25 cents per gallon tax on gasohol
 - 41.7 cents per gallon tax on diesel fuel
 - 26 cents per gallon tax on natural gas or propane
- Oil Companies Tax** – The Oil Companies Tax, also known as the Petroleum Products Gross Receipts Tax, is levied on the gross earnings from the first sale of petroleum products by distributors in Connecticut. Petroleum products include but are not limited to gasoline, aviation fuel, kerosene, diesel fuel, number 2 heating oil, greases, lubricants, mineral oils, and motor oil.

Currently, the Oil Companies Tax rate is 8.1 percent. Since 2012, this tax has been capped at \$3.00 per gallon on the first sale for gasoline and gasohol. Petroleum products distributors are required to calculate the tax at \$3.00 per gallon even if the price exceeds said amount and any consideration received by the distributor in excess of \$3.00 is exempt from tax. From 1999 to 2015, the total amount of oil companies' revenue collected was deposited into the state's General Fund and a set amount, determined by state statute, was transferred to the STF. During the 2015 state legislative session, the Connecticut General Assembly passed a law to revise the statutes so that beginning July 1, 2015 and thereafter, all of the Oil Companies Tax revenue is deposited into the STF. According to recent OPM projections for the next 5 years, sales and use tax revenues deposited into the STF will average about \$300 million per year, growing to almost \$360 million in FY 2022.

- **Sales and Use Taxes** – Connecticut levies sales and use taxes on the gross receipts of retailers from the sale of tangible personal property at retail, from the rental or leasing of tangible personal property, and on the gross receipts from the rendering of certain services. Sales and use tax revenue deposited into the STF is a recent addition to the STF and a new revenue source for transportation. During the 2015 legislative session, the Connecticut General Assembly decided to begin phasing in revenues from the Sales and Use Tax into the STF. It began with transferring 0.3 percent of the 6.35 percent revenue collected in FY 2016, transferring 0.4 percent of this revenue collected in FY 2017, and transferring 0.5 percent of this revenue collected in FY 2018 and beyond. In FY 2016, the revenue from the Sales and Use Tax deposited into the STF totaled \$109 million. In FY 2017, the revenue deposited totaled \$188 million. According to recent OPM projections for the next 5 years, the Sales and Use Tax will produce revenue will exceeding well over \$300 million per year into the STF and will grow to more than \$380 million in FY 2022.
- **Motor Vehicle Sales Taxes** – In 1998, state legislation was passed to begin pledging a portion of the taxes collected on motor vehicle sales into the STF. These revenues deposited into the STF include motor vehicle sales tax revenues generated from “casual sales,” or sales of automobiles between private individuals. Over the last 10 years, the revenues deposited into the STF from this tax averaged approximately \$75 million per year. However, these tax revenues only represent a small percentage of the total taxes collected on car sales per year. Most vehicle sales come from private dealers who remit the motor vehicle sales tax directly to the GF. It is estimated that roughly 10 percent of total sales and use tax collections, or approximately \$400 million per year, comes directly from vehicle sales or sales related to the maintenance of motor vehicles. During the 2017 state legislative session, the Connecticut General Assembly passed legislation to begin phasing in all motor vehicle sales taxes into the STF starting in FY 2021.
- **Motor Vehicle Receipts** – Motor Vehicle Receipts (MVR) contains revenue collected from the issuing of motor vehicle licenses, motor vehicle registrations, and other motor vehicle related fees/licenses. MVR were first established as a revenue source for the STF in FY 1985. Over the last 10 years, the revenues deposited into the STF from these receipts averaged approximately \$235 million per year.
- **License, Permits & Fees** – License, Permit, and Other Fees (LPF) contains various revenue accounts not associated with the registration or operation of motor vehicles. LPF revenues are generated from fines levied for motor vehicle infractions, permits, and fees imposed by the Department; other fees collected by the DMV; late fees imposed under the Emissions Inspection Program; and a portion of the Clean Air Act fee. This revenue source was established as a revenue source for the STF in FY 1985. Over the last 10 years, the revenues deposited into the STF from these fines and fees averaged approximately \$140 million per year.

- **Interest Income** – Interest income comes from interest earned on the deposits made to the STF, primarily from interest earned on the Debt Service Reserve Account. Every time a STO bond is sold, an amount equal to the funds required to meet the principal and interest payments for the highest maturity year of the bond issue is deposited in the Debt Service Reserve Account to provide added security for the bondholders. Revenues collected from interest income have been deposited into the STF since FY 1985. Over the last 10 years, the revenues deposited into the STF from interest income ranged from a low of approximately \$2 million in FY 2012 to a high of \$37 million in 2008. Most recently, in state FY 2017 interest income revenues totaled \$9 million.
- **Federal Grants** – These federal grants deposited into the STF are federal payment subsidies for Build America Bonds (BAB). BABs provide Connecticut and other state and local governments with direct federal payment subsidies for a portion of the state’s borrowing costs on taxable bonds. These payment subsidies began as a stimulus to states under the American Recovery and Reinvestment Act of 2009 (Recovery Act). Since 2009, Connecticut has received more than \$86 million in BABs, averaging a little more than \$12 million per year for the last 5 years.
- **Transfers from Other Funds** – Throughout the over 30-year history of the STF, increasing operational and capital needs of the transportation system have either required that revenue streams be moved from the GF into the STF or that GF transfers be used to keep the STF from operating in a deficit. Over the last 10 years, nearly \$400 million was transferred from the GF to the STF, specifically in FYs 2010, 2011, 2012, 2013, and 2015.
- **Less Refunds & Transfers to Other Funds** – Each year various STF revenues are transferred from the STF to other accounts to pay for tax refunds and other payments, statutory obligational payments to other funds, as well transfers to the GF to help balance state budgets. **Over the last 10 years, total STF revenues transferred from the STF to other accounts amounted to nearly \$400 million, ranging from a low of \$24 million in FY 2017 to a high of \$109 million in FY 2014.**

8.9.4 Source of Federal Funds for Transportation

The Federal Highway Trust Fund (HTF) is the largest source of federal disbursements for transportation improvements to states. These funds are dispersed nationally to states as formula-based allocations to specific transportation programs with specific purposes, also known as federal apportionments. The HTF comprises two accounts, a highway account and a mass transit account. Each year states make payments to both accounts from federal revenues collected in each state.

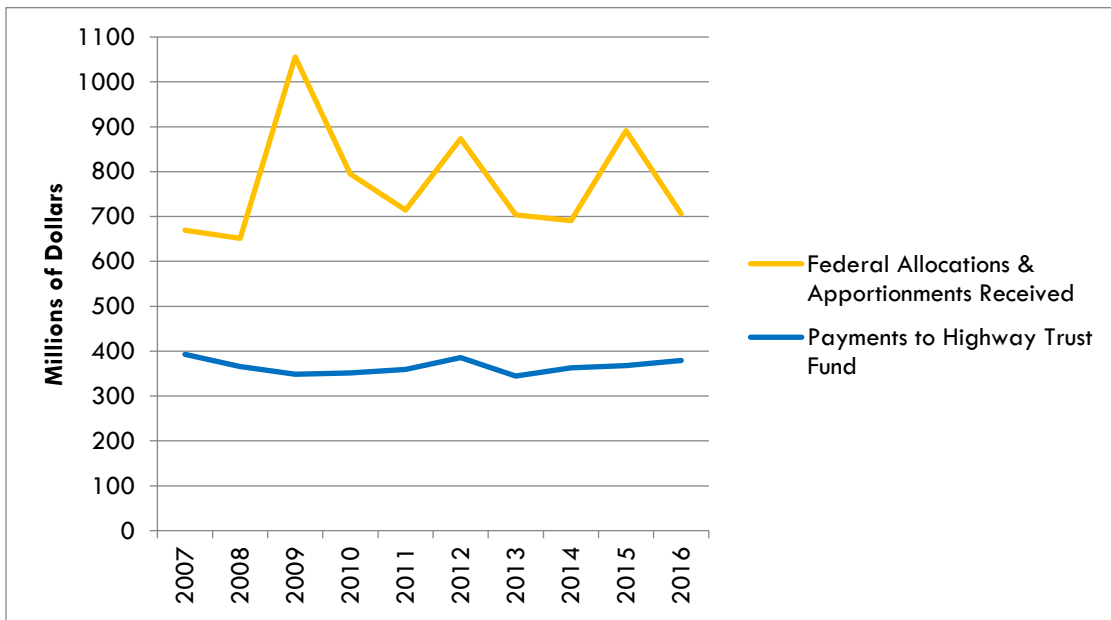
HTF revenues come from a variety of transportation-related excise taxes—primarily federal excise taxes levied on gasoline and diesel fuels, which comprise the majority of transportation revenues to the HTF. The remaining revenues deposited into the HTF come from a variety of other excise taxes including a sales tax on tractors and heavy trucks, a tax on tires for heavy vehicles, and a tax for the annual use of those vehicles. The HTF also receives revenue from interest on HTF reserves. **Figure 8.12** shows the breakdown of federal highway user taxes, rates and revenues collected in Connecticut between FFY 2007 and 2016.

Each year, states receive funding back from USDOT in the form of allocations and apportionments. A majority of this funding comes from the HTF and, in some years, some funding comes from special programs or allocations from the General Fund of the U.S. Treasury. Between FFY 2007 and 2016, Connecticut has received more than two times the funding in the form of allocations and apportionments than the state made in federal highway user tax payments to the HTF. **Figure 8.13** shows Connecticut’s federal highway user tax payments made to the HTF and the federal allocations and apportionments received between FFY 2007-2016.

Figure 8.12: Federal Highway User Taxes, Rates & Revenues Collected in CT FFY 2007-2016

Federal Highway User Taxes		Tax Rate (cents per gallon)	Federal Highway User Tax Revenues Collected in CT FFY 2007-2016 (average per year)
Motor Fuel Taxes	Gasoline	18.40	\$333 Million
	Diesel	24.40	
	Gasohol	18.40	
	Special Fuels:		
	General rate	18.40	
	Liquefied petroleum gas (per gasoline gallon equivalent)	18.30	
	Liquefied natural gas (per diesel gallon equivalent)	24.30	
M85 (from natural gas)	9.25		
Compressed natural gas (per gasoline gallon equivalent)	18.30		
Truck-Related Taxes	Tire Tax	9.45 cents for each 10 pounds so much of the maximum rated load capacity thereof as exceeds 3,500 pounds 12 percent of retailer's sales price for tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 pounds GVW.	\$8 Million
	Truck and Trailer Sales Tax		\$22 Million
	Heavy Vehicle Use Tax	Annual tax: Trucks 55,000 pounds and over GVW, \$100 plus \$22 for each 1,000 pounds (or fraction thereof, in excess of 55,000 pounds). Maximum tax: \$550.	\$3 Million

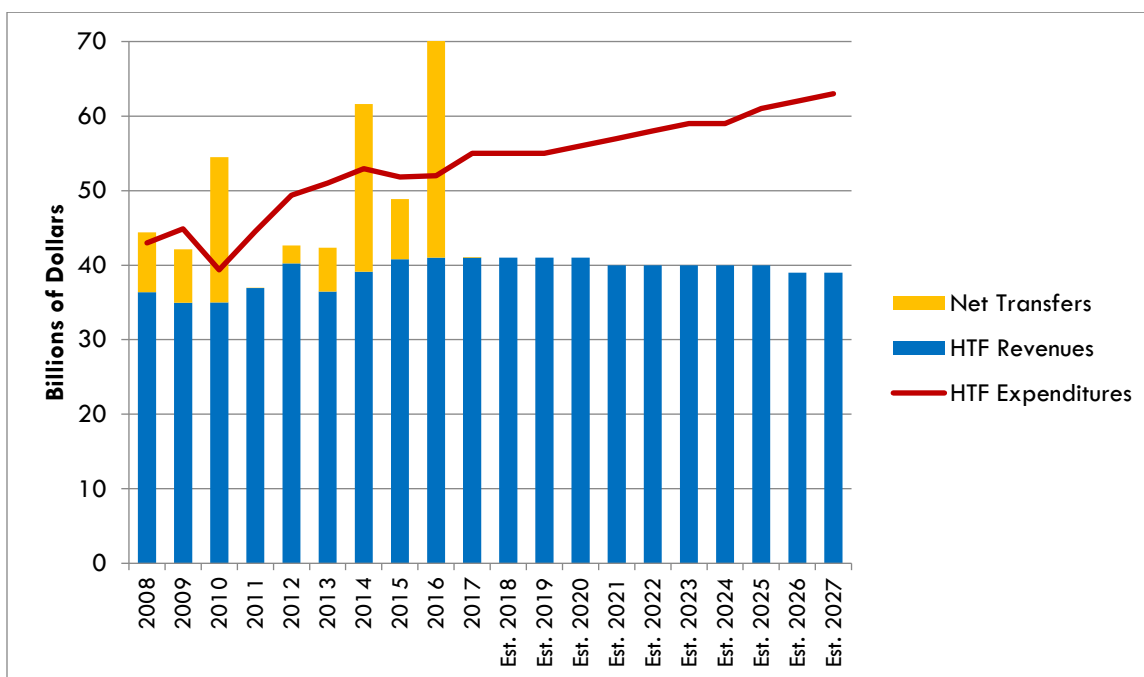
Figure 8.13: Connecticut's Federal Highway User Tax Payments to HTF vs. Allocations & Apportionments Received



Source: CTDOT Bureau of Finance & Administration; <https://www.fhwa.dot.gov/policyinformation/statistics/2016/fe9.cfm>

Beginning in FFY 2008, and in most subsequent fiscal years to date, the HTF’s outlays have exceeded the federal highway user tax revenues collected from each state. To ensure that the HTF could promptly pay its bills, Congress has passed several laws that have transferred amounts from other sources (as noted above) into the HTF. The majority of these funds have come from the General Fund of the U.S. Treasury, but some has originated from other sources as well. Since FFY 2008, Congress has transferred a total of approximately \$144 billion from other sources into the HTF. **Figure 8.14** shows the breakdown of actual and projected HTF revenues, expenditures, and net transfers between FFY 2008 and FFY 2027.

Figure 8.14: Breakdown of Federal HTF Revenues, Expenditures, and Net Transfers



Source: <https://www.fhwa.dot.gov/policyinformation/statistics/2015/fe210.cfm>;
<https://www.cbo.gov/sites/default/files/recurringdata/51300-2017-01-highwaytrustfund.pdf>

8.10 Connecticut’s Transportation Funding Outlook

Connecticut, like many other states, faces challenges in funding its future transportation needs by continuing to rely on current funding sources and practices. Today there are several issues which impact the long-term sustainability of transportation funding in Connecticut.

8.10.1 Background: How We Got Here

In January 2016, the transportation finance panel (the “Panel”) created by Governor Malloy studied the STF and issued a report that warned that Connecticut needed to find new funding streams to shore up the STF to keep it sustainable over the long-term. Financial projections at the time indicated that declining revenue and increasing expense trends could deplete the STF balance in approximately 5 years, if no corrective action was taken. Since the Panel’s work in 2016, the situation has worsened.

8.10.2 Negative Trends

- **Gas tax revenues are decreasing.** To date, the reduction of the state gas tax in 1997 has resulted in a cumulative loss of \$4 billion in the STF. Since the 1990s, the rates of federal and state gas taxes which Connecticut relies on for the majority of transportation revenues are levied

on a per-gallon basis, not adjusted to inflation. As motorists continue to purchase and drive more fuel-efficient vehicles and as growth in per capital driving continues to slow, these factors will further contract the revenue stream will contract further and reduce the state's ability to meet transportation needs.

- **Rising debt service associated with past debt is eroding available STF revenue.** While several STF revenue sources have either decreased or remained flat, expenditures have grown and continue to grow substantially, primarily from expanding debt service. The amount of annual debt service is increasing significantly as repayment obligations on previously issued bonds become due. These bonds were sold during a period of transportation infrastructure rebuilding over the last 2 decades when the Department's state capital funds for transportation grew by 600 percent.
- **Revenue to debt service coverage ratios headed lower, risking bond rating.** As the amount of STF revenues pledged for debt service continues to rise, the state's appeal and ratings from the three major credit ratings agencies are at risk of being lowered, which would make it more expensive to for the state to bond projects.
- **Erosion of available STF revenues combined with increasing operating costs makes the problem worse.** In addition to the erosion of available STF revenue due to rising debt service from state transportation investments, other transportation costs funded by the STF continue to increase as well, especially costs dedicated to public transportation services which now comprise more than 50 percent of the Department's operational and maintenance budget. Over the last 20 years between FY 1997-2017, the Department's entire operational and maintenance budget has grown by 215 percent.
- **Transportation revenues have been transferred to other accounts.** Over the last 10 years, total STF revenues transferred from the STF to other accounts amounted to nearly \$400 million. In the FY 2016-2017 biennial budget, \$37.5 million was diverted out of the STF and resulted in increased bus and rail fares, reduced highway maintenance, and a cut in the Department's agency personnel positions. This also resulted in a reduction in the cumulative balance in the STF.
- **The STF and HTF have major projected shortfalls in near term.** Based on current transportation needs, the STF is forecast to have annual deficits starting in FY 2019 and cumulative deficits starting in FY 2020. In 5 years, FY 2022, the annual deficit between STF revenues and expenditures is estimated to be more than \$200 million and the cumulative deficit is estimated to be almost \$400 million. Similar to the STF, the HTF also is expected to have projected shortfalls in the near term. The \$144 billion in transfers from the GF of the Treasury to keep the HTF afloat since 2008 will dry up in FFY 2020, leaving the HTF with a large financial gap to fill in the coming years. Beyond 2020, the HTF will face an annual gap of HTF revenues and expenditures totaling between \$17 and \$21 billion per year. Cumulatively in 2025, this amounts to an almost \$100 billion deficit.

8.10.3 State Legislative Actions Taken Since 2015

Some corrective actions were taken by the legislature in recent years; however, they were not enough to offset the negative trends now affecting the STF.

- In 2015, Connecticut's legislature responded to the issue of diminishing transportation revenues relative to the state's needs by dedicating 0.5 percent of the state's sales tax revenue to the STF and ensuring that 100 percent of the Petroleum Gross Receipts Tax revenue collected gets deposited into the STF as well.

- In 2017, the Connecticut legislature again revisited the issue of increasing funding for transportation by phasing in all motor vehicle sales taxes, including new car sales to the STF. In FY 2021, 20 percent of these funds will be transferred into the STF and afterwards, the transfer will increase by an additional 20 percent per year until 100 percent of the funds are deposited into the STF in FY 2025. While this will be a major help to the STF in the long-term, it comes too late to solve the immediate needs of the STF.
- In 2017, Connecticut's legislature also approved a statewide referendum on a constitutional lockbox to prevent the diversion of STF revenues for non-transportation purposes. This issue will be left to Connecticut voters to decide in November 2018. The provision was originally proposed by the Governor in 2015.

8.10.4 Near-Term Funding Shortfalls Impact on Long-Term Transportation Program in Connecticut

If the state does not take action to increase revenues in the STF, the Department will be forced to significantly revise its operating budget and its 5-year capital program. This scenario would have significant impacts on the long-term transportation program in Connecticut. The reduced capital outlays would demand difficult decisions about deferring or cancelling important projects. Since some of these projects must ultimately be completed to protect life safety, these delays would only serve to drive up costs and restrain future economic growth in the state.

Actions to significantly reduce operating and capital expenses instead of new revenue would require implementation through future state budgets, as well as through the federally mandated transportation planning process in collaboration with the state's MPOs. They would result in deterioration of the state's transportation facilities in a few short years, as well as a significant curtailment of transit services and affordability. Unfortunately, absent new revenues, the state would have no choice but to implement such dire alternatives.

Table 8.1: Successful State Plans to Raise Additional Transportation Revenue, 2012-2017

State	Year Enacted	Type of Revenue	Details
Arkansas	2012	General obligation bonds 0.5-cent statewide sales tax (for 10 yrs.)	State can issue \$1.3 billion in new general obligation bonds, mostly for a 4-lane state highway network. A portion of these revenues will be given to city and county governments to repair rural and local roads. The voters approved an increase in the statewide sales tax (half a penny) to repay the bonding. Bonds must be repaid in 10 years, at which time the sales tax is rescinded. Intended for roads, and specifically a 4-lane state highway network.
California	2017	Gas tax Diesel tax Vehicles fees	Raises \$52 billion in new transportation revenue by raising the gasoline tax by 12 cents (to 30 cents per gallon), increasing diesel taxes by 20 cents (to 36 cents per gallon) and creating a new annual fee on almost all vehicles based on value. It directs \$7.5 billion to transit capital and operations and \$1 billion into the state's Active Transportation Fund and reserves \$4 billion for bridge repair.
Delaware	2013	Tolls	Tolls on State Route 1 were raised by \$1 on weekends, which will generate \$20 million annually. The new funds will avoid cuts for the Community Transportation Fund which pay for local transportation projects and will help raise revenue for road maintenance. Intended for state highways and road maintenance.
Delaware	2015	Vehicle fees License fees Vehicle sales tax	Generate \$23.9 million annually by increasing several vehicle and license fees, including a 0.5-percentage-point increase in the vehicle sales tax.
Florida	2014	Leased ROW near cell phone towers Tolls	Broad transportation package that includes new revenue from leasing right-of-way for cell phone towers near state roads and advertisements on state nature and recreational trails. It also calls for more toll roads. Intended for roads and an increase of maintenance revenue.
Georgia	2015	Fuel excise tax Diesel tax Registration fee for electric vehicles Heavy vehicle impact fee Short-term lodging fee Local option sales tax	Increases fuel excise tax to 26 cents per gallon (29 cents per gallon for diesel). Indexes the excise fuel tax rates to both average vehicle fleet efficiency and the consumer price index (used until July 2018). Exempts fuel from current sales tax, except for the 1 percent that counties impose. Imposes new registration fees for electric vehicles (\$200/yr. for noncommercial, \$300/yr. commercial). Heavy vehicles registered in Georgia pay a highway impact fee annually of \$50 for vehicles between 15,500-26,000 pounds. and \$100 for weights greater than 26,000 pounds. Institutes a \$5-per-night fee for short-term lodging, made exclusively for transportation purposes in the state. Gives the ability to counties and groups of counties to impose a limited duration transportation purpose local option sales tax of up to 1 percent by ballot.
Idaho	2015	Gas tax Vehicle registration fees Hybrid/electric vehicle fee	Raises the state gas tax by 7 cents per gallon (to 32 cents per gallon) and increases annual registration fees to \$21 for cars, \$10 for motorcycles, and \$25 for commercial and farm vehicles. Hybrids and electric cars now face an additional fee of \$75 and \$140, respectively, which will be distributed into the highway account. The bill also dedicates some excess dollars from the general fund to statewide roads projects. In total, the bill will increase revenues for transportation by \$94 million per year.

State	Year Enacted	Type of Revenue	Details
Iowa	2015	Fuel tax Vehicle registration fee	Increases fuel taxes by 10 cents per gallon and increases vehicle permit fees to raise \$215 million for roads and highways annually.
Indiana	2015	Fuel tax Truck registration fee Hybrid/electric vehicle fee Tolls	Increases fuel taxes by 10 cents per gallon and indexes rates to inflation (but limits increase to 1 cent per gallon per year). Adds a \$15 registration surcharge on large trucks. Adds a \$150 annual fee on electric vehicles and \$50 fee on hybrids. Dedicates revenue from sales tax on fuel to state highway accounts rather than the general fund. Repeals restriction on tolling and directs Indiana DOT to seek a waiver from USDOT to allow tolling on interstate highways. The law will generate an estimate \$854 million in new annual revenue for state and local road projects.
Kentucky	2015	Fuel tax	Raises the floor on the assessed wholesale fuel price, setting the minimum tax to 24.6 cents per gallon. The current rate is 27.5 cents per gallon but the rate was expected to fall to 22 cents per gallon on the April 1 automatic adjustment date due to falling gas prices, so this act prevented a \$292 million cut in revenue.
Maryland	2013	Gas tax Transit fares	Indexes the gas tax to inflation starting immediately (with a ceiling of no more than 8 percent in any given year.) Adds a 3 percent sales tax at the pump, phased in over a period of 3 years starting summer 2013. Requires indexing transit fares charged by the MTA to inflation via the consumer price index. The sales tax on gasoline will increase to 4 percent if the congressional ban on internet sales tax is lifted; otherwise, the tax goes up 5 percent if Congress does not lift the ban. Modes aren't defined, but it does fund the unified state transportation trust fund which funds ALL modes. This will raise \$4.4 billion over 6 years, which includes borrowing ability against future revenues.
Massachusetts	2013	Gas tax Vehicle sales tax Tobacco product tax	Raises the gas tax 3 cents and indexes it to inflation. Requires MassDOT and MBTA to raise a greater portion of their costs—up to an additional \$229 million per year—from tolls, fees, fares, and other sources and from efficiencies. Dedicates other state funds—including all proceeds from vehicle sales taxes—to transportation. Increases taxes on cigarettes and tobacco products.
Michigan	2015	Gas tax Diesel tax Vehicle registration fee Hybrid/electric vehicle fee	In 2017, gas taxes will increase 7.3-cents-per-gallon and diesel taxes will increase 12.3-cents-per-gallon to bring both to 26.3-cents-per-gallon. Fuel tax rates will be indexed to future inflation. Fuel tax increases are estimated to bring in \$400 million in new revenue. Another \$200 million in new revenue will come from a 20 percent increase in vehicle registration and new fees on hybrid and electric vehicles, also beginning in 2017. Additionally, the package dedicates general fund money to the highway fund, beginning with \$150 million in 2018 and ramping up to \$600 million per year from 2020.
Montana	2017	Gas tax Diesel tax	Increases gas tax 6 cents per gallon and diesel tax 2 cents per gallon by 2023 to raise \$27 million in additional annual revenue. Thirty-five percent of new funding (or at least \$9.8 million) is allocated to state highways and the remainder is allocated to local governments through a new construction and maintenance matching fund for local road, street, and bridge projects.

State	Year Enacted	Type of Revenue	Details
Nebraska	2015	Gas tax	Raises the per-gallon gasoline tax by 6 cents over 4 years to a total of 31.6 cents per gallon. The tax would generate an additional \$25 million annually for the state and \$51 million for cities and counties once fully implemented.
New Hampshire	2013/ 2014	Gas tax Alternative fuels tax	Increases the per gallon tax by 4 cents. The funds raised are dedicated to rehabilitation and bridge repair projects for the next 2 years. It also adds bonds for the widening of I-93. (2013) Extends fuel taxes to fuels used by alternative fuel vehicles. (2014)
New Jersey	2016	Fuel tax Earned income tax credits	Increases fuel tax by 23 cents per gallon. The fuel tax hike will add \$1.23 billion annually to the state's transportation fund to pay for road and transit maintenance and construction projects. The bill also reduces the state's general sales tax by three-eighths of a percent, eliminates the estate tax, and increases earned income tax credits.
North Carolina	2015	Gas tax	Reduces the gas tax in North Carolina from 37.5 cents to 34 cents per gallon by the end of 2016, but it amounts to a higher tax than what would have been calculated with the drop-in fuel prices and no changes to its calculation. Beginning in January 2017, the gas tax is automatically adjusted based 75 percent on population increases and 25 percent on changes in the Consumer Price Index. The result is a \$13.5 million reduction in transportation revenues in the short-term, but a \$400 million gain from changes in the calculation in the gas tax.
Ohio	2013	Tolls	Biennial state transportation budget: A plan that would authorize the Ohio Turnpike Authority to issue \$1.5 billion in new debt over 6 years to finance (roads-only) projects around the state. The debt would be repaid with increased turnpike tolls, and a large share of funds will be spent in Northern Ohio. (Though debts would be repaid with greater turnpike tolls, tolls for locals will be frozen for the next 10 years. EZ pass transponder required.)
Oregon	2017	Fuel tax Vehicle sales tax Vehicle registration fee High-miles-per-gallon/electric vehicle fee Bicycle purchase tax Employee payroll tax	Raises \$5.3 billion over 10 years for all types of transportation projects. The law increases the state fuel tax by 2 cents per year for a total increase of 10 cents per gallon. It adds a vehicle sales tax of 0.5 percent, increases vehicle registration fees and adds additional fees on high-MPG and electric vehicles. It also adds a \$15 tax on adult bicycle purchases. The law introduces a new 0.1 percent employee payroll tax with revenues dedicated to transit. This tax is expected to generate \$103 million annually.
Pennsylvania	2013	Gas tax Vehicle registration fee Licensing fee Truck weight fee Moving violation fines	Raises an additional \$2.3 billion per year, including \$1.65 billion for highways and \$476 million for transit. Establishes a first-of-its-kind, \$144-million-per-year Multimodal Transportation Fund for local economic development. Will allocate an additional \$220 million to local governments (a 60 percent increase). Eliminates the per-gallon gas tax. Increases the sales tax on gas assessed at the wholesale level (by gradually eliminating the cap on taxable value and replacing it with a floor). Increases vehicle registration, licensing and truck weight fees, and moving violation fines.

State	Year Enacted	Type of Revenue	Details
Rhode Island	2014	Vehicle fee Rental car tax Gas tax	Directs revenues from vehicle fees and rental car taxes to the state highway maintenance fund, increases the gas tax by approximately 1 cent in 2015 and sets it to inflation for future years, and calls for a statewide referendum to approve issuing \$35 million in bonds to fund multimodal transit hub infrastructure which was approved in November 2014.
South Carolina	2017	Fuel tax Vehicle registration fee Hybrid/electric vehicle fee	Increases fuel tax by 12 cents per gallon, phased in over the next 6 years. Increases registration fee by \$16, add \$60 biannual fee on hybrid vehicles and \$120 biannual fee on electric vehicles. When fully implemented, the new taxes and fees will bring in approximately \$730 million annually for road construction and maintenance projects across the state.
South Dakota	2015	Fuel tax Vehicle sales tax Vehicle registration fee Vehicle weight fee Local option property tax Local option county vehicle registration fee	Increases motor fuels taxes by 6 cents-per-gallon (to 28 cents per gallon) to raise an extra \$40.5 million annually; increases vehicle sales tax by 1 percentage point, for an extra \$27-\$30 million annually; increases vehicle registration and weight fees; expands abilities for counties and townships to levy local option property taxes for road and bridge repair and construction (with approval by voter referenda) and increases optional county vehicle registration fees; and creates a local bridge improvement competitive grant fund.
Tennessee	2017	Gas tax Diesel tax Vehicle registration fee Electric vehicle fee Local option sales tax, business tax, car rental tax, hotel/motel tax, residential development tax, wheel tax, or transit tax	Raises the gas tax by 6 cents per gallon to 27.4 cents per gallon and raises the diesel rate 10 cents to 28.4 cents per gallon, increases registration fees, and adds a new fee for owners of electric vehicles, bringing in \$350 million per year for road projects. From the new revenue, \$250 million will go to state highway projects and \$100 million will be directed to cities and counties for local road projects. Cuts the sales tax rate on groceries from 5 to 4 percent, and cuts the franchise and excise tax on manufacturers. The law also allows the most populous cities and counties to increase local sales tax, business tax, car rental tax, hotel/motel tax, residential development tax or wheel tax, with approval through a voter referendum. A local government must approve a detailed transit improvement plan before levying a local transit tax.
Texas	2015	State sales tax	Sets aside future state sales tax revenue to fund highways. Specifically, \$2.5 billion of the state sales tax revenue will be reserved for transportation, so long as overall sales tax receipts are at least \$28 billion (approximately the collections this year). Additionally, 35 percent of revenue growth from taxes on vehicle sales and rentals will be set aside for transportation beginning in 2020, netting \$250 million to \$350 million annually. All revenues under this amendment would be dedicated to constructing non-toll highways (or servicing debt for such construction).

State	Year Enacted	Type of Revenue	Details
Utah	2015	Gas tax Diesel, natural gas, hydrogen tax Local option one-fourth cent sales tax	Raises the tax on gas from 24.5 cents per gallon to a 12 percent assessed rate beginning January 1, 2016, with a floor on the gas tax rate 5 cents per gallon higher than today and able to increase up to an assessed tax of 40 cents per gallon. On diesel, natural gas, and hydrogen it incrementally increases the tax rate to 16.5 cents by July 1, 2018 (an increase of 8 cents per gallon for diesel and natural gas and a new 16.5 cents per gallon equivalent tax applied to hydrogen). A road-usage charge revenue system will be studied for potential future implementation in the state. The bill also enables counties to raise a quarter-cent local sales tax to fund local roads, transit, bicycle or pedestrian infrastructure or other transportation projects. This package will increase state transportation revenue by \$76 million by FY 2017.
Vermont	2013	Gas tax Diesel tax	Raises \$28 million annually by adding new 2 percent sales tax assessment to gasoline, reducing gas tax from 20 cents to 19.2 cents and issuing a \$9 million bond to be repaid with existing revenues. Passed through a transportation budget bill, goes into effect on May 1, 2013. Diesel per gallon tax will rise 3 cents over 2 years, starting July 1, 2013.
Virginia	2013	Sales tax Local tax in two regions Sales tax Real estate transfer tax Hotel tax Gas tax Vehicle registration fee Hybrid vehicle fee Internet sales tax	Sales taxes: Directs 0.175 percent of existing sales tax revenues to transportation; raises sales tax by 0.3 percent with 1.25 percent of the increase dedicated to transit and passenger rail. (Statewide sales tax increases from 5 percent to 5.3 percent). Local taxes: Imposes mandatory taxes in two regions: in Northern Virginia, increases sales tax by 0.7 percent and adds 15 cents per \$100 assessed value to real estate transfer tax along with a 2 percent increase in hotel tax); in Hampton Roads it increases sales tax by 0.7 percent and adds a 2.1 percent wholesale tax on gasoline. Gas tax: Eliminates the cents per gallon tax on gasoline and diesel; adds a 3.5 percent wholesale tax on gasoline and 6 percent on diesel (wholesale tax increases by 1.6 percent in 2015 if the Internet sales tax ban is not lifted). Vehicle fees: Adds a \$64 fee on hybrid vehicles and raises the motor vehicle sales and use tax by 1.15 percent. Other fees: Direct a portion of internet sales tax receipts to transportation if Congressional ban is lifted, which would raise \$1.13 billion over 5 years.
Washington	2015	Fuel tax Vehicle weight fee License fee Vehicle sales tax Sales tax Property tax Local option vehicle fee	Raise \$16.1 billion by increasing the fuel tax by 11.9 cents per gallon over 2 years and increasing vehicle weight and driver's license fees. Directs \$8.8 billion to new state and local highway construction projects; \$1.4 billion to road repair; and \$1 billion to transit, pedestrian, and bike projects. Allows Sound Transit to impose a vehicle tax of up to 0.8 percent, an additional 0.4 percent sales tax, and/or a property tax of 25 cents per thousand dollars by referendum; increase the cap on local option vehicle fees from \$20 to \$40 (if the local district has imposed a \$20 fee for at least 2 years, up to \$50 if the district imposed a \$40 fee); allow transit benefit districts to impose a sales and use tax of up to 0.3 percent by referendum; and allow for the creation of passenger ferry funding districts.

State	Year Enacted	Type of Revenue	Details
West Virginia	2017	Fuel tax Vehicle sales tax Vehicle registration fee	Raises the floor on the variable-rate fuel tax by 3.5 cents per gallon (from 11.7 cents to 15.2 cents per gallon), increases the motor vehicle sales tax from 5 percent to 6 percent, and increases various motor vehicle fees. The law will raise an additional \$140 million annually for road projects.
Wyoming	2013	Gas tax	Raise \$70 million annually by increasing the gas tax 10 cents per gallon. Intended for highways only.

Source: *Transportation for America*.



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9. IMPLEMENTATION STRATEGIES

9.1 Implementation Strategies and Policies (A Strategic Approach to Transportation Investment)

The Plan will be implemented through specific actions at the state, regional, and local levels. The goals and objectives of this long-range transportation plan (refer to **Chapter 3**)—which are aligned with the goals and objectives of other state agencies, including those related to land use, energy, environment, economic development, and housing—are measurable. Tracking and analyzing the various performance metrics used to measure progress of the Plan is critical to good investment decision-making and will enable the state’s transportation system to be responsive to current and future demands.

Implementation of the Plan will require new or refined policies, processes, and plans to optimize the economic, social, environmental, and quality of life benefits of the major transportation investments. This section provides the supporting policies and guidelines for the investment strategies outlined in this Plan. Achieving the desired results will require continuous review and update of these policies to ensure that transportation decisions are consistent with the Plan recommendations.

In addition, the Plan recognizes the many entities involved in providing transportation in Connecticut and the challenges inherent in reaching consensus among them. Transportation capital investments and the governance of the agencies that provide transportation services in Connecticut are guided by a wide variety of policies, standards, procedures, and guidelines developed by the state legislature, the Department and other state agencies, MPOs, local governments, transit operators, and others.

9.2 Potential New Policies to Implement the Plan

Clearly, implementing the Plan will be a major undertaking. At a minimum, this major effort will require the Department to work with its partners and the public to:

- Increase funding levels to meet and exceed the public’s expectations of the transportation system.
- Adopt and implement the asset management plans.
- Develop and refine performance measures and indicators, based on the Plan goals and objectives, to monitor system performance, guide investment decisions, and demonstrate progress in achieving these goals and objectives.
- Implement a performance-based decision-making process that links the Plan goals with capital investment decisions.
- Increase the capacity to plan, design, finance, construct, and maintain complex, multi-billion-dollar projects and programs.

- Improve available data and tools to evaluate performance and progress.
- Ensure that the Department has the organizational structure to anticipate and respond to challenges and opportunities to meet the travel needs of the future.
- Periodically convene partners and the public to review progress in implementing the Plan and address emerging or outstanding issues.

These actions are critical not only to the proper functioning of the state's transportation systems, but also to the health and prosperity of the state's citizens.

Potential new policies to implement the goals and objectives of the Plan are provided in **Table 9.1**. This table correlates potential new policies with each of the multiple objectives developed under the 16 goals of the Plan. The goals are organized under four categories produced by the visioning for the plan, including:

- A. Economic
- B. Deliverability
- C. Quality of Life
- D. Livability and Resilience

This table also includes a column titled "Related Policy Recommendations from Previous Plans Prepared by the Department and by Other State Agencies." The purpose of this column is to indicate how the goals and objectives of the Plan are consistent and compatible with many goals and objectives of several other state agencies, and how the goals and objectives of the Plan may support or advance the goals and objectives of these sister agencies.

Table 9.1: Correlating Goals and Objectives with Potential Policies

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
A. Economic	A.1. Economic growth with efficient and effective transportation for people and goods.	<ul style="list-style-type: none"> • Manage travel to reduce traffic congestion and improve reliability. • Support development of a robust, integrated multimodal passenger transportation system. • Support improved airport facilities for both passenger and air cargo. • Support innovation and emerging technologies in the transportation industry. 	<ul style="list-style-type: none"> • Encourage employers to incentivize use of transit by their employees. • Improve parking supply at transit terminals. • Provide shuttles between commuter parking lots or satellite parking lots and transit stations. • Support AV/CV technologies, especially for shared-ride services • Encourage car rental companies, shared vehicle operators (e.g. Zip Cars), taxi operators, and shared bicycle networks to locate facilities or rental outlets adjacent to transit terminals. • Provide shuttles between commuter parking lots, transit stations, and airport terminals. 	<ul style="list-style-type: none"> • Improve transit services and linkages to attract more customers through better integration of all transportation options and advances in technology, while providing convenience, reliability, safety, and competitive modal choices.³⁹ • Make strategic investments in the transportation system to restore and sustain economic growth.⁴⁰ • Retain and expand existing domestic air service.⁴¹ • Identify cargo development opportunities.⁴²
	A.2. Connectivity to national and global markets to make Connecticut more competitive.	<ul style="list-style-type: none"> • Enhance connections to NYC and Boston to improve business travel and attract new employers. • Improve connectivity between regional centers in Connecticut. • Improve intermodal connectivity for people. 	<ul style="list-style-type: none"> • Provide express bus service in cities and town centers that lack bus and commuter rail service. • Develop alternative standards for the design and implementation of multimodal projects and the incorporation of Complete Streets principles through revisions to its Highway Design Manual to better connect pedestrians, bicyclists, shared vehicles (carpools, taxis, shuttles) to transit terminals. 	<ul style="list-style-type: none"> • Partner with airlines to support ongoing passenger and cargo flights.⁴³ Add service to key destinations.⁴⁴ • Expand rail freight infrastructure and improve access to ports, airports, and rail freight intermodal facilities.⁴⁵ • Promote the creation of support mechanisms that will assist in the implementation of air service to Europe, including with the goal of sustainable service in accordance with FAA guidelines for Revenue Use Policy.⁴⁶

³⁹ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 15.

⁴⁰ 2011 Master Transportation Plan, CTDOT; page 1-3.

⁴¹ Bradley International Airport Strategic Plan.

⁴² Bradley International Airport Strategic Plan.

⁴³ Bradley International Airport Strategic Plan.

⁴⁴ Bradley International Airport Strategic Plan.

⁴⁵ 2011 Master Transportation Plan, CTDOT; page 1-5.

⁴⁶ Bradley International Airport Strategic Plan.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
	A.3. Infrastructure in a state of good repair to improve reliability and reduce costs to users.	<ul style="list-style-type: none"> Restore and maintain Connecticut's multimodal transportation system in a state of good repair. 	<ul style="list-style-type: none"> Develop appropriate condition inventories of Department assets and develop asset management system to optimize long-term investments. Incorporate asset management information into short-term decision-making. 	<ul style="list-style-type: none"> Identify and invest in ways to maximize the use of the existing transportation system.⁴⁷ Improve system productivity by coordinating the scheduling of maintenance and providing real-time travel information to the public.⁴⁸ Protect and enhance shipyard/ship repair services.⁴⁹
	A.4. Reduced business costs by improving goods movement.	<ul style="list-style-type: none"> Improve truck freight travel times/travel time reliability. Increase rail freight capacity. Restore the viability of waterways and ports for freight movement. Support better connections among all freight modes. Improve freight connectivity to national and global markets. 	<ul style="list-style-type: none"> Sustain dialog with freight stakeholders and regional partners, to understand private sector infrastructure needs and priorities and to ensure that state and regional transportation improvement programs include freight-beneficial projects. Empower new Port Authority with substantial freight, intermodal, and commercial portfolio. 	<ul style="list-style-type: none"> Restore (dredge) strategic shipping channels and pier areas to their authorized depths.⁵⁰ Fund New Haven Channel and Small Marina Dredging.⁵¹
	A.5. Revitalized urban centers with enhanced transportation options.	<ul style="list-style-type: none"> Focus transportation investments in existing population and employment centers. Make more efficient and effective use of existing infrastructure. 	<ul style="list-style-type: none"> Prioritize transportation investments based on quantitative measures such as improved mobility, and consider the more qualitative, secondary benefits that accrue from connected communities (e.g. health impact assessments, reduced environmental impacts, reduced sprawl). Prioritize redevelopment, reuse, and rehabilitation of existing infrastructure to revitalize Connecticut's central cities. Accelerate and monitor TOD plan implementations to improve the attractiveness of central development areas. 	<ul style="list-style-type: none"> Protect and enhance liquid bulk and related energy uses. Increase dry bulk and break-bulk cargoes. Increase scrap metal exports. Attract wood pellet exports. Compete for break bulk lumber, copper, and steel imports. Evaluate fresh food imports.⁵²

⁴⁷ 2011 Master Transportation Plan, CTDOT; page 1-8.

⁴⁸ 2011 Master Transportation Plan, CTDOT; page 1-8.

⁴⁹ Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 88.

⁵⁰ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 16.

⁵¹ Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 89.

⁵² Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 88.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
B. Deliverability	<p>B.1. The Department delivers projects and services faster, cost-effectively and with greater customer satisfaction.</p>	<ul style="list-style-type: none"> Streamline administrative processes (agreements, procurements, etc.), reduce the time and cost of project delivery, and increase the local use of state construction funds. Continuity of staff skill base achieves and maintains a high level of technical proficiency, creativity, and capacity. State-of-the-art financial management and project reporting systems. New design and construction methods (Acceleration Bridge Construction, Design-Build, etc.) reduce the time and cost of project delivery. Reduce infrastructure life-cycle costs with prudent asset management practices, including more timely and effective treatments. Ensure that staff have the skills and work in an organizational structure to address the travel needs of the future. 	<ul style="list-style-type: none"> Work with the legislature, Governor, and the public to find a stable, reliable, and adequate source of funding to meet Connecticut's transportation needs Develop and implement a project prioritization process that supports the Plan and strengthens the linkage with the state's capital plan. Complete the implementation of an asset management program to track the condition of state assets and to optimize replacement and repair schedules. Perform life-cycle cost analysis to identify potential cost burdens beyond the initial capital investment for any expansion of transportation infrastructure. Continually engage and collaborate with municipalities, stakeholders, and the general public to understand transportation need, local preferences, and environmental preservation decisions. Provide incentives and remove disincentives or barriers to public-private partnerships. Expand use of innovative project delivery methods, including accelerated bridge 	<ul style="list-style-type: none"> Coordinate closely with Office of State Traffic Administration (OSTA) to address and resolve bicycle and pedestrian issues.⁵³ Utilize the latest technology to provide a safe, efficient, integrated, multimodal transportation system.⁵⁴ When considering a project to enhance, expand, or modify limits on system capacity, analyze the impact to providing greater mobility, accessibility, and integration of the various transportation modes.⁵⁵ Give priority to "fix-it-first" initiatives.⁵⁶ Identify means to finance the maintenance, repair, and improvement of the state's transportation systems.⁵⁷ Improve the Bicycle and Pedestrian Needs Review phase of project design process.⁵⁸ Improve training of Department Design staff and Department Maintenance staff by encouraging participation of this staff in state-of-the-art bicycle facility design classes.⁵⁹ Include all relevant Department offices and divisions on the Statewide Bicycle and Pedestrian Advisory Committee.⁶⁰ Revise and improve governance structure either with a market-based approach or a statewide port authority approach.⁶¹

⁵³ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 51.

⁵⁴ 2011 Master Transportation Plan, CTDOT; page 2.

⁵⁵ 2011 Master Transportation Plan, CTDOT; page 1-8.

⁵⁶ 2011 Master Transportation Plan, CTDOT; page 1-8.

⁵⁷ 2011 Master Transportation Plan, CTDOT; page 1-6.

⁵⁸ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 49.

⁵⁹ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 49.

⁶⁰ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 51.

⁶¹ Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 90.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
		<ul style="list-style-type: none"> Utilize public-private partnerships as effective support for the Department 	<p>construction and public-private partnerships.</p>	<ul style="list-style-type: none"> Create Market-Based Grant-in-Aid Program to leverage private sector investment and private sector employment.⁶²
	B.2. Improved communications and responsiveness with system users, residents, and businesses.	<ul style="list-style-type: none"> Continue to strengthen public outreach and involvement activities to enable the full range of stakeholders and the public to provide input on key decisions. 	<ul style="list-style-type: none"> Provide additional avenues for sustained and continuous feedback and two-way communication with the public. 	<ul style="list-style-type: none"> Consult with internal and external stakeholders in an open and transparent decision-making process and remain responsive by providing timely information on services and programs.⁶³ Provide early notification to municipalities of maintenance/restriping schedules.⁶⁴
	B.3. Strong partnerships with state agencies and local governments foster collaboration and improve program delivery.	<ul style="list-style-type: none"> Improve partnerships with local governments to seek sustainable transportation solutions. Improve partnerships with other transportation services, including Metro-North and Amtrak. Improve partnerships with neighboring states. 	<ul style="list-style-type: none"> Improve interagency data sharing and coordination, including expanding the use of performance based decision-making, to include all types of transportation investments. Coordinate among partners to track progress of mutual commitments for supportive transportation, land use, economic development, and environmental policies, as well as related investments. Improve the environmental review and project development process by involving resource agencies, communities, and other stakeholders from the planning stage and throughout the life of the project. 	<ul style="list-style-type: none"> Maintain a regular schedule of meetings of the Statewide Bicycle and Pedestrian Advisory Committee.⁶⁵ Coordinate with regional planning agencies and local jurisdictions, state agencies, and statewide user/advocacy groups.⁶⁶ Partner with Department of Economic and Community Development (DECD), Connecticut Business and Industry Association (CBIA), and the Metro-Hartford Alliance to market the airport.⁶⁷ Work with DECD to include Bradley marketing material at all State Site Selector events.⁶⁸ Coordinate with bus and rail transit service providers to align schedule and occupancy requirements with the needs of bicycle commuters.⁶⁹

⁶² Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 89.

⁶³ 2011 Master Transportation Plan, CTDOT; page 2.

⁶⁴ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 49.

⁶⁵ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 49.

⁶⁶ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 49.

⁶⁷ Bradley International Airport Strategic Plan.

⁶⁸ Bradley International Airport Strategic Plan.

⁶⁹ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 50.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
C. Quality of Life	C.1. Safe and secure travel for people and goods for all modes.	<ul style="list-style-type: none"> Significantly reduce travel related fatalities, crashes, and derailments. Reduce work zone related accidents. 	<ul style="list-style-type: none"> Develop protocol for and conduct road safety audits. Implement new work zone protection measures and/or enhanced enforcement strategies. Identify high-accident locations, address issues, and communicate results of efforts to reduce accidents. 	<ul style="list-style-type: none"> Actively enforce the existing bicycle and pedestrian-related laws and policies in Section IV of the plan.⁷⁰ Operate a safe and secure airport according to the aviation regulations, environmental guidelines, and best management practices; and continue to maximize all available federal funds and passenger facility charges to maintain the highest level of airfield infrastructure.⁷¹
	C.2. Mobility and accessibility for all users, particularly (the aging population and) people who can't drive or have limited access to autos.	<ul style="list-style-type: none"> Develop a transportation system that recognizes and accommodates changing socioeconomic diversity of the state. Expand transit systems to improve access to jobs, reduce household transportation costs, and decrease traffic congestion. Improve the effectiveness of all transportation modes and facilities to allow for "aging in place" populations. 	<ul style="list-style-type: none"> Implement and monitor a process that will identify transit-dependent neighborhoods and the density of bus stops//transit service levels, as well as job locations, to better track and align transit needs with transit supply. Develop and implement a process that enables employers to identify the need for employees to have modal options. Encourage towns and cities to conduct audits of the town or city centers to determine how "Aging-in-place friendly their towns are and to identify ways to improve mobility for the elderly. 	

⁷⁰ 2009 CT Statewide Bicycle and Pedestrian Plan Update.

⁷¹ Bradley International Airport Strategic Plan.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
	C.3. Convenient and reliable travel choices.	<ul style="list-style-type: none"> • Improve travel choice where it is most cost-effective to do so. • Increase communication to users in system interruptions, both planned and unplanned. • Utilize emerging technology to provide real-time information to users on system performance across modes. 	<ul style="list-style-type: none"> • Accelerate and monitor TOD plan implementations to improve the attractiveness of central development areas. • Accelerate implementation of ITS systems • Coordinate fare payments on multiple transit modes through a universal pass program or transit smart cards. • Provide state-of-the-art, GPS-based, real-time transit information (schedules, routes and location or status of specific transit vehicle) for smart phone apps, at transit terminals and at bus shelters. 	<ul style="list-style-type: none"> • Work with transportation providers throughout the state to enhance connectivity between modes (e.g., allowing bicycles aboard all trains).⁷² • Work with municipalities to update their sidewalk ordinances to require connectivity.⁷³ • Implement projects to encourage mode change at the Department (e.g., put a bicycle rack at the front door of Department offices).⁷⁴ • Protect and enhance private ferry services.⁷⁵ • Partner with government agencies and airlines to introduce cutting edge technology to facilitate airport processes.⁷⁶
	C.4. Integrated transportation and land use for more travel options to connect people and places.	<ul style="list-style-type: none"> • Facilitate TOD that concentrates mixed-uses around transportation nodes and along major transportation corridors. • Encourage policies that support quality housing at a broad range of prices, especially workforce housing accessible to transit. • Make public transportation cheaper and faster than Single Occupant Vehicles (SOV) for travel to dense, mixed use destinations. 	<ul style="list-style-type: none"> • Incentivize TOD that concentrates mixed-uses around transportation nodes and along major transportation corridors through infrastructure grants and planning programs and improved transit. The infrastructure can be implemented through funding tied to TIFs or value capture programs. • Tie government grants, loans, and other aids to jurisdictions that have implemented affordable, mixed-income housing programs such as the state's Incentive Housing Zone Program/Housing for Economic Growth (HEG) Program.⁷⁷ 	<ul style="list-style-type: none"> • Promote housing and/or affordable housing as part of mixed use and TODs within walking distance to public transportation facilities.⁷⁸

⁷² CT Bicycle and Pedestrian Advisory Board.

⁷³ CT Bicycle and Pedestrian Advisory Board.

⁷⁴ CT Bicycle and Pedestrian Advisory Board.

⁷⁵ Connecticut's Deep Water Port Strategy Study; State of Connecticut Office of Policy and Management; September 2012; page 88.

⁷⁶ Bradley International Airport Strategic Plan.

⁷⁷ <http://www.ct.gov/doh/cwp/view.asp?a=4513&q=530592>

⁷⁸ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 13.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
D. Livability and Resilience	<p>D.1. Livable, healthy, and environmentally sustainable communities.</p>	<ul style="list-style-type: none"> • Provide more walking and bicycling opportunities in community centers. • Support community efforts to create vibrant, mixed-use neighborhoods that are less highway centric. • Coordinate transportation policy with local and state development plans and policies. 	<ul style="list-style-type: none"> • Better align the state's Plan of Conservation and Development with transportation policies by defining typologies of multimodal centers and intermodal solutions that are compatible with various scales, densities and design sensibilities of Connecticut communities to improve linkages among housing, employment, and transportation. 	<ul style="list-style-type: none"> • Provide a network of pedestrian and bicycle paths and greenways with convenient inter- and intra-town access, including access to the regional public transportation network.⁷⁹ • Promote supportive land uses around rail stations, major bus terminals, airports, and sea ports and discourage uses that are not dependent upon, or complementary to, the available infrastructure.⁸⁰ • Promote TOD and intermodal accessibility.⁸¹ • Give priority for the receipt of transportation funding to communities that implement complete street changes to their subdivision regulations and street ordinances.⁸² • Work with communities to make bicycle/pedestrian counts routine parts of projects.⁸³ • Review for possible revision local sidewalk match requirements in CTDOT's policies.⁸⁴ • Ensure that the planning, design, construction, and operation of state and local highways accommodates municipal plans and the needs of all users.⁸⁵ • In adding projects to the State Transportation Improvement Program, prioritize multimodal, complete streets projects.⁸⁶ • Encourage installation of bicycle parking at private employment and retail facilities.⁸⁷

⁷⁹ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 9.

⁸⁰ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 9.

⁸¹ 2013 Comprehensive Energy Strategy for Connecticut, the Connecticut Department of Energy and Environmental Protection (DEEP).

⁸² CT Bicycle and Pedestrian Advisory Board.

⁸³ CT Bicycle and Pedestrian Advisory Board.

⁸⁴ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 47.

⁸⁵ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 15.

⁸⁶ CT Bicycle and Pedestrian Advisory Board.

⁸⁷ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 50.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
	<p>D.2. Enhanced bicycling and walking accommodations and opportunities.</p>	<ul style="list-style-type: none"> Accommodate demand for pedestrian and bicycle travel. Fully integrate the Department's Complete Streets policies into design and programming. Establish regular communication between the Department and municipalities for early input on upcoming projects. 	<ul style="list-style-type: none"> Report every 2 years on implementation status of statewide bicycle plan. Provide secure and sheltered bicycle parking at bus and commuter rail terminals. Improve walking and cycling routes (e.g. Complete Streets improvements and bicycle lanes) between residential areas and transit terminals and between transit terminals and downtowns or other centers of activity or employment. Institutionalize Complete Streets and CSS policies by adopting multimodal street design guidelines that address the scale and character of the community and the context and function of the street to improve safety and travel choice on a local level. 	<ul style="list-style-type: none"> In future transportation projects that receive federal money, provide description of how pedestrians, bicyclists, transit riders, and drivers of all ages and abilities would be accommodated.⁸⁸ Identify bicycle/pedestrian "generation factor" for engineers to use in modeling non-motorized transportation.⁸⁹ Include bicycle and pedestrian measures in the Department's Performance Metrics Report.⁹⁰
	<p>D.3. Environmentally-friendly transportation that is affordable.</p>	<ul style="list-style-type: none"> Develop realistic, affordable alternatives to automobile use that helps to reduce resource and energy use and impacts on communities and the environment. Support transportation technologies that increase efficiency, reduce congestion, and produce environmental benefits. 	<ul style="list-style-type: none"> Increase efficiencies in the transportation system through better traffic synchronization systems, and ensuring that existing systems are optimized. Encourage ZEV and low emission vehicle use. 	<ul style="list-style-type: none"> Promote transportation alternatives to the automobile such as bicycling, walking, and public transportation to reduce energy consumption, air pollution, and obesity-related health care costs.⁹¹ Reduce VMT to reduce GHG levels by increasing transit ridership, investing in new transit, and establishing an interagency program to promote smart transportation and land use decisions.⁹² Reduce carbon dioxide emissions in this state consistent with the recommendations of the Connecticut Climate Change Preparedness Plan.⁹³

⁸⁸ CT Bicycle and Pedestrian Advisory Board.

⁸⁹ CT Bicycle and Pedestrian Advisory Board.

⁹⁰ 2009 CT Statewide Bicycle and Pedestrian Plan Update; page 47.

⁹¹ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 24.

⁹² Connecticut Climate Change Preparedness Plan, 2011.

⁹³ Conservation and Development Policies: The Plan for Connecticut, 2013-2018; OPM; page 24.

	Goals	Objectives	Potential New Policies to Implement Goals and Objectives	Related Policy Recommendations from Previous Plans Prepared by CTDOT and by Other State Agencies
	<p>D.4. Resilient transportation systems.</p>	<ul style="list-style-type: none"> • Improve reliability of transportation by addressing vulnerabilities in the system. • Integrate 'Green' transportation practices into all Department activities from planning to design, construction, and operations. 	<ul style="list-style-type: none"> • Conduct vulnerability assessments of the state's bridges and culverts. • Evaluate existing storm-event design standards, and how these standards will hold up against projected increases in storm surges. • Incorporate climate change vulnerability and risk in transportation decision making. 	



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10. ASSET MANAGEMENT AND PERFORMANCE MANAGEMENT

10.1 Asset Management

With the enactment of MAP-21 and the FAST Act came a change in transportation management practices, mandating states to establish asset management methods and report performance measures on the NHS. Transportation asset management (TAM) is a strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their life-cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision-making based on high quality information and well-defined objectives. Transportation Performance Management (TPM) is a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.

The Department has embraced asset management and performance management as an aid to decision-making. Adopting and implementing an asset management approach to infrastructure investments will enable the Department to optimize funding across different assets. Prior to the federal mandate, the Department had been using bridge and pavement management system tools to generate optimized treatment strategies for the state's bridges and roadways. Using asset management software tools enables the Department to forecast deterioration and help prioritize treatments to prolong the useful life of these assets. The Department is working towards using a cross-asset optimization tool to assist in making broad investment decisions across assets, on multiple modes, with the aim of prolonging an assets useful life and extending the value of these transportation investments.

The Department is preparing both a Transportation Asset Management Plan (TAMP) for highway system infrastructure and a TAMP for transit system infrastructure. Additionally, the Department has formed a unit dedicated to TAM, a unit dedicated to transit asset management, and a unit dedicated to transportation performance management that develops, tracks, and reports performance measures. Like many states, particularly those in the Northeast, the asset management and performance management approaches come at a critical time in Connecticut, when aging infrastructure is coming due for replacement and major rehabilitation. At the same time, the need to increase transportation capacity in a strategic way has increased as well. Asset management and performance management will enable the Department to best use its available resources to seek to achieve and maintain the system in place today in a state of good repair and allow the Department to make wise investments for the safety, health, and economic well-being of its citizens.

10.2 Performance Management

10.2.1 Performance-Based Decision Making

Performance-based decision-making or performance-based planning and programming prioritizes limited funding on the most strategic projects and adds accountability and transparency to the decision-making process. By establishing broad goals in the Plan, and by monitoring progress toward their achievement in

regular cycles of performance measurement, the Department has established a reliable means of informing investment decisions.

Performance-based planning and programming is defined by FHWA as “a data-driven, strategic approach, providing for public and stakeholder involvement and accountability, in order to make investment and policy decisions to attain desired performance outcomes for the multimodal transportation system.”⁹⁴ Performance-based planning and programming is considered a best practice in the transportation industry and can be used by many transportation and planning agencies. The overall purpose of performance-based planning and programming is to use performance data and information to make more effective and efficient decisions that lead to improved future outcomes.

Adopting a performance-based approach to transportation planning allows for the prioritization of limited funding and improves resource allocation. Because it is focused on performance outcomes, performance-based planning and programming fosters open discussions about the strategic direction that an agency should take. In addition to allowing for integration among transportation-related plans within a state, performance-based planning and programming encourages enhanced coordination both across traditional “silos” within agencies as well as with non-traditional transportation planning partners.⁹⁵

10.2.2 Performance Measures

MAP-21 ushered in a new era of decision-making based on the development, measurement, and use of performance measures. The Department established its own performance measures in 2008 and has tracked progress against those measures ever since. Additionally, the Department is complying with the performance-measure provisions included in MAP-21 and the FAST Act. The performance measures are one part of a multifaceted approach for each state department of transportation to support the national goals. The measures are integrated with establishing targets, target setting, planning, and reporting. These processes are broadly referred to as TPM and cover both highway and transit assets.

To implement the TPM framework, MAP-21 delineated national performance goal areas: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery days. In total, 17 national performance measures have been established to measure outcomes, and state DOTs must report performance and set targets for all 17 measures.

MAP-21 rules require state long-range transportation plans to include a system performance report component that reflects these measures and targets, as well as progress toward the targeted performance.

Given the MAP-21 implementation TPM reporting timeline, this Plan predates the forthcoming complete system performance report. To date, performance measures and targets have only been submitted in the areas of highway safety and transit assets. The Department is compliant with the required reporting and timelines in these areas. For more detailed information of TPM, MAP-21, and related resources, please see the FHWA’s Transportation Performance Management home page at <https://www.fhwa.dot.gov/tpm/>.

⁹⁴ Federal Highway Administration (FHWA). 2014. *Model Long-Range Transportation Plans: A Guide for Incorporating Performance-Based Planning*. August 2014.

⁹⁵ *Ibid.*

In addition to the national measures, our performance data is tailored to the agency's own needs and discussed in **Chapter 6** of this plan. As an example of the performance story that will emerge from the measures, the best estimates and metrics currently available are presented in the following tables/figures. The numbers in **Table 10.1** are included for informational purposes only and are expected to change as the data are submitted and targets are developed within the MAP-21 implementation timeline.

Table 10.1: National Highway Performance Measures and Targets, where Established

Measure	Measure value (preliminary estimate in italics)	Target (for future measures and targets, deadlines are given instead, in italics)
Number of fatalities - 5-year rolling average	257	257
Rate of fatalities per 100M VMT - 5-year rolling average	0.823	0.823
Number of serious injuries - 5-year rolling average	1571	1571
Rate of serious injuries per 100M VMT - 5-year rolling average	5.03	5.03
Number of non-motorized fatalities and non-motorized serious injuries - 5-year rolling average	280	280
Percentage of interstate pavements in Good condition	66.2%	5/20/2018
Percentage of interstate pavements in Poor condition	2.2%	5/20/2018
Percentage of non-interstate NHS pavements in Good condition	39.6%	5/20/2018
Percentage of non-interstate NHS pavements in Poor condition	8.6%	5/20/2018
Percentage of NHS bridges classified in Good condition (by deck area)	18.1%	5/20/2018
Percentage of NHS bridges classified in Poor condition (by deck area)	15.0%	5/20/2018
Percent of the person-miles traveled on the interstate System That Are Reliable	78.1%	5/20/2018
Percent of the person-miles traveled on the non-interstate NHS that are reliable (based on 2016 NPMRDS data)	82.9%	5/20/2018
Percent of the interstate system mileage providing for reliable truck travel times	Not available	5/20/2018
State annual hours of peak-hour excessive delay (PHED)	Not available	6/15/2022
State percent of non-single occupant vehicle (SOV) travel	Not available	6/15/2022
State total emissions reduction	Not available	5/20/2018

For transit asset management, the data are submitted in a more detailed format as shown in **Table 10.2**.

Table 10.2: Performance Measures Target Summary

Target Summary:		Metro North, Shore Line East, CTtransit (HNS), Nason, Collins, Northeast Transportation, New Britain Transportation, Dattco			
Revenue Vehicle Classes Total	Goal: Maintain the vehicle class of rolling stock in a state of good repair				
Asset Class	Performance Metric*	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Articulated Bus	ULB	51 Vehicles	0%	0%	14%
Bus	ULB	477 Vehicles	46%	18%	14%
Cutaway Bus	ULB	43 Vehicles	2%	2%	17%
BR Over-The-road bus	ULB	48 Vehicles	15%	0%	14%
Commuter Rail Locomotive	ULB	30 Vehicles	40%	40%	17%
Commuter Rail Passenger Coach	ULB	84 Vehicles	24%	88%	17%
Commuter Rail Self Propelled Passenger Car	ULB	310 Vehicles	12%	12%	17%
Ferry Boats	ULB	3 Vehicles	100%	100%	0%
Service Vehicle Classes Total	Goal: Maintain the vehicle class of rolling stock in a state of good repair				
Asset Class	Performance Metric*	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	48 Vehicles	29%	29%	7%
Automobiles	ULB	11 Vehicles	46%	0%	20%
Sport Utility Vehicle	ULB	26 Vehicles	62%	0%	20%
Steel Wheel Vehicles	ULB	40 Vehicles	100%	100%	0%
Guideway Infrastructure Total	Goal: Maintain all transit guideway assets in a state of good repair				
Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Commuter Rail Guideway	% Restricted	~240 Track Miles	6%	5%	2%
Facilities Classes Total	Goal: Maintain all facilities in a state of good repair				
Asset Class	Performance Metric*	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	49 Facilities	2%	0%	0%
Admin and Maintenance	TERM (1-5)	25 Facilities	4%	4%	0%

* Useful Life Benchmark (ULB); Transit Economic Requirements Model (TERM) when referencing the state of good repair rating.

As stated previously, the Department established performance measures in 2008 (**Table 10.3**). These measures predate the MAP-21 mandates and are continually revised and updated, and new measures established, when warranted. A series of performance measures reports, which focus on results and accountability, are listed below. These reports are published quarterly and each measure is updated as the latest data becomes available. The Department is committed to telling the story on why its measures are important. Using performance measures, the Department provides the transparency and accountability that customers expect. Measures are continually reviewed by the Department's Performance Measures Standing Committee to determine their usefulness in helping the Department make strategic decisions for managing its infrastructure assets. The Standing Committee is comprised of the Commissioner, Deputy Commissioner, Bureau Chiefs, and key executive team members. For more information please see the Department's performance measures website here:

<http://www.ct.gov/dot/cwp/view.asp?a=3815&q=448402>

The Department has developed a framework for tracking compliance with the requirements in the MAP-21 and FAST Act federal surface-transportation legislation. This has led to an effort to organize and coordinate activities both within the Department and between the Department and the various MPOs to adjust to this new federal-aid-program framework of transportation performance management.

Table 10.3: CTDOT Existing Performance Measures

#	Description
1	Rate of Annual Highway Fatalities per 100 million VMT, CTDOT
2	Rate of Annual Highway Fatalities per 100,000 population
3	Percent of Seat Belt Usage
4	Percent of State Maintained Roadway Bridges in a State of Good Repair
5	Number of Bridge Work Items Completed
6	Number of Backlogged Bridge Work Items
7	Mean Distance Between Failures (Miles) - Locomotives
8	Mean Distance Between Failures (Miles) - Coaches
9	Mean Distance Between Failures (Miles) - Electric Multiple Unit (EMU) M8
10	Percent of State Maintained Roads with Acceptable or Better Ride Quality (NHS)
11	Percent of State Maintained Roads with Acceptable or Better Ride Quality (Entire Network)
12	Percent of Funds Expended for Bicycle/ Pedestrian Access
13	Number of Rail Passengers New Haven Line (NHL)
14	Number of Rail Passengers Shore Line East(SLE)
15	Number of CTtransit Passenger Trips
16	Percent of Rail On-Time Performance (OTP)-New Haven Line (NHL)
17	Percent of Rail On-Time Performance (OTP)-Shore Line East (SLE)
18	Average Miles Between Road Calls (Bus)
19	Percent of Construction Contracts Awarded within 60 Days of Bid Opening
20	Percent of Construction Contracts Completed on Time
21	Percent of Construction Contracts Completed within Budget

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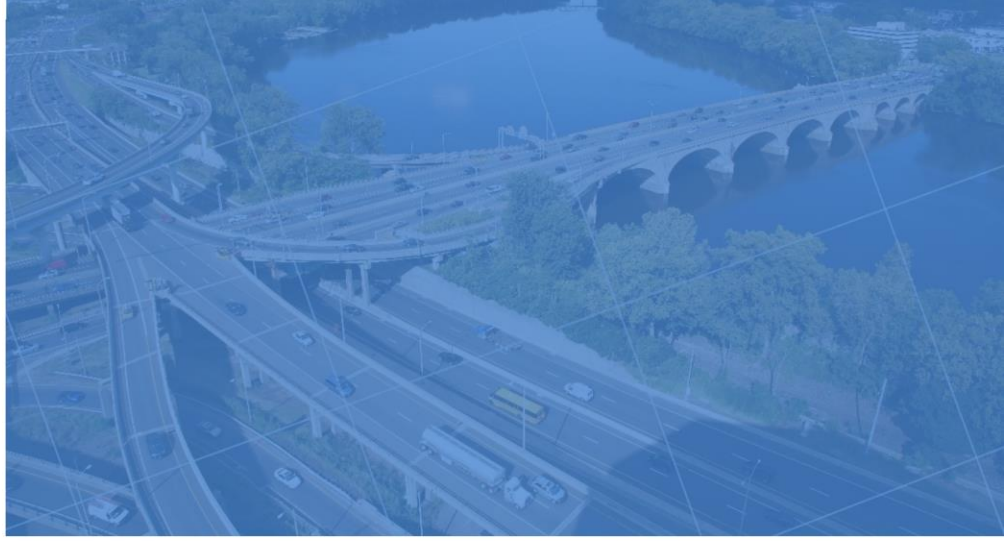
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