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Effectiveness of Transportation Funding Mechanisms for Achieving National, State and Metropolitan Economic, Health and Other Livability Goals

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EFFECTIVENESS OF TRANSPORTATION FUNDING MECHANISMS FOR ACHIEVING NATIONAL, STATE AND METROPOLITAN ECONOMIC, HEALTH AND OTHER LIVABILITY GOALS

Final Report

NITC-RR-875

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16. Abstract

Federal, state and local governments spent approximately $320 billion on transportation in 2012. These public monies buy outputs: facilities and services for highways, transit, air, water, rail and pipelines (BTS, 2016, 110–114, table 5-5). But how effectively do these investments deliver desired outcomes: reducing commute times, improving the economy, supporting community development, enhancing public health, providing cleaner air, and advancing other livability goals?

The Moving Ahead for Progress in the 21st Century Act (MAP-21), adopted in 2012, established national performance goals, called for the development of performance measures and targets, required that targets be incorporated into plans and programs, and required reporting on progress in meeting targets (FHWA, 2013a).

MAP-21 directs states and MPOs to use performance measures and targets. But little has been written about how to integrate performance measures, especially outcomes measures, into all phases of transportation decision-making. In particular, little attention has been given to how existing governance and finance structures can frustrate efforts to achieve desired outcomes cost effectively. States and MPOs have different mechanisms for allocating funding from various sources to transportation projects and programs: the Federal Highway Trust Fund, state gas and sales taxes, etc. Many funding sources are dedicated to particular uses. For example, 27 states limit the use of gas and other motor vehicle taxes to just investments in roads. In some states, transportation commissions allocate funding; in others, the legislature or governor decides bridges (AASHTO, 2016, 52–69).

Though performance measures are becoming more pervasive because of federal policy, and each state has goals in long-range plans, we sought to understand how planning, governance and finance, programming and reporting on performance were integrated. Essentially, we sought to understand how states and MPOs were spending transportation funding in alignment with goals in transportation plans, and how states and MPOs report outcomes to citizens. We looked closely at six case study states, as well as a selected MPO in each state.

While we found good practices in some states, we found little evidence of states clearly linking planning, governance and finance, and programming systematically. Further, we found that states report outputs rather than outcomes. We provide recommendations for better linking planning, governance and finance, programming, and reporting to improve accountability and transparency.

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EXECUTIVE SUMMARY

Federal, state and local governments spent approximately $320 billion on transportation in 2012. These public monies buy **outputs**: facilities and services for highways, transit, air, water, rail and pipelines (BTS, 2016, 110–114, table 5-5). But how effectively do these investments deliver desired **outcomes**: reducing commute times, improving the economy, supporting community development, enhancing public health, providing cleaner air, and advancing other livability goals?

To learn how effectively transportation investments are advancing important public goals—especially economic, health and other livability goals—the research team looked at six case study states and also a select metropolitan planning organization (MPO) in each state:

- **California** / Metropolitan Transportation Commission (San Francisco)
- **Massachusetts** / Pioneer Valley Planning Commission (Springfield)
- **Minnesota** / Metropolitan Council (Minneapolis)
- **Tennessee** / Nashville Area MPO
- **Utah** / Wasatch Front Regional Council (Salt Lake City)
- **Virginia** / Hampton Roads MPO (Virginia Beach)

We chose these states and MPOs to obtain a geographic representation, to highlight specific best practices, and to obtain variation in project selection frameworks and funding limitations. We also expected to see innovations by these jurisdictions.

Though performance measures are becoming more pervasive because of federal policy, and each state has goals in long-range plans, we sought to understand how planning, governance and finance, programming and reporting on performance were integrated. Essentially, we sought to understand how states and MPOs were spending transportation funding in alignment with goals in transportation plans, and how states and MPOs report outcomes to citizens.

Originally, we hoped to obtain information from case study jurisdictions that would shed light on how effectively transportation investments were providing the goals and outcomes they stated they themselves hoped to achieve. (It was not our purpose to impose *our* goals on jurisdictions, but merely to inquire how effectively they are achieving *their* own goals.)

In general, we found that states and MPOs produce ***ex ante* estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post* outcomes** from such investments.

Absent data to assess the effectiveness of transportion investments in achieving goals, the project evolved into a search for better practices, and a sense of what it would take for a state or MPO to focus their transportation decision-making processes to achieving outcomes cost effectively.

A major finding is that current transportaton governance and finance structures can impose significant barriers to making transportation investments that effectively advance goals: What sources of money are available? How can it be used? Who decides how to use it?

A 2009 technical report highlights some of the challenges: “Transportation decision making in Virginia suffers from an inability to marshal the resources and the authority to make transportation funding and investment decisions that both offer the appropriate nexus of decision making and provide an appropriate level of funding to address regional transportation challenges. There is no lack of organizational entities that could be created to address transportation issues of regional significance. The problems remain:

1. Limitation on the powers of such entities to raise revenue, since the Virginia Constitution requires direct election of representatives to any body that has the ability to levy taxes;

2. Issues relating to the federal mandate for a ‘continuing, comprehensive and coordinated’ transportation planning process, which has heretofore been satisfied through metropolitan planning organizations (MPOs);

3. The disconnect between the powers of local government to control land use and the need for regional action to direct growth in ways that minimize sprawl and congestion; and

4. Local agencies currently lack the capacity, in terms of financial resources and expertise, to take responsibility for the ongoing maintenance and management of roads and bridges (devolution)” (Virginia Office of Intermodal Planning and Investment, 2009, 1).

As an outgrowth of this research project, we developed a separate toolkit for practitioners. Drawing on what we learned from our case study states and MPOs, as well as other jurisdictions across the country, the toolkit offers a comprehensive, four-phase framework for outcomes-based, transportation decision-making. See Figure ES-1.

The toolkit offers specific recommendations in eight areas. See Table ES-1.

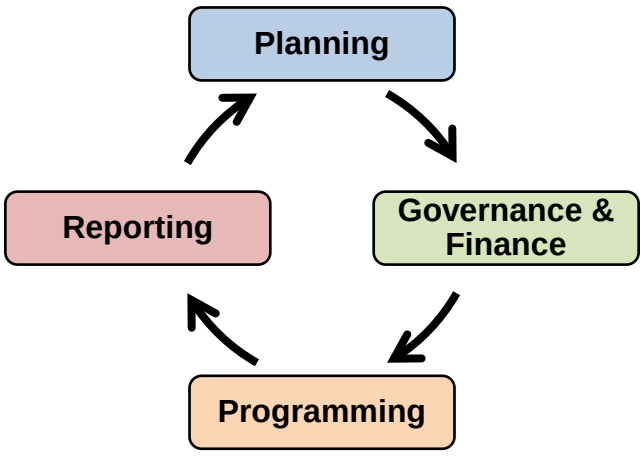

Figure ES-1: Comprehensive, Four-Phase Framework for Outcomes-Based Decision-Making

Table ES-1: Summary of Toolkit Recommendations

Phase 1: Planning *What outcomes do we want? What investments will be effective?* ➢ Develop performance measures that reflect local priorities. ➢ Plan to achieve desired outcomes cost-effectively.
Phase 2: Governance & Finance *What sources of money are available? How can it be used? Who decides how to use it?* ➢ Tie sources of funding to desired outcomes. ➢ Provide flexibility to make cost-effective investments. ➢ Delegate investment decisions to policymakers with sufficiently broad authority.
Phase 3: Programming *What investments do we make?* ➢ Make cost-effective investments to achieve desired outcomes.
Phase 4: Reporting *How did our investments perform? What do we report to the public?* ➢ Analyze outcomes and adjust expectations. ➢ Report returns on investments to taxpayers.

The ideas in the toolkit are not new, but rather build on performance management practices generally and especially on guidance from the Federal Highway Administration (FHWA, 2013c). Moreover, as it was beyond the scope of this project, the toolkit is not intended to be a definitive and complete how-to guide, but rather a high-level introduction with recommendations, examples and links to additional resources. Our hope is that this separate toolkit might spur discussion and innovation (Zako and Lewis, 2017).

1.0 INTRODUCTION

Taxpayers expect their investments in transportation to deliver results.

On behalf of Americans, federal, state and local governments combined spent $319.8 billion on all modes of transportation in 2012.[1] This amount represents approximately 5.1 percent of total government expenditures, or $1,000 per capita.[2] These funds buy transportation projects and programs. Among other things, monies are expended to build, operate and maintain publicly owned transportation facilities and implement public policy in areas such as safety and security. Nearly two-thirds of government expenditures went to highways (roads, bridges and tunnels), followed by transit, air, water, rail, general support and pipeline (BTS, 2016, 110–114, table 5-5). See Table 1.1.

Table 1.1: Federal, State and Local Government Transportation Expenditures in 2012

	Expenditures (billions of current dollars)		
Mode	**Federal**	**State & Local**	**Total**
Highway	$8.7	$197.5	$206.3
Transit	$0.1	$55.1	$55.2
Railroad	$1.8	$0.0	$1.8
Air	$18.2	$23.6	$41.8
Water	$8.1	$5.2	$13.3
Pipeline	$0.1	$0.0	$0.1
General Support	$1.5	$0.0	$1.5
Total	**$38.5**	**$281.4**	**$319.8**

Source: (BTS, 2016, table 5-5).

Transportation investments in various modes (outputs) are not ends in themselves, but rather means to serve broader societal goals (outcomes). Taxpayers are not necessarily satisfied that billions of dollars are spent simply on public works and services.[3] Americans expect their taxes to deliver value (i.e., to deliver the results they want and expect). See Figure 1.1.

[1] The latest year for which comprehensive data have been published is 2012.

[2] In 2014, personal consumption expenditures—what households spend in aggregate and what federal, state and local governments and other organizations spend on behalf of households—on transportation were roughly $1.231 trillion (BTS, 2016, 108–110). This amount represents almost $4,000 per capita. But this research project is focused on just public expenditures.

[3] Some might be even less pleased to learn that billions of dollars are borrowed to do so. Total transportation revenues fell short of government transportation expenditures in 2012, covering only 56.3 percent of expenditures. When revenues do not cover expenditures, general tax receipts (e.g., from sales and property taxes), trust fund balances and borrowing are needed to cover the shortages (BTS, 2016, 114–115, table 5-6).

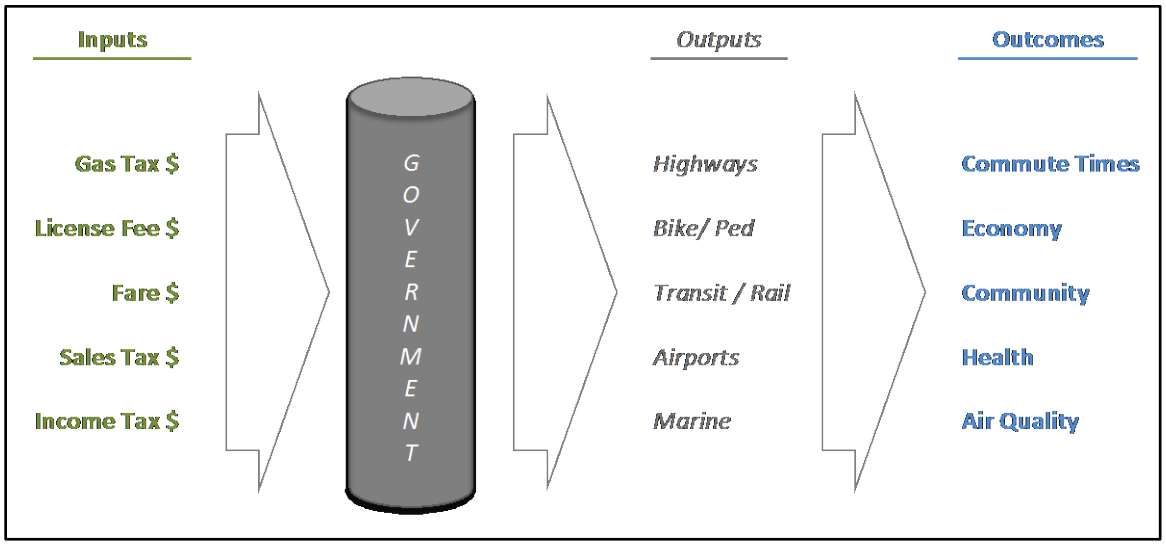

Figure 1.1: Americans Want Government to Use Taxes (Inputs) to Deliver Results (Outcomes)

According to the U.S. PIRG Education Fund (2016, 9), "Some of today's highway expansion projects are so unjustifiable that they can be described as 'boondoggles'—a term defined by the *Oxford Dictionary of Difficult Words* as 'work or activity that is wasteful or pointless but gives the appearance of having value. Many of these projects 'give the appearance of having value' when justified by public officials based on decades-old studies, speculative economic development promises, or fears of hypothetical future traffic congestion. On closer inspection, however, the rationale for the massive expense proposed for these projects often melts away. Money spent on a wasteful highway expansion project is money that can't be spent fixing our existing roads and transit systems, adding a new light rail or bus line in a growing American city, or exploring ways to serve America's changing transportation needs more effectively and efficiently."

As Massachusetts Secretary of Transportation Stephanie Pollack explained, "Transportation is not important for what it is, it's important for what it does" (Aicardi, 2016). "The return on investment in transportation … is not just measured in how many people physically use it. It's also measured in improvements to the economy, decreases in people's commuting time, creation of new jobs and reduction in greenhouse gases" (Vock, 2016).

Of course, transportation investments support the efficient movement of people, goods and services. "The U.S. transportation system serves nearly 319 million Americans—including those who may not own a vehicle or rarely travel. Transportation allows us to commute to work, obtain goods and services, call on family and friends, and visit distant places. It also drives our economy, connecting 7.5 million businesses with customers, suppliers, and workers. The system allows almost 75 million foreign visitors to travel to our country, resulting in a sizable contribution to the U.S. economy. The system serves a large and diverse set of users" (BTS, 2016, 2).

But transportation investments also impact a wide range of livability goals. Transportation projects and programs can enhance or diminish transportation choices, air quality, public health, safety and security, housing affordability, economic competitiveness, community vitality, neighborhood

character, urban sprawl, rural preservation, and the accountability and effectiveness of all levels of government to plan for future growth (Partnership for Sustainable Communities, 2013).

This project looks at the effectiveness of transportation investments in advancing important societal goals and objectives as reflected in various performance measures—at the "bang for the buck."

According to former U.S. Secretary of Transportation Ray La Hood, "the truth is we will never have enough money to be wasteful with it. That is why this idea of using performance measures to identify the truly beneficial projects and then prove that they are getting the proper results is so important. Not only does this approach ensure a good return on investment, demonstrating results helps build taxpayer support for investing in the first place" (Transportation for America, 2015c, 4).

This project does not recommend or gauge specific outcomes. Originally, this project hoped to assess which states and metropolitan planning organizations (MPOs) were making transportation investments more effectively. As will be discussed in Chapter 3, under current practices, with available data, it is not feasible to determine how much funding has been spent in alignment with specific goals. At a basic level, current project selection and programming processes make it difficult to understand how funded projects are aligned to *any* goals.

Rather this project looks at transportation decision-making processes. We seek to understand how states and MPOs align goals, objectives and performance measures with funding mechanisms, allocation formulas, planning, programming and project selection—in short, any decision-making process that directs the use of transportation funding. We are interested in how and whether public funding is spent in alignment with public goals.

Historically, these processes have been varied across states, elusive and not well connected to planning goals. Performance-based programming seeks to bring transparency and uniformity to this process (FHWA, 2013c, 76).

We rely on case study states and MPOs to examine long-range goals, project selection processes, programming decision-making and performance management. Our key research questions center around the following:

- **How do goals, project selection criteria and weighting influence project investment decisions?**
    - What are the linkages between goals, criteria and weights?
    - How are criteria and weights determined?
- **How do funding constraints influence the project selection process?**
    - Do funding constraints change the way projects are evaluated and compared?

- **How is performance measurement integrated in the project selection process?**
    - How are performance measures linked to goals, criteria and weights?

In this report we examine how states and MPOs integrate goals into project selection processes and track performance towards achieving these goals.

This project identifies key transportation decision-making processes, examines a handful of case studies, assesses how well goals are integrated into different efforts, and highlights some better practices.

We proceed as follows: The rest of this introduction outlines traditional and performance-based transportation decision-making processes, and summarizes America's federalist system of transportation funding. We review relevant literature and explain our methodology. The bulk of this report consists of detailed case studies of six states: California, Massachusetts, Minnesota, Tennessee, Utah and Virginia. We synthesize case studies. We highlight better practices from the case studies. Finally, we summarize our conclusions and point to possible future research.

A separate toolkit offers practitioners a comprehensive, four-phase framework for outcomes-based, transportation decision-making (Zako and Lewis, 2017).

1.1 TRANSPORTATION DECISION-MAKING

Although transportation decision-making processes vary widely across states and MPOs, the federal government imposes minimum process standards for planning, programming, public involvement and reporting.

Since at least the Intermodal Surface Transportation Efficiency Act of 1991,[4] federal statutes and regulations have required states and MPOs to each develop a long-range transportation plan (LRTP):

- *State*: **Long-Range Statewide Transportation Plan (LRSTP)**[5]
- *MPO*: **Metropolitan Transportation Plan (MTP)**,[6] or sometimes called a Regional Transportation Plan (RTP)

[4] Pub. L. 102-240 (1991), http://www.congress.gov/bill/102nd-congress/house-bill/2950.

[5] 23 C.F.R. § 450.216: "**Development and content of the long-range statewide transportation plan.** (a) The State shall develop a long-range statewide transportation plan, with a minimum 20-year forecast period at the time of adoption, that provides for the development and implementation of the multimodal transportation system for the State. The long-range statewide transportation plan shall consider and include, as applicable, elements and connections between public transportation, non-motorized modes, rail, commercial motor vehicle, waterway, and aviation facilities, particularly with respect to intercity travel. …" http://www.law.cornell.edu/cfr/text/23/450.216.

[6] 23 C.F.R. § 450.324: "**Development and content of the metropolitan transportation plan.** (a) The metropolitan transportation planning process shall include the development of a

Federal statutes and regulations also require states and MPOs to each develop a short-range investment program:

- *State*: **State Transportation Investment Program (STIP)**[7]
- *MPO*: **Transportation Improvement Program (TIP)**,[8] or sometimes called a Metropolitan Transportation Improvement Program (MTIP) or Regional Transportation Improvement Program (RTIP)

In more detail, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) have long *suggested* a multistep, transportation decision-making process (FHWA and FTA, 2015a, 13; FHWA and FTA, 2015b, figure 1; FHWA, 2011, 6; ITE, 2010, figure 2.1; FHWA and FTA, 2006, figure 29; FHWA, 2006, figure 2-1; FHWA and FTA, n.d., 8).

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transportation plan addressing no less than a 20-year planning horizon as of the effective date. In formulating the transportation plan, the MPO shall consider factors described in §450.306 as the factors relate to a minimum 20-year forecast period. In nonattainment and maintenance areas, the effective date of the transportation plan shall be the date of a conformity determination issued by the FHWA and the FTA. In attainment areas, the effective date of the transportation plan shall be its date of adoption by the MPO. …" http://www.law.cornell.edu/cfr/text/23/450.324.

[7] 23 C.F.R. § 450.218: "**Development and content of the statewide transportation improvement program (STIP).** (a) The State shall develop a statewide transportation improvement program (STIP) for all areas of the State. The STIP shall cover a period of no less than 4 years and shall be updated at least every 4 years, or more frequently if the Governor of the State elects a more frequent update cycle. However, if the STIP covers more than 4 years, the FHWA and the FTA will consider the projects in the additional years as informational. In case of difficulties developing a portion of the STIP for a particular area (e.g., metropolitan planning area, nonattainment or maintenance area, or Indian Tribal lands), the State may develop a partial STIP covering the rest of the State. …" http://www.law.cornell.edu/cfr/text/23/450.218.

[8] 23 C.F.R. § 450.326: "**Development and content of the transportation improvement program (TIP).** (a) The MPO, in cooperation with the State(s) and any affected public transportation operator(s), shall develop a TIP for the metropolitan planning area. The TIP shall reflect the investment priorities established in the current metropolitan transportation plan and shall cover a period of no less than 4 years, be updated at least every 4 years, and be approved by the MPO and the Governor. However, if the TIP covers more than 4 years, the FHWA and the FTA will consider the projects in the additional years as informational. The MPO may update the TIP more frequently, but the cycle for updating the TIP must be compatible with the STIP development and approval process. The TIP expires when the FHWA/FTA approval of the STIP expires. Copies of any updated or revised TIPs must be provided to the FHWA and the FTA. In nonattainment and maintenance areas subject to transportation conformity requirements, the FHWA and the FTA, as well as the MPO, must make a conformity determination on any updated or amended TIP, in accordance with the Clean Air Act requirements and the EPA's transportation conformity regulations (40 CFR part 93, subpart A). …" http://www.law.cornell.edu/cfr/text/23/450.326.

One version of the process suggested by FHWA and FTA (2015b, 3) involves eight steps:

1. Engaging the public to establish shared goals and visions.
2. Monitoring existing conditions and comparing them against transportation goals.
3. Forecasting future population and employment growth and assessing land use in the region.
4. Identifying current and projected transportation needs by developing performance measures and targets.
5. Analyzing transportation improvement strategies and tradeoffs.
6. Developing long-range plans and short-range programs of capital improvements, management and operations.
7. Estimating how recommended improvements will impact performance goals.
8. Developing a financial plan to secure revenues to cover the costs of improvements.

Note that development of a long-range plan and a short-term investment program is step 6. As described in step 1, goals serve as important building blocks for the plans and decisions.

A related version of the process suggested by FHWA and FTA is shown in Figure 1.2.

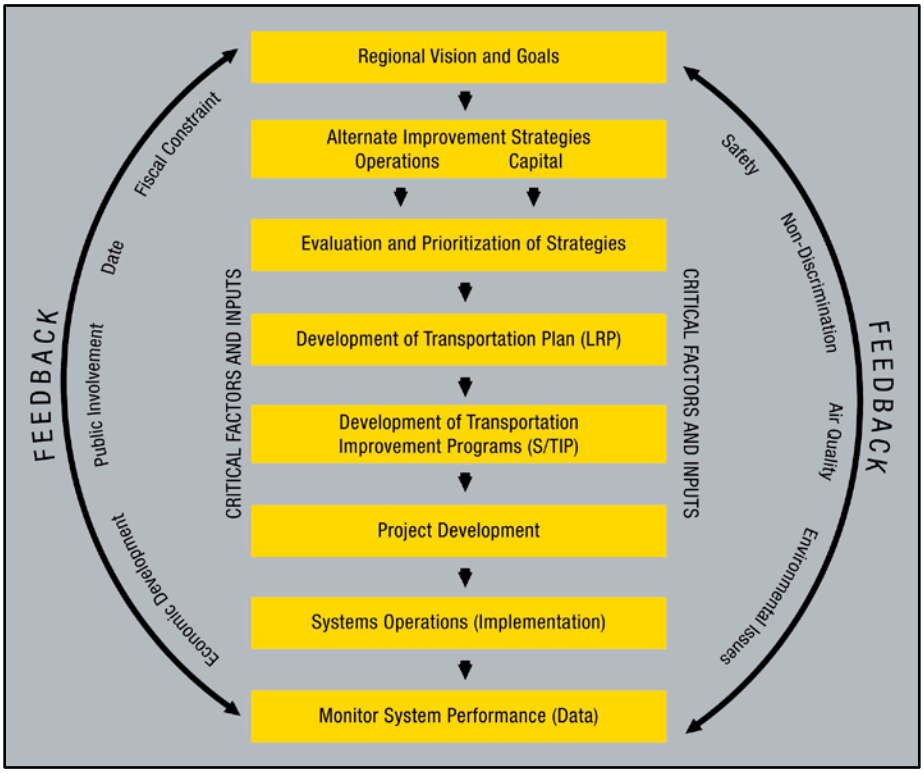

Figure 1.2: Federally Recommended Transportation Decision-Making Process
Source: (FHWA and FTA, 2015a, 13).

In order to translate the LRSTP or MTP into a short-range STIP or TIP, states and MPOs must prioritize projects. Although STIPs and TIPs are fiscally constrained, prioritization and inclusion does not guarantee immediate funding. States and MPOs rely on project selection processes to program and fund projects.

FHWA and FTA (2015b, 6) distinguish prioritization from project selection:

- **Prioritization** is the cooperative process among states, MPOs and transit agencies for identifying projects and strategies from the MTP that are of sufficiently high priority as to be included in the TIP.

- **Project selection**, on the other hand, relates to identifying projects that are already listed in the TIP that are next in line for grant award and funding authorization. In TMAs, MPOs play a lead role in project selection for most program funding.

1.1.1 Performance Management

Performance measures indicate how well the transportation system is meeting agency goals and public expectations. They can demonstrate whether transportation investments are linked to goals and producing desired outcomes.

At the federal level, the Moving Ahead for Progress in the 21st Century Act (MAP-21), adopted in 2012, established national performance goals for Federal-aid highways in seven areas:[9]

1. **Safety**: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

2. **Infrastructure condition**: To maintain the highway infrastructure asset system in a state of good repair.

3. **Congestion reduction**: To achieve a significant reduction in congestion on the National Highway System.

4. **System reliability**: To improve the efficiency of the surface transportation system.

5. **Freight movement and economic vitality**: To improve the National Highway Freight Network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

6. **Environmental sustainability**: To enhance the performance of the transportation system while protecting and enhancing the natural environment.

7. **Reduced project delivery delays**: To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion

[9] 23 U.S.C. § 150(b), http://www.law.cornell.edu/uscode/text/23/150.

through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

MAP-21 expired in 2014 and was replaced by the Fixing America's Surface Transportation (FAST) Act, which was signed into law in 2015. Implementation of performance measures outlined by MAP-21 has continued under FAST Act (FHWA, 2016).

Pursuant to MAP-21, as of May 20, 2017, all rules for national performance measures were in effect, with the exception of certain portions of the rule pertaining to the measure on the percent change in CO_2 emissions (FHWA, 2017b).

MAP-21 also requires states and MPOs to establish performance-based planning processes, set targets (performance measures), and link planning and funding to these targets. States and MPOs use national highway and transit performance goals in setting performance targets, and may identify additional performance measures and targets (FHWA, 2013a).

According to FHWA and FTA (2015b, 30), "The performance-based planning and programming (PBPP) process helps agencies develop LRTPs, other plans and processes, including those required by the Federal Government, and programming documents, including STIPs and TIPs. With PBPP, decisions are made based on data and evidence so that transportation investments remain realistic and achievable."

FHWA (2013c, 10–12) describes the benefits of using performance-based planning and programming (PBPP) including:

- improved investment decision-making;
- improved return on investments and resource allocation;
- improved system performance;
- increased accountability and transparency; and
- demonstrates link between funding and performance.

FHWA (2013c, 12–13) defines the following terms:

- A **goal** is a broad statement that describes a desired end state, for example, a safe transportation system.

- An **objective** is a specific, measurable statement that supports achievement of a goal, for example, reduce highway fatalities.

- A **performance measure** is a quantity used to assess progress toward meeting an objective, for example, the number of highway fatalities per year or the fatality rate per vehicle mile traveled.

- A **target** is a specific level of a performance measure that is desired to be achieved within a certain time frame, for example, reduce fatalities by 5 percent by 2015, which will save more than 150 lives.

FHWA and FTA (2010, 4), Sen et al. (2011, table 6), Artly and Stroh (2001, app. E), and the Office of Management and Budget (OMB) (1995) further distinguish between different kinds of performance measures:

- An **input** measure is used to identify the human and capital resources used to produce the outputs and outcomes.

- A **process** measure is used to distinguish the intermediate steps in producing a product or service.

- An **output** measure is used to measure the actual product or service provided by the organization.

- An **outcome** measure assesses the expected, desired or actual result(s) by which the outputs of the activities of the organization meet the desired results.

- An **impact** measure evaluates the direct or indirect effects as a result of attaining the goals of the program.

A key distinction this research makes is between outputs and outcomes.

As shown in Figure 1.3, FHWA and FTA (2015b, 31–32) outline the framework of stages for PBPP. This diagram shows how performance measures, goals and targets can drive the planning process and ensure it is aligned with national and community-based goals and objectives. The framework includes these steps:

- **Strategic Direction**: *Where do we want to go?*

  In the transportation planning process, the public and other stakeholders articulate a strategic direction that is based on a shared vision for the future.

  - ***Goals and Objectives*** stem from a state or region's vision and goals, and they address key desired outcomes. Agencies create objectives—which are specific, measurable statements—that shape planning priorities.

  - ***Performance Measures*** support objectives and are the basis for comparing alternative improvement strategies, investment and policy strategies, and tracking results.

- **Planning Analysis**: *How are we going to get there?*

  Driven by data on performance, along with public involvement and policy considerations, agencies conduct analyses that inform investment and policy priorities.

  - ***Identify Trends and Targets***: Preferred trends—a general direction of where results should go—or targets—specific performance levels to be met within a timeframe—are established for each measure. Trends and targets let agencies compare alternative strategies. This step relies on baseline data from past trends, tools to forecast future

performance, and information on possible strategies, available funding and other constraints.

- ***Identify Strategies and Analyze Alternatives***: Scenario analysis may also be used to compare alternative strategies and funding levels, or to explore funding levels required to achieve certain performance goals.

- ***Develop Investment Priorities***: To reach investment targets, agencies create LRTPs that consider policy priorities and tradeoffs.

- **Programming**: *What will it take?*

  Programming involves selecting specific investments to include in an agency capital plan, a TIP or a STIP. In a PBPP approach, agencies make programming decisions based on whether those decisions support performance targets or contribute to desired trends, and whether they account for a range of factors.

  - ***Investment Plan***: In order to connect the LRTP, which has an outlook of at least 20 years, to projects in a TIP/STIP, some areas develop a mid-range investment plan that, for example, may cover 10 years.

  - ***Resource Allocation / Program of Projects***: Project prioritization or selection criteria are used to identify specific investments or strategies for a capital plan or TIP/STIP. Projects included in the TIP/STIP are selected based on performance, and whether they show a clear link to meeting performance objectives.

- **Implementation and Evaluation**: *How did we do?*

  PBPP is founded on evidence that the process leads agencies to their goals. The following evaluation activities happen throughout implementation and when needed throughout performance-based planning.

  - ***Monitoring***: Gathering information on actual conditions.

  - ***Evaluation***: Conducting analysis to understand whether implemented strategies have been effective.

  - ***Reporting***: Communicating information about system performance and whether policymakers, stakeholders and the public think plans and programs are effective.

In a PBPP approach, each step in the process is clearly connected to the next so that goals translate into specific measures. Those measures then become the basis for selecting and analyzing strategies for the long-range plan. Ultimately, project selection decisions are influenced by expected performance returns. Keeping the next step in the process in mind is critical to each step along the way.

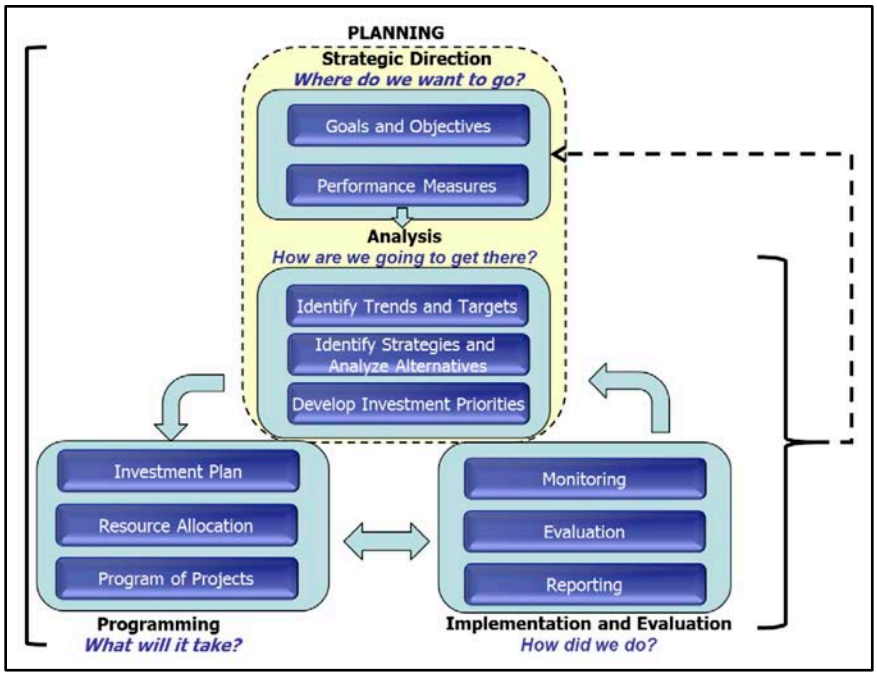

Figure 1.3: Federally Recommended Performance-Based Planning and Programming
Source: (FHWA and FTA, 2015b, figure 5).

While FHWA's and FTA's framework provides an ideal vision for how MPOs and states could do performance-based planning, this project investigates how states and MPOs are working to implement a performance-based approach. Several barriers prevent easy implementation of this framework. This project describes approaches taken by states to achieve goals through transportation planning and programming, including the extent that performance-based processes are used.

As described by FHWA (2013c, 76): "Demonstrating the connections between individual projects and system performance targets is a critical area of focus for MPOs and State DOTs to demonstrate the connections between their individual projects and system performance targets. Traditionally, agencies have first looked at available funding programs and attempted to select projects based on their appropriateness for the funding that is available. This creates challenges in that there are different restrictions on funding from different categories and different levels of federal match or involvement. A successful PBPP plan or strategy requires that the projects be prioritized based on their ability to meet desired outcomes. The key is prioritization of projects through project selection criteria based on performance measures. Consequently, a critical link from the plan to the program is defining project selection criteria that will effectively translate the plan identified outcomes to projects actually funded and implemented. Some areas have developed 'scoring' techniques or other quantitative approaches in order to combine multiple attributes to make project decisions."

Chief among the barriers to implementing PBPP are constraints on governance and finance: who decides and what funding is available? Most every dollar spent on transportation is somehow limited in how it can be spent. Federal transportation funding programs, state restrictions on gas

tax revenues, statutory allocations, and many other constraints described in this report create boundaries on the flexibility of transportation revenue. Thus, the idealized PBPP framework posited by FHWA and FTA sits alongside existing governance and finance structures that prevent true performance-based expenditure of transportation dollars.

A key conclusion of this research is that effective governance and finance structures are critical to successful transportation decision-making aimed at achieving desired outcomes. A holistic approach would integrate performance feedback loops not only into the planning and programming framework, but also governance and finance.

1.2 GOVERNANCE AND FINANCE

Total federal, state and local spending on *surface* transportation—which includes roads, bridges, tunnels, and other motor vehicle infrastructure; and buses, subways, commuter trains, and other public mass transit—averaged $207 billion per year between 2007 and 2011. Of that amount, the federal government provided 25 percent; states contributed 40 percent; and localities (i.e., municipalities, counties and local transportation authorities) accounted for the remaining 36 percent (Pew Charitable Trusts, 2014, 3). Although more than half of all government spending on surface transportation comes from federal and state sources, more than half is spent at the local level. Figure 1.4 shows with light green arrows how funds pass through from the federal to state to local governments. The arrows to the right of the level of government show how much funding is spent by that level. Even though local governments generate only $73 billion in their own source funding, because of pass throughs local governments are responsible for spending $107 billion in funding (Pew Charitable Trusts, 2014, 4–6).

Here we summarize federal, state and local roles in making transportation investments.

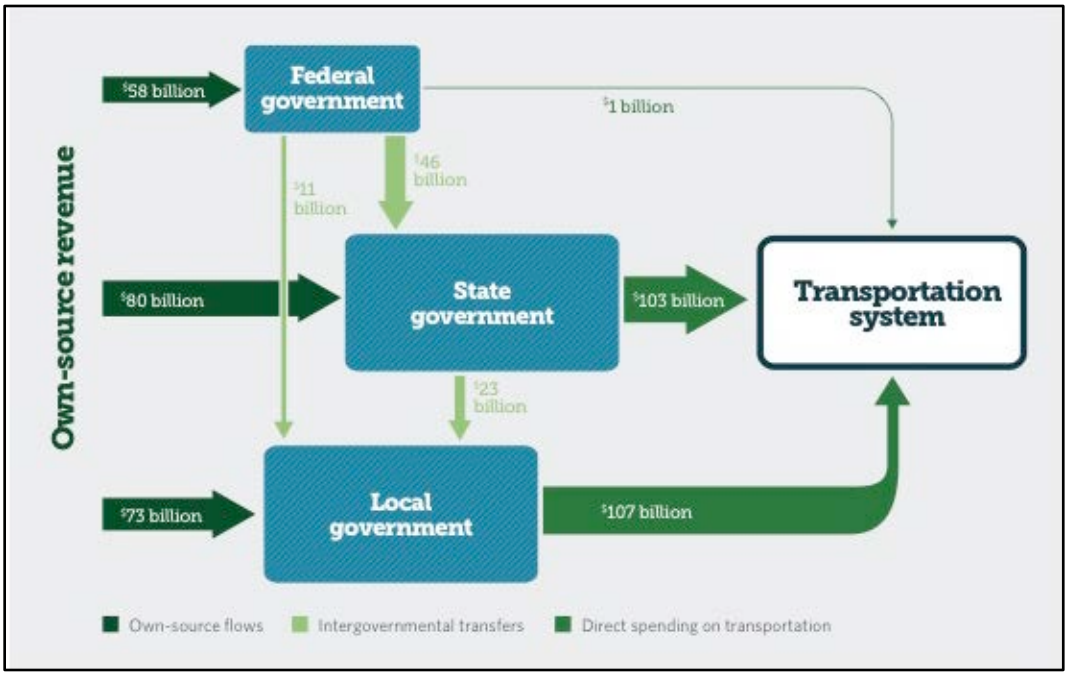

Figure 1.4: Surface Transportation Funding Flows Among Levels of Government, 2011
Source: (Pew Charitable Trusts, 2014, figure 3).

1.2.1 Federal Role

The federal government plays an important role in transportation investments, though the nature of that role has evolved from one authorization bill to another. As described above, the federal government imposes requirements for planning and programming, including requirements to create long-range plans and transportation improvement programs. The federal government also provides funding in block grants, with specific matching requirements and purposes for each source. But with some exceptions for specific transit projects, the federal government generally does not make decisions directly about funding projects. Below, we outline key federal funding programs.

The federal government provides significant transportation funding for state and MPO projects, which are part of program-specific grants generally dedicated to narrower purposes.

The Federal Highway Act[10] established the Highway Trust Fund. Since then, reauthorization bills have established formulas for apportioning surface transportation funding to the states and establish matching requirements.

There have been five multiyear reauthorizations of the Federal-Aid Highway Act since 1987:

- **ISTEA**: Intermodal Surface Transportation Efficiency Act,[11]
- **TEA-21**: Transportation Equity Act for the 21st Century,[12]
- **SAFETEA-LU**: Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users,[13]
- **MAP-21**: Moving Ahead for Progress in the 21st Century,[14] and
- **FAST Act**: Fixing America's Surface Transportation Act[15] (Dilger, 2015, 18).

Funding sources and restrictions vary from one authorization bill to the next. In general, the trend has been towards more consolidation of funds and more flexibility for states. For example, MAP-21 consolidated 90 surface transportation funds into 30, primarily to provide flexibility in how funds are spent. FAST Act continues this trend by providing greater flexibility by converting the Surface Transportation Program (STP) into a block grant and rolling in the Transportation Alternatives Program (TAP) (Dilger, 2015, 2).

Of the federal funds distributed to local governments, 93 percent are formula grants, which are based on a series of measures intended to quantify a given state or locality's needs (Pew Charitable

[10] Pub. L. 84-627 (1956), http://www.govtrack.us/congress/bills/84/hr10660.
[11] Pub. L. 102-240 (1991), http://www.congress.gov/bill/102nd-congress/house-bill/2950.
[12] Pub. L. 105-178 (1998), http://www.congress.gov/bill/105th-congress/house-bill/2400.
[13] Pub. L. 109-59 (2005), http://www.congress.gov/bill/109th-congress/house-bill/3.
[14] Pub. L. 112-141 (2012), http://www.congress.gov/bill/112th-congress/house-bill/4348.
[15] Pub. L. 114-94 (2015), http://www.congress.gov/bill/114th-congress/house-bill/22.

Trusts, 2014, 8). After funds are distributed to states through apportionment, states take different routes to deciding how funds are spent.

Federal funding for surface transportation projects primarily occurs through the Federal-Aid Highway Program. Under this program the federal government distributes money to states for the construction and improvement of urban and rural highway systems and for transit system capital expenditures. This program is funded from the federal motor fuel tax, the federal heavy vehicle use tax, and federal motor carrier excise taxes. Even though the federal government provides much of the funding, the state or local government has some control. The state develops a plan in accordance with federal regulations, signs contracts and supervises construction. Operation and maintenance of the roads or facilities remain under state or local administrative control. Table 1.2 summarizes major programs and amounts under the latest authorization, FAST Act.

Table 1.2: Funding for Six Federal-Aid Highway Programs and Mass Transit in FAST Act

Program	Description	Average Annual Funding Level (billions)
National Highway Performance Program	Funding to improve condition and performance of National Highway System, construct new facilities, and meet state performance targets.	$23.3
Surface Transportation Block Grant Program	Flexible program to fund transit, bridges, tunnels, carpooling, intelligent transportation systems, etc.	$11.7
Highway Safety Improvement Program	Funding source for strategies, activities and projects on a public road to correct or improve a hazardous road condition or address a highway safety problem.	$2.3
Congestion Mitigation & Air Quality Improvement Program	Flexible funding source for transportation projects and programs to help meet the requirements of the Clean Air Act.	$2.4
National Highway Freight Program	Funding to improve the efficient movement of freight on the National Highway Freight Network (NHFN).	$1.2
Metropolitan Transportation Planning	Funding for MPOs to carry out the metropolitan transportation planning process.	$0.3
Mass Transit	16 programs managed by the FTA.	$10.6

Source: (FHWA, 2016a; FHWA, 2018a; FTA, 2015).

For most programs, states must match a portion of the federal money; 80 percent of a Federal-aid project is paid for with federal money, and 20 percent is paid by non-federal sources.

Each state has a fair amount of discretion in how federal funds are allocated and the processes for allocating funding.

MPOs receive federal funds primarily through the federal Surface Transportation Program (STP) and Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds. Under FAST Act, STP was replaced with the Surface Transportation Block Grant Program (STBG).

Table 1.3 describes key stakeholders in the federal transportation process including U.S. DOT, state DOTs, MPOs, transit operators and non-governmental organizations.

Table 1.3: Major Stakeholders in the Legislative Process

Stakeholder	Transportation Reauthorization Role
U.S. Department of Transportation (U.S. DOT)	U.S. DOT includes the Federal Highway Administration, Federal Transit Administration and other agencies, which are tasked with implementing federal transportation programs. Most of the surface transportation programs are funded by the Highway Trust Fund, which consists of the Highway and Mass Transit Accounts.
State Departments of Transportation (State DOTs)	State DOTs are very diverse and are represented nationally by the American Association of State Highway and Transportation Officials (AASHTO). They manage both federal and state highway and some transit projects, but must comply with federal guidelines in order to receive federal transportation funding.
Metropolitan Planning Organizations (MPOs)	MPOs are responsible for the planning, programming and coordination of federal highway and transit investments in urbanized areas (over 50,000 population). This includes individual MPOs as well as the Association of MPOs and the National Association of Regional Councils.
Transit Operators	This includes individual public and private transit operators and the American Public Transit Association (APTA).
Non-Governmental Organizations (NGOs)	This includes environmentally oriented organizations like Transportation for America, the Surface Transportation Policy Project, Sierra Club, etc.; highway user groups like the American Automobile Association; business interests like the Chamber of Commerce; and groups like AARP, League of Women Voters; and others. Many organizations have focused agendas (e.g., reducing local air pollution or growing the economy).

Source: (Nigro and Burbank, 2014, table 3).

1.2.2 State and Local Role

Though the federal government offers some guidance and restrictions for how money can be spent, there exists significant variation among states and MPOs in how funding occurs. Each state has a fair amount of discretion in how federal funds are allocated and the processes for deciding. States also control state and local revenues and requirements for these.

States provide almost half of surface transportation funding from their own revenues. The primary revenue source from the states is the motor vehicle fuel tax.

State legislatures play an important role in appropriating funding for transportation. In 33 states, the legislature appropriates *federal* funds to the DOT, and in another seven the legislature does so in part (AASHTO, 2016, table 20). In 42 states, the legislature allocates *state* funds to the DOT and in another seven the legislature does so in part (AASHTO, 2016, table 21).

States and MPOs have different mechanisms for allocating funding from the federal Highway Trust Fund, state gas and sales taxes, etc. to specific transportation projects. In 15 states, the legislature plays a substantial role in capital project selection; in only five states does the legislature play no role. In some states, the governor or a state transportation commission decides which projects to fund (AASHTO, 2016, table 22).

Most legislatures constrain the use of fuel taxes to just transportation or more narrowly to just roads and bridges. Twenty-seven states limit the use of fuel taxes to just investments in roads and bridges, and almost all limit the use to just transportation. Only Alaska and Texas (in part) allow fuel revenues to be used for other purposes such as schools (AASHTO, 2016, table 25).

Local governments own more than 75 percent of the nation's public road miles, and also have responsibilities for public transit systems and other transportation modes. Nearly every state distributes a portion of its fuel taxes or other state transportation revenues to counties or municipalities according to statutory formulas that are based on each jurisdiction's population, road miles, land area, number of registered vehicles, or other criteria. Exceptions include Alaska and Hawaii, which allocate state revenues to local entities through legislative appropriations, and Rhode Island, which does not currently have a state-aid program. State legislatures have also appropriated funds to localities for specific purposes, including local matches for federal projects, and a number of state DOTs award discretionary grants for project costs (AASHTO, 2016, 77–78).

2.0 LITERATURE REVIEW

2.1 POLICY CONTEXT

The Moving Ahead for Progress in the 21st Century Act (MAP-21), passed in 2012, includes seven national performance goal areas: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays (FHWA, 2013a). MAP-21 expired in 2014 and was replaced by the Fixing America's Surface Transportation (FAST) Act, which was signed into law in 2015. Implementation of performance measures outlined by MAP-21 has continued under FAST Act (FHWA, 2016). While rules pertaining to performance measures from this law have not been fully implemented, many states and MPOs are already operating under a performance-based framework. These governments are measuring environmental sustainability, health impacts and economic impacts in their transportation plans and pursuing planning outcomes to meet such livability goals. Since the passage of MAP-21, little has been written about how livability outcomes are actually measured in state and MPO transportation plans or how performance-based planning and programming results in greater livability. While MAP-21 sets national transportation goals and performance measures, actual "refocusing on national transportation goals, increasing the accountability and transparency of the Federal-Aid Highway Program, and improving project decision-making through performance-based planning and programming"[16] has not been measured.

2.2 PRIOR RESEARCH

Most existing literature focuses on design of performance measures for achieving goals, but does not assess the funding, planning and programming frameworks in which performance measures would be implemented. Jeon, Amekudzi and Guensler (2013) evaluate possible performance measures for sustainability in transportation planning. AASHTO (2010) discusses specific performance measures and promotes 13 specific state strategies for improving community livability. Similarly, Heller (2014) examines different types of performance measures being utilized by transportation agencies nationwide and identifies best practices. Hales et al. (2012) employed an expert panel in their study to develop a single framework for transportation performance based on a unification of various U.S. transportation agency and stakeholder models. Hales et al. use Rhode Island as a model state for implementation of five performance measures: safety, congestion, infrastructure preservation, environment and systems operation.

The Government Accountability Office (GAO, 2010) endorses the adoption of federal performance measures for state transportation plans. The GAO (2012) also recommends performance measures as criteria for state proposals in the Transportation Infrastructure Finance and Innovation Act (TIFIA) funding application process. The Federal Highway Administration

[16] Moving Ahead for Progress in the 21st Century Act (2012), 23 U.S.C. § 150(a), http://www.law.cornell.edu/uscode/text/23/150.

(FHWA, 2012) offers a short report and how-to guide that outlines operations performance measures for use by transportation planning agencies, including examples from states, MPOs, cities and businesses. Operations performance measures seek to increase road system efficiency without building new roads. Pew Center on the States and Rockefeller Foundation (2011) conclude that states generally have data and resources to help them measure progress on safety and infrastructure preservation, but that in several other important areas—including jobs and commerce, mobility, access and environmental stewardship—policymakers and the public in many states need better and more information to effectively measure results. Transportation for America (2015c, 9–11) outlines the benefits that measuring outcomes brings to the allocation of resources towards meeting goals, and proposes specific goal areas and measures.

2.3 RESEARCH GAP

While many governments aspire for multimodal and livable transportation networks, results in these areas are not being accounted for. None of the published studies to date assess government funding structures and decisions in relation to how transportation investments produce outcomes that advance national, state and metropolitan goals, including economic development, health improvements and livability. This research will fill this gap by looking for evidence that the adoption of such goals and targets leads to transportation funding decisions that advance livability goals. This research will offer best practices recommendations for linking goals to funding.

3.0 METHODOLOGY

In this section, we describe the methods used to identify case study states and MPOs. We describe how we examined research questions through plan and policy analysis. We explain how our research fits into our conceptual framework in our attempt to understand how livability goals are reflected in transportation project selection processes.

3.1 CASE STUDY SELECTION

To examine the project selection process and determine how goals are reflected in the process, the research team relied on state and MPO case studies to study how the process works in different states.

With advice from partners Transportaion for America and Natural Resources Defense Council (NRDC), we began our selection process by examining 10 states in closer detail. These states were selected to obtain geographic representation, political diversity, use of livability goals, a variety of types of transportation funding frameworks, and a variation in constraints on the gas tax. See Figure 3.1.

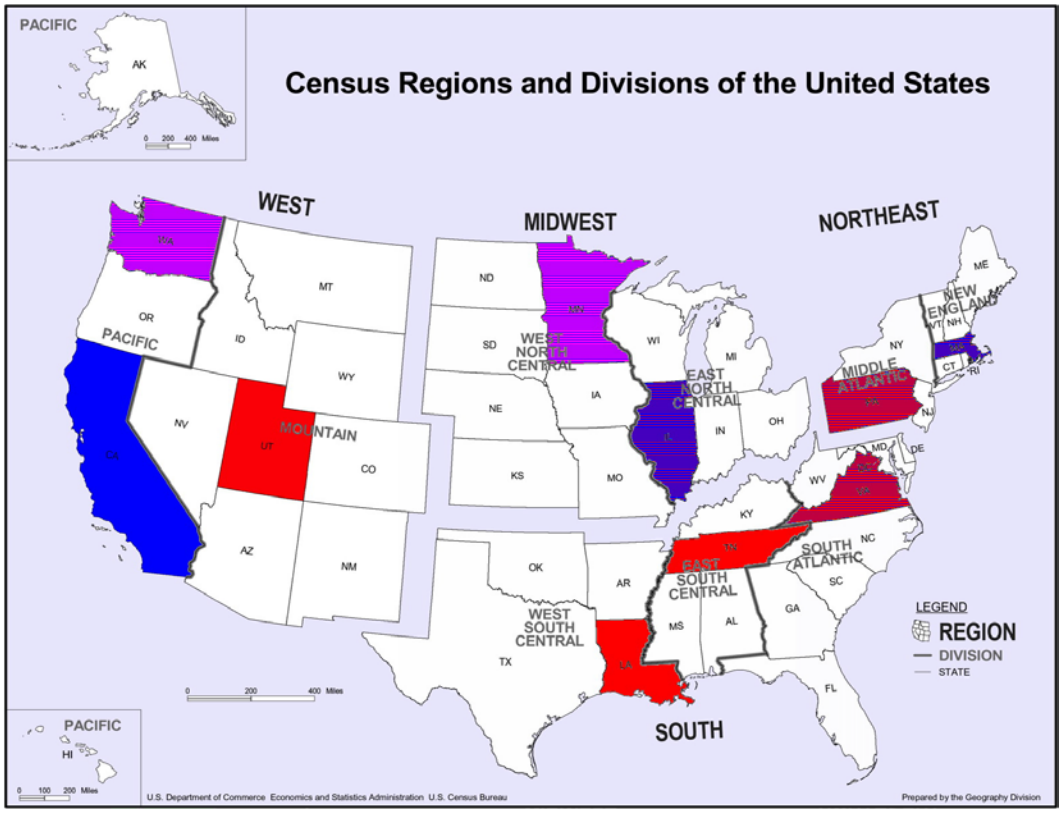

Figure 3.1: Potential Case Study States Map

To narrow our list of case studies, the research team reviewed key policy documents to develop profiles of each state and an MPO in each state. Each profile included a summary of: livability, health and economic competitiveness goals and performance measures; types of transportation funding frameworks; types of restrictions on key revenue sources; regional representation; and multimodal transportation network.

Based on feedback from our partners Transportation for America and NRDC, we ultimately chose six states and six MPOs in those states to study further:

- **California** / Metropolitan Transportation Commission (San Francisco)
- **Massachusetts** / Pioneer Valley Planning Commission (Springfield)
- **Minnesota** / Metropolitan Council (Minneapolis)
- **Tennessee** / Nashville Area MPO
- **Utah** / Wasatch Front Regional Council (Salt Lake City)
- **Virginia** / Hampton Roads MPO (Virginia Beach)

We chose these states and MPOs to obtain a geographic representation, to highlight specific best practices, and to obtain variation in project selection frameworks and funding limitations.

3.2 PLAN AND POLICY ANALYSIS

To examine project selection processes in each state and MPO, we collected several documents from states and MPOs including: long-range transportation plans, transportation improvement programs, transportation budgets, descriptions of the project selection process, list of ranking criteria, performance measures, and capital request forms.

Each of these plans, policies and documents were critical to obtaining an understanding for how project selection works within each state and MPO. Within these documents, we were interested in the following pieces of information to fit into our conceptual framework:

- **Governance and Finance**
    - What is the share of funding from federal government?
    - What is the gas tax rate? What restrictions are placed on the use of the gas tax proceeds?
    - What is the statutory allocation of money into funds?
    - How are projects selected for the TIP?
        - Who makes the decisions?
        - Do projects compare across modes? How?
- **Planning**
    - What are the goals identified in the long-range transportation plan?

- What are the performance measures?
  - How are goals and performance measures linked?

- **Programming**
  - How are goals used in the decision-making process? What are the criteria used to select projects?
    - How are goals and criteria linked?
    - How are criteria established?
    - Are criteria weighted?
    - How are the weights set?
    - How are criteria and performance measures linked?
  - How are performance measures used and modeled in the decision-making process?
    - How are performance measures reported at the time of decision?

- **Reporting**
  - How are outcomes compared to expected performance?
  - How is information about outcomes used to inform future decisions?

To verify our understanding, we conducted interviews with staff at the state and MPO level.

3.3 STATUTORY ANALYSIS

This project also relied on legal and statutory analysis. To understand how funding constraints impact the project election process, we examined statutes and rules related to various transportation funds. Each state allocates state transportation revenue through the state constitution, state statute and/or state regulation. Often these allocations require that a certain percent of state transportation revenues be allocated to a specific geographic area, or towards a specific transportation mode. State transportation funds are also usually created by statute, and their use is often dictated by a statutory formula or allocation scheme. Researchers investigated each state's law to uncover the organization of transportation funds, gas tax allocation schemes, and other formulas or allocations of state transportation funding. Some states also dictate the use of a state's federal transportation funding allocation by statute. Researchers analyzed these mechanisms for constraining the use of transportation funds to shed light on the legal constraints on funding sources that might impact how transportation projects are selected.

After the collection of transportation funding information, researchers performed case law research on state transportation planning and programming using the LexisNexis legal database. Researchers used the search terms "transportation plans," "transportation goals," "livability

goals," and "environmental goals" to search the database. Although most transportation case law deals with National Environmental Policy Act (NEPA) issues, some case law discusses the role of planning and programming in meeting transportation goals. Cases only discussing NEPA issues are not analyzed here. Rather, the cases analyzed here discuss the role of transportation plans for meeting environmental and climate change goals, as those are the only cases researchers found that discuss the role of planning and programming in meeting transportation goals.

3.4 ALIGNMENT WITH GOALS

Researchers sought to understand how livability goals were reflected in the project selection process. To first understand how livability goals were reflected, we needed to understand what the goals were and how projects are selected in the state. Thus, our assessment first focuses on transparency of the process.

While we intended to examine how many projects lined up with state goals, our analysis quickly led us to the conclusion that a lack of transparency and lack of explicit integration of goals into the project selection process curtailed the possibility of examining project level data by each livability goal. As a result, we describe livability goals in the next section, then focus on transparency and accountability in the project selection process.

3.5 ECONOMIC DEVELOPMENT, HEALTH OR LIVABILITY GOALS

Under this project, the research team sought to understand how states and MPOs adopt economic development, public health or other livability goals into transportation plans. We sought to understand how states and metropolitan areas incorporate economic development, public health and other livability goals into transportation funding decisions. Additionally, we sought to understand opportunities and constraints for integrating these goals into transportation funding decisions.

To understand how specific types of goals were reflected in the decision-making process, we first had to understand how goals are reflected in general. That led us to study the performance-based planning and programming process within states. We quickly determined that, because the connection between goals and decision-making is vague, it was not possible to attribute particular decisions to specific goals.

Thus, in subsequent sections, we focus on transparency and accountability in the process overall. We describe the goals used by states and MPOs in the case studies in Chapter 4, but we are unable to connect and measure outcomes along individual goals. In Chapters 6 and 7, we make recommendations for improving the linkage between goals and project selection along with performance measures and outcomes to make it easier to assess the integration of livability goals in the future.

In a follow-up project, we produced a separate toolkit offering practitioners a comprehensive, four-phase framework for outcomes-based, transportation decision-making. The toolkit includes numerous examples of successes from our six case study states and others around the country (Zako and Lewis, 2017).

4.0 CASE STUDIES

This chapter summarizes what we learned about governance, finance, planning, programming and reporting within each case study state as well as a selected MPO in each state:

- **California** / Metropolitan Transportation Commission (San Francisco)
- **Massachusetts** / Pioneer Valley Planning Commission (Springfield)
- **Minnesota** / Metropolitan Council (Minneapolis)
- **Tennessee** / Nashville Area MPO
- **Utah** / Wasatch Front Regional Council (Salt Lake City)
- **Virginia** / Hampton Roads MPO (Virginia Beach)

4.1 CALIFORNIA

California is in Census Region 4 (West), Division 9 (Pacific) (U.S. Census Bureau, 2016). California has a population of 37,253,956 (1st), a land area of 155,779.2 square miles (3rd), and a density of 239.1 persons per square mile (11th) (U.S. Census Bureau, 2010).

Table 4.1 summarizes the California statewide transportation system. Of the road miles in California, 15 percent are in the state highway system while 85 percent are local. But 54 percent of the annual vehicle miles travelled occur on state roads while 46 percent occur on local roads (California Department of Transportation, 2015d).

Table 4.1: California Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 385,860 (2009)
	miles of tolled roadway: 96 (2009)
	bridges: 24,549 (2010)
	toll bridges and tunnels: 8 (2009)
Transit	trips per year (all transit modes): approximately 1.45 billion (2008)
Rail	freight rail route-miles: 5,200 (2008)
Aviation	airports total: 249; public-use: 249; state-owned: 0 (2008)
	enplanements per year: 80,602,051 (2009)
Marine	port traffic per year (20-foot equivalent units): 10,594,794 (2009)
	waterborne tonnage per year: 201.8 million (2009)

Source: (NCSL and AASHTO, 2011, 50).

4.1.1 Governance

Historically, California is a Democratic state and the Legislature has been exclusively controlled by Democrats since 1995. The executive has been more varied over the past 20 years, as the current Governor (Jerry Brown) is Democratic, but was preceded directly by a Republican (Arnold

Schwarzenegger). In fact, Republicans have held the office of Governor more frequently than Democrats over the past 30 years.

Transportation is overseen by a super-agency called the **California State Transportation Agency (CalSTA).** CalSTA is charged with developing and coordinating policies and programs of the state's transportation entities including the Board of Pilot Commissioners, the California Highway Patrol, the California Transportation Commission, the Department of Transportation (Caltrans), the Department of Motor Vehicles, the High-Speed Rail Authority, the Office of Traffic Safety, and the New Motor Vehicle Board. The secretary of CalSTA is appointed by the Governor and confirmed by the Senate.[17]

The **California Department of Transportation (Caltrans)** is responsible for planning, designing, constructing and maintaining the state highway system for motor vehicles and active transportation modes. Caltrans nominates interregional capital projects for construction.

Caltrans' divisions include: Administration, Finance, Maintenance and Operations, Planning and Modal, and Project Delivery. The **Division of Transportation Programming** within the Finance Division oversees the programming of state and federal funds. The Division of Transportation Programming is responsible for the State Highway Operation and Protection Program (SHOPP) and STIP. **The Office of State Planning** of the Division of Transportation Planning (within the Planning and Modal Division) oversees long-range planning including the state transportation plan, called the California Transportation Plan.

The **Office of Interagency and Regional Planning** oversees coordination between Caltrans districts and regional MPO transportation projects and planning.

Created in 1978 by Assembly Bill 402,[18] the **California Transportation Commission (CTC)** includes 11 voting members and two non-voting, ex-officio members. Nine of the voting members are appointed by the Governor, one is appointed by the Senate Rules Committee, and one is appointed by the Speaker of the Assembly. The two non-voting, ex officio members are appointed from the State Senate and Assembly. The CTC is charged with programming and allocating funds for highway, passenger rail, aeronautics and transit. Additionally, CTC assists CalSTA and the Legislature in formulating and evaluating state policies and plans for California's transportation programs[19] (California Transportation Commission, 2017). Specifically, CTC has four responsibilities: 1) recommending policies and funding priorities to the Legislature; 2) providing project oversight for the state; 3) adopting state transportation programs, and 4) approving projects nominated for funding by Caltrans and regional agencies (California Department of Transportation, 2015d, 2). The CTC has the authority to override MPO decisions only by rejecting the entire Regional Transportation Improvement Program (RTIP) for revision by the MPO

[17] Cal. Gov't Code § 13976 ("Transportation Agency » General Duties and Powers"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=13976.

[18] Assembly Bill 402, 1977 Cal. Stat. 1106.

[19] Cal. Gov't Code § 14520 ("California Transportation Commission » Duties"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=14520.

(California Transportation Commission, 2015, 27). The CTC can reject a RTIP for any one of the following reasons:

1. It is inconsistent with the STIP Guidelines.
2. There are insufficient funds to implement the RTIP.
3. The RTIP conflicts with the Interregional Transportation Improvement Program (ITIP).
4. The project is not approved as part of a Congestion Management Plan.
5. The RTIP is not a cost-effective use of state funds.

In addition, the requirement that the CTC may reject only the whole RTIP, rather than just individual projects, establishes a strong preference for regional and local decision-making.

There are 19 MPOs wholly or partly within California (see Figure 4.1 and Table 4.2). Only one MPO is established in state law: Metropolitan Transportation Commission, which was created by statute in 1970.[20] California designated 26 Regional Transportation Planning Agencies (RTPAs) in areas with less than 50,000 people.[21] Regional agencies (including MPOs and RTPAs) are responsible for planning, coordinating and administering federal, state and local funds that enhance the regional interregional transportation network.

MPOs gained influence with 1997's Senate Bill 45,[22] which transfers a significant amount of federal transportation funding away from state oversight and directly into the hands of MPOs. SB 45 redistributed central transportation planning authority from Caltrans' California Transportation Commission to the state's Regional Transportation Planning Associations. SB 45 gave MPOs 75 percent of the programming authority over capital improvement projects, with only 25 percent retained by Caltrans. The 75 percent of programming authority delegated to MPOs is planned in RTIPs, while the 25 percent retained by Caltrans is planned in the ITIP (California Department of Transportation, 2015d, chart 4).

We studied the Metropolitan Transportation Commission (MTC) of the San Francisco Bay area to understand how MPOs in California implement transportation policy. MTC encompasses nine counties and is responsible for adopting regional transportation plans and transportation improvement programs. Of the 21 members of MTC's board, the 17 voting members are elected officials from the county and city governments within MTC's jurisdiction. Non-voting members include an official from the United States Department of Transportation, the U.S. Department of Housing and Urban Development, and CalSTA. Because the state sits on the board but does not

[20] Cal. Gov't Code § 66500 ("Metropolitan Transportation Commission"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=66500.

[21] Cal. Gov't Code § 29532 ("Transportation Fund"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=29532.

[22] Senate Bill 45, 1997 Cal. Stat. 622 ("Transportation funding"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=199719980SB45.

have a vote, the local decision-makers lead the regional planning and programming process (Metropolitan Transportation Commission, 2017).

Over 400 transit operators serve 1.4 billion riders in California. These operators include fixed-route buses, dial-a-ride, commuter services and paratransit. Transit is provided by local governments and regional agencies (California Department of Transportation, 2015d, 1).

California has 482 incorporated cities and 58 counties, and each local government has control over land use planning, roads and streets within respective geographic boundaries. In California, land use planning is controlled at the local level. Local governments and transit operators nominate projects for funding to MPOs and RTPAs. In "self-help" counties that have passed self-imposed, voter-approved local sales tax measures, county transportation authorities are responsible for developing expenditure plans (California Department of Transportation, 2015d, 3).

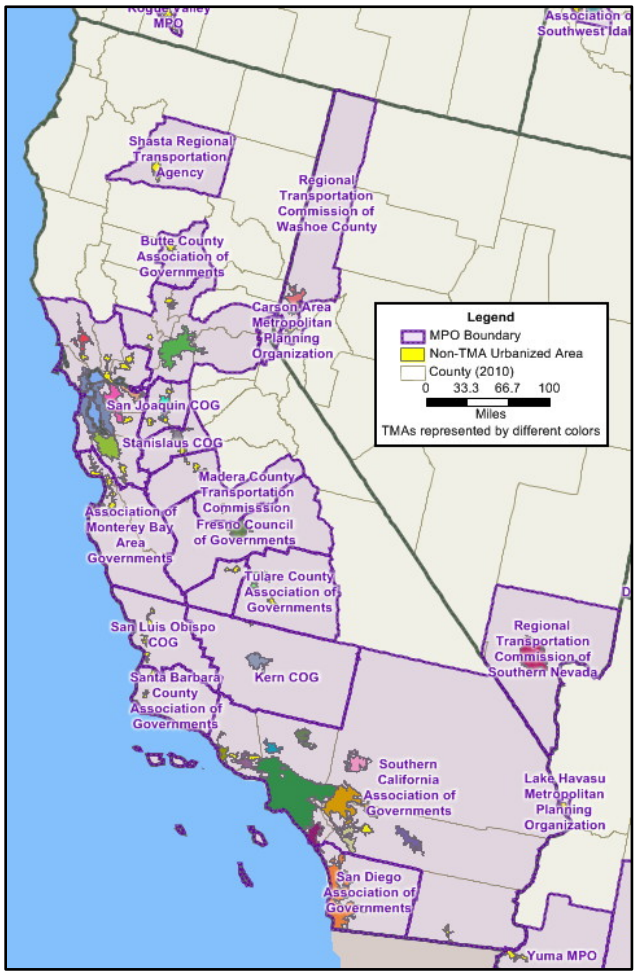

Figure 4.1: California MPOs and TMAs Map
Source: (FHWA, 2018b).

Table 4.2: California MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
Southern California Association of Governments (SCAG)	CA	Los Angeles	18,051,203	38,649	467.1
Metropolitan Transportation Commission (MTC)	CA	Oakland	7,150,828	7,485	955.4
San Diego Association of Governments (SANDAG)	CA	San Diego	3,095,271	4,260	726.6
Sacramento Area COG (SACOG)	CA	Sacramento	2,274,557	6,189	367.5
Fresno Council of Governments (Fresno COG)	CA	Fresno	930,885	6,016	154.7
Kern COG	CA	Bakersfield	839,614	8,161	102.9
Association of Monterey Bay Area Governments (AMBAG)	CA	Marina	732,667	5,151	142.2
San Joaquin COG (SJCOG)	CA	Stockton	685,306	1,425	480.9
Stanislaus COG (StanCOG)	CA	Modesto	514,453	1,514	339.8
Tulare County Association of Governments (TCAG)	CA	Visalia	442,171	4,838	91.4
Santa Barbara County Association of Governments (SBCAG)	CA	Santa Barbara	423,891	2,751	154.1
San Luis Obispo COG (SLOCOG)	CA	San Luis Obispo	269,637	3,323	81.1
Merced County Association of Governments (MCAG)	CA	Merced	255,366	1,971	129.6
Butte County Association of Governments (BCAG)	CA	Chico	220,000	1,675	131.3
Yuma MPO (YMPO)	AZ, CA	Yuma	195,807	5,522	35.5
Shasta Regional Transportation Agency (SRTA)	CA	Redding	177,223	3,843	46.1
Kings County Association of Governments (KCAG)	CA	Lemoore	152,982	1,391	110.0
Madera County Transportation Commission (Madera CTC)	CA	Madera	150,865	2,152	70.1
Tahoe MPO (TMPO)	NV, CA	Stateline	55,489	512	108.4

Source: (U.S. DOT, 2016).

4.1.2 Finance

California's system of funding transportation is complex. Total funding for transportation totals $28 billion per year, but most of these funds are allocated to other state agencies or local governments. Approximately 24 percent of transportation funding in California is federal (California Department of Transportation, 2015d, 4).

The largest *state* revenue sources are:

- **Fuel Excise Tax**: California collects a 30 cents/gallon excise tax on gasoline and 13 cents/gallon tax on diesel fuel, generating approximately $5 billion a year. Revenues are divided between the State Highway Account and local entities according to statutory

formula, and used to relieve General Fund transportation debt (California Department of Transportation, 2015d, 4).

- **Truck Weight Fees**: The state collects commercial vehicle fees based on weight, generating approximately $900 million a year. The California Department of Motor Vehicles (DMV) calculates weight fees based on the gross weight of commercial vehicles. Fees are collected and deposited into the State Highway Account and then transferred into the General Fund to pay for transportation debt (California Department of Transportation, 2015d, 5).

See Table 4.3 and Table 4.4.

Table 4.3: California State Motor Vehicle Fees and User Taxes

State Revenue Sources	FY 2016–2017
Motor Vehicle License Fees	$611,258,000
Motor Vehicle Registration Fees	$3,140,625,000
Motor Vehicle Fuel Tax (Diesel)	$516,431,000
Motor Vehicle Fuel Tax (Gasoline and Jet Fuel)	$4,215,784,000
Motor Vehicle Registration (Weight Fees)	$1,053,470,000
Road Improvement Charge	$1,056,055,000
Total	**$10,593,623.000**

Source: (California State Transportation Agency, 2016).

Table 4.4: California State Highway Account Resources, FY 2016–2017

State Revenue Sources	FY 2016–2017
Reserves	$1,991,231,000
Gasoline and Diesel Taxes	$3,083,514,000
Motor Vehicle Weight Fees	$1,053,470,000
Interest and Miscellaneous	$215,588,000
Federal Reimbursement	$4,534,453,000
Transportation Congestion Relief Fund	$5,000,000
Road Maintenance and Rehabilitation Account	$513,028,000
Total	**$11,396,284,000**

Source: (California State Transportation Agency, 2016).

Of the sources listed in Table 4.3, approximately 60 percent are allocated to other state agencies including the California Highway Patrol, the Department of Motor Vehicles and Air Resources Board, ($4.6 billion), and cities and counties ($1.4 billion). The rest ($4.5 billion) is allocated to the State Highway Account. The sources in the State Highway Account (including federal sources and special accounts) are listed in Table 4.4.

California's Constitution limits the legal uses of gas tax proceeds. All motor vehicle fuel taxes are to be deposited into the Highway Users Tax Account (HUTA). The HUTA is limited to research, planning, construction, improvement, maintenance, and operation of public streets and highways; their related public facilities for nonmotorized traffic; and the research, planning, construction and improvement of exclusive public mass transit guideways. The fund is allocated monthly to counties and cities under a formula outlined in the Constitution. This constitutional language imposes minimal restriction on the type of transportation infrastructure the state may pursue with

gas tax proceeds. CalSTA has broad discretion to choose how to spend funds from the HUTA. Roadways, non-motorized facilities and transit guideways are all legal uses of gas tax proceeds.[23]

By statute, 25 percent of funds (both state and federal) available for all transportation capital projects programmed in the State Transportation Improvement Program (STIP) are controlled by the state of California. These projects are programmed in the Interregional Transportation Improvement Program (ITIP). The other 75 percent of state funds available for transportation capital projects are controlled by Regional Transportation Planning Agencies (RTPAs) and programmed into Regional Transportation Improvement Programs (RTIPs). The 75 percent of funds allocated to RTPAs are further split by statute to south counties and north counties. Counties in the southern half of the state receive 60 percent of funds, and counties in the northern half of the state receive 40 percent (California Department of Transportation, 2015d, chart 4). Funding for both the ITIP and RTIPs comes from various state funds and accounts. Indeed, most transportation projects programmed into the ITIP and RTIPs draw from several resources. For example, one transit project programmed in the ITIP may draw from funds from both the Highway Users Tax Account within the Transportation Tax Fund, as well as the Public Transportation Account within the State Transportation Fund.

State statute directs how state revenues are distributed to cities and counties. After some statutory transfers for debt service and snow removal, 44 percent of the HUTA is transferred to the State Highway Account to fund projects included in the STIP. Twelve percent is transferred to the State Highway Account to fund projects listed in the State Highway Operation and Protection Program (SHOPP). The remaining 44 percent is transferred to city and county governments for local street and road purposes.[24] These funds are further apportioned by statutory formula. Fifty percent is apportioned to cities based on population. The other 50 percent is apportioned to counties based on the number of registered vehicles in the county and the number of miles of county roads[25] (Coleman, 2015).

[23] Cal. Const. art. XIX, § 4 ("Motor Vehicle Revenues"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&article=XIX&sectionNum=sec.%204.

[24] Cal. Sts. & High. Code § 2103(a)(3) ("Highway Users Tax Account"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=2103.

[25] Cal. Sts. & High. Code § 2103(a)(3)(C) ("Highway Users Tax Account"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=2103.

Table 4.5 summarizes the amounts in each of the following funds or accounts:

- The **Transportation Tax Fund** includes three accounts:
  - **The Motor Vehicle Fuel Account** receives state taxes on gasoline, diesel and aviation fuels, and provides funding for the Highway Users Tax Account and other accounts per constitutional declaration[26] and legislative intent.[27]
  - **The Highway Users Tax Account (HUTA)** receives transfers from the Motor Vehicle Fuel Account and is used for research, planning, construction, improvements, maintenance and operation of public streets and highways, per the constitutional[28] and legislative requirements.[29]
  - **Motor Vehicle License Fee Account** receives vehicle license fees and is transferred to local governments, per legislative requirement.[30]
- The **State Transportation Fund** includes several accounts including:
  - **Aeronautics Account:** Derived from jet fuel excise taxes and used for airport improvements.[31]
  - **Local Airport Loan Account:** Revenue sources include payments from local agencies to Caltrans.[32]

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[26] Cal. Const. art. XIX, § 4 ("Motor Vehicle Revenues"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&article=XIX&sectionNum=sec.%204.

[27] Cal. Sts. & High. Code § 2101 ("Highway Users Tax Account"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=2101.

[28] Cal. Const. art. XIX, §§ 2, 4 ("Motor Vehicle Revenues"), http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=CONS&division=&title=&part=&chapter=&article=XIX.

[29] Cal. Sts. & High. Code §§ 2100–2127. ("Highway Users Tax Account"), http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=SHC&division=3&title=&part=&chapter=3.

[30] Cal. Rev. & Tax. Code §§ 10701–11006 ("Vehicle License Fee"), http://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=RTC&division=2&title=&part=5.

[31] Cal. Pub. Util. Code §§ 21680–21688 ("Aeronautics Fund"), http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=9&title=&part=1&chapter=4&article=4.

[32] Cal. Pub. Util. Code § 21602 ("Airports and Air Navigation Facilities » Assistance to Political Subdivisions"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC&sectionNum=21602.

- **Local Transportation Loan Account:** Revenue sources from Federal Trust Fund.[33]

- **Motor Vehicle Account**: Revenue sources include vehicle registration, driver's license and off-highway vehicle fees to fund the DMV and CHP.[34]

- **Public Transportation Account:** Revenues generated from sales on diesel fuel and transfers from the State Highway Account for transportation planning and mass transportation.[35]

- **State Highway Account:** Receives fuel taxes from HUTA and reimbursements from the Federal Trust Fund for Federal-aid highway projects.

- The **Greenhouse Gas Reduction Fund** is funded through cap and trade proceeds and provides funding for projects that reduce GHG emissions.

- The **Traffic Congestion Relief Fund** is funded by transfers from the sales and use tax, the General Fund and the Transportation Investment Fund, and provides funding for local road deferred maintenance, congestion relieving projects and high-growth areas.[36]

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[33] Cal. Gov't Code § 64000(g) ("Transportation Finance Bank"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=64000.

[34] Cal. Rev. & Tax. Code § 11003 ("Vehicle License Fee » Distribution of Proceeds"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=11003.

[35] Cal. Pub. Util. Code §§ 21682.5 ("Aeronautics Fund"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC&sectionNum=21682.5, §§ 99310–99316 ("Transportation Planning and Development Account"), http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=10&title=&part=11&chapter=4&article=6.5; Cal. Sts. & High. Code § 194 ("Funds for Highway and Public Mass Transit Guideway Purposes"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=194; Cal. Rev. & Tax. Code §§ 7101–7107 ("Sales and Use Taxes » Disposition of Proceeds"), http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=RTC&division=2&title=&part=1&chapter=9, § 6051.8 ("The Sales Tax » Imposition of Tax"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=6051.8, § 6357.3 ("Sales and Use Taxes » General Exemptions"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=6357.3, § 6357.7 ("Sales and Use Taxes » General Exemptions"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=6357.7.

[36] Cal. Gov't Code § 14556.5 ("Traffic Congestion Relief Fund"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=14556.5.

- The **Transportation Investment Fund** provides funding for improvements to neighborhoods streets and roads, transit operations and intercity rail, and supplements the Traffic Congestion Relief Fund.[37]

- The **Transportation Deferred Investment Fund** is funded by loan repayments from the General Fund and funds debt service.[38]

- The **Transportation Debt Service Fund** is funded by transfers of vehicle weight fees deposited into the State Highway Account, and provides debt service on bonds to reimburse the General Fund for debt service and redeem and retire bonds.[39]

- The **Highway Safety, Traffic Reduction, Air Quality, and Port Security Fund of 2006 (Prop 1B)** is a fund created by a voter-approved bond measure to provide funding for mobility, safety and air quality improvements described in the 2006 Act.[40]

- The **High-Speed Passenger Train Bond Fund** is a fund created by a voter-approved bond measure to provide funding for an intercity high-speed train system.[41] (California Department of Finance, 2016; California Department of Transportation, 2015d).

[37] Cal. Rev. & Tax. Code § 7104 ("Sales and Use Taxes » Disposition of Proceeds"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=7104.

[38] Cal. Rev. & Tax. Code § 7105 ("Sales and Use Taxes » Disposition of Proceeds"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC&sectionNum=7105.

[39] Cal. Gov't Code § 16965(a)(1) ("Transportation Debt Service Fund"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=16965.

[40] Cal. Gov't Code § 8879.23 ("Highway Safety, Traffic Reduction, Air Quality, and Port Security Fund of 2006 and Program"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=8879.23; Cal. Health & Safety Code § 39625 ("Goods Movement Emission Reduction Program"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=39625.

[41] Cal. Sts. & High. Code § 2704.05 ("High-Speed Passenger Train Financing Program"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=2704.05.

Table 4.5: California Amount by Fund or Account

Fund or Account	2015–2016
Transportation Tax Fund:	
Motor Vehicle Fuel Account (MVFA)	$4,914,597,000
Highway Users Tax Account (HUTA)	$4,636,710,000
Motor Vehicle License Fee Account	$566,945,000
State Transportation Fund:	
Aeronautics Account	$8,784,000
Local Airport Loan Account	$17,360,000
Local Transportation Loan Account	$4,031,000
Motor Vehicle Account	$3,775,097,000
Public Transportation Account	$1,286,482,000
State Highway Account (SHA)	$10,100,940,000
Greenhouse Gas Reduction Fund	$1,442,000,000
Traffic Congestion Relief Fund	$209,971,000
Transportation Investment Fund	$224,898,000
Transportation Deferred Investment Fund	$55,237,000
Transportation Debt Service Fund	$1,186,113,000
Highway Safety, Traffic Reduction, Air Quality, and Port Security Fund of 2006 (Prop 1B)	$734,375,000
High-Speed Passenger Train Bond Fund (Prop 1A)	$1,168,035,000

Source: (California Department of Transportation, 2015b).

Transportation program expenditures by department are summarized in Table 4.6.

Table 4.6: California Fund Total Distributions

Program / Department	2015–2016
Department of Transportation	$10,913,000
California Highway Patrol	$2,288,000
High–Speed Rail Authority	$755,000
Department of Motor Vehicles	$1,121,000
State Transit Assistance	$389,000
Transit Capital (Proposition 1B)	$154,000
Other transportation programs	$335,000
Total	**$15,955,000**

Source: (California Legislative Analyst Office, 2016).

The Metropolitan Transportation Commission (MTC), spans the San Francisco Bay region. As a creature of federal law, MTC has direct control over only federal funds. The only projects that are listed in the Regional Transportation Improvement Plan (RTIP) are those using some amount of federal funds. MTC receives federal funds primarily through the federal Surface Transportation Program (STP) and Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds. From these federal fund payments, MTC receives only 17 percent of its total revenue spent on capital projects in the RTIP. The rest of the revenue represented in the RTIP comes from state and local sources. In other words, 17 percent of the project funding in the RTIP comes from the federal government, and 83 percent comes from state and local sources. Together, the federal and state revenues account for the 75 percent of transportation programming funding reserved for all MPOs under California's statutory framework. This federal and state revenue is supplemented by local sources. MTC received $52.8 million in federal funds in FY 2013–2014. Total revenues for FY 2014 were $307.1 million (Metropolitan Transportation Commission, 2014a).

The 2015 RTIP Appendix A-2 Investment Analysis Report indicates that 42 percent of expenditures were on road and bridge maintenance, 37 percent on transit expansion, 11 percent on transit maintenance, and 10 percent on road and bridge expansion (Metropolitan Transportation Commission, 2015b).

4.1.3 Planning

The **California Transportation Plan 2040 (CTP)** is the long-range, statewide multimodal transportation policy plan that lays out an overarching vision and goals for transportation in California.

After extensive public outreach, in 2016 Caltrans published CTP 2040. Caltrans created the plan based on CTP Guidelines adopted by CTC.

CTP 2040 pulls together six modal plans and serves as a guiding document for decision-makers at all levels of transportation policy. The CTP also identifies seven statewide goals:

1. Improve Multimodal Mobility and Accessibility for All People
2. Preserve the Multimodal Transportation System
3. Support a Vibrant Economy
4. Improve Public Safety and Security
5. Foster Livable and Healthy Communities and Promote
6. Social Equity
7. Practice Environmental Stewardship (California Department of Transportation, 2016a).

Each goal is categorized as economic, equity, or human and environmental health. Policies are then associated with each goal to provide a more specific meaning (California Department of Transportation, 2016a).

Following the adoption of SB 45 (described above), the responsibility for planning and programming was split between MPOs for regional urban transportation planning and Caltrans for interregional planning. The Interregional Transportation Strategic Plan identifies the "visions, strategies, principles, objectives, and criteria for operating, developing, and improving interregional transportation facilities and services." While each MPO sets its own goals and objectives for regional planning, the ITSP establishes six objectives that guide project development for the Interregional Transportation Improvement Program:

1. Accessibility
2. Reliability
3. Safety
4. Sustainability
5. Economy
6. Integration (California Department of Transportation, 2015c).

As we discuss below, these objectives are used as the basis for Caltrans project selection criteria in the ITSP (California Department of Transportation, 2016a).

Most performance measures are adopted by agency action and not required by state law. The CTP uses one performance measure (greenhouse gases) to assess different scenarios in the future. The first scenario projected greenhouse gas (GHG) emissions based on the build out of existing transportation plans, while the second and third scenarios projected using additional strategies and meeting the emissions targets (California Department of Transportation, 2016a, 69–71). The measures used in Appendix 1 of the CTP draws direct connections among goals, strategies and performance measures (California Department of Transportation, 2016a). That is, it is possible to trace how effective investments are in achieving California's transportation goals through reviewing performance measure data associated with each goal. For example, the table in Appendix 1 connects the goal of supporting a vibrant economy with the performance measure of travel time to jobs. However, as we discuss below, the measures that lack targets make it more difficult to assess progress towards associated goals.

In 2015, Governor Brown issued Executive Order B-32-15[42] that directed Caltrans to establish targets for freight efficiency, zero-emission technologies, and competitiveness of California's freight system by July 2016 (California Department of Transportation, 2016a). These targets are still forthcoming.

Based on Goal 4 of the CTP, Caltrans recommends using performance measures and targets to implement their "towards zero deaths" vision of zero deaths and zero serious injuries (California Department of Transportation, 2016a). This vision could itself be a target, but it does not include a timeframe or any intermediary targets. California also publishes a performance measure report called *MileMarker* that summarizes performance for the previous and current periods, and tracks whether the goal was met as well as the desired trend (California Department of Transportation, 2015e).

Other targets included in the CTP do not have associated ultimate or intermediary targets. However, some targets are used strictly in the context of scenario planning for GHG reductions. Specifically, the CTP projects the level of per capita and total vehicle miles traveled (VMT), vehicle hours of delay (VHD) and vehicle hours of travel (VHT) to project GHG emissions scenarios under different investment strategies (California Department of Transportation, 2016a).

MTC's regional transportation plan (RTP), Plan Bay Area, identifies seven goals:

1. Climate Protection
2. Adequate Housing
3. Healthy and Safe Communities
4. Open Space and Agricultural Preservation
5. Equitable Access
6. Economic Vitality
7. Transportation System Effectiveness (Metropolitan Transportation Commission, 2013a).

[42] Governor Edmund G. Brown Jr., Cal. Exec. Order No. B-32-15 (July 17, 2015), http://www.gov.ca.gov/news.php?id=19046.

Each of MTC's goals are associated with performance measures and targets. However, the legislature passed Senate Bill 375,[43] which required performance measures specifically for GHG emissions. The California Air Resources Board developed GHG emission targets under SB 375 (California Department of Transportation, 2016a). SB 375 requires MPOs to develop Sustainable Communities Strategies that demonstrate how they will reach GHG emissions targets for light duty trucks and passenger vehicles. These strategies require MPOs to adopt GHGemissions reduction strategies and measure progress towards their targets. Each MPO has unique targets for 2020 and 2035 that are based on population, land development and travel patterns, and demographic and market trends (California Air Resources Board, 2010, 10–12). These targets are binding on MPOs in that the California Air Resources Board (CARB) verifies that their plans will put each region on track to meet its target. If CARB determines that the plans fail to meet an MPO's target, the MPO is required to develop an "alternative planning strategy" to meet the targets (California Air Resources Board, 2017). While MPOs have to show that plans will reach targets through scenario planning, there are no consequences from the state for failing to reach the targets by the horizon year.

California has a rich history of using performance measures at the regional level. In 2002, the state adopted Senate Bill 1492,[44] which requires MPOs to use performance criteria to evaluate and prioritize projects (Transportation for America, 2014, 82–84).

MTC's Plan Bay Area matches each goal with performance measures and targets. MTC establishes specific targets for each of its performance measures creating a 1:1:1 relationship between goals, measures and targets. Two of the targets, reducing GHG emissions and supplying adequate housing without displacing low-income residents, are mandatory (under SB 375), while the remaining five were adopted my MTC and considered voluntary. Plan Bay Area contains a section that assesses whether the plan will meet its targets. The plan makes progress on nine of the 15 targets MTC established for itself, but recognizes that it will fall short on six of the targets. Interestingly, in the areas where the plan fails to meet the targets, MTC acknowledges that it will have to focus on "breakthrough" strategies to achieve the targets in the future (Metropolitan Transportation Commission, 2013b).

4.1.4 Programming

Because Caltrans turns over 75 percent of STIP to the regional level, only 25 percent of Caltrans funding is allocated to projects that Caltrans has control over in the ITIP. Caltrans has its own project selection process of the Interregional Transportation System Plan (ITSP) and Interregional Transportation Improvement Program (ITIP) that is separate from of the decision-making process of MPOs and counties. The ITSP identifies six project selection criteria:

1. Accessibility

[43] Senate Bill 375, 2008 Cal. Stat. 728 ("Transportation planning: travel demand models: sustainable communities strategy: environmental review"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375.

[44] Senate Bill 1492, 2002 Cal. Stat. 470 ("Transportation: Metropolitan Transportation Commission"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200120020SB1492.

2. Reliability
3. Safety
4. Sustainability
5. Economy
6. Integration (California Department of Transportation, 2015c).

Rather than use a scoring system to rank projects, Caltrans associates the criteria with questions in order to provide more flexibility and use of their expert judgment (California Department of Transportation, 2015c). The goals of the ITIP are not directly related to the goals of the CTP or performance measures.

In 2013, Senate Bill 99[45] and Assembly Bill 101[46] created the Active Transportation Program to consolidate funds under MAP-21's more flexible funding scheme. SB 99 required the CTC to develop project selection criteria to administer these consolidated funds to provide a broad spectrum of projects to benefit many types of active transportation users (California Department of Transportation, 2015a). SB 99 directs the CTC to base criteria on unweighted factors relating to active transportation.

Under the SHOPP program, Caltrans ran a pilot project in 2016 to develop transparent project prioritization criteria for the SHOPP to measure strategic goals related to 1) safety and health; 2) stewardship and efficiency; 3) sustainability, livability and economy; 4) system performance; and 5) organizational excellence. The process included scoring along each goal, measuring cumulative benefit and performing a cost-benefit ranking of competing projects (California Department of Transportation, 2016b). Weights were determined by executive leadership. During the pilot project Caltrans found that the agency is not currently collecting the necessary data to allow prioritization to be conducted. Thus, further work is needed before Caltrans can adopt the pilot process.

For MTC, project selection is the process where project proposals are solicited, and alternatives are ranked and formally funded.

As part of the planning process, MTC uses a Project Performance Assessment project to evaluate over 1,000 projects along targets and a benefit/cost ratio. The Project Performance Assessment is used to place projects in the plan and allocate discretionary funds (Transportation for America, 2014, 82–84). The assessment relies on qualitative metrics embodied in goals and quantitative measures of cost effectiveness. High-performing projects were prioritized for funding in Plan Bay Area. Low-performing projects underwent additional scrutiny and required project sponsors to present a compelling case for inclusion in the plan (Smart Growth America and State Smart Transportation Initiative, 2015). See Figure 4.2.

[45] Senate Bill 99, 2013 Cal. Stat. 359 ("Active Transportation Program"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB99.

[46] Assembly Bill 101, 2013 Cal. Stat. 354 ("Budget Act of 2013"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB101.

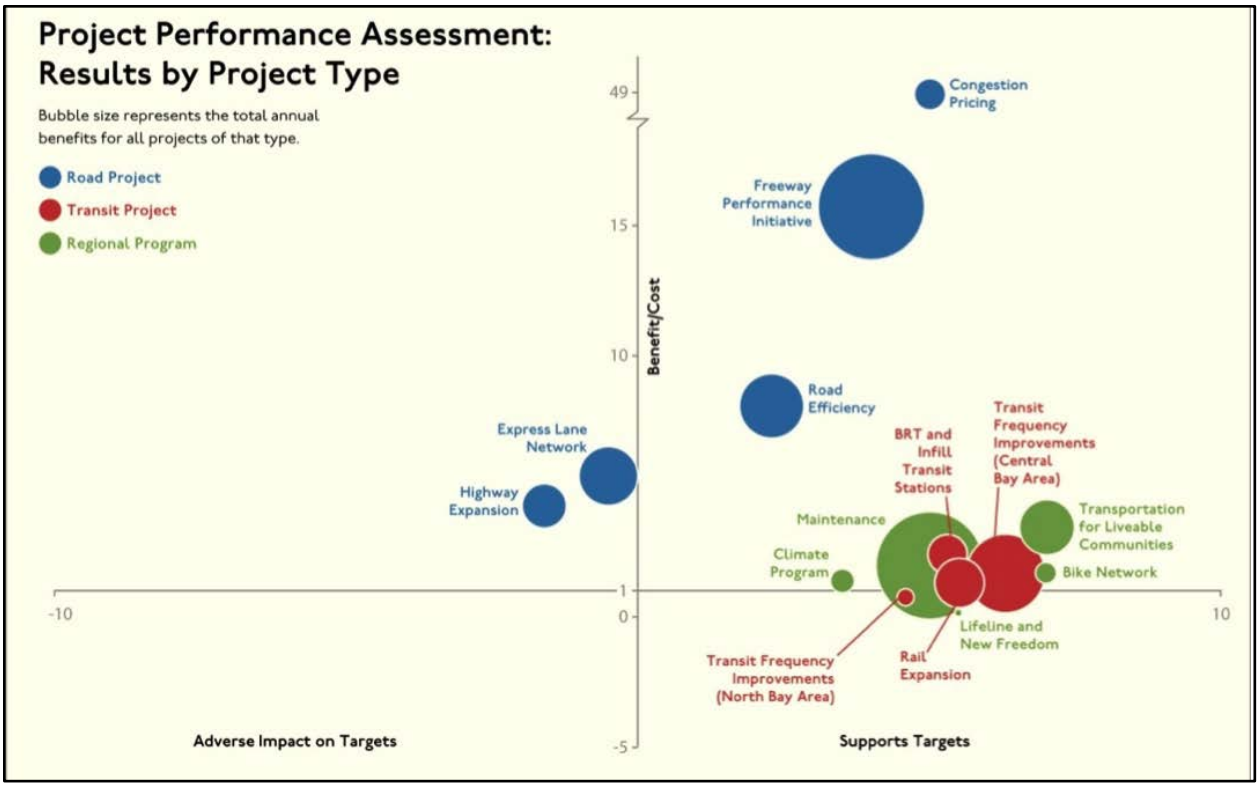

Figure 4.2: California Performance Assessment: Results by Project Type
Source: (Metropolitan Transportation Commission, 2013b, 53).

In California, the process of selecting projects for inclusion in RTPs is very important as it constrains the projects that will ultimately end up in the RTIP. Section 6 of the 2016 STIP Guidelines indicates that MPOs and RTPAs submit RTIPs to Caltrans for inclusion into the STIP (California Transportation Commission, 2015). MTC uses a highly decentralized system for selecting projects in the development of the RTP and RTIP. The RTIP Guidelines indicate that MTC leaves it up to counties to create the project list that uses their county share of RTIP funds. As long as the list of projects is consistent with the RTP and local plans, and followed proper procedure, MTC includes the project list in the RTIP without a regional selection process (Metropolitan Transportation Commission, 2013b). As we learned in conversations with MTC staff, most projects are checked against the goals and performance measures of Plan Bay Area because most projects rely on at least some federal funding.

4.1.5 Reporting

Like most every jurisdiction, California and its MPOs produce ***ex ante*** **estimates of outcomes** from transportation projects: modeling of projects on how the state thinks they will perform. In California and every state, these data are difficult to access and make sense of, but also difficult to link to goals. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post*** **outcomes** from such investments.

4.2 MASSACHUSETTS

Massachusetts is in Census Region 1 (Northeast), Division 1 (New England) (U.S. Census Bureau, 2016). Massachusetts has a population of 6,547,629 (14th), a land area of 7,800.1 square miles (45th), and a density of 839.4 persons per square mile (3rd) (U.S. Census Bureau, 2010).

Table 4.7 summarizes the Massachusetts statewide transportation system.

Table 4.7: Massachusetts Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 76,332 (2009)
	miles of tolled roadway: 138 (2009)
	bridges: 5,113 (2010)
	toll bridges and tunnels: 3 (2009)
Transit	trip per year (all transit modes): approximately 398.3 million (2008)
Rail	freight rail route-miles: 952 (2008)
Aviation	airports total: 248; public-use: 43; state-owned: 1 (2008)
	enplanements per year: 13,001,565 (2009)
Marine	port traffic per year (20-foot equivalent units): 158,764 (2009)
	waterborne tonnage per year: 25.0 million (2009)

Source: (NCSL and AASHTO, 2011, 88).

4.2.1 Governance

The bicameral, partisan legislature, termed the Massachusetts General Court, consists of a 40-member Senate and a 160-member House, and meets annually year-round (NCSL and AASHTO, 2011, 88). Since the early 1990s, Democrats have controlled both chambers of the legislature. But the governor and lieutenant governor have been Republicans, except from 2007 to 2014 when they were Democrats.

In 2009, Senate Bill 2087[47] combined several state transportation agencies into the **Massachusetts Department of Transportation (MassDOT)**. MassDOT is governed by a Board of Directors consisting of 11 members appointed by the Governor, including the **Secretary of Transportation**, who serves ex officio as chair.[48] The Secretary of Transportation is one of eight cabinet members appointed by the Governor.[49] MassDOT includes four divisions:

- **Highway Division**: Responsible for managing the state highway system, including bridges and bike paths, the division was created by merging the Massachusetts Highway

[47] Senate Bill 2087, 2009 Mass. Acts 25 ("An Act Modernizing the Transportation Systems of the Commonwealth"), http://malegislature.gov/Bills/186/S2087.

[48] Mass. Gen. Laws ch. 6C, § 2 ("MassDOT » Creation; board or directors; officers and employees"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section2.

[49] Mass. Gen. Laws ch. 6A, §§ 2, 3 ("Establishment of executive offices"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6A.

Department with the Massachusetts Turnpike Authority, and also includes the Tobin Memorial Bridge[50] (Massachusetts Department of Transportation, 2014b, 7–9).

- **Rail and Transit (Mass Transit) Division**: Responsible for the development, implementation and oversight of statewide rail policies and programs as well as for the Commonwealth's 15 Regional Transit Authorities (RTAs) and the Massachusetts Bay Transportation Authority (MBTA)[51] (Massachusetts Department of Transportation, 2014b, 10–12).

- **Aeronautics Division**: Responsible for coordinating aviation policy in the Commonwealth and overseeing the state's public-use, general aviation airports; private-use landing areas; and seaplane bases. The division also certifies airports and heliports, licenses airport managers, and conducts annual airport inspections[52] (Massachusetts Department of Transportation, 2014b, 13).

- **Registry of Motor Vehicles Division**: Responsible for issuing vehicle operator licensing, vehicle and aircraft registration and overseeing commercial and non-commercial vehicle inspection stations[53] (Massachusetts Department of Transportation, 2014b, 14).

MassDOT also includes the **Office of Transportation Planning**[54] and the **Office of Performance Management and Innovation**[55] (Massachusetts, 2016; Massachusetts Department of Transportation, 2014a; Massachusetts Department of Transportation, 2016g, 13).

All public transportation agencies in Massachusetts are administered independently. But the MassDOT board of directors also governs the **Massachusetts Bay Transportation Authority (MBTA)**,[56] the major provider of public transportation in the greater Boston area. MBTA is the nation's fifth largest transit system, with 2,500 buses and trains carrying 1.3 million passenger trips per day across 175 communities. The remaining 15 public transit authorities are called **Regional Transit Agencies (RTAs)** and they provide public bus services in the remainder of the state, operating an additional 1,400 vehicles across 231 communities (Massachusetts Department of Transportation, 2016e, 3, 21, 31–32; Massachusetts Department of Transportation, 2014b, 12).

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[50] Mass. Gen. Laws ch. 6C, § 37 ("Division of highways; administrator"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section37.

[51] Mass. Gen. Laws ch. 6C, § 52 ("Mass Transit division; administrator"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section52.

[52] Mass. Gen. Laws ch. 6C, § 59 ("Aeronautics division; administrator"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section59.

[53] Mass. Gen. Laws ch. 6C, § 56 ("Registry of motor vehicles; administrator"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section56.

[54] Mass. Gen. Laws ch. 6C, § 10 ("Office of transportation planning"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section10.

[55] Mass. Gen. Laws ch. 6C, § 6 ("Office of performance management and innovation; duties"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section6.

[56] Mass. Gen. Laws ch. 161A, § 7 ("MBTA » Board of Directors"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter161A/Section7.

The **Massachusetts Port Authority (Massport)** is independent from MassDOT, but the Secretary of Transportation is an ex officio member of the Massport Board of Directors.[57] Massport owns and operates the maritime Port of Boston, Boston's Logan International Airport, Hanscom Field and Worcester Regional Airport (Massachusetts Department of Transportation, 2016e, 36).

The Zoning Act[58] gives cities and towns authority to adopt ordinances and bylaws to regulate the use of land, buildings and structures. The Regional Planning Law[59] allows cities and towns to voluntarily join with others to establish planning districts "to promote with the greatest efficiency and economy the coordinated and orderly development of the areas within their jurisdiction and the general welfare and prosperity of their citizens." Today, all but five of the 351 municipalities in Massachusetts are part of one of the 13 **Regional Planning Agencies (RPAs)** (Massachusetts Association of Regional Planning Agencies, 2007; Massachusetts Association of Regional Planning Agencies, 2009; Massachusetts Chapter of the American Planning Association, 2016). The Smart Growth Zoning Overlay District Act[60] encourages—but does not require—cities and towns to establish new overlay zoning districts to promote housing production and, more generally, smart growth development.

There are 10 **MPOs** wholly or partly within Massachusetts (see Figure 4.3 and Table 4.8). In addition, three rural planning areas do not have MPOs: Franklin, Martha's Vineyard, and Nantucket. In Massachusetts, each MPO has at least four common members: the Secretary of Transportation, who acts as chair; the MassDOT Highway Division Administrator; a representative from the RTA; and a representative from the respective RPA. RPAs and MPOs can be confusing because they encompass identical geographical boundaries but serve different functions (Massachusetts Department of Transportation, 2016d; Massachusetts Department of Transportation, 2016g, 13–14).

[57] 1965 Mass. Acts 465 ("An Act … Creating the Massachusetts Port Authority …"), http://archives.lib.state.ma.us/handle/2452/45773.

[58] 1975 Mass. Acts 808 ("An Act Further Regulating the Zoning Enabling Act"), Mass. Gen. Laws ch. 40A, http://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40A.

[59] 1955 Mass. Acts 374 ("An Act to Permit the Establishment of Metropolitan or Regional Planning Districts Within the Commonwealth"), Mass. Gen. Laws ch. 40B, http://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40B.

[60] 2004 Mass. Acts 149 ("An Act Making Appropriations for the Fiscal Year 2005…"), Mass. Gen. Laws ch. 40R, http://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40R.

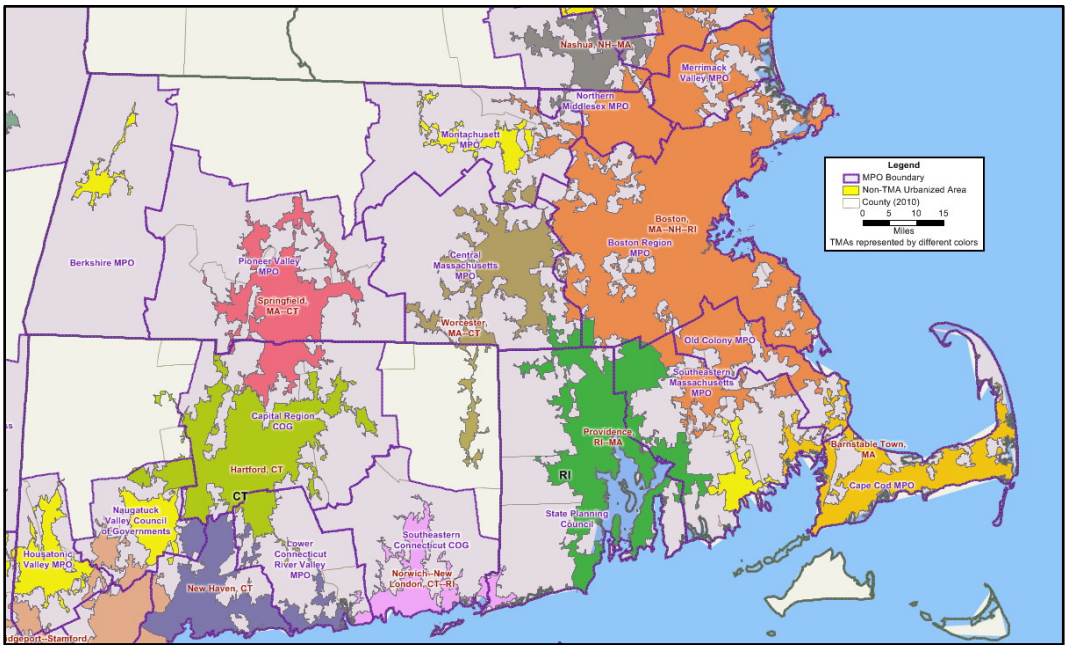

Figure 4.3: Massachusetts MPOs and TMAs Map
Source: (FHWA, 2018b).

Table 4.8: Massachusetts MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
Boston Region MPO	MA	Boston	3,159,512	1,458	2,167.0
Pioneer Valley MPO (PVMPO)	MA	Springfield	621,823	1,178	527.9
Southeastern Massachusetts MPO	MA	Taunton	616,689	823	749.3
Central Massachusetts MPO	MA	Worcester	556,910	959	580.7
Merrimack Valley MPO (MVMPO)	MA	Haverhill	333,357	283	1,177.9
Old Colony MPO	MA	Brockton	288,628	303	952.6
Northern Middlesex MPO (NMMPO)	MA	Lowell	286,951	196	1,464.0
Montachusett MPO (MMPO)	MA	Fitchburg	236,482	683	346.2
Cape Cod MPO	MA	Barnstable	215,881	444	486.2
Berkshire MPO	MA	Pittsfield	131,232	945	138.9

Source: (U.S. DOT, 2016).

For example, for the Pioneer Valley Planning Commission (PVPC), the RPA for 43 cities and towns in the region around Springfield, transportation decisions are made by the **Pioneer Valley MPO (PVMPO)**. The PVMPO is composed of 10 Commissioners: the four standard members plus six elected officials from local governments within the MPO (Pioneer Valley Planning Commission, 2016a).

4.2.2 Finance

The Massachusetts Constitution requires that taxes and fees on the operation or use of motor vehicles and on motor vehicle fuels be used for roads, bridges, mass transportation lines, other mass transportation purposes, and enforcement of state traffic laws.[61]

Figure 4.4 shows state revenues and spending for transportation operations and debt service in fiscal year 2015, the most recent year for which comprehensive data is available. The width of each arrow represents the amount of dollars that flow from one source or activity to another. The chart doesn't include federal funds, which help support those capital projects and vary annually based on the timing of federal grants and reimbursements. Nor does the chart display spending by local cities and towns.

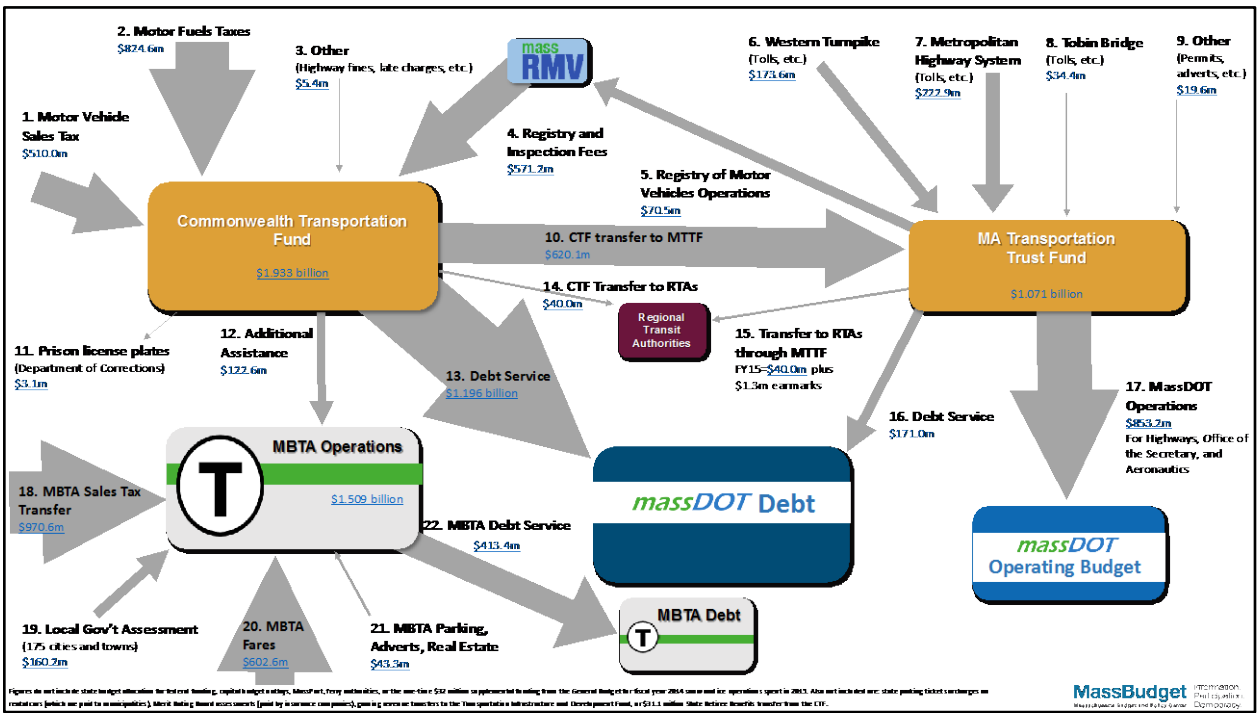

Figure 4.4: Massachusetts Transportation Funding Flow Chart, FY 2015
Source: (Baxandall, 2017).

Most state transportation dollars in Massachusetts are automatically dedicated to transportation from designated revenue sources such as the tax on gasoline, car sales, registry fees, tolls or a portion of the sales tax. The amount of investment available to meet transportation needs therefore depends on how quickly these sources increase over time and on decisions made through legislation, or the budget process to dedicate different amounts of revenue or new revenue sources (Baxandall, 2017).

[61] Mass. Const. amend. CIV (1974), http://malegislature.gov/Laws/Constitution#amendmentArticleCIV.

Two big transportation funds serve as conduits to collect transportation revenues and direct the funds for operations at particular agencies or to pay off debt for past spending: the Commonwealth Transportation Fund and the Massachusetts Transportation Trust Fund, both created in 2009 by SB 2087. See Table 4.9 (Baxandall, 2017).

Table 4.9: Massachusetts CTF and MTTF Revenue Sources

Source	Revenue FY 2015	
CTF:		
Motor fuel taxes	$824,640,027	
Registry and inspection fees	$571,159,664	
Motor vehicle sales tax	$510,030,805	
Other	$27,537,689	
CTF Total		$1,933,368,185
MTTF:		
Transfer from CTF to MTTF	$620,149,841	($620,149,841)
Metropolitan Highway System tolls and other revenue	$222,876,000	
Western Turnpike tolls and other revenue	$173,563,000	
Tobin Bridge tolls and other revenue	$34,442,000	
Other revenue paid to MTTF	$19,624,000	
MTTF Total		$1,070,654,841
Total		**$2,383,873,185**

Source: (Baxandall, 2017; Massachusetts Department of Transportation, 2016f, 7, 10; Massachusetts Department of Transportation, 2015a, 110).

The **Commonwealth Transportation Fund (CTF)**[62] is an instrument of the state budget that receives annual funds from particular revenue sources, as designated by law, including federal disbursements, the state gas tax, vehicle sales taxes, vehicle registration fees, and general fund transfers (Baxandall, 2017).

Although the CTF is partially funded by the gas tax, vehicle registrations and sales tax, the state does not solely rely on these pay-as-you-go revenues. Instead, Massachusetts usually passes a state transportation bond approved by the legislature roughly every three years (NCSL and AASHTO, 2011, 89; Massachusetts Department of Transportation, 2016g, 17).

MassDOT receives a funding "authorization" or estimate of total federal funding available from FHWA. In recent years, this authorization has been approximately $600 million, though this may increase with FAST Act authorizations. Congress reviews the authorization during its budgeting process (Massachusetts Department of Transportation, 2016g, 16).

A portion of the federal highway funding allocated to Massachusetts is directly transferred to the Accelerated Bridge Program, established by the legislature in 2008 to fund bridge repair[63] (Massachusetts Department of Transportation, 2016g, 16; Massachusetts Department of Transportation, 2014b, 8–9).

[62] Mass. Gen. Laws ch. 29, § 2ZZZ ("Commonwealth Trust Fund"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter29/Section2ZZZ.

[63] 2008 Mass. Acts 233 ("An Act Financing An Accelerated Structurally-Deficient Bridge Improvement Program"), http://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter233.

MassDOT's Highway Division, the Office of Transportation Planning, and the Federal Aid Programming and Reimbursement Office jointly examine the remaining funds and determine how much of that amount is required for statewide needs, such as interstate maintenance, district-wide contracts, planning, and transportation demand management (Massachusetts Department of Transportation, 2016g, 16).

When funding for statewide needs is deducted from the total, the remainder is distributed to the MPOs by formula as target funds for each regional TIP. The distribution is determined according to a formula that is primarily based on each MPO's road mileage and population. The formula for distribution among the MPOs was developed by the Massachusetts Association of Regional Planning Agencies (MARPA), and is known as the "MARPA formula." For example, the Pioneer Valley MPO receives 10.8 percent of the remaining balance. Funding for RTAs is formula-based from FTA (Massachusetts Department of Transportation, 2016g, 16).

An additional set-aside portion of the CTF is known as "Chapter 90 funds,"[64] which provide state reimbursement for municipal transportation projects. Chapter 90 funds are allocated to every municipality in the state through a formula based on the city's road miles, employment and population (Massachusetts Department of Transportation, 2016g, 190–191). For example, each local government in the Pioneer Valley receives its Chapter 90 funds. Every project included in the Pioneer Valley 2016–2020 TIP that includes local funding is funded by a match of 20 percent from the state and local government, with the remaining 80 percent funded by federal funds. Often, the 20 percent that the local government is responsible for is reimbursed through the state Chapter 90 program.

Moreover, annually at least $160 million of the CTF is transferred to MBTA, and at least $15 million to RTAs.[65] Otherwise, MassDOT has considerable discretion to decide the annual allocation of the balance of the CTF.

The **Massachusetts Transportation Trust Fund (MTTF)**[66] sits outside the Commonwealth budget as a financial instrument for MassDOT. It is the repository for dedicated revenues from quasi-independent toll agencies, federal government grants, and some budgeted money from the state (Baxandall, 2017).

PVMPO received $29.6 million in federal funding for highway and transit projects (Pioneer Valley Planning Commission, 2016b, 45–46). The PVMPO TIP does not report how much state and local funding is included in its projects, but does describe how almost every project listed receives a 20 percent match from local or state sources. Exceptions to this 80/20 match split are interstate maintenance projects, which receive 90 percent federal funding; Highway Safety Improvement Program projects, which can be 90–100 percent federal funding; congressional earmark projects; and non-Federal-aid projects, which include "bikeways, State Aid (Chapter 90), and highway

[64] Mass. Gen. Laws ch. 90, § 34 ("Motor vehicles and aircraft » Disposition of fees"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIV/Chapter90/Section34.

[65] Mass. Gen. Laws ch. 29, § 2ZZZ(d) ("Commonwealth Trust Fund"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter29/Section2ZZZ.

[66] Mass. Gen. Laws ch. 6C, § 4 ("Massachusetts Transportation Trust Fund"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section4.

construction and maintenance (Chapter 497)" and are "included in the TIP for informational purposes only" (Pioneer Valley Planning Commission, 2016b, 16–18). Other than this general information, PVMPO does not describe what percent of all funding in the TIP is state or local versus federal.

PVMPO receives 10.8 percent of the remaining balance of the CTF after MassDOT retains its portion of the CTF for projects of statewide significance (Massachusetts Department of Transportation STIP 2016, 17). Each local government within PVMPO also receives its Chapter 90 funds. Every project included in the PVMPO 2016–2020 TIP that includes local funding is funded by a match of 20 percent from the state and local government, with the remaining 80 percent funded by federal funds administered by PVMPO. Often, the 20 percent that the local government is responsible for is reimbursed through the state Chapter 90 program.

4.2.3 Planning

In 2010, to promote sustainability in the transportation sector, MassDOT issued the **GreenDOT Policy Directive**, which includes three goals:

1. Reduce greenhouse gas (GHG) emissions.
2. Promote the healthy transportation modes of walking, bicycling and public transit.
3. Support smart growth development.

GreenDOT is designed to support implementation of:

- Climate Protection and Green Economy Act,[67]
- Green Communities Act,[68]
- Healthy Transportation Compact,[69]
- Leading by Example,[70]
- youMove Massachusetts civic engagement process (Massachusetts Department of Transportation, 2016j), and
- Complete Streets design standard (Massachusetts Department of Transportation, 2016a).

(Massachusetts Department of Transportation, 2010).

[67] Mass. Gen. Laws ch. 21N ("Climate Protection and Green Economy Act"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter21N.

[68] 2008 Mass. Acts 169 ("An Act Relative to Green Communities"), http://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169.

[69] Mass. Gen. Laws ch. 6C § 33 ("Health transportation compact"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section33.

[70] Governor Deval L. Patrick, Mass. Exec. Order No. 484 (April 18, 2007) ("Leading by Example"), http://www.mass.gov/anf/docs/dcam/dlforms/energy/energy-eo484-final.pdf.

In 2012, MassDOT released the **GreenDOT Implementation Plan**, which includes the following goals:

- Air
  - Reduce GHG emissions
  - Improve statewide air quality

- Energy
  - Consume less energy
  - Increase reliance on renewable energy

- Land
  - Minimize energy and chemicals used in maintenance
  - Enhance ecological performance of MassDOT-impacted land

- Materials
  - Improve life-cycle impacts of investments
  - Purchase environmentally preferred products
  - Build green facilities for MassDOT

- Policy, Planning and Design
  - Design a multimodal transportation system
  - Promote health transportation and livable communities
  - Triple mode share of bicycling, transit and walking

- Waste
  - Achieve zero solid waste disposal
  - Reduce all exposure to hazardous waste

- Water
  - Use less water
  - Improve ecological function of water systems (Massachusetts Department of Transportation, 2012, 3, 9).

In 2013, MassDOT issues the **Healthy Transportation Policy Directive Policy** "to ensure all MassDOT projects are designed and implemented in a way that all [their] customers have access to safe and comfortable healthy transportation options at all MassDOT facilities and in all the services [they] provide" (Massachusetts Department of Transportation, 2013a; Massachusetts Department of Transportation, 2016b).

In 2014, MassDOT released **weMove Massachusetts: Planning for Performance** (Massachusetts Department of Transportation, 2016i). Its Planning for Performance analytical tool establishes ways to measure the performance of transportation assets now and in the future under different funding levels based on the agency's policy priorities. This capability will enable MassDOT to prioritize transportation investments across all modes. Within each mode, the performance of key asset categories can be analyzed, including bridges, roadways, buses and trains, railroad tracks and signals, and bike paths (Massachusetts Department of Transportation, 2014b, 1).

weMove Massachusetts satisfies federal requirements for a long-range statewide transportation plan[71] and state requirements for a statewide intermodal and integrated transportation plan.[72] It is the first fully multimodal plan for the Commonwealth. It represents another step in the on-road to transportation reform, which began in 2009 with the formation of MassDOT[73] (Massachusetts Department of Transportation, 2014b, 1, 3).

During the Gov. Deval Patrick administration (2007–2015), MassDOT focused on several key priorities: infrastructure maintenance, access to jobs and opportunities, quality of life and sustainability. These high-level policy priorities helped to shape decisions about how to best allocate the available transportation funding (Massachusetts Department of Transportation, 2014b, 15–17).

In 2009, SB 2087 required MassDOT to develop a performance-based planning process, which is reflected in *weMove Massachusetts* (Massachusetts Department of Transportation, 2014b, 17). MassDOT developed the Planning for Performance analytical tool to evaluate the impact of different levels of spending with the goal of maximizing overall system performance over time. By looking at the transportation system in a holistic manner, MassDOT could better prioritize federal and state funding for improved performance outcomes. The tool allows MassDOT to consider the marginal benefits of allocating funds to one asset category versus another, and weigh the tradeoffs of each investment decision. The MassDOT tool is based on the FHWA Highway Economic Requirements System - State Version (HERS-ST) model and the FTA Transit Economic Requirements Model (TERM), and is supplemented with other state-collected asset and condition data. For this reason, the tool could be replicated by other states with relative ease. States can tailor the tool to their funding levels, asset categories and policy priorities (FHWA, 2014).

weMove Massachusetts was used to forecast performance and condition of the various transportation assets under four different funding scenarios. Scenarios were developed for years 2023 (the target year for the administration's *The Way Forward* investment plan) and 2040 (MassDOT's long-term planning horizon year), and based on the pre-2013 finance bill funding levels ("historical") and the 2013 revenue bill levels ("current") (Massachusetts Department of Transportation, 2014b, 19–20). The tool then produces outputs that reveal the performance trade-offs that will ultimately need to be considered when allocating funds to achieve state—and eventually national—goals and performance targets (FHWA, 2014).

The tool reported the following performance measures:

- Pavement condition (present serviceability rating)
- Bridge condition (health index)
- Mobility (hours of delay per 1,000 VMT)
- Safety (number of crashes at interchanges or intersections)

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[71] 23 U.S.C. § 135(f) ("Long-range Statewide Transportation Plan"), http://www.law.cornell.edu/uscode/text/23/135.

[72] Mass. Gen. Laws ch. 6C, § 3(7) ("MassDOT » Powers"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section3.

[73] Senate Bill 2087, 2009 Mass. Acts 25 ("An Act Modernizing the Transportation Systems of the Commonwealth"), http://malegislature.gov/Bills/186/S2087.

- Bicycle (completion of the Bay State Greenway)
- MBTA bridge (condition rating)
- MBTA subway elevators/escalators (condition)
- MBTA station accessibility (not specifically defined in LRTP)
- MBTA bus and train (percent of vehicles in a state of good repair)
- MBTA track (daily hours of delay)
- MBTA signal (annual signal failures)
- RTA bus (percent of vehicles in a state of good repair)
- MBTA additional rapid transit access (related to transit expansion but not defined in LRTP)
- MBTA added rapid transit carrying capacity (Massachusetts Department of Transportation, 2014b, 20–25).

The tool is designed to inform the decision-making process for investments in transportation assets classes, but it is not capable of incorporating all essential factors, such as geographic equity (communication with MassDOT staff).

In 2015, the Pioneer Valley MPO adopted an updated RTP, with 13 goals and also five emphasis areas to assist in the development of regional transportation needs and strategies to assist in the achievement of the regional goals (see Table 4.10). The Pioneer Valley MPO developed performance measures grouped into seven different planning areas and linked to the appropriate RTP goals and emphasis areas (see Table 4.11).

Table 4.10: Pioneer Valley MPO Regional Transportation Goals and Emphasis Areas

	Safety	Operations and Maintenance	Environmental	Coordination	Energy Efficient	Cost Effective	Intermodal	Multimodal	Economically Productive	Quality of Life	Environmental Justice	Land Use	Climate Change
Safety and Security	☐			☐		☐	☐	☐		☐	☐		
Movement of People	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Movement of Goods	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Movement of Information			☐	☐		☐	☐	☐	☐	☐	☐		☐
Sustainability	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Source: (Pioneer Valley Planning Commission, 2015a, 4).

Table 4.11: Pioneer Valley MPO Regional Performance Measures and Targets

Planning Area	Performance Measure	Target
Operations and Maintenance	Structurally deficient bridges	Reduce the number of structurally deficient bridges below 2014 levels in the PV Region
	Overall Condition Index	Increase the average OCI for the federal aid eligible roadways by 5% by 2025
Safety	Equivalent property damage only	Reduce motor vehicle fatalities by 20% over five years (short term)
	Fatality rate	Halve the number of fatalities and serious injuries on roadways by 2030 (long term)
	Top 100 high-crash intersections	Complete one safety study a year for locations identified in the Top 100 High Crash locations report
Congestion	Travel time index	Reduce the average regional travel time index to less than 1.5 by 2025
	Regional bottlenecks	Fund one congestion improvement project through the TIP every five years. Complete one congestion study per year for locations identified in the CMP / Top Bottleneck Report
	Bicycle condition index	Increase the total mileage of on road facilities by 10% by 2025
	Passengers per Revenue Hour, Passengers per trip	Meet the minimum number of Passengers per Trip and Passengers per Revenue Hour for fixed-route transit service consistent with PVTA's established tiers of service.
Greenhouse Gas / Air Quality	Transportation-related GHG levels	Reduce GHG from the transportation sector 25% by 2020 and 80% by 2050
	CMAQ projects	Fund at least one AQ improvement project through the TIP each year
Freight	Restricted and closed bridges or overpasses	Use state target
Intermodal	Park-and-ride occupancy	Increase average park-and-ride lot use by 5% by 2025
	Bike path use volumes	Demonstrate an overall annual increase in the use of regional bike paths
Multi-modal	Fixed-route transit ridership	Demonstrate an overall annual increase in PVTA and FRTA ridership
	Miles of mixed-use path, on-road bike facilities, and sidewalks	Increase the total mileage of all bicycle and pedestrian infrastructure by 10% by 2025 (No more than 5% off-road paths)

Source: (Pioneer Valley Planning Commission, 2015a).

4.2.4 Programming

In 2013, the General Court established the Project Selection Advisory Council (PSAC) to develop "a uniform project selection criteria to be used in the development of a comprehensive state transportation plan" (Massachusetts Department of Transportation, 2015b). The recommendations of PSAC have yet to be formally adopted by MassDOT, but their draft criteria are under review and will be used for the purposes of this study as an example of leading practices in the field of transportation investment. While the goals and criteria are meant to apply to a broad universe of projects, it will not apply to every possible project of MassDOT. The recommendations are designed to apply to modernization and expansion projects across modes, while the preservation projects will still use a separate data-driven approach (Massachusetts Department of Transportation, 2015b).

Additionally, MassDOT will weigh different types of projects differently in order to allow projects to compete fairly across modes. Once projects are scored and ranked, decision-makers further analyze project readiness, performance targets, and regional and social equity considerations (Massachusetts Department of Transportation, 2015b). PSAC does not compare projects across modes, but sets the amount in each category first.

Table 4.12 summarizes the PSAC recommended goals/criteria and weighting system.

Table 4.12: Massachusetts Project Priority Formula Summary Table

Goals/Criteria	Roads and Paths Modernization	MBTA/ Regional Transit Modernization	Roads & Paths Capacity	MBTA/ Regional Transit Capacity
Cost Effectiveness	15	20	20	25
Economic Impact	10		15	20
Environmental and Health Effects	10	5	10	10
Mobility	10	30	25	25
Policy Support	10	10	10	10
Safety	10	10	10	
Social Equity			10	10
System Preservation	35	25		
Total	**100**	**100**	**100**	**100**

Source: (Massachusetts Department of Transportation, 2015b, iii).

These goals differ from the goals of the 2014 LRTP, *weMove Massachusetts*; however, no plan has been developed since the goals were recommended by PSAC.

For projects that are eligible for federal aid, the Pioneer Valley MPO assesses and prioritizes projects according to criteria in Table 4.13. All Federal-aid-eligible projects compete across modes under Transportation Evaluation Criteria (TEC) (Pioneer Valley Planning Commission, 2015b). However, the results of TEC's prioritization results is not binding for the Pioneer Valley MPO, and other considerations can influence what projects are ultimately funded.

Table 4.13: Pioneer Valley MPO Transportation Evaluation Criteria Scoring Summary

Section	Criteria	Maximum Score	
System Preservation, Modernization and Efficiency	Improves substandard pavement	8	
	Improves intersection operations	6	
	In a Congestion Management Process Area	5	**19**
Livability	Design is consistent with Complete Streets policies	3	
	Provides multimodal access to a downtown, village center or employment center	2	
	Reduces auto-dependency	2	
	Project serves a targeted development site	2	
	Completes off-road bike and ped network	3	**12**
Mobility	Improves efficiency, reliability and attractiveness of public transit	4	
	Improves existing peak-hour LOS	6	
	Reduces traffic congestion	7	**17**
Smart Growth and Economic Development	Encourages development around existing infrastructure	2	
	Prioritizes transportation investments that support land use and economic development goals	1	
	Provides services to a TOD, TND or cluster development	0.5	
	Supports mixed-use downtowns and village centers	0.5	
	Improves intermodal connections	4	
	Reduces congestion on freight routes	2	**10**
Safety and Security	Reduces number and severity of collisions	7	
	Promotes safe and accessible pedestrian and bike environment	5	
	Improves emergency response	4	**16**
Environment and Climate Change	Preserves floodplains and wetlands	1	
	Promotes green infrastructure and low-impact development to reduce stormwater impacts	2	
	Reduced impervious surfaces	0.5	
	Protects or enhances environmental assets	0.5	
	Supports brownfield redevelopment	0.5	
	Improves air quality	1	
	Reduces CO_2 emissions	1	
	Promotes mode shift	1	
	Improves fish and wildlife passage	1	
	Supports Green Communities	0.5	
	Improves storm resilience	3	**12**
Quality of Life	Enhances or preserves greenways and blueways	1	
	Improves access to parks, open lands and open space	1	
	Improves access to jobs	2	
	Preserves historical and cultural resources	0.5	
	Preserves prime agricultural land	0.5	
	Provides safe and reliable access to education	0.5	
	Supports designated scenic byways	0.5	
	Implements ITS strategies	2	
	Improves network wayfinding	1	
	Health Impact Assessment	1	
	Length of time on TIP	1	**11**
Environmental Justice	Reduces and limits disproportionate impacts on an EJ community	1	
	Improves transit for EJ populations	2	
	Creates an EJ burden	-5	**3**
	Total		**100**

Source: (Pioneer Valley Planning Commission, 2015b).

4.2.5 Reporting

Like most every jurisdiction, Massachusetts and its MPOs produce ***ex ante* estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post* outcomes** from such investments.

4.3 MINNESOTA

Minnesota is in Census Region 2 (Midwest) Division 4 (North Central) (U.S. Census Bureau, 2016). Minnesota has a population of 5,303,925 (21st), a land area of 79,626.7 square miles (14th), and a density of 66.6 persons per square mile (31st) (U.S. Census Bureau, 2010).

Table 4.14 summarizes the Minnesota statewide transportation system.

Table 4.14: Minnesota Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 283,378 (2009)
	bridges: 13,108 (2010)
	toll bridges and tunnels: 1, plus 1 shared with North Dakota (2009)
Transit	trips per year (all transit modes): approximately 102.1 million (2008)
Rail	freight rail route-miles: 4,528 (2008)
Aviation	airports total: 371; public-use: 165; state-owned: 0 (2008)
	enplanements per year: 15,884,588 (2009)
Marine	waterborne tonnage per year: 28.7 million (2009)

Source: (NCSL and AASHTO, 2011, 92).

There are 138,700 center line miles in the state of Minnesota. Trunk Highways (Interstate, U.S. and MN Highway routes) constitute 8 percent of road miles (at approximately 12,000 miles), but carry 48 percent of annual miles of vehicle travel. County, municipal and township roads constitute the remainder of the road network, with 39 percent in townships, 16 percent in municipalities and 32 percent in counties, while 4 percent are categorized as other (Minnesota Department of Transportation, 2017b).

4.3.1 Governance

Political party strength in Minnesota has varied over the past 20 years, altering between independents, Republicans and Democrats. The state Senate and House have altered between Democratic and Republican control over the past 20 years as well. Currently, the Governor is Democratic, and the State House and Senate are both Republican-controlled (as of 2017).

In Minnesota, transportation is controlled by the **Minnesota Department of Transportation (MnDOT)**. By statute, MnDOT is tasked with "development, implementation, administration, consolidation, and coordination of state transportation policies, plans, and programs."[74] MnDOT oversees an integrated transportation system of "aeronautics, highways, motor carriers, ports,

[74] Minn. Stat. § 174.01, ("Department of Transportation » Creation; Policy"), http://www.revisor.leg.state.mn.us/statutes/?id=174.01.

public transit, railroads, and pipelines, and including facilities for walking and bicycling."[75] MnDOT is organized along two administrations: Engineer and Operations and Modal and Resource Management. The MnDOT **Commissioner** is appointed by the Governor and is tasked with reporting on performance of agency operations and accomplishing goals in the agency's binnenial budget, in addition to other responsibilities.[76]

MnDOT Planning and Programming writes plans (including the Statewide Multimodal Plan and State Highway Investment Plan), reviews performance outcomes and manages capital projects (Minnesota Department of Transportation, 2017c).

There are 56 public **transit systems** in Minnesota's 86 counties. The **Metropolitan Council** plans, coordinates and administers transit services in the Twin Cities, while MnDOT's Office of Transit administers financial assistance for public transit in greater Minnesota (Minnesota Department of Transportation, 2016a).

There are 12 **Regional Development Organizations (RDOs)** that serve as partners with MnDOT in creating the annual work program. RDOs assist with statewide and regional planning and participate in ATPs, described below (Minnesota Department of Transportation, 2017a).

Area Transportation Partnerships (ATPs) were created in the 1990s to ensure stakeholder participation in using federal transportation funding. ATPs include representatives from MnDOT, MPOs, Regional Development Commissions, counties, cities, tribal governments, special interests and the public. ATPs are responsible for developing a regional transportation improvement program (Area Transportation Improvement Program, or ATIP), which are included in the STIP (Minnesota Department of Transportation, 2017b).

Counties, municipalities and townships maintain 92 percent of road miles. Some roads in municipalities and counties are "state-aid" roads which receive state funds for highway maintenance and construction according to Legislative formula (Minnesota Department of Transportation, 2017d).

Minnesota has many regional and local areas with responsibility relating to transportation investments and decisions. The state has eight **MPOs** wholly or partly within Minnesota. In Minnesota, as in other states, MPOs develop transportation plans for the metropolitan areas and coordinate the transportation planning process. MPOs also participate in ATPs (Minnesota Department of Transportation, 2017a). See Figure 4.5 and Table 4.15.

[75] Minn. Stat. § 174.01, ("Department of Transportation » Creation; Policy"), http://www.revisor.leg.state.mn.us/statutes/?id=174.01.

[76] Minn. Stat. § 174.02, ("Department of Transportation » Commissioner's Powers and Duties"), http://www.revisor.leg.state.mn.us/statutes/?id=174.02.

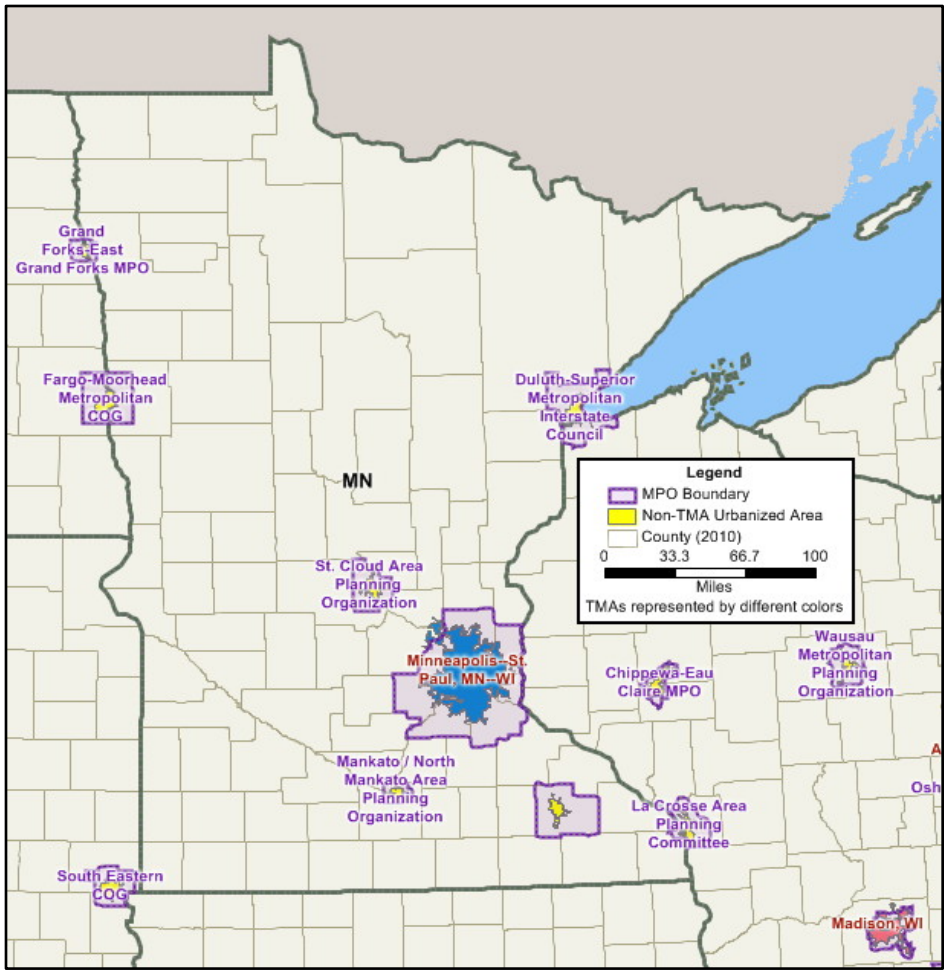

Figure 4.5: Minnesota MPOs and TMAs Map
Source: (FHWA, 2018b).

Table 4.15: Minnesota MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
Metropolitan Council	MN	St. Paul	2,906,684	2,970	978.7
Fargo-Moorhead Metropolitan COG (FMMetroCOG)	ND, MN	Fargo	199,592	1,071	186.4
Rochester-Olmsted COG (ROCOG)	MN	Rochester	148,041	657	225.3
Duluth-Superior Metropolitan Interstate Council (MIC)	MN, WI	Duluth	131,954	190	694.5
St. Cloud Area Planning Organization (APO)	MN	St. Cloud	130,191	363	358.7
La Crosse Area Planning Committee (LAPC)	WI, MN	La Crosse	115,358	318	362.8
Grand Forks-East Grand Forks MPO	ND, MN	Grand Forks	63,281	113	560.0
Mankato / North Mankato Area Planning Organization	MN	Mankato	61,764	131	471.5

Source: (U.S. DOT, 2016).

The largest MPO by far is the Metropolitan Council for the Minneapolis-St. Paul twin cities region. It was created by the Legislature in 1967. The Metropolitan Council performs the functions of a MPO but existed before MPOs were required by federal statute. Metropolitan Council performs duties beyond transportation planning including wastewater, parks and affordable housing. Metropolitan Council also provides transit service for the region (Metropolitan Council, 2015a).

Metropolitan Council's 17-member board is composed of 16 district representatives and one at-large position. Board members are appointed by the Governor (Metropolitan Council, 2015a). The Chair is presently the at-large member who works on MnDOT's Transportation Strategic Management and Operations Advisory Task Force (Metropolitan Council, 2016).

4.3.2 Finance

Minnesota's requirements for funding and distribution of gas taxes transportation is described in the Constitution. Minnesota restricts the use of highway user taxes for highway purposes (AASHTO, 2016, table 25).

Minnesota had a total of $3.28 billion in federal and state transportation funding in 2015 (Minnesota Department of Transportation, 2016b, app. C).

Constitutional and statutory formulas influence how transportation funds are appropriated. But, 80 percent of the funds are appropriated by the Legislature while 20 percent are statutorily appropriated (Minnesota Department of Transportation, 2016b, app C).

Minnesota's Highway User Tax Distribution Fund (HUTD) receives the state's gas tax, vehicle sales tax and tab fees revenues, and is the main instrument for state transportation funds. The HUTD is limited by the Constitution "to be used solely for highway purposes."[77]

As Table 4.16 summarizes, the largest *state* revenue sources are:

- **Motor Fuel Excise Tax**—"The Legislature may levy an excise tax on any means or substance used for propelling motor vehicles on the public highways of this state. This tax is levied on gasoline, disel fuel, compressed natural gas and variety of other special fuels." Currently, the tax is 28.5 cents per gallon (most recently increased in 2012).

- **Motor Vehicle Registration Tax**—"A tax may be put in place, by law on motor vehicles using public streets and highways. The current passenger vehicle registration tax policy was instituted in 2008, wherein vehicles are taxed based on $10 plus 1.25 percent of the vehicle's value, depreciated over time through the 10th year of registration, after which the additional tax is $25 ($35 total)." These rates are set by Minnesota Statute 168.013.

- **Motor Vehicle Sales Tax**—"This is 6.5 percent tax on the sale of new and used motor vehicles." Sixty percent of the revenue from this tax is allocated to the HUTD fund while

[77] Minn. Const. art. XIV, § 5 ("Highway user tax distribution fund"), http://www.revisor.mn.gov/constitution/#article_14.

40 percent is allocated to fund public transit (Minnesota Department of Transportation, 2016b, 4).

Table 4.16: Minnesota State Revenue Sources

State Revenue Sources	FY 2015
State Fuel Tax	$885,600,000
Motor Vehicle Registration Tax	$688,800,000
Federal Aid: Trunk Highway	$492,000,000
Motor Vehicle Sales Tax	$426,400,000
Bond Proceeds	$360,800,000
Federal Aid: Local Roads and Multimodal	$262,400,000
Other Income and Transfers	$164,000,000
Total	**$3,280,000,000**

Source: (Minnesota Department of Transportation, 2016b, app. C).[78]

Minnesota has several different transportation funds. The primary fund, **Highway Use Tax Distribution (HUTD)** is allocated to other sub-funds including **Trunk Highway Fund, County State Aid Highway Fund and Municipal State Aid Street Fund**. The Trunk Highway fund is the primary fund used by the state while the other two sub-funds are pass-throughs to local governments. In addition to the **HUTD,** there are additional funds including the **Transit Assistance Fund** and the **State Airports Fund.**

- **The Highway Use Tax Distribution** is composed of the motor vehicle tax, motor vehicle registration tax and motor vehicle sales tax. One hundred percent of the gas tax and vehicle registration fees go into this fund, while 60 percent of motor vehicle sales tax revenues are dedicated to this fund.
    - **Trunk Highway Fund:** receives 62 percent of HUTD and some federal highway aid agreements. Of this fund, 86 percent is appropriated for highway construction and maintenance, 9 percent to the Department of Public Safety and 5 percent to debt service on Trunk Highway bonds.
    - **The County State Aid Highway Fund:** receives 29 percent of HUTD and is apportioned to the state's 87 counties by statutory formula.
    - **Municipal State Aid Street Fund**: receives 9 percent HUTD and is distributed to cities with a population over 5,000 through statutory formula.
    - **5 percent Set Aside**: funds in the Flexible Highway Account, Town Roads and Town Bridges.
- The **Transit Assistance Fund** was created by statute and receives 40 percent of the motor vehicle sales tax. Of this, 36 percent is designated for metropolitan transit and 5 percent for greater Minnesota transit. The transit assistance fund is also supported by motor vehicle leasing sales tax revenues.

[78] Amounts estimated by multiplying total revenues by share percentages.

- The **State Airports Fund** serves the state's 135 publicly owned airports. Funding is statutorily dedicated and funding sources include: aviation fuel tax, aircraft registration tax, airline flight property tax and aircraft sales tax (Minnesota Senate, 2017).

Minnesota's Constitution sets the formula for the use of the state gas tax:[79]

> ***Highway user tax distribution fund.*** *There is hereby created a highway user tax distribution fund to be used solely for highway purposes as specified in this article. The fund consists of the proceeds of any taxes authorized by sections 9 and 10 of this article. The net proceeds of the taxes shall be apportioned: 62 percent to the trunk highway fund; 29 percent to the county state-aid highway fund; nine percent to the municipal state-aid street fund. Five percent of the net proceeds of the highway user tax distribution fund may be set aside and apportioned by law to one or more of the three foregoing funds. The balance of the highway user tax distribution fund shall be transferred to the trunk highway fund, the county state-aid highway fund, and the municipal state-aid street fund in accordance with the percentages set forth in this section. No change in the apportionment of the five percent may be made within six years of the last previous change.*

The **HUTD** is constitutionally allocated: 62 percent to Trunk Highway, 29 percent to the County State-Aid Highway Fund, 9 percent to the Municipal State-Aid Street Fund, and 5 percent may be set aside for a flexible highway account for counties and cities.[80]

The **County State-Aid Highway Fund** is apportioned to counties by legislative formula. Ten percent is divided equally among all counties; 10 percent is based on the number of motor vehicle registrations; 30 percent is based on proportion of lane miles in the system; and 50 percent is proportional based on county construction needs to bring the system up to county engineering standards as defined by statute.[81] In addition to the constitutional distribution from the HUTD, the County State-Aid Highway Fund receives "excess" funds from three sources: revenue from motor fuels tax above the amount collected at a rate of 20 cents per gallon; revenue from the registration tax above the inflation-adjusted amount collected in fiscal year 2008; and revenue from the motor vehicle sales tax above the percentage allocated to the CSAH fund in fiscal year 2007. These excess funds are also apportioned by legislative formula. Forty percent is distributed in proportion to each county's motor vehicles registered, and 60 percent is distributed in proportion to each county's share of construction needs.[82] Beginning in 2016, Minnesota set a formula for these "apportionment" and "excess" direct aid amounts to counties: Sixty-eight percent of all County

[79] *Ibid.*

[80] *Ibid.*

[81] Minn. Stat. § 162.07, subdivision 1b ("Apportionment of Money to Counties"), http://www.revisor.mn.gov/statutes/?id=162.07.

[82] Minn. Stat. § 162.07, subdivision 1c ("Apportionment of Money to Counties"), http://www.revisor.mn.gov/statutes/?id=162.07..

State-Aid Highway Fund distributions are through the apportionment sum formula, and 32 percent through the excess sum formula[83] (Minnesota Department of Transportation, 2014b).

Similarly, apportionments from the **Municipal State Aid Street Fund** to local governments is also determined by legislative formula. Fifty percent is divided proportionally based on the population of each city, and 50 percent is divided proportionally based on construction needs for each city.[84]

The Minnesota budget for FY 2018–2019 allocated the following amounts by program (see Table 4.17).

Table 4.17: Minnesota Highway Use Tax Distributions

Program	FY 2018–2019
Trunk Highway	$2,910,249
County State Aid	$1,495,811
Federal	$1,045,555
Transit Assistance	$716,748
Municipal State Aid	$375,864
Special Revenue	$314,798
General	$243,592
State Airport	$40,700
Other (SGSG, HUTD, Gift	$40.734
Total	**$7,184,051**

Source: (Minnesota Senate, 2017).

MnDOT passes through federal funding to the Metropolitan Council through the regional solicitation process and through federal formula funds (Metropolitan Council, 2015c). Metropolitan Council works with MnDOT to control deciding how to spend the money.

In Minnesota, 36 percent of the Transit Assistance Fund is constitutionally dedicated to the Metropolitan Council (Minnesota Senate, 2017).

4.3.3 Planning

Minnesota refers to statewide transportation planning as *Minnesota GO* (Minnesota Department of Transportation, 2017e).

Minnesota GO includes a family of plans that provide direction for different modes of transportation: highways, transit, rail, bikes, pedestrians, freight and aviation (Minnesota Department of Transportation, 2017f).

[83] Minn. Stat. § 162.07, subdivision 1a ("Apportionment of Money to Counties"), http://www.revisor.mn.gov/statutes/?id=162.07..

[84] Minn. Stat. § 162.13 ("Formula for Apportionment to Cities"), http://www.revisor.mn.gov/statutes/?id=162.13.

The **50-Year Vision for Transportation**, adopted in 2011, guides planning for all modes:

> **Minnesota's multimodal transportation system maximizes the health of people, the environment and our economy. The system:**
>
> - Connects Minnesota's primary assets—the people, natural resources and businesses within the state—to each other and to markets and resources outside the state and country;
> - Provides safe, convenient, efficient and effective movement of people and goods;
> - Is flexible and nimble enough to adapt to changes in society, technology, the environment and the economy;
>
> **Quality of Life:**
>
> - Recognizes and respects the importance, significance and context of place – not just as destinations, but also where people live, work, learn, play and access services;
> - Is accessible regardless of socio-economic status or individual ability;
>
> **Environmental Health:**
>
> - Is designed in such a way that it enhances the community around it and is compatible with natural systems;
> - Minimizes resource use and pollution;
>
> **Economic Competitiveness:**
>
> - Enhances and supports Minnesota's role in a globally competitive economy as well as the international significance and connections of Minnesota's trade centers;
> - Attracts human and financial capital to the state *GO* (Minnesota Department of Transportation, 2011).

The vision also identifies eight "guiding principles":

1. Leverage public investment to achieve multiple purposes (Economic Competitiveness, Environmental Stewardship, Public Health, Energy Independence)
2. Ensure accessibility
3. Build to a maintainable scale
4. Ensure regional connections
5. Integrate safety
6. Emphasize reliable and predictable options
7. Strategically fix the system
8. Use partnerships (Minnesota Department of Transportation, 2011).

The **Statewide Multimodal Transportation Plan** is the state's 20-year, long-range plan. Last updated in 2017, it includes objectives in five areas:

- Open Decision-Making
- Transportation Safety
- Critical Connections
- System Stewardship
- Healthy Communities (Minnesota Department of Transportation, 2017g).

Within each objective area, the Statewide Multimodal Transportation Plan includes performance measures, targets and reporting requirements. The plan also includes strategies for achieving the targets (Minnesota Department of Transportation, 2017g). For example, Table 4.18 shows measures, targets and reporting requirements in the "Healthy Communities" objective area.

Table 4.18: Minnesota Performance Measures for Healthy Communities

Measure	Target	Reporting
Annual greenhouse gas emissions from the transportation sector	29.5 million tons $CO2_e$ by 2025	Report total and trend
Number of criteria pollutants below National Ambient Air Quality Standards threshold each year	All criteria pollutants below threshold	Report number of pollutants not meeting standards and which pollutants
Total percentage of acres planted with native seeds on MnDOT projects	To be determined	Report percent and trend
Total percent of light fixtures using LED luminaries on MnDOT roadways	100%	Report percent
Annual percent of MnDOT omnibus survey respondents perceiving safe environments for bicycling / walking	No target	Report percent and trend
Annual total road salt used for snow and ice control on the state highway system compared to modeled optimal salt use	Less than 10% more than modeled optimal quality	Report percentage difference and trend

Source: (Minnesota Department of Transportation, 2017g).

Note that the vision and guiding principles are aspirational or suggestive, but do not bear a one-to-one correspondence with the five object areas in the Statewide Multimodal Transportation Plan. Note also that modal plans have additional performance.

In developing the current Statewide Multimodal Transportation Plan, MnDOT conducted an assessment of the previous plan, adopted in 2012 (Minnesota Department of Transportation, 2012).

In addition, Minnesota has several modal transportation plans including the Minnesota State Highway Investment Plan (MnSHIP) and plans covering aviation, bicycles, freight, ports and waterways, pedestrians, rail and greater Minnesota transit. These modal plans outline goals and investment strategies. MnSHIP is the 20-year system plan for Trunk Highways. The Strategic Highway Safety Plan includes strategies for reducing fatalities and injuries on all roads in Minnesota.

Two plans provide project listings for Trunk Highways including the Capital Highway Investment Plan (CHIP), which provides a list of major highway projects tentatively planned for construction in the next 10 years. The State Transportation Improvement Program (STIP) is the federally

mandated documented listing the highway projects scheduled for construction in the next four years. The CHIP and STIP are updated each year.

In the Metropolitan Council, transportation planning is guided by the **2040 Transportation Policy Plan (TPP)**, last updated in 2015 (Metropolitan Council, 2015b).

In the Transportation Policy Plan (TPP), the Metropolitan Council closely links goals, objectives and strategies. The goals of the TPP include:

- Transportation system stewardship
- Safety and security
- Access to destinations
- Healthy environment
- Competitive economy
- Leveraging transportation investment to guide land use (Metropolitan Council, 2015b)

The Metropolitan Council directly aligns objectives and strategies with goals within the TPP. There are a few objectives and strategies accompanying each goal. The Metropolitan Council further identifies performance measures that align with each goal (see Table 4.19).

Table 4.19: Metropolitan Council Goals and Performance Measures

Goal	Performance Measure
Transportation System Stewardship	Highway pavement conditions
	Bridge conditions
	Condition of transit fleet (buses and trains)
Safety and Security	Number and rate of crashes
	Number and rate of serious injuries and fatalities
Access to Destinations	Average annual hours of delay per capita
	Transit ridership
	Number of miles of managed lanes (MnPASS)
	Number of miles of bus-only shoulder lanes
Competitive Economy	Average travel time to reach job concentrations during rush hour
Healthy Environment	Transportation-related emissions such as carbon monoxide and particulate matter
	Vehicle-miles traveled per capita
	Number of crashes involving pedestrians
	Number of crashes involving bicycles
Leveraging Transportation Investment to Guide Land Use	Change in population and/or employment that are between ¼- to ½-mile of a transit stop (bus, light rail, bus rapid transit, etc.)
	The number of intersections per square mile

Source: (Metropolitan Council, 2015b).

4.3.4 Programming

Minnesota relies on eight regional partnerships (called Area Transportation Partnerships, or ATPs) whose boundaries are based on MnDOT's State Aid Districts. The ATPs integrate the state and local priorities within their region and recommend a minimum four-year program for federally funded transportation investments, called a draft Area Transportation Improvement Program

(ATIP). Each draft ATIP includes a prioritized list of projects that aid in solving transportation problems and implementing the long-range objectives for the area.

MnDOT reformed its project selection process in 2013 in response to MAP-21. Under the previous process, money was allocated to ATPs by formula and ATPs got to decide how to spend money as they wanted while meeting centrally determined performance targets. Under the reformed process (which applies to all projects that will start construction in 2017 and after), money is allocated based on estimates of need, districts must conform to statewide spending targets, and districts must prove that their chosen projects are as effective at meeting performance targets as project lists created by MnDOT (Minnesota Office of the Legislative Auditor, 2016). The project development process is shown in Figure 4.6.

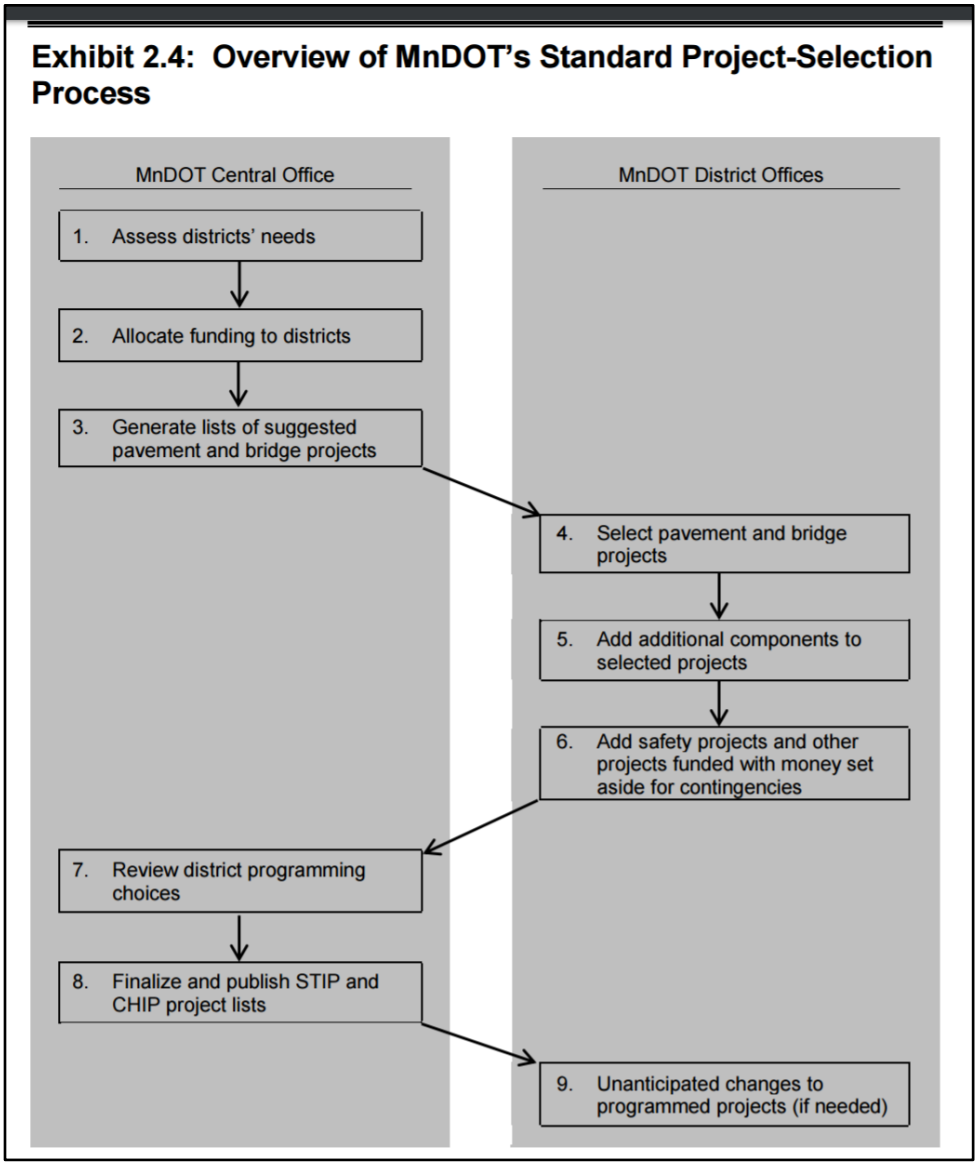

Figure 4.6: Minnesota Overview of Standard Project Selection Process
Source: (Minnesota Office of the Legislative Auditor, 2016, 37).

According to the Office of the Legislative Auditor, MnDOT staff rely on internal expertise to identify projects and do not publicly score or rank projects (Minnesota Office of the Legislative Auditor, 2016).

"Project selection includes two iterative processes. The first iterative process is 'determining the program' from the list of projects within the draft ATIPs. This includes the analysis of the preferred sources of funding for the projects and the directions included in the Minnesota Statewide Transportation Plan. It also is the step where the fiscal constraint is maintained. The second iterative process is the review of the STIP. The draft STIP is circulated back to the District/ATP for review and comment. Changes are made in the draft STIP as a result of the review and comment period. The STIP is forwarded to the Commissioner's staff for review and approval before being sent to the U.S. DOT. The *MnDOT Commissioner* signs off on STIP funded projects. The *Legislature* and *Governor* finalize the transportation budget" (Minnesota Department of Transportation, 2014a, II-8).

As the Office of the Legislative Auditor concluded in a report (2016, xi):

> ***MnDOT does not provide sufficient information about its project-selection decisions to the public or interested stakeholders.***
>
> *In selecting projects, MnDOT district staff interact almost entirely with other MnDOT staff. Local stakeholders do not directly participate in project decisions regarding trunk highways, except for the Metropolitan Council in the Twin Cities metropolitan area.*
>
> *MnDOT publishes lists of the projects it plans to construct, but it does not publish information about how these decisions were reached or what alternatives were considered. Without that basis for comparison, it is difficult for those outside of MnDOT to understand or assess its decisions.*
>
> *MnDOT district staff do present information about the project-selection process to local stakeholders, but these efforts have had mixed results. We recommend that MnDOT take steps to improve the transparency of its project selection process.*

In the Metropolitan Council, competitive project selection for projects funded through STP, TAP and CMAQ occurs in a process called Regional Solicitation. These programs constitute 29 percent of federal highway funding. NHPP, HSIP and transit projects are selected by different means and organizations (Metropolitan Council, 2015c). In this process prioritization is decoupled from funding categories, and scoring and ranking instead occurs by three modal categories:

1. Roadways Including Multimodal Elements (48–68 percent of funds);
2. Transit and Travel Demand Management Projects (22–32 percent of funds); and
3. Bicycle and Pedestrian Facilities (10–20 percent of funds).

The Metropolitan Council identifies target funding levels for each category. There are certain types of application categories within modal categories (like expansion, bridges, roadway system management and reconstruction/modernization for roadways). Each application category has unique scoring criteria, and the review and ranking of projects occurs through volunteers at local

and state agencies (Metropolitan Council, 2016). Volunteers rank projects individually according to criteria, then gather to discuss rankings and develop a prioritized list of projects.

The Metropolitan Council lists the following categories for the prioritization of projects in the TIP, but these categories are not yet integrated into project selection or Regional Solicitation.

- Consistency with the Regional Development Framework
- Integration of land use and transportation
- Demonstrated present and future need for facility
- Service provided
- Characteristics of area or population served
- Integration of modes
- Reduction of congestion on principal or minor arterials
- Increase in hourly person throughput
- Accident prevention and control
- Equity
- Cost effectiveness
- Air quality (Metropolitan Council, 2015c, 26).

However, the Metropolitan Council does not provide details about the ranking process in terms of how these categories of criteria relate to goals. The ranking process is conducted by volunteers from local and state agencies who rank and score proposals independently, then meet to explain rankings and prioritize projects as a group (Metropolitan Council, 2015c).

The Transportation Advisory Board (TAB) evaluates projects for funding and selects projects for the draft TIP. The final TIP is sent to the Metropolitan Council for concurrence. The Council only returns the TIP to the TAB for revision if it is inconsistent with Council policy. Once approved by the Council, the TIP is sent to MnDOT for inclusion in the STIP.

4.3.5 Reporting

Like most every jurisdiction, Minnesota and its MPOs produce ***ex ante*** **estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post*** **outcomes** from such investments.

4.4 TENNESSEE

Tennessee is in Census Region 3 (South), Division 6 (East South Central) (U.S. Census Bureau, 2016). Tennessee has a population of 6,346,105 (17^{th}), a land area of 41,234.9 square miles (34^{th}), and a density of 153.9 persons per square mile (19^{th}) (U.S. Census Bureau, 2010).

Table 4.20 summarizes the Tennessee statewide transportation system.

Table 4.20: Tennessee Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 196,969 (2009)
	bridges: 19,892 (2010)
Transit	trips per year (all transit modes): approximately 30.4 million (2008)
Rail	freight rail route-miles: 2,641 (2008)
Aviation	airports total: 210; public-use: 78; state-owned: 1 (2008)
	enplanements per year: 10,783,463 (2009)
Marine	port traffic per year (20-foot equivalent units): 9,229 (2009)
	waterborne tonnage per year: 38.2 million (2009)
	state-operated ferries: 1 (2009)

Source: (NCSL and AASHTO, 2011, 137)).

Tennessee has 93,997 road miles, of which 15 percent are owned and maintained by the state, 62 percent by counties and 23 percent by municipal government. However, 73 percent of the total 71 billion vehicle miles travelled occur on state roads (Mattson and Potts, 2015).

4.4.1 Governance

Historically, the Governor's office in Tennessee has rotated from Democratic to Republican over the past 40 years. Both houses of the state Legislature were predominantly Democratic until 2005 when the Senate was dominated by Republicans and 2009 when the House became Republican-dominated.

The Department of Transportation is responsible for planning, implementing, maintaining and managing an integrated transportation system including highways, airports, rail, transit, waterways and bicycle/pedestrian modes (Tennessee Department of Transportation, 2017a). TDOT's organizational structure includes three bureaus: Administration, Environment and Planning, and Engineering, in addition to four regions.

The **Long Range Planning Division** within the Environment and Planning Bureau is responsible for long-range planning. The **Strategic Planning Office** within the Administration Bureau is responsible for strategic direction and performance measurement and analysis. **The Development and Administration Division** produces the State Transportation Improvement Program in consultation with TDOT headquarters, TDOT regional offices, MPOs, RPOs and federal land management agencies (Tennessee Department of Transportation, 2016).

The **Commissioner of Transportation** is appointed by the Governor to serve as the administrator and head of the departments. The Commissioner has broad responsibilities outlined in state statute, including:[85]

> *… develop and implement a continuing, comprehensive, and multimodal statewide transportation planning process that is consistent with the transportation planning requirements of the United States department of transportation and includes the development and periodic updating of a long-range statewide transportation plan,*

[85] Tenn. Code § 4-3-2303 ("Department of Transportation » Powers and duties of commissioner"), http://law.justia.com/codes/tennessee/2016/title-4/chapter-3/part-23/section-4-3-2303.

including: consideration and provision, as applicable, of elements and connections of and between highway, rail, mass transit, waterway, aviation, pedestrian and bicycle facilities; consideration of operations and maintenance of those facilities; and a review of projected costs and anticipated revenues.

There are 28 **transit systems** serving all 95 counties, including four large urban systems, eight small urban systems, 10 rural systems, one commuter transit system and local transit in five towns (Tennessee Department of Transportation, 2017b). State statutes govern regional transportation authorities in general and establish guidance for the Regional Transportation Authority of Middle Tennessee specifically, covering the Nashville region.[86]

There are 11 **MPOs** wholly or partly within Tennessee (see Figure 4.7 and Table 4.21). According to state statutes. MPO policy boards should ensure that local governments receive equal votes (not population-based votes), and one voting member should be chosen by the Tennessee County Highway Officials Association.[87]

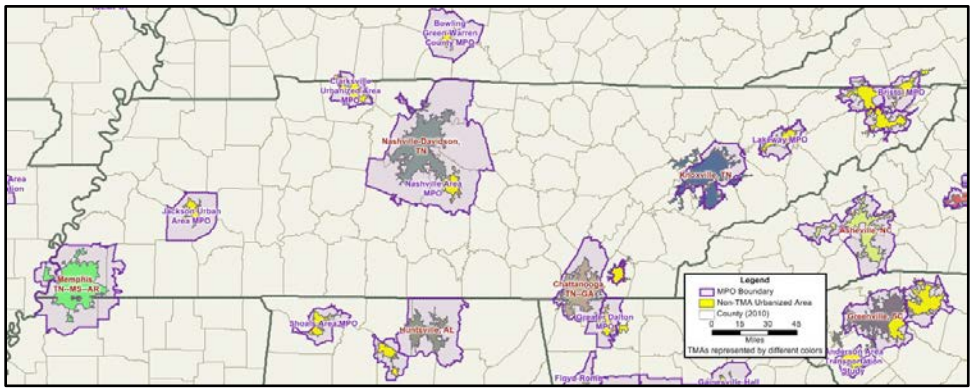

Figure 4.7: Tennessee MPOs and TMAs Map
Source: (FHWA, 2018b).

[86] Tenn. Code § 64-8-101 ("Regional Transportation Authority of Middle Tennessee » Creation"), http://law.justia.com/codes/tennessee/2016/title-64/chapter-8/part-1/section-64-8-101.

[87] Tenn. Code § 64-8-301 ("Composition of metropolitan planning organization's policy board"), http://law.justia.com/codes/tennessee/2016/title-64/chapter-8/part-3/section-64-8-301.

Table 4.21: Tennessee MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
Nashville Area MPO	TN	Nashville	1,494,356	3,951	378.2
Memphis Urban Area MPO	TN, MS	Memphis	1,077,697	1,513	712.3
Knoxville Regional Transportation Planning Organization	TN	Knoxville	657,358	1,066	616.7
Chattanooga-Hamilton County/North Georgia Transportation Planning Organization (CHCNGTPO)	TN, GA	Chattanooga	436,669	799	546.5
Clarksville Urbanized Area MPO (CUAMPO)	TN, KY	Clarksville	193,971	581	333.9
Johnson City Metropolitan Transportation Planning Organization (MTPO)	TN	Johnson City	159,877	351	455.5
Kingsport MTPO	TN, VA	Kingsport	127,775	298	428.8
Jackson Urban Area MPO	TN	Jackson	98,294	559	175.8
Cleveland Area MPO	TN	Cleveland	85,073	191	445.4
Bristol MPO	TN, VA	Bristol	83,167	142	585.7
Lakeway MPO (LAMTPO)	TN	Morristown	81,648	226	361.3

Source: (U.S. DOT, 2016).

Twelve **Rural Planning Organizations (RPOs)** provide an avenue for the involvement of local officials in the planning process. RPOs are tasked with considering multimodal needs on a regional and local basis, reviewing long-term needs and short-term priorities, and making recommendations to TDOT (Tennessee Department of Transportation, 2017c). See Figure 4.8.

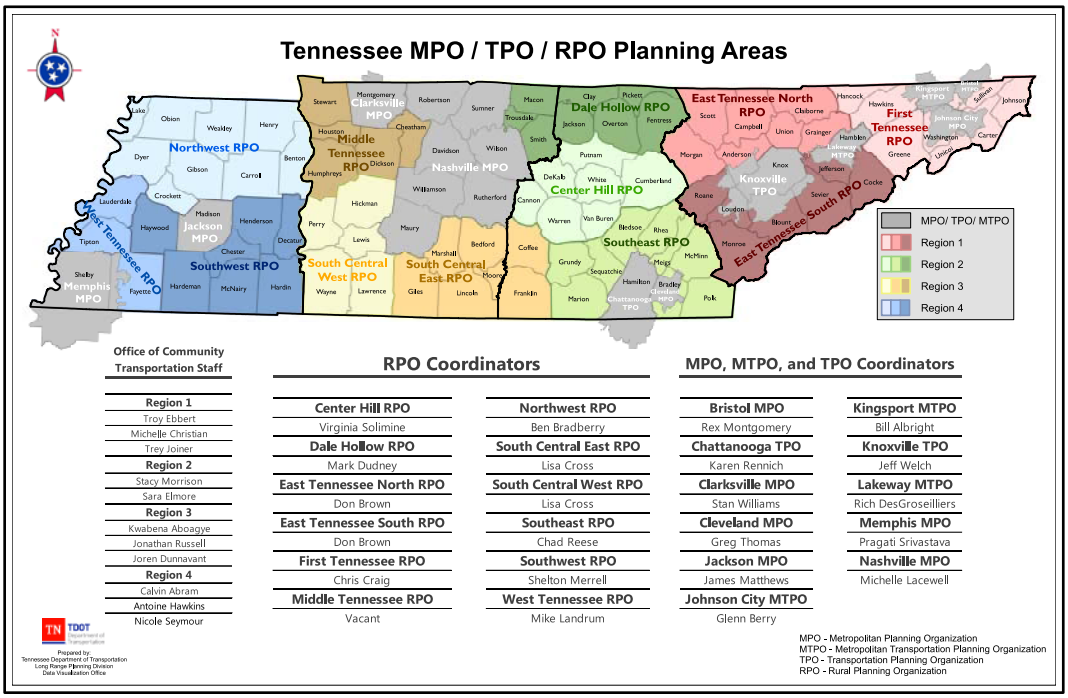

Figure 4.8: Tennessee MPO / TPO / RPO Planning Areas Map
Source: (Tennessee Department of Transportation, 2017d).

Cities and counties own and maintain 85 percent of the road miles in the state. Tennessee distributes funding through "local aid" according to statutory formulas, described below.

In Tennessee, MPOs are not identified by name in state statute, but board constitution is set by state statute.[88] The Nashville Area Metropolitan Planning Organization is responsible for planning and programming for the multimodal transportation system in the region. The Nashville Area MPO is comprised of the Executive Board including elected officials from cities and counties, the Governor, a representative from the Greater Nashville Regional Council, a representative from Nashville MTA, and staff from the Federal Highway Administration and Federal Transit Administration. The Technical Coordinating Committee includes administrators, planning directors and engineers from local governments and transportation-related agencies (Nashville Area MPO, 2017).

TDOT passes federal funding to MPOs through formula and competitive federal programs. State and local revenue from unspecified sources serves as matching funds for federal funding.

Projects in the Nashville Area MPO's TIP include federal funding and local match funding required under federal law. The Nashville Area MPO requires project sponsors to identify whether their project match funding comes from a local source or state grant. The TIP does not identify whether match funding comes from state or local sources. Instead, a TIP program revenues table only identifies federal funds and state funds. From this table, in 2014, $172 million, or 82 percent, came from federal sources, and $37 million, or 18 percent, came from state sources (Nashville Area MPO, 2013).

Both the TIP and LRTP include a percentage formula for federal Urban Surface Transportation Program (USTP) funds. First, Nashville Area MPO designated three target areas and percentage amounts of all USTP funding to be spent on those target areas: Five percent of USTP on "System Management and Operations," 15 percent of USTP for "Active Transportation and Walkable Communities," and 10 percent of USTP for "Public Transportation and Mass Transit. The remaining 70 percent of USTP funds are to be spent on "Multimodal Roadway Capacity and Safety," which includes all roadway improvement projects that best meet Nashville Area MPO's "overall goals and objectives for a safe, efficient, multi-modal transportation system" (Nashville Area MPO, 2013, 19). Nashville Area MPO's Board developed this formula independently in order to allocate funding to areas of perceived need within Nashville Area MPO's jurisdiction (personal communication from Rochelle Carpenter, Nashville Area MPO).

4.4.2 Finance

Tennessee's system for funding transportation is codified in statute. Tennessee has no constitutional limitations on the use of gas and other vehicle-related taxes and fees. However, Tennessee has a statutory limit that sets out a specific framework for distribution of gas tax revenues, including debt service and rules for future gas tax increase revenues.[89] All revenues that

[88] Tenn. Code § 64-8-301 ("Composition of metropolitan planning organization's policy board"), http://law.justia.com/codes/tennessee/2016/title-64/chapter-8/part-3/section-64-8-301.

[89] Tenn. Code § 67-3-901 ("Gasoline Tax—Distribution of receipts"), http://law.justia.com/codes/tennessee/2016/title-67/chapter-3/part-9/section-67-3-901.

are allocated to TDOT, which includes a portion of gas tax revenues, are deposited into the State Highway Fund, used mainly for highway and transit projects (AASHTO, 2016, table 25).

The budget identifies the estimated revenues and the distribution of the revenues to the related transportation agencies and programs. The budget for fiscal year 2016–2017 totals $1.9 billion (Tennessee, 2016). Approximately 53 percent is federal funding and 45 percent comes from state revenue sources, while the remaining 2 percent comes from other state agencies and local match (Mattson and Potts, 2015). The Department of Transportation receives revenues from dedicated state and federal sources. The federal revenues primarily come from the Federal Highway Administration and the Federal Transit Administration.

The largest *state* revenue sources are:

- **Highway User Taxes**: Tennessee collects a 20-cent-per-gallon tax on all gasoline imported into the state, and 17 cents per gallon on diesel fuel imported into the state. These are import taxes paid upstream and not by end users at the pump. Tennessee also collects a one-cent-per-gallon privilege tax on all petroleum products. It allocates 60.3 percent of the gasoline tax to the state highway fund, 25.4 percent to counties, 12.7 percent to cities and 1.6 percent to the state general fund (Mattson and Pitts, 2015, exhibit 10).

- **Sales Tax – Transportation Equity Fund**: A 4.5 percent tax on aviation fuels is used only for aviation, rail, and waterway projects.[90]

See Table 4.22.

Table 4.22: Tennessee State Revenue Sources

State Revenue Sources	FY 2017
Highway User Taxes	$670,000,000
Sales Tax – Transportation Equity Fund	$38,200,000
Miscellaneous Revenue	$19,656,000
Bond Authorization	$87,700,00
Fund Balance and Reserves	$29,000,000
Total	**$844,556,000**

Source: (Tennessee, 2016).

A January 2015 report on state transportation funding by the Tennessee Comptroller's office, produced at the request of the Tennessee General Assembly Fiscal Review Committee, includes the following breakdown of state transportation revenue (excluding federal and local): gas tax 47 percent; motor vehicle registration 26 percent; motor fuel 14 percent; sales and use taxes 8 percent; special petroleum tax 4 percent; and beer less than 1 percent (Mattson and Potts, 2015).

Tennessee's statutory formula for distribution of its gas tax is complex. First, any debt service must be paid in full. Then, 4 percent of the remaining gas tax revenue is transferred to the general fund to pay for administrative expenses. Next, 28.6 percent is distributed to counties and

[90] Tenn. Code § 67-4-2701 ("Privilege tax on gross charge for aviation fuel—'Gross charge' defined"), http://law.justia.com/codes/tennessee/2016/title-67/chapter-4/part-27/section-67-4-2701.

14.3 percent is distributed to municipalities. Finally, the remainder of annual gas tax revenues are deposited into the state highway fund.[91]

County apportionment of gas tax funds are distributed according to a formula based on equal distribution to all counties (50 percent), population (25 percent), and area (25 percent). Counties cannot spend more that 22.2 percent of their gas tax distribution on transit.[92] Municipal apportionments are distributed according to a formula based entirely on population.[93]

Tennessee maintains a state aid program to allocate funding for state highways and bridges.[94] State highway aid projects are funded through the State Highway Fund. For highways, this funding requires a 25 percent local match, and a 20 percent local match for bridges.[95]

Tennessee has only two major state transportation funds:

- **The State Highway Fund** is the primary fund, and receives most of the state gas tax revenues, and is used to fund the state highway system as well as distributions to local governments.[96]

- **The Transportation Equity Fund** is funded solely by an aviation fuels tax and is used only for aviation, rail, and waterway projects.[97]

The Tennessee budget for FY 2017 allocated the following amounts by program (see Table 4.23).

[91] Tenn. Code § 67-3-901(b)(1)–(5) ("Gasoline Tax—Distribution of receipts"), http://law.justia.com/codes/tennessee/2016/title-67/chapter-3/part-9/section-67-3-901.

[92] Tenn. Code § 54-4-103 ("County Aid Funds » Distribution of funds"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-1/section-54-4-103.

[93] Tenn. Code § 54-4-203 ("Municipal Aid Funds » Distribution of funds"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-2/section-54-4-203.

[94] Tenn. Code § 54-4-403 ("State-Aid Highway System » Annual program of work"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-4/section-54-4-403, §§ 54-4-501, et seq. ("1990 Bridge Grant Program Act"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-5.

[95] Tenn. Code § 54-4-507 ("1990 Bridge Grant Program Act » Maximum state share of project cost"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-5/section-54-4-507, § 54-4-404 ("State-Aid Highway System » Allocation and expenditure of funds—Matching funds—Bridge replacement"), http://law.justia.com/codes/tennessee/2016/title-54/chapter-4/part-4/section-54-4-404.

[96] Tenn. Code § 67-3-901 ("Gasoline Tax—Distribution of receipts"), http://law.justia.com/codes/tennessee/2016/title-67/chapter-3/part-9/section-67-3-901.

[97] Tenn. Code § 67-6-103(b) ("Deposit and allocation of receipts—Transportation equity trust fund—Other special allocations"), http://law.justia.com/codes/tennessee/2016/title-67/chapter-6/part-1/section-67-6-103.

Table 4.23: Tennessee Transportation Fund Recommended Distributions

Program	FY 2017	
State Funding Programs:		
Administration	$80,149,900	
Headquarters Operations	$31,706,800	
Field Operations	$63,090,200	
Garage and Fleet Operations	$36,112,500	
Capital Improvements	$0	
Highway System Maintenance	$306,323,900	
State-Funded Programs	$63,422,000	
Federally Funded Programs	$263,750,700	
Total State Funded Programs		$844,556,000
Other Programs:		
Federal Aid	$999,710,400	
Local Governments	$29,115,000	
Other State Agencies	$4,600,000	
Total Other Programs		$1,033,425,400
Total		**$1,877,981,400**

Source: (Tennessee, 2016).

4.4.3 Planning

The TDOT 25-Year Long-Range Transportation Policy Plan, adopted in 2015, guides transportation planning in the state. Three objectives guided the development of the 25-year policy plan:

1. Promote Efficiency
2. Increase Effectiveness
3. Emphasize Economic Competitiveness

The previous long-range plan was adopted in 2005.

Rather than goals, TDOT uses "guiding principles" to represent priorities. These guiding principles include:

1. **Preserve and Manage the Existing System:** Protect existing assets and maintain efficiency of the system through cost-effective management and new technologies.

2. **Support the State's Economy:** Make transportation investments that support economic growth, competitiveness and tourism; build partnerships with communities and regions to link employment, commercial/retail areas and other key activity centers.

3. **Maximize Safety and Security:** Reduce injuries and fatalities in all modes of transportation; minimize construction-related safety incidents; improve disaster preparedness and incident response.

4. **Provide for the Efficient Movement of People and Freight**: Optimize the movement of people and goods by providing greater access to transportation services for all people and by building better connections among different modes of transportation.

5. **Build Partnerships for Sustainable and Livable Communities**: Provide early and ongoing opportunities for broad public input on plans and programs; work closely with local public and private planning efforts; coordinate land use and transportation planning.

6. **Protect Natural, Cultural, and Environmental Resources:** Maintain the integrity of communities and historical sites; minimize impacts on natural resources and conserve energy.

7. **Emphasize Financial Responsibility**: Provide accountability; maximize Tennessee's share of federal transportation funding; develop alternative funding strategies; select projects based on identified regional needs; allow flexibility in local management of projects where feasible (Tennessee Department of Transportation, 2015).

In 2012, Tennessee shifted to a technology-driven prioritization process using DL3 software. Under this process, criteria are identified related to the guiding principles based on input from TDOT staff and Executive Leadership. Each principle is weighted differently. The software ranks projects based on Benefit Score, Investment Funding Source and Scheduling Constraints while additional consideration is given to Even Distribution of Projects per Region, Phase of construction, and MPO/RPO distribution. See Figure 4.9.

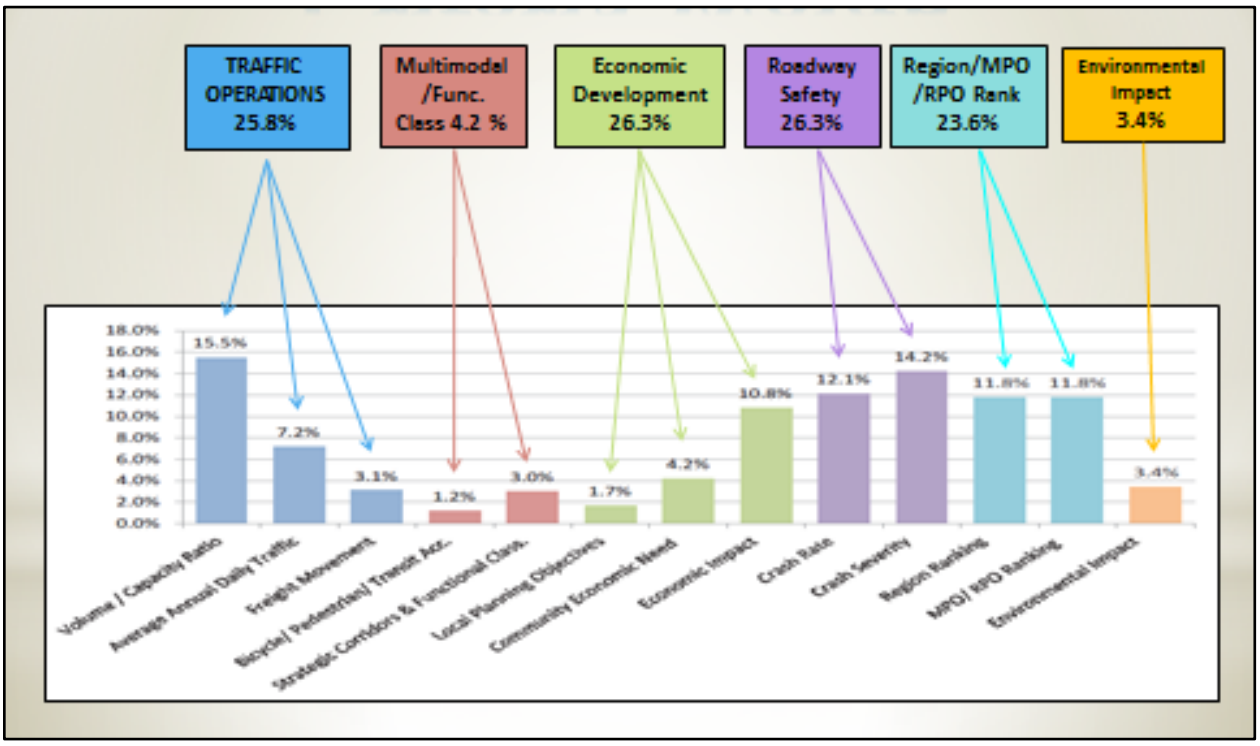

Figure 4.9: Tennessee Criteria Weighting in Project Selection
Source: (Tennessee Department of Transportation, 2017e).

Tennessee's system for measuring performance management predates federal guidance from MAP-21. As a result, performance measures are not aligned with goals. Since 2004, TDOT has relied on a performance measurement framework along five major areas:

1. **Customer**—focuses on overall customer service and satisfaction.

2. **Financial**—considers TDOT's budget and funding information, returns on investments, and efforts to reduce or contain costs.

3. **Organizational Effectiveness**—focuses on effectiveness of key internal processes, use of innovative technology and management practices, productivity, and efficiency.

4. **Transportation System**—assesses the performance of the statewide transportation system with a focus on the operation, preservation, and maintenance of the system.

5. **Workforce**—focuses on the quality of the workplace environment and TDOT's capability to achieve its mission and strategic direction (Tennessee Department of Transportation, 2013b).

Under each of these categories, TDOT uses several performance measures, including a wide range of metrics related to system performance (e.g., fatality rate) and contracting (e.g., number of contracts completed on time) in addition to staff vacancy and turnover rates. TDOT publishes an annual report and measures progress over time (Tennessee Department of Transportation, 2013b).

The state is currently in the process of developing performance measures in alignment with MAP-21 (phone conversation, Tennessee Department of Transportation staff, July 22, 2016).

For the Nashville Area MPO, transportation planning is guided by Middle Tennessee Connected. Last updated in 2016, this 2040 RTP includes four guiding principles and four goals.

The guiding principles are:

1. Livability
2. Sustainability
3. Prosperity
4. Diversity

The goals are:

1. Maintain a Safe and Reliable Transportation System for People and Goods.
2. Help Local Communities Grow in a Healthy and Sustainable Way.
3. Enhance Economic Competitiveness by Improving Private Sector Performance.
4. Spend Public Funds Wisely by Ensuring a Return on Investment.

Nashville Area MPO's 2040 RTP also includes several objectives under each goal (Nashville Area MPO, 2016).

With 11 specific performance criteria in Middle Tennessee Connected, Nashville Area MPO identifies several performance measures:

1. Number of People Residing within the Region
2. Number of Occupied Jobs Across the Region
3. One-way Trips Per Capita each Day
4. Total Vehicle Miles Traveled per Day
5. Miles Traveled per Capita each Day
6. Time Spent Traveling per Capita each Day
7. Average Speed across all Major Roadways
8. Percent of Miles Traveled on Congested Route
9. Percent of Freight Truck Travel on Congested Routes
10. Daily Transit Ridership (Nashville Area MPO, 2016).

4.4.4 Programming

Tennessee has been recognized for restructuring project selection to select projects based on data-driven evaluation (Smart Growth America and State Smart Transportation Initiative, 2015). Tennessee shifted to a technology-driven prioritization process using Decision Lens (DL3) software for evaluating and prioritizing projects funded through discretionary sources and setting performance criteria. Decision Lens is a private company that offers software and tools for purchase to the public sector. Many DOTs, including Tennessee, rely on Decision Lens. Under this software, criteria are identified related to the guiding principles based on input from TDOT staff and Executive Leadership. Each principle is weighted differently. The software ranks projects based on Benefit Score, Investment Funding Source and Scheduling Constraints, while additional consideration is given to Even Distribution of Projects per Region, Phase of construction, and MPO/RPO distribution.

In the Nashville Area MPO, project sponsors submit requests for funding that are reviewed according to evaluation factors including system preservation and enhancement; quality growth; sustainable land development and economic prosperity; expansion of multimodal options; roadway congestion management; safety and security; freight and goods movement; health and environment; and project support and history.

Nashville Area MPO developed a priority scoring system to help determine which projects will best facilitate the region's long-term vision. The scoring system is based on both federallydefined planning factors and locally developed project evaluation factors (Nashville Area MPO, 2016). Specific factors are delineated in the Project Scoring Methodology. These weights were determined by the MPO's Technical Coordinating Committee using a pairwise survey administered to members (Nashville Area MPO, 2016). See Figure 4.10.

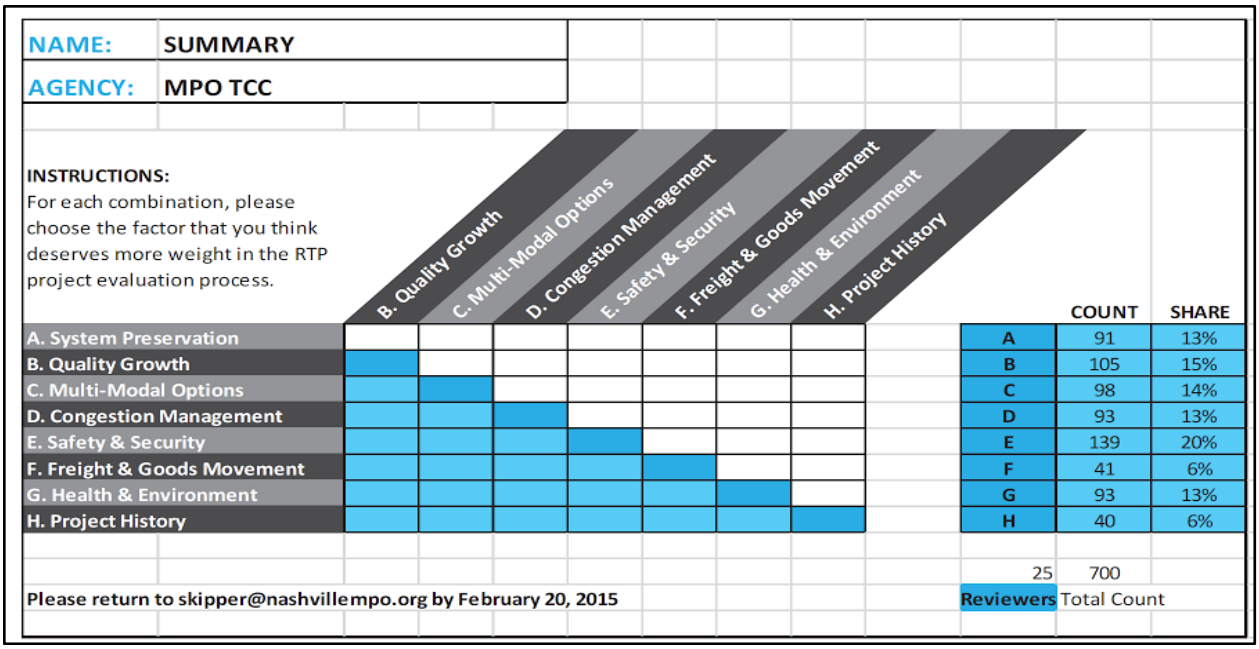

Figure 4.10: Nashville Area MPO Project Weights
Source: (Nashville Area MPO, 2016).

Table 4.24: Nashville Area MPO Project Selection Criteria and Weighting

Project Selection Criteria	Weighting
System Preservation	10
Quality Growth	15
Multimodal	15
Congestion Management	15
Safety and Security	20
Freight and Goods Movement	5
Environment and Health	15
Project Support/History	5
Total	**100**

Source: (Nashville Area MPO, 2016).

Nashville Area MPO developed a comprehensive process to evaluate projects for their consistency with Nashville Area MPO's guiding principles, regional goals and major objectives (FHWA, 2015). However, there is not direct alignment between goals, evaluation criteria and performance measures.

Nashville Area MPO is in the process of expanding its approach to performance-based planning by developing new performance measures related to safety, state of good repair, mobility, access to economic opportunity, environmental impact, and public health outcomes for use in evaluating land use scenarios and transportation projects that will be considered for future regional transportation plans. Nashville Area MPO is in the process of establishing performance targets to help monitor progress towards federal, state and regional transportation goals (Nashville Area MPO, 2016).

4.4.5 Reporting

Like most every jurisdiction, Tennessee and its MPOs produce ***ex ante* estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post* outcomes** from such investments.

4.5 UTAH

Utah is in Census Region 4 (West), Division 8 (Mountain) (U.S. Census Bureau, 2016). Utah has a population of 2.763,885 (34th), a land area of 82,169.6 square miles (12th), and a density of 33.6 persons per square mile (41st) (U.S. Census Bureau, 2010).

Table 4.25 summarizes the Utah statewide transportation system.

Table 4.25: Utah Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 94,410 (2009);
	miles of tolled roadway: 1 (2009)
	bridges: 2,911 (2010)
Transit	trips per year (all transit modes): approximately 43.7 million (2008)
Rail	freight rail route-miles: 1,365 (2008)
Aviation	airports total: 141; public-use: 47; state-owned: 1 (2008)
	enplanements per year: 10,018,345 (2009)
Marine	state-operated ferries: 1 (2009)

Source: (NCSL and AASHTO, 2011, 142).

Of the 46,163 road miles in the state of Utah, 5,878 are maintained by the state while cities and counties maintain the vast majority (35,422 miles). The remainder of road miles are maintained by federal agencies and Native American tribes. Though the state has 13 percent of road miles, state roads carry 66.7 percent of the vehicle miles travelled (Utah Department of Transportation, 2015a).

4.5.1 Governance

Utah is controlled by a Republican Legislature and Republican Governor, as Republicans have controlled both the legislative and executive branch since 1984.

In Utah, transportation is controlled by the Department of Transportation and the Utah Transportation Commission. The DOT's Executive Director is appointed by the Governor with consultation from the Utah Transportation Commission and consent of the Senate.[98]

The **Utah Department of Transportation (UDOT)** is responsible for all aspects of the state's transportation system including planning, designing, constructing and maintaining the transportation systems. The department's divisions include Administrative Services, Comptroller,

[98] Utah Code § 72-1-202 ("Department of Transportation » Executive director of department"), http://le.utah.gov/xcode/Title72/Chapter1/72-1-S202.html.

Internal Audit, Community Relations, Program Development, Project Development and Operations.

The **Utah Transportation Commission** is composed of seven members who are appointed by the Governor and confirmed by the Senate to serve six-year terms.[99] According to statute, Commissioners represent four different geographic regions of the state, and three are at-large. The Commission is charged with setting priorities and funding levels for projects for each fiscal year, advising the department in state transportation systems policy, service as ex officio members on public transit boards, and reviewing short- and long-range public transit plans, among other administrative responsibilities.[100] The Commission is also responsible for reporting on funding priorities (including a prioritized list of projects), and unfunded construction and maintenance needs. Of particular interest to this project, the Commission is responsible for creating the written project prioritization process for new transportation capacity projects.[101]

Utah is served by several transit authorities which plan for and provide transit services. The **Utah Transit Authority (UTA)**, serving the Salt Lake Region, is the primary transit provider in the state of Utah and is governed by state statutes related to special districts and public transit districts.[102] Outside of Salt Lake City, there are eight other fixed-route transit agencies: Basin Transit Association, Cache Valley Transit District, Cedar Area Transportation, Navajo Transit System, Park City Transit, Ute Tribe Transit and Sun Tran (Utah Unified Plan Partners, 2015).

In rural areas of the state, seven **Associations of Governments (AOGs)** coordinate economic development planning and contribute to transit plans for rural areas and to the Coordinated Human Service Public Transportation Plan (Utah Governor's Office of Economic Development, 2017; Utah Department of Transportation, 2007).

Cities and counties build and maintain local streets, sidewalks, paths and bicycle routes. By state statute, UDOT distributes funds to cities and counties for Class B and Class C roads (B&C roads). Class B roads are under the jurisdiction of the county while Class C roads are under the jurisdiction of municipalities. Although UDOT is tasked with oversight of the $127 million in B&C road funds, these funds are currently pass-through funds with little oversight from UDOT (Utah Office of the Legislative Auditor General, 2016).

MPOs facilitate coordinated planning and programming within urban areas that receive federal funding. There are four MPOs wholly or partly within Utah, two of which are TMAs and are in the northeast corner of the state near the population center of Salt Lake City. See Figure 4.11 and Table 4.26.

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[99] Utah Code § 72-1-301 ("Transportation Commission created"), http://le.utah.gov/xcode/Title72/Chapter1/72-1-S301.html.

[100] Utah Code § 72-1-303 ("Transportation Commission » Duties of Commission"), http://le.utah.gov/xcode/Title72/Chapter1/72-1-S303.html.

[101] Utah Code § 72-1-304 ("Written project prioritization process for new transportation capacity projects"), http://le.utah.gov/xcode/Title72/Chapter1/72-1-S304.html

[102] Utah Code § 17B-1-103 ("Local district status and powers"), http://le.utah.gov/xcode/Title17B/Chapter1/17B-1-S103.html.

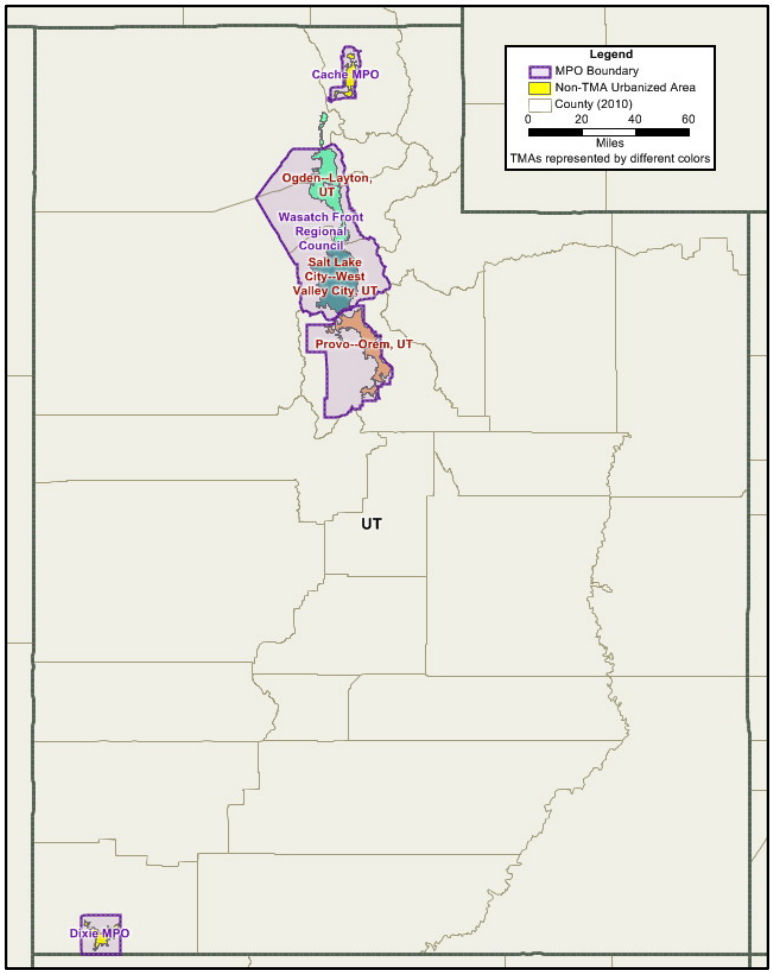


Figure 4.11: Utah MPOs and TMAs Map
Source: (FHWA, 2018b).

Table 4.26: Utah MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
Wasatch Front Regional Council (WFRC)	UT	Salt Lake City	1,561,348	1,777	878.6
Mountainland Association of Governments (MAG)	UT	Orem	514,972	785	656.0
Dixie MPO (DMPO)	UT	St. George	105,366	223	472.5
Cache MPO (CMP))	UT	Logan	98,960	118	838.6

Source: (U.S. DOT, 2016).

The **Wasatch Front Regional Council (WFRC)** is the largest MPO in Utah and includes Salt Lake City and Ogden. The WFRC consists of 21 voting members, 19 of whom are local elected officials. The remaining two voting members are from UDOT and the Utah Transit Authority. Non-voting members on the WFRC board include representatives from the Utah state Senate, House of Representatives, the State Planning Director, the Utah League of Cities and Towns, the Utah Association of Counties, and Envision Utah (Wasatch Front Regional Council, 2017a).

The **Joint Policy Advisory Committee (JPAC)** was created in 2002 to coordinate long-range planning in the Salt Lake Region under two MPOs, UTA and UDOT. JPAC expanded to include other MPOs in the state to coordinate long-range MPO plans with UDOT's plans for rural areas. The **Utah Unified Transportation Plan** has created cooperation between partners including MPOs, UTA and UDOT Transportation Systems Planning and Programming (Wasatch Front Regional Council, 2017b).

4.5.2 Finance

In 2015, Utah appropriated a total of $1.4 billion for transportation. Of this total amount, $315 million, or approximately 23 percent, comes from federal sources, and the remaining comes from state sources (Utah Department of Transportation, 2015a). See Table 4.27.

Table 4.27: Utah State Transportation Revenue Sources

Source	FY 2015
Sales & Use Tax	$462,900,706
Motor & Special Fuels Tax	$361,815,225
Federal Contracts & Grants	$315,370,777
Licenses, Permits & Fees	$161,765,663
Mineral Lease	$56,526,268
Charges for Services & Royalties	$41,191,897
Cooperative Agreements	$24,132,319
Aero Fuel Tax & Madra Dillree MV Rental Tax	$10,507,993
Misc & Other	$6,717,977
General Fund	$50,000
Total	**$1,440,978,827**

Source: (Utah Department of Transportation, 2015a, figure 4.4).

In 2015, Utah altered the structure of its transportation user revenue with the passage of House Bill 362.[103] The bill repealed a cent-per-gallon excise tax on motor vehicle fuels and replaced it with a 12 percent tax. The percent tax equates to an immediate 4.9 cents per gallon increase in the state fuel tax, with likely growth over time as the price of fuel rises. The percent tax has a floor and a ceiling to prevent extreme windfalls or shortfalls.

HB 362 also authorized a local option 0.25 percent general sales tax. Counties can enact the sales tax by voter approval. If approved by voters, 0.10 percent of the funds would be allocated directly to the transit provider; 0.10 percent to cities, towns and unincorporated county areas; and 0.05 percent to the county. In areas without transit service, cities, towns and unincorporated areas receive 0.10 percent of the tax and the county receives the remaining 0.15 percent (Wasatch Front Regional Council, 2015a, 70).

The largest state sources of funding are:

- **Sales and Use Tax**: Utah has a 4.7 percent state sales tax. Several legislative bills over the last two decades have set aside earmarks for transportation (Utah State Legislature, 2016b). In FY 2015, $462.9 million of sales tax revenue was earmarked for transportation, equating

[103] House Bill 362, 2015 Utah Laws 275 ("Transportation Infrastructure Funding"), http://le.utah.gov/~2015/bills/static/HB0362.html.

to approximately 27 percent of revenue from the state sales and use tax (Utah State Tax Commission, 2015).

- **Motor Fuel Taxes**: Since 2016, a tax of 12 percent of statewide average rack price is imposed on motor fuel sold, used or received for sale or use within the state. Since 1961 by constitutional requirement,[104] all taxes, fees and charges on motor vehicles must be used for highway purposes. As a whole, highway user charges generated $443 million, of which $300 million stayed with UDOT (Utah Department of Transportation, 2015a, figure 4.1).

Highway user revenues include fuel taxes, licenses and registration fees, as shown in Table 4.28.

Table 4.28: Utah State Highway User Revenue Sources

Source	FY 2015
Motor Fuel Tax	$261,743,264
Special Fuel Tax	$100,071,950
Vehicle Registration Fees	$41,092,021
Proportional Registration Fees	$16,209,185
Special Transportation Permits	$9,906,051
Highway Use Tax	$8,754,880
Motor Vehicle Control Fees	$5,508.323
Temporary Permits	$346,310
Total	**$443,631,994**

Source: (Utah Department of Transportation, 2015a, figure 4.1).

Utah's constitution[105] requires that taxes on the operation of motor vehicles and fuels be used for road-related purposes (AASHTO, 2016, table 25).

Of the highway user revenues, a portion (approximately $12 million) of these funds are transferred to state agencies including the Utah Highway Patrol, DAS Finance Administration, Tax Commission and the DCED Travel Council (Utah Department of Transportation, 2015a, figure 4.2). Of the remaining net revenue, 30 percent is distributed to cities, counties and state parks through the B&C Fund, and 70 percent is distributed to the Transportation Fund. Two main state funds make up the majority of Utah's state transportation revenue, the Transportation Fund and the Transportation Investment Fund Capacity Program (which includes the Centennial Highway Fund created in 1996, the Transportation Investment Fund of 2005, and the Critical Highway Needs Fund (Utah State Legislature, 2016a). The Transportation Fund includes highway user revenues. The Transportation Investment Fund is dedicated to state and federal highway use. The Transportation Investment Fund has been funded primarily by sales and use earmarks through legislative earmarks overtime. Legislative earmarks through 12 separate bills from 2005 through 2013 created the Transportation Investment Fund, Centennial Highway Fund and Critical Highway Needs Fund, which were combined into a single program (Utah State Legislature, 2016a; Utah State Legislature, 2016b). The 2015 appropriation for this fund was $202 million (Utah State

[104] Utah Const. art. XIII, § 5(6) ("Use and amount of taxes and expenditures"), http://le.utah.gov/xcode/ArticleXIII/Article_XIII,_Section_5.html.

[105] Utah Const. art. XIII, § 5(6) ("Use and amount of taxes and expenditures"), http://le.utah.gov/xcode/ArticleXIII/Article_XIII,_Section_5.html.

Legislature, 2016c). Most recently, in 2011 Senate Bill 229[106] set aside 30 percent of future growth in sales tax revenue for the Transportation Investment Fund.

Many sub-accounts within the Transportation Fund have dedicated uses. The annual amounts for some of these sub-accounts are not determined legislatively or by formula, but rather UDOT transfers funds from the Transportation Fund to sub-accounts on an ad hoc basis (personal communication with Bill Lawrence at UDOT). Managers develop needs and accomplishment reports and present them to the Commission to request funds for specific uses. Other sub-accounts within the Transportation Fund, such as the B&C Roads Account, receive transfers based on statutory formulas. See Table 4.29.

Table 4.29: Utah State Transportation Expenditures

Expenditure	FY 2015
Highway Construction Projects and ROW	$673,649,020
Debt Service	$327,411,089
Operations	$217,631,587
B&C Allocations	$131,136,765
Administration	$74,356,887
Mineral Lease	$56,526,268
Other State Agencies	$11,920,900
Total	**$1,492,677,515**

Source: (Utah Department of Transportation, 2015a, figure 4.5).[107]

By statute,[108] highway user revenues are dedicated to specific uses. See Table 4.29.

Table 4.30: Utah Highway User Revenue Expenditures

Expenditure	FY 2015
Transportation Fund (UDOT Portion)	$300,787,760
B&C Fund	$130,923,334
Transfer to Other State Agencies	$11,920,900
Total	**$443,631,994**

Source: (Utah Department of Transportation, 2015a, figure 4.2).

WFRC is funded primarily through federal funding and local match. Utah requires a local match of 6.77 percent of project costs to receive the remaining 93.23 percent of federal funding received by MPOs. For the year 2015, the WFRC 2015–2020 TIP indicates $444.4 million of federal highway funding, and $34.8 million of local match funding. For transit in 2015, the TIP indicates $43.1 million in federal funding, and $10.9 million in local match. Combined, WFRC programmed $533 million in 2015 and $487.5 million, or 91 percent, was federal and $45.7 million, or 9 percent, was local.

[106] Senate Bill 229, 2011 Utah Laws 441 ("Transportation Funding Revisions"), http://le.utah.gov/~2011/bills/static/SB0229.html.

[107] The difference in State Transportation Funding Sources (Table 4.27) and State Transportation Expenditures (Table 4.29) are attributable to the timing of payments made on projects which are not tied to a fiscal year.

[108] Utah Code § 72-2-107 ("Appropriation from Transportation Fund—Apportionment for class B and class C roads"), http://le.utah.gov/xcode/Title72/Chapter2/72-2-S107.html.

WFRC does not directly receive any state transportation funding, nor any local transportation funding. Rather, these funding sources are included in the TIP as match funding from project sponsor jurisdictions. Two counties within WFTC, Salt Lake and Weber, have enacted the local option sales tax increase for transportation authorized by HB 362 in 2015. Counties and cities receive this funding directly, and WFRC works with those counties and cities to develop and program projects.

4.5.3 Planning

Long-range planning of Utah's transportation system is guided by the *2015–2040 Long-Range Transportation Plan: Transportation in Utah's Rural Areas*, created by UDOT in 2015. Utah leaves urban area planning to the state's four MPOs and compiles the plans into a unified plan for the state.

The 2015 Long-Range Transportation Plan consists of three goals and several performance measures under each goal:

1. **Zero Crashes, Injuries, and Fatalities**: UDOT is committed to safety and won't rest until a status of zero crashes, zero injuries, and zero fatalities is attained.

    a. Safety: traffic fatalities, contributing factors, workplace safety incidents (annual workers compensation claims)

2. **Optimize Mobility**: UDOT continuously strives to make the transportation system work better while quickly and efficiently moving people to their destinations by optimizing operations; improving connections for transit, biking and pedestrians; and increasing capacity.

    a. Manage System: traveler information distribution, setting and tracking snow removal targets, and tracking incident management.

    b. Optimize System: signal optimization improvements and managed lanes improvements.

    c. Capacity: capacity increases, travel-delay forecasts, and Transportation Investment Fund expenditures.

3. **Preserve Infrastructure**: UDOT believes good roads cost less, and through proactive preservation, UDOT will maximize the value of Utah's infrastructure investment for today and the future.

    a. Pavement Condition: pavement conditions; ride quality

    b. Bridge Condition: bridge condition, age distribution, pavement and bridge expenditures.

    c. Maintenance: Quality Assurance Program (Utah Department of Transportation, 2015b, 10).

The 2015 Long-Range Transportation Plan was written to fulfill MAP-21 performance requirements in conjunction with the MPOs (Utah Department of Transportation, 2015b). Within the LRTP, UDOT offers five program categories and describes how goals and performance measures are reflected within each program area. Using revenue assumptions and modeling, UDOT then prioritizes projects by phases within each region.

Beyond the state's LRTP, the unified plan (including MPOs) conveys a set of agreed-to goals, objectives and performance measures, as shown in table 4.32. It is unclear how this list of goals, objectives and performance measures impacts project selection at the state or MPO level. See Table 4.31.

Table 4.31: Utah Unified Transportation Plan Performance Measures

Goal	Objective	Performance Measure
Safety	Reduce number of fatal and serious injuries on transportation system.	Fatalities and serious injuries per capita
Economic Vitality	Increase number of jobs and services that Utahns can reach within a certain travel time.	Increase number of jobs and services that Utahns can reach within a certain travel time
State of Good Repair	Keep infrastructure in good condition.	Cost/benefit savings from proper maintenance
Air Quality	Reduce emissions that adversely affect health, quality of life and the economy.	Key mobile source ozone and PM2.5 emissions
Mobility and Accessibility	Reduce the likelihood of driving long distances daily; increase the share of trips using non-single-occupant vehicle.	Vehicle miles traveled per capita; commute mode split percentages

Source: (Utah Unified Plan Partners, 2015).

Wasatch Choice for 2040 provides a long-range land use and transportation vision for the region. Transportation planning is guided by the 2015–2040 Regional Transportation Plan, last updated in 2015:

- Enhance Safety and Health
- Preserve Infrastructure
- Provide Mobility and Accessibility
- Achieve Cost Efficiency
- Promote Economic Vitality
- Support Environmental Stewardship
- Encourage Community-Friendly and Sustainable Urban Form (Wasatch Front Regional Council, 2015a).

The performance criteria in WFRC's LRTP are not directly related to their goals. WFRC uses the categories and measures in Table 4.32.

Table 4.32: Wasatch Front Regional Council RTP Performance Measures

Performance Category	Performance Measure
Accessibility	Percent of all regional employment and higher education opportunities accessible within 20 minutes of the average household.
	Percent of all regional employment and higher education opportunities accessible within a 20 minute transit ride on rail or BRT for the average household.
Mobility	The proportion of all motorized work and college trips predicted to be taken on the region's major transit lines.
Travel	The forecasted duration of travel by each household on an average weekday.
Economic Vitality	Predicted average weekday peak travel period travel time from 17 of the region's largest freight centers to their nearest freeway.
Cost Efficiency	Construction costs of roads in the Draft Preferred RTP divided by the increase in total job and college enrollment opportunities within 20 minute drive as compared to if no RTP projects were built by 2040.
	Construction costs of transit in the Draft Preferred RTP divided by the forecasted annual system ridership in 2040 multiplied by 30 to represent a generalized transit project lifespan.
Health and Safety	This index is composed of the relative production of five types of emissions from cars and trucks: volatile organic compounds, nitrogen oxides, carbon monoxide, and small and very small particulate matter (pm 10 and pm 2.5).
Environment	The increase in the amount of energy consumed by buildings and transportation based upon the assumed development types and travel forecasts.
	Potential development pressure to regionally significant natural areas due to increased access to employment and education from these areas. Excludes potential development pressures due to speculation based on corridor preservation projects.
	Potential impacts to seven water and four land characteristics such as prime agricultural land, conservation and mitigation areas, and significant open spaces

Source: (Wasatch Front Regional Council, 2015a).

4.5.4 Programming

UDOT staff rank projects while the Utah Transportation Commission has final approval authority for all construction programs and projects. The Utah state Legislature has passed legislation to guide the project selection process.

The Legislature passed Senate Bill 25[109] in 2005 to develop a cross-modal project selection process. SB 25 directs the Utah Transportation Commission along with MPOs and UDOT to undergo rulemaking for prioritizing transportation projects to systematically advance UDOT's strategic goals.[110]

In response, the UTC adopted Rule R940-6.[111] UDOT will use the strategic goals to:

- First seek to preserve and optimize mobility of the current infrastructure.

[109] Senate Bill 25, 2005 Utah Laws 245 ("Transportation Amendments and Highway Jurisdictional Transfer Task Force"), http://le.utah.gov/~2005/bills/static/SB0025.html.

[110] Utah Code § 72-1-304 ("Written project prioritization process for new transportation capacity projects—Rulemaking"), http://le.utah.gov/xcode/Title72/Chapter1/72-1-S304.html.

[111] Utah Admin. Code R940-6 ("Prioritization of New Transportation Capacity Projects"), http://rules.utah.gov/publicat/code/r940/r940-006.htm.

- Improve the mobility of the existing system through technology like intelligent transportation systems (ITS), as well as using other tools such as access management, transportation demand management, etc.

- Address safety through projects in preservation and mobility, as well as target specific highway locations for safety improvements.

- Add new capacity projects.

UDOT has published policies and procedures that apply the guidance of SB 25. "Selecting and Programming Highway Projects UDOT 07-10" outlines four strategic goals:

- Preserve infrastructure
- Optimize mobility
- Zero fatalities
- Strengthen the economy

UDOT 07-10 notes that it is "UTC policy to have a fair, open, equitable selection process based on criteria that determine which projects contribute most to state, regional, and local transportation and economic development goals" (Utah Department of Transportation, 2013, 1). The policy outlines some broad criteria under each goal, but includes a caveat that allows UTC to select projects regardless of score, ranking, cost or functional class. The policy further requires projects to be ranked and prioritized using quantifiable measures, then apply funding using any flexibility allowed to fund projects in priority order.

In the STIP Workshop, projects are considered by type with criteria in four categories: size/magnitude scores, congestion scores, safety and other. Each project type has unique criteria. Project types include: widen existing facilities, new facilities, upgrade existing at-grade intersections, new interchanges on existing interchanges, and passing lanes (Utah Department of Transportation, 2016b). See Figure 4.12.

For WFRC, project selection is broken into three categories including highway, transit and non-motorized. Each modal category includes unique criteria. Highway projects include unique goals, criteria, measures and weights. Transit criteria do not follow the same format, but rather include measures, definitions and weights. Nonmotorized projects also follow a unique process, basing selection criteria on demonstrating quality-of-life benefits, enhancing connections to fixed rail transit, and laying the foundation for a regional bike network.

After scoring the highway and transit projects, staff places projects into phases based on the WFRC evaluation criteria, Congestion Management Program and "other specific factors." Financial constraints also affect the phasing of projects (Wasatch Front Regional Council, 2015a, 93).

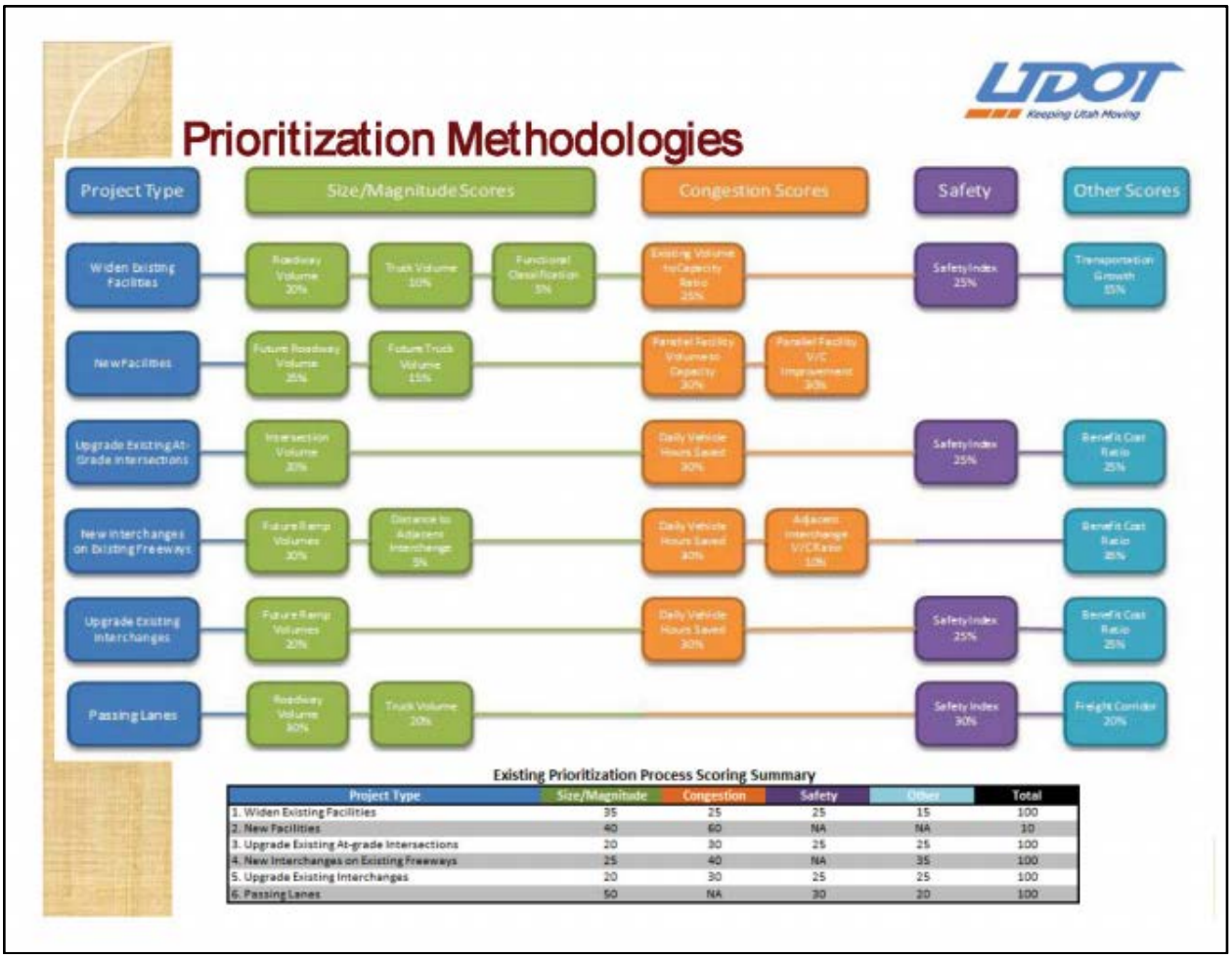


Figure 4.12: Utah Prioritization Methodologies
Source: (Utah Department of Transportation, 2016b).

4.5.5 Reporting

Like most every jurisdiction, Utah and its MPOs produce ***ex ante*** **estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post*** **outcomes** from such investments.

4.6 VIRGINIA

Virginia is in U.S. Census Region 3 (South), Division 5 (South Atlantic) (U.S. Census Bureau, 2016). Virginia has a population of 8,001,024 (12th), a land area of 39,490.1 square miles (36th), and a density of 202.6 persons per square mile (14th) (U.S. Census Bureau, 2010).

Table 4.33 summarizes the Virginia statewide transportation system.

Table 4.33: Virginia Statewide Transportation System Statistics

Mode	Statistics
Roads and bridges	total highway, road and street lane miles: 160,727 (2009)*
	miles of tolled roadway: 56 (2009)
	bridges: 13,522 (2010)*
	toll bridges and tunnels: 4, plus 1 shared with Maryland (2009)
Transit	trips per year (all transit modes): Approximately 78.1 million (2008)
Rail	freight rail route-miles: 3,205 (2008)
Aviation	airports total: 66; public-use: 66; state-owned: 0 (2008)
	enplanements per year: 24,081,772 (2009)
Marine	port traffic per year (20-foot equivalent units): 1,421,633 (2009)
	waterborne tonnage per year: 67.2 million (2009)

**The numbers of total lane miles and bridges above are as reported by FHWA. VDOT reported 155,335 lane miles (excluding federal public roads and privately maintained toll roads) and 13,216 bridges as of April 2011.*
Source: (NCSL and AASHTO, 2011, 147).

4.6.1 Governance

Since 2000, Republicans have held a majority in the state House but the majority of the state Senate and governorship have switched between Republicans and Democrats. Since 2000, the overall leadership of the state has been split between the two parties, except in 2000–2001 and 2012–2013 when it was controlled by Republicans.

In Virginia, transportation is overseen jointly by the Secretary of Transportation and the Commonwealth Transportation Board (see Figure 4.13).

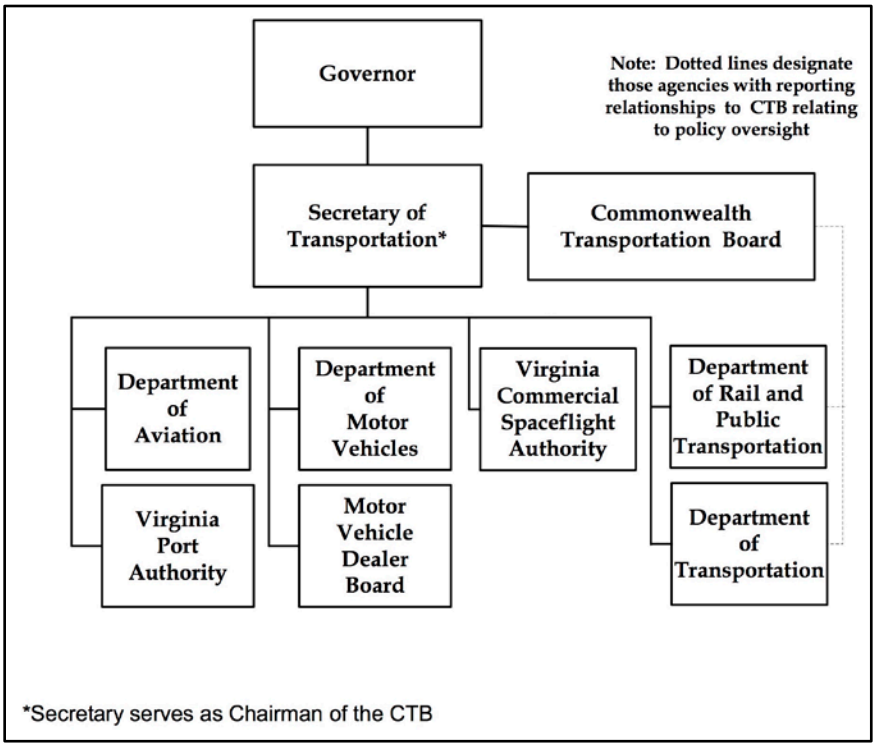


Figure 4.13: Virginia Transportation Secretariat Organizational Structure
Source: (Virginia Commonwealth Transportation Board, 2016a, 2-1).

Virginia's **Secretary of Transportation** is appointed by the Governor and confirmed by the General Assembly. He/she oversees seven state agencies:[112]

- **Department of Transportation (VDOT)**: Responsible for building, maintaining and operating the state's roads, bridges and tunnels, and through the Commonwealth Transportation Board provides funding for airports, seaports, rail and public transportation.

- **Department of Rail and Public Transportation (DRPT)**: Focus is the movement of people and goods throughout the Commonwealth, and its primary areas of activity are rail, public transportation, and commuter services. Works with local, regional, state, and federal governments, as well as private entities to provide support for projects and programs.

- **Department of Aviation (DOAV)**: Plans for the development of Virginia's air transportation system, promotes and educates the public about aviation, and provides flight services to Commonwealth of Virginia leadership and state agencies.

- **Department of Motor Vehicles (DMV)**: Responsibilities include vehicle titling and registration, driver licensing and maintenance of driver and vehicle records. Also collects Virginia's fuel tax, monitors the state's trucking industry and serves as Virginia's Highway Safety Office. In addition, effectively enforces motoring and transportation-related tax laws, and efficiently collects and distributes transportation-related revenues.

- **Virginia Port Authority (VPA)**: Moves cargo through world-class facilities and transports to and from markets around the globe, carrying the goods and supplies that manufacturers, corporations, and individual consumers use in their everyday lives. Owns and is responsible for the operations of the Port of Virginia, consisting of three marine terminals as well as an inland intermodal facility.

- **Motor Vehicle Dealer Board (MVDB)**: Charged with the regulation and oversight of the new and used car and truck dealer industry.

- **Virginia Commercial Space Flight Authority (VCSFA)**: Aims to provide safe, reliable, and responsive space access at competitive prices, and is proud to offer full-service launch facilities for commercial, government, scientific and academic users both foreign and domestic (Virginia, 2017; Virginia Secretary of Transportation, 2017).

The 17-member **Commonwealth Transportation Board (CTB)** is appointed by the Governor and confirmed by the General Assembly. It is chaired by the Secretary of Transportation. The CTB has direct authority to approve the policies and objectives of VDOT and DRPT. The CTB allocates funds to other agencies—including some outside the Transportation Secretariat—through funding mechanisms established by statute. Although the member agencies in the Secretariat function

[112] Va. Code § 2.2-228 ("Position established; agencies for which responsible"), http://law.lis.virginia.gov/vacode/title2.2/chapter2/section2.2-228.

independently of one another, they are linked to the CTB through their reporting relationship to the Secretary of Transportation (Virginia Commonwealth Transportation Board, 2016a, 2-1).[113]

Virginia's **Office of Intermodal Planning and Investment (OIPI)** is located within the Office of the Secretary of Transportation and was created in 2002 to encourage the coordination of multimodal and intermodal planning across the various transportation modes within the Commonwealth. Since then, the office has produced multiple statewide planning efforts and performance reports, and collaborated with multiple entities to promote a safe, strategic and seamless transportation system (Virginia Office of Intermodal Planning and Investment, 2016a).[114]

OIPI is tasked with maintaining and coordinating the **Multimodal Working Group (MMWG)**. This group consists of the lead planners for each mode of transportation and the policy advisors of every agency within the Secretariat. See Figure 4.14.

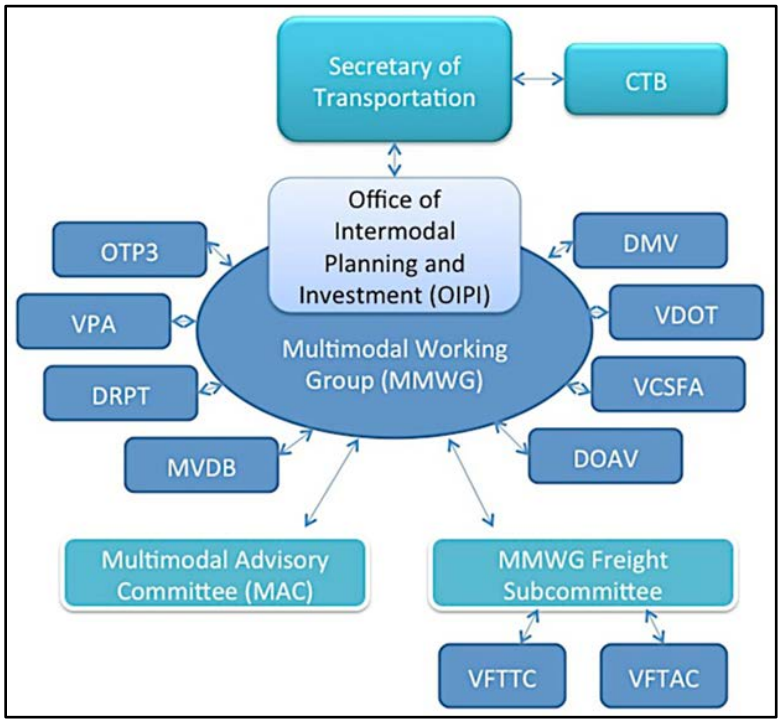


Figure 4.14: Virginia Multimodal Working Group
Source: (Virginia Office of Intermodal Planning and Investment, 2017a).

VDOT maintains 57,867 road miles, the third largest state-maintained transportation system in the country. Only 10,561 miles are maintained by municipalities, and 1,638 by counties (Virginia Department of Transportation, 2016e).

[113] Va. Code § 33.2-200 ("Commonwealth Transportation Board; membership; terms; vacancies"), http://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-200.

[114] Va. Code § 2.2-229 ("Office of Intermodal Planning and Investment of the Secretary of Transportation"), http://law.lis.virginia.gov/vacode/title2.2/chapter2/section2.2-229.

Virginia has many regional and local agencies whose areas of responsibility have a direct or indirect bearing upon transportation investments and decisions. The state's 15 MPOsfacilitate coordinated planning and programming of transportation projects in urban regions, particularly federally funded facilities (Virginia Office of Intermodal Planning and Investment, 2013, 85). See Figure 4.15 and Table 4.34.

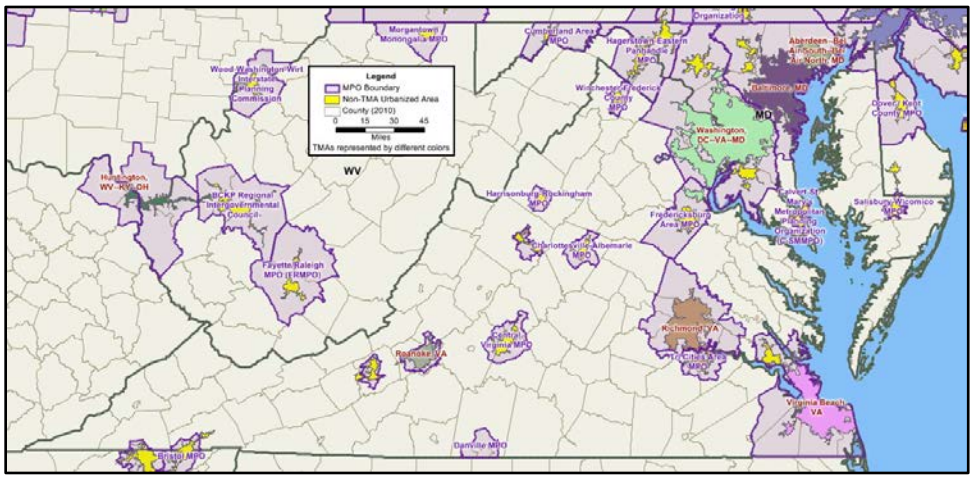


Figure 4.15: Virginia MPOs and TMAs Map
Source: (FHWA, 2018b).

Table 4.34: Virginia MPOs

MPO	State	Major City	2010 Population	Area (sq. mi.)	2010 Density
National Capital Region Transportation Planning Board (TPB)	DC, MD, VA	Washington	5,068,737	3,555	1,425.8
Hampton Roads Transportation Planning Organization (HRTPO)	VA	Chesapeake	1,619,202	2,658	609.2
Richmond Area MPO	VA	Richmond	928,765	1,487	624.6
Fredericksburg Area MPO (FAMPO)	VA	Fredericksburg	275,644	704	391.5
Roanoke Valley MPO	VA	Roanoke	231,337	248	932.8
Tri Cities Area MPO	VA	Petersburg	154,407	322	479.5
Central Virginia MPO	VA	Lynchburg	153,316	354	433.1
Kingsport MTPO	TN, VA	Kingsport	127,775	298	428.8
Charlottesville-Albemarle MPO	VA	Charlottesville	122,809	243	505.4
Blacksburg-Christiansburg-Montgomery Area MPO	VA	Christiansburg	100,038	143	699.6
Bristol MPO	TN, VA	Bristol	83,167	142	585.7
Staunton-Augusta-Waynesboro MPO (SAWMPO)	VA		78,794	143	551.0
Winchester-Frederick County MPO (WinFredMPO)	VA	Winchester	78,616	105	748.7
Harrisonburg-Rockingham MPO (HRMPO)	VA	Staunton	74,372	106	701.6
Danville MPO	VA	Martinsville	65,689	198	331.8

Source: (U.S. DOT, 2016).

The Hampton Roads Transportation Planning Organization (HRTPO) is composed of 22 voting members. Of the 22 voting members, 13 are representatives of cities and counties, and four are representatives of the General Assembly (Virginia's Legislature). The non-voting members represent: the Williamsburg Area Transit Authority, the Transportation District Commission of Hampton Roads, VDOT, the Virginia Department of Rail and Public Transportation, and the Virginia Port Authority (Hampton Roads Transportation Planning Organization, 2010a).

Twenty-one regional **Planning District Commissions (PDCs)** provide sponsored transportation planning services in Virginia's rural regions and small urban areas. PDCs also provide a unique forum for coordinating multidisciplinary regional plans that address economic, environmental and social issues. VDOT and DRPT work actively with MPOs and PDCs on an individual basis and through statewide associations such as the Virginia Association of Metropolitan Planning Organizations (VAMPO) and the Virginia Association of Planning District Commissions (VAPDC) (Virginia Office of Intermodal Planning and Investment, 2013, 85).

Regional urban and rural **transit providers** work closely with DRPT and their member localities to provide transportation services and travel demand management programs such as ridesharing. Other regional public service providers advocate for, and sometimes provide, mobility services for their target populations, such as Area Agencies on Aging for older adults; Community Service Boards that address mental health issues; Community Action Agencies that focus on alleviating poverty; and Workforce Investment Boards that aim to generate jobs for regional labor pools (Virginia Office of Intermodal Planning and Investment, 2013, 85).

Virginia's independent **counties, cities and towns** manage public works programs to build and maintain local streets, sidewalks, paths and bicycle routes, in coordination with VDOT-maintained interstate, primary and secondary roads. Some cities and counties also operate public transit services, working closely with DRPT. Primary and secondary roads in Virginia counties are managed by VDOT, but some projects are built with revenue-sharing funds that leverage local and state resources. Many local roadway links are built by private developers under the direction of local governments, and later turned over to VDOT for long-term maintenance. In other cases, private development projects approved by local officials can generate traffic levels that trigger a need for VDOT to program improvements to state-owned roadways (Virginia Office of Intermodal Planning and Investment, 2013, 86).

"Transportation decision making in Virginia suffers from an inability to marshal the resources and the authority to make transportation funding and investment decisions that both offer the appropriate nexus of decision making and provide an appropriate level of funding to address regional transportation challenges. There is no lack of organizational entities that could be created to address transportation issues of regional significance. The problems remain:

1. Limitation on the powers of such entities to raise revenue, since the Virginia constitution requires direct election of representatives to any body that has the ability to levy taxes;

2. Issues relating to the Federal mandate for a 'continuing, comprehensive and coordinated' transportation planning process, which has heretofore been satisfied through metropolitan planning organizations (MPOs);

3. The disconnect between the powers of local government to control land use and the need for regional action to direct growth in ways that minimize sprawl and congestion; and

4. Local agencies currently lack the capacity, in terms of financial resources and expertise, to take responsibility for the ongoing maintenance and management of roads and bridges (devolution)" (Virginia Office of Intermodal Planning and Investment 2009, 1).

4.6.2 Finance

Virginia's system for funding transportation is codified in statute. Virginia has no constitutional limitations on the use of gas and other vehicle-related taxes and fees (AASHTO, 2016, table 25).

The Commonwealth Transportation Fund (CTF) budget identifies the estimated revenues and the distribution of the revenues to the related transportation agencies and programs. The CTF budget for fiscal year 2017 totals $6,003,166,578. The CTF receives revenues from dedicated state and federal sources. The federal revenues come from the Federal Highway Administration and the Federal Transit Administration (Virginia Department of Transportation, 2016a, 7).

In 2013, **House Bill 2313** ("Virginia's Road to the Future")[115] made several changes to the state revenues collected by the Commonwealth and the distribution of such revenues, primarily for the benefit of transportation. Led by then-Governor Bob McDonnell and the Virginia General Assembly, the compromise bill was passed with support across political and geographic divides. The bill replaced the 17.5-cents-per-gallon gas tax with a 5.1 percent sales tax on the wholesale price of fuel, and a 6 percent sales tax on the wholesale price of diesel. In addition, state and local sales and use taxes rose from 5 to 5.3 percent, and the tax on vehicle titles rose from 3 to 4.15 percent (Transportation for America, 2015a, 10–12; Slone, 2013; McMinimy, 2013; Virginia Transportation Construction Alliance, 2013a; Let's Go VA, 2013; Whack and Kunkle, 2013; Schwartz, 2013; McDonnell, 2013).

The largest *state* revenue sources are:

- **Retail Sales and Use Tax**: one-half percent dedicated to the Transportation Trust Fund,[116]

- **Motor Vehicle Sales and Use Tax**: dedicated to special funds within the Commonwealth Transportation Fund,[117]

[115] House Bill 2313, 2013 Va. Acts 766 ("Revenues and appropriations primarily for transportation"), http://lis.virginia.gov/cgi-bin/legp604.exe?131+sum+hb2313. See also "HB 2313 Conference Report," http://hac.virginia.gov/committee/2013_Session.htm.

[116] Va. Code § 58.1-638 ("Retail Sales and Use Tax—Disposition of state sales and use tax revenue"), http://law.lis.virginia.gov/vacode/title58.1/chapter6/section58.1-638.

[117] Va. Code § 58.1-2425 ("Motor Vehicle Sales and Use Tax— Disposition of revenues"), http://law.lis.virginia.gov/vacode/title58.1/chapter24/section58.1-2425.

- **Sales Tax on Motor Fuels**: dedicated to special funds within the Commonwealth Transportation Fund,[118] including for certain transportation districts,[119] and

- **Motor Vehicle Licenses**: dedicated to special funds within the Commonwealth Transportation Fund.[120]

See Table 4.35.

Table 4.35: Virginia State Revenue Sources

Source	FY 2017
Retail Sales and Use Tax	$1,049,900,000
Motor Vehicle Sales and Use Tax	$927,200,000
Sales Tax on Motor Fuels	$886,900,000
Motor Vehicle Licenses	$246,800,000
International Registration Plan	$61,700,000
Recordation Tax	$45,400,000
Motor Vehicle Rental Tax	$39,600,000
Miscellaneous Revenues	$17,000,000
Road Tax	$7,900,000
Aviation Fuels Tax	$2,000,000
Total	**$3,284,400,000**

Source: (Virginia Department of Transportation, 2016a, 14).

By statute, the revenues are dedicated to specific funds within the CTF:

- **Highway Maintenance and Operating Fund (HMOF)** revenues support highway maintenance, operations and administration.[121]

- **Transportation Trust Fund (TTF)** revenues are distributed by formula, as defined by the Code of Virginia, to the Construction Fund, the Mass Transit Fund, the Airport Fund and the Port Fund. The 78.7 percent distributed to the Construction Fund is managed by the Virginia Department of Transportation (VDOT). The 14.7 percent provided to the Mass Transit Fund supports transit operations, capital and special programs and is managed by the Virginia Department of Rail and Public Transportation (DRPT). The Airport Fund's 2.4 percent is provided to the Aviation Board, and the 4.2 percent to the Port Fund is managed by the Virginia Port Authority.[122]

[118] Va. Code § 58.1-2289 ("Virginia Fuels Tax Act—Disposition of tax revenue generally"), http://law.lis.virginia.gov/vacode/title58.1/chapter22/section58.1-2289.

[119] Va. Code § 58.1-2299.20 ("Motor Vehicle Fuels Sales Tax in Certain Transportation Districts—Disposition of tax revenues"), http://law.lis.virginia.gov/vacode/title58.1/chapter22.1/section58.1-2299.20.

[120] Va. Code § 46.2-206 ("Department of Motor Vehicles—Disposition of fees"), http://law.lis.virginia.gov/vacode/title46.2/chapter6/section46.2-206.

[121] Va. Code § 33.2-1530 ("Highway Maintenance and Operating Fund"), http://law.lis.virginia.gov/vacode/title33.2/chapter15/section33.2-1530.

[122] Va. Code § 33.2-1524 ("Transportation Trust Fund"), http://law.lis.virginia.gov/vacode/title33.2/chapter15/section33.2-1524.

- **Priority Transportation Fund (PTF)** revenues are dedicated to debt service on the Federal Highway Reimbursement Anticipation Notes (FRANs) and the Commonwealth of Virginia Transportation Capital Projects Revenue Bonds.[123]

- **Federal Fund** revenues are used for their defined purposes to support construction, maintenance or transit.

- **Northern Virginia Transportation Authority Fund** revenues pass through with 70 percent dedicated to the Northern Virginia Transportation Authority for regional transportation projects, and the remaining 30 percent are distributed to member governments for local projects.[124]

- **Hampton Roads Transportation Fund** revenues pass through and are dedicated to the regional Hampton Roads Transportation Accountability Commission[125] solely for highway construction projects on new or existing roads, bridges and tunnels.[126]

See Table 4.36.

Table 4.36: Virginia Commonwealth Transportation Fund Total Revenues

Fund	FY 2017	
Operating Revenues:		
Highway Maintenance and Operating Fund	$2,109,013,032	
Transportation Trust Fund	$1,737,425,744	
Priority Transportation Fund	$215,661,599	
Bonds	$348,122,435	
Federal Fund	$1,096,843,768	
Total Operating Revenues		$5,507,066,578
Pass Through Revenues:		
Northern Virginia Transportation Authority Fund	$327,200,000	
Hampton Roads Transportation Fund	$168,900,000	
Total Pass Through Revenues		$496,100,000
Total		**$6,003,166,578**

Source: (Virginia Department of Transportation, 2016—FY 2017 CTF Budget, 7–9).

[123] Va. Code § 33.2-1527 ("Priority Transportation Fund"), http://law.lis.virginia.gov/vacode/title33.2/chapter15/section33.2-1527.

[124] Va. Code § 33.2-2509 ("Northern Virginia Transportation Authority Fund"), http://law.lis.virginia.gov/vacode/title33.2/chapter25/section33.2-2509.

[125] In 2014, the Virginia General Assembly established the Hampton Roads Transportation Accountability Commission (HRTAC) to maintain and administer the Hampton Roads Transportation Fund (HRTF). The organization exists alongside the Hampton Roads Transportation Planning Organization (HRTPO), which is the MPO for the region. Although politically independent, the TAC generally consists of the same members as the TPO, with the major exception being that mass transit is not represented on the TAC due to state law prohibiting the use of HRTF funds for mass/public transit purposes.

[126] Va. Code § 33.2-2600 ("Hampton Roads Transportation Fund"), http://law.lis.virginia.gov/vacode/title33.2/chapter26/section33.2-2600.

In 2014, **House Bill 311**[127] replaced Code of Virginia Title 33.1 ("Highways, Bridges and Ferries") with Title 33.2 ("Highways and Other Surface Transportation Systems"), specifying how various transportation revenues can be used.

In 2015, **House Bill 1887**[128] changed transportation funding allocation formulas and how transportation revenues can be used.

The Commonwealth Transportation Board adopted the CTF budget for FY 2017, consistent with controlling statutes, specifying how revenues are to be distributed (Virginia Department of Transportation, 2016a; Virginia Commonwealth Transportation Board, 2016b). See Table 4.37.

Table 4.37: Virginia Commonwealth Transportation Fund Recommended Distributions

Program	FY 2017	
Debt Service	$349,583,100	
Other Agencies and Transfers	$68,122,057	
Maintenance and Operations	$2,111,574,016	
Tolls, Administration and Other Programs	$464,422,437	
Rail and Public Transportation	$582,403,550	
Airport Trust Fund	$24,510,004	
Port Trust Fund	$42,973,756	
Construction	$1,863,477,658	
Total Operating Programs		**$5,507,066,578**
Northern Virginia Transportation Authority	$327,200,000	
Hampton Roads Transportation Accountability Commission	$168,900,000	
Total Pass Through Programs		**$496,100,000**
Total		**$6,003,166,578**

Source: (Virginia Department of Transportation, 2016a, 9).

Notably, Virginia's state statutes include an affirmative use of state funds for bicycle and pedestrian projects: "Nothing contained in this chapter and no regulation promulgated by the Commissioner of Highways or the Board shall be construed to prohibit or limit the ability of the Board or the Department to fund and undertake pedestrian or bicycle projects except in conjunction with highway projects."[129]

For 2015, HRTPO programmed $177.5 million in federal funding for highway projects, and $34.2 million in state and local funding (Hampton Roads Transportation Planning Organization, 2014b, II-3). Because Virginia has a separate state agency, VRDPT, that oversees MPO transit projects, HRTPO's TIP reports on its funding for transit projects separately. The transit portion of the TIP shows $23.6 million in federal funding, and $6.1 million in state and local funding (Hampton Roads Transportation Planning Organization, 2014b, II-5). In total, of the

[127] House Bill 311, 2014 Va. Acts 805 ("Revision of Title 33.1"), http://lis.virginia.gov/cgi-bin/legp604.exe?141+sum+hb311.

[128] House Bill 1887, 2015 Va. Acts 684 ("Transportation funding; formula, reporting, and allocations"), http://lis.virginia.gov/cgi-bin/legp604.exe?151+sum+hb1887.

[129] Va. Code § 33.2-111 ("Funding and undertaking of pedestrian or bicycle projects apart from highway projects not prohibited"), http://law.lis.virginia.gov/vacode/title58.1/chapter22.1/section33.2-111.

$241.4 million in transportation funding available to HRTPO in 2016, 83 percent is federal and 27 percent is state and local.

4.6.3 Planning

VTrans is the long-range, statewide multimodal transportation policy plan that lays out an overarching vision and goals for transportation in Virginia. It identifies transportation investment priorities and provides direction to transportation agencies on strategies and programs to be incorporated into their plans and programs (Virginia Office of Intermodal Planning and Investment, 2017c).

VTrans satisfies federal requirements for a long-range statewide transportation plan[130] and state requirements for a statewide transportation plan[131] (Virginia Office of Intermodal Planning and Investment, 2015a, 6–7).

There have been several iterations of VTrans:

- **VTrans2025** (2004): Virginia's first unified, statewide multimodal plan.
- **VTrans2035** (2009): Built on extensive research to identify long-term trends and issues.
- **VTrans2035 Update** (2013): Transition to performance-based planning with an emphasis on rating priorities.
- **VTrans2040** (currently under development): Fully implement and integrate performance-based planning (Virginia Office of Intermodal Planning and Investment, 2017c).

VTrans2040 will be Virginia's first statewide transportation plan to fully incorporate the performance-based planning and programming approach called for by MAP-21 and Virginia's **House Bill 2**.[132] HB 2 requires VDOT to screen and rank projects based on an objective and quantifiable analysis that considers, at a minimum, five factors relative to the cost of the project or strategy: congestion mitigation, economic development, accessibility, safety and environmental quality (Transportation for America, 2015b; Transportation for America, 2016, 6). In addition to establishing measurable objectives, VTrans2040 will serve as a screen for projects identified through the HB 2 process. HB 2 creates an important link between planning and programing by establishing a scoring process for projects that address a need identified in VTrans2040. The CTB will use this performance-based planning process to inform their funding decisions for the Six-Year Improvement Program (Virginia Office of Intermodal Planning and Investment, 2015a, 4, 9). See Figure 4.16.

[130] 23 U.S.C. § 135(f) ("Long-range Statewide Transportation Plan").

[131] Va. Code § 33.2-353 ("Commonwealth Transportation Board to develop and update Statewide Transportation Plan"), http://law.lis.virginia.gov/vacode/title33.2/chapter3/section33.2-353.

[132] House Bill 2, 2014 Va. Acts 726 ("Allocations within highway construction districts"), http://lis.virginia.gov/cgi-bin/legp604.exe?141+sum+hb2.

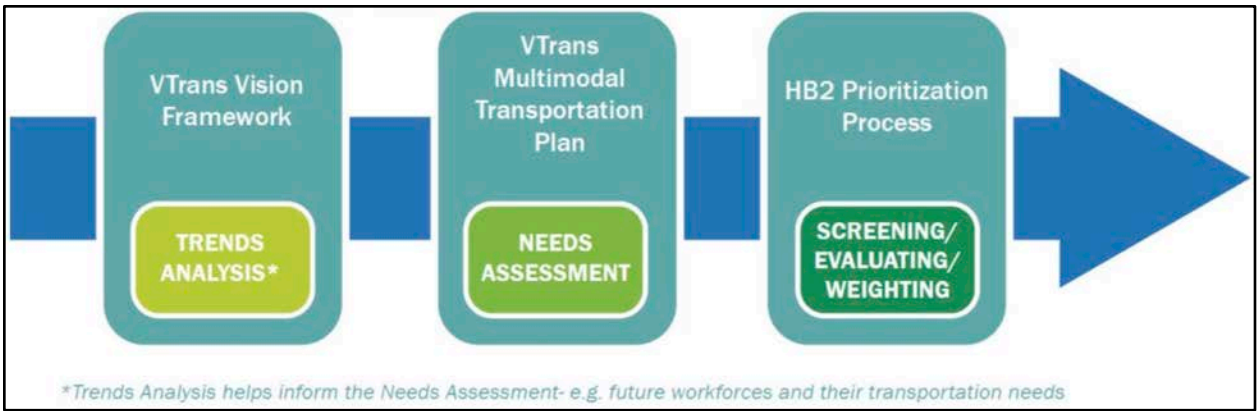


Figure 4.16: Virginia Relationship of VTrans and HB 2 Process
Source: (Virginia Office of Intermodal Planning and Investment, 2015a, 6).

VTrans consists of two documents: a Vision Plan and the Virginia Multimodal Transportation Plan (VMTP), formerly the Virginia Surface Transportation Plan (VSTP) (Virginia Office of Intermodal Planning and Investment, 2015a, 6, 9).

In December 2015, the CTB adopted a vision and guiding principles for VTrans2040. The CTB also adopted these goals and objectives:

1. **Economic Competitiveness and Prosperity**: Invest in a transportation system that supports a robust, diverse, and competitive economy.
    a. Reduce the amount of travel that takes place in severe congestion.
    b. Reduce the number and severity of freight bottlenecks.
    c. Improve reliability on key corridors for all modes.
2. **Accessible and Connected Places**: Increase the opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs.
    a. Reduce average peak-period travel times in metropolitan areas
    b. Reduce average daily trip lengths in metropolitan areas.
    c. Increase the accessibility to jobs via transit, walking and driving in metropolitan areas.
3. **Safety for All Users**: Provide a safe transportation system for passengers and goods on all travel modes.
    a. Reduce the number and rate of motorized fatalities and severe injuries.
    b. Reduce the number of non-motorized fatalities and severe injuries.

4. **Proactive System Management**: Maintain the transportation system in good condition and leverage technology to optimize existing and new infrastructure.

    a. Improve the condition of all bridges based on deck area.

    b. Increase the lane miles of pavement in good or fair condition.

    c. Increase percent of transit vehicles and facilities in good or fair condition.

5. **Healthy Communities and Sustainable Transportation Communities**: Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic and cultural resources.

    a. Reduce per-capita vehicle miles traveled.

    b. Reduce transportation related NOX, VOC, PM and CO emissions.

    c. Increase the number of trips traveled by active transportation (bicycling and walking) (Virginia Commonwealth Transportation Board, 2015; Virginia Office of Intermodal Planning and Investment, 2015b).

The Virginia Multimodal Transportation Plan (VMTP) is currently being developed. OIPI will identify performance targets, priorities and projects that can help advance the VTrans2040 Vision. The foundation for this phase of VTrans will be the policies established in the Vision document, and a multimodal needs analysis that rethinks how Virginia measures and establishes multimodal solutions. A Needs Assessment will serve as a screen for projects applying for consideration under the HB 2 prioritization process. It will assess Virginia's transportation needs at three scales, and will include a statewide assessment of safety needs:

- **Corridor of Statewide Significance (CoSS)**: interregional travel market
- **Regional Networks**: intraregional travel market
- **Urban Development Areas (UDA)**: local activity center market (Virginia Office of Intermodal Planning and Investment, 2017d; Virginia Office of Intermodal Planning and Investment, 2017e; Virginia Office of Intermodal Planning and Investment, 2015c; Virginia Office of Intermodal Planning and Investment, 2015d).

HRTPO adopted its 2040 Long-Range Transportation Plan (LRTP) in 2016 (Hampton Roads Transportation Planning Organization, 2016a).

HRTPO intentionally aligns its goals with Federal Planning Factors, and statewide goals of VTrans 2040. The Goals of HRTPO include:

- Support the Economic Vitality of the Metropolitan area, enabling global competitiveness, productivity, and efficiency.

- Increase the safety of the transportation system for all users including minimizing conflicts between motorized and nonmotorized modes.
- Ensure the security of the region's transportation infrastructure and its users.
- Protect and enhance the environment, promote energy conservation, and improve the quality of life.
- Consider the impact of transportation investments on the environment.
- Promote compatibility between transportation improvements and planned land use and economic development patterns.
- Increase accessibility and mobility of people and goods
- Provide a variety of transportation options that accommodates all users.
- Increase the coordination of the transportation system, across and between modes, for people and goods.
- Promote an efficient and reliable regional transportation system.
- Preserve and maintain the existing transportation system.
- Engage a diverse public in the development of the region's transportation system.
- Continue to work towards finding dedicated and sustainable revenue sources for transportation to close the funding gap (Hampton Roads Transportation Planning Organization, 2016a).

Figure 4.17 depicts how the HRTPO connects regional goals with national planning factors and state goals.

FEDERAL PLANNING FACTORS	*VTrans2040* PLANNING GOALS	2040 LRTP PLANNING GOALS
Support the economic vitality of the metropolitan area.	Economic Competitiveness and Prosperity	Support the economic vitality of the metropolitan area, enabling global competitiveness, productivity, and efficiency.
Enhance travel and tourism.		
Increase safety for motorized and non-motorized users.	Safety for All Users	Increase the safety of the transportation system for all users, including minimizing conflicts between motorized and non-motorized modes.
Increase security for motorized and non-motorized users.		Ensure the security of the region's transportation infrastructure and its users.
Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and Local planned growth and economic development patterns.	Healthy Communities and Sustainable Transportation Communities	Protect and enhance the environment, promote energy conservation and improve the quality of life.
		Consider the impact of transportation investments on the environment.
		Promote compatibility between transportation improvements and planned land use and economic development patterns.
Increase accessibility and mobility for people and freight.	Accessible and Connected Places	Increase accessibility and mobility of people and goods.
Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.		Provide a variety of transportation options that accommodates all users.
		Increase the coordination of the transportation system, across and between modes, for people and goods.
Promote efficient system management and operation.	Proactive System Management	Promote an efficient and reliable regional transportation system.
Improve the resiliency and reliability of the transportation system.		
Emphasize the preservation of the existing transportation system.		Preserve and maintain the existing transportation system.
		Engage a diverse public in the development of the region's transportation system.
		Continue to work towards finding dedicated and sustainable revenue sources for transportation to close the funding gap.

Figure 4.17: Hampton Roads TPO Alignment of Federal, State and Metropolitan Goals
Source: (Hampton Roads Transportation Planning Organization, 2016b, table 1).

HRTPO also identifies approaches and performance measures for each LRTP goal. For example, Table 4.38, shows the approaches and performance measures for the economic vitality goal.

Table 4.38: Hampton Roads TPO Goals, Approaches and Measures for Economic Vitality

LRTP Goal	Approaches / Regional Efforts	Measures
Support the economic vitality of the metropolitan area, enabling global competitiveness, productivity and efficiency.	HRTPO Project Prioritization Tool Rob's Driving the Economy Study Regional Freight Studies	Access to Jobs (Average Travel Time)
		Regional Accessibility (for Regional Priority Projects)
		Transit Accessibility
		Regional Economic Analysis
		Freight Data

Source: (Hampton Roads Transportation Planning Organization, 2016b, table 2).

4.6.4 Programming

Following the 2013 adoption of HB 2313, legislators knew they would have to prove results with the additional revenues. To direct these public dollars to the strongest investments, in 2014 the General Assembly adopted HB 2, with unanimous votes in each chamber.

In 2015, **House Bill 1887**,[133] passed 34-4 in the Senate and 94-1 in the House, shifted highway funds to a new, simple formula. Under the new formula, 45 percent of all funds will be reserved for maintenance and repair. The remaining 55 percent will be split evenly between priority state projects picked through the objective, performance-based ranking process established by 2014's HB 2, and priority local projects selected through regional competitions. Additionally, HB 1887 shifts $40 million annually to transit projects from highway, aviation and ports, upping the Commonwealth's commitment to the growing demand for transit in metro areas. Additional reforms in this law aim to limit the role that politics plays in project selection, and further ensure that funds go to the projects that will deliver real benefits. Specifically, the law will prevent the Governor from removing members of the CTB. The transparent and objective project ranking and selection processes instituted by HB 2, and the simpler formulas and political independence offered by HB 1887, should result in the state's transportation funds—including the new funds raised through the 2013 funding package—going to the projects that best meet local needs (Transportation for America, 2015b, 23–26; Transportation for America, 2016, 9; Sturgeon, 2015).

Virginia's implementation of HB 2, called **SMART SCALE**,[134] is about picking the right transportation projects for funding and ensuring the best use of limited tax dollars. It is the method of scoring planned projects included in VTrans that are funded by HB 1887. Transportation projects are scored based on an objective, outcome-based process that is transparent to the public and allows decision-makers to be held accountable to taxpayers. Once projects are scored and prioritized, the CTB has the best information possible to select the right projects for funding (Virginia Department of Transportation, 2016c).

The SMART SCALE process includes five overarching steps (see Figure 4.18). The preliminary step requires project sponsors to determine their eligibility prior to beginning the SMART SCALE applications process. The final step in the prioritization process includes programming of selected projects (Virginia Department of Transportation, 2016c).

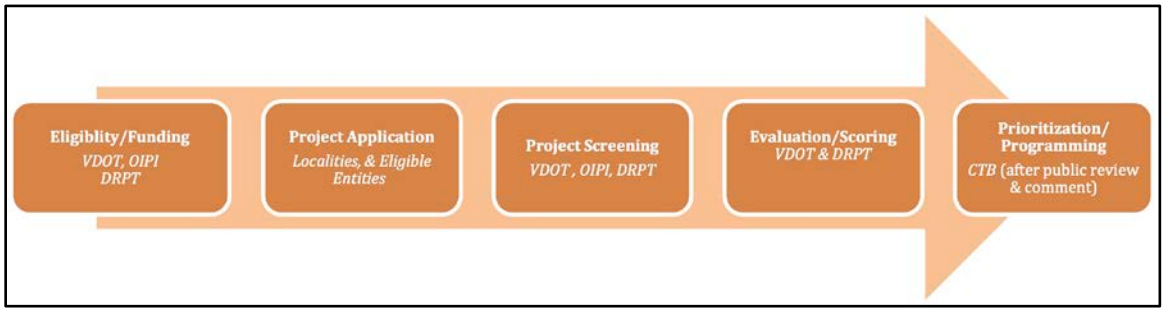


Figure 4.18: Virginia SMART SCALE Process
Source: (Virginia Department of Transportation, 2016c).

[133] House Bill 1887, 2015 Va. Acts 684 ("Transportation funding; formula, reporting, and allocations"), http://lis.virginia.gov/cgi-bin/legp604.exe?151+sum+hb1887.

[134] Va. Code § 33.2-214.1 ("Statewide prioritization process for project selection"), http://law.lis.virginia.gov/vacode/title58.1/chapter22.1/section33.2-214.1.

SMART SCALE projects may be submitted by regional entities, including MPOs and PDCs, along with public transit agencies, counties, cities and towns that maintain their own infrastructure. Eligible project types include:

- **Highway Improvements**: widening, operational improvements, access management, intelligent transportation systems and technology operational improvements
- **Transit and Rail Capacity Expansion**
- **Bicycle and Pedestrian Improvements**
- **Transportation Demand Management**: park-and-ride facilities

Asset management projects—bridge repair/replacement, pavement repair/replacement and guardrail replacement—are not eligible for SMART SCALE funding (Virginia Department of Transportation, 2016c).

Funding for project prioritization comes from two main pathways—the construction District Grants Program (DGP) and the High-Priority Projects Program (HPPP).[135] The DGP is open only to localities. Projects applying for the DGP funds compete with other projects from the same construction district. Projects applying for HPP funds compete with projects from across the Commonwealth. A project application for funds from the HPPP or the DGP must meet an identified need in VTrans2040, which evaluates the Commonwealth's needs at four scales focused on key travel markets and safety needs. Submitted projects must meet a need identified under one or more of the following categories:

1. **Corridors of Statewide Significance (CoSS)**: Key multimodal travel corridors that move people and goods within and through Virginia, serving primarily long-distance/inter-regional travel markets.
2. **Regional Networks (RN)**: Multimodal networks that facilitate travel within urbanized areas/intra-regional travel markets.
3. **Urban Development Areas (UDA)**: Areas where jurisdictions intend to concentrate future population growth and development.[136]
4. **Transportation Safety Needs**: Statewide safety needs identified in VTrans2040 (Virginia Department of Transportation, 2016c).

Once it has been determined that a project meets an identified need, the project is evaluated and scored. A scoring evaluation team takes the project and begins collecting additional data required for evaluating each of the five factors—congestion mitigation, economic development, accessibility, safety and environmental quality—and a sixth factor (land use) in areas greater than

[135] Va. Code § 33.2-358 ("Allocation of funds among highway systems"), http://law.lis.virginia.gov/vacode/title58.1/chapter22.1/section33.2-358.

[136] Va. Code § 15.2-2223.1 ("Comprehensive plan to include urban development areas"), http://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2223.1.

200,000 in population. After the data has been collected for each project sufficient to evaluate each factor, factor scores are calculated and weighted according to the area type where the project is located. After factor scores have been weighted and summed, the final score is determined by dividing the total factor score by the SMART SCALE cost. SMART SCALE utilizes evaluation measures that quantify the benefits of each project for six factor areas (see Table 4.39). These criteria were decided based on input from districts and the public. The CTB made the final decision about criteria and weighting for SMART SCALE.

Table 4.39: Virginia SMART SCALE Evaluation Measures

Factor Area	Measure ID	Measure
Safety	S.1	Number of Fatal and Injury Crashes (50%)
	S.2	Rate of Fatal and Injury Crashes (50%)
Congestion Mitigation	C.1	Person Throughput (50%)
	C.2	Person Hours of Delay (50%)
Accessibility	A.1	Access to Jobs (60%)
	A.2	Access to Jobs for Disadvantaged Persons (20%)
	A.3	Access to Multimodal Choices (20%)
Environmental Quality	E.1	Air Quality and Environmental Effect (50%)
	E.2	Impact to Natural and Cultural Resources (50%)
Economic Development	ED.1	Project Support for Economic Development (60%)
	ED.2	Intermodal Access and Efficiency (20%)
	ED.3	Travel Time Reliability (20%)
Land Use*	L.1	Transportation-Efficient Land Use (100%)

* for areas over 200,000 in population

Source: (Virginia Department of Transportation, 2016c).

Four area weighting typologies were established based on an analysis of transportation, land use and demographic indicators to facilitate evaluation of each project's benefit on a scale relative to the needs of that region as compared across the Commonwealth (Virginia Department of Transportation, 2016c). See Figure 4.19 for an example of a project scorecard.

For each SMART SCALE cycle, the screening and scoring results are presented to the CTB and the public. The CTB provides guidance on program development, and staff develop a draft Six-Year Improvement Program (SYIP) based on the CTB's direction and the SMART SCALE scoring results. A public comment period allows the public to provide input on the draft SYIP, including the scoring results for individual projects. The CTB takes into account public comments regarding the draft SYIP, ultimately approving the SYIP for implementation (Virginia Department of Transportation, 2016c).

HRTPO uses a Project Prioritization Tool to evaluate projects. As Figure 4.20 shows, three types of criteria are used: Project Utility, Economic Vitality and Project Viability. Because of funding constraints, projects are divided into separate modes: Highway, Interchange/Intersection, Bridge/Tunnel, Transit, Intermodal, and Active Transportation. Projects are not compared across modes. All projects are evaluated using the same criteria, but using different weights for different modes. For example, Figure 4.21 shows the weighting factors for highway projects (Hampton Roads Transportation Planning Organization, 2013).

PROJECT SCORECARD

HB2 Funding the Right Transportation Projects

McVitty Road and Old Cave Spring Road Improvements

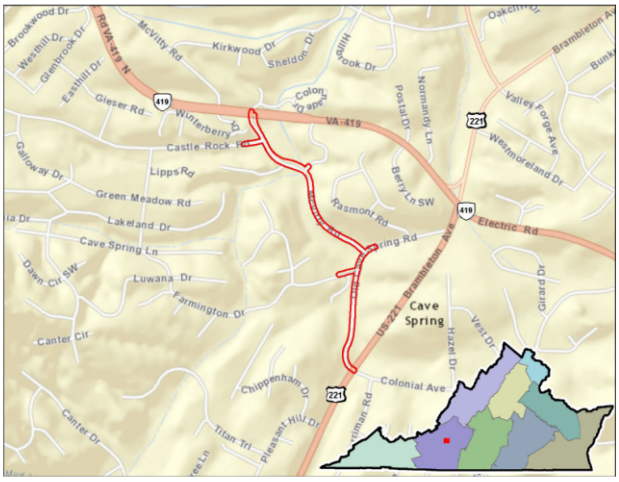
1

App Id: 605

Improve safety and congestion at McVitty Rd (Rte 1662) and Old Cave Spring Rd (Rte 1663) by reconstructing the intersection, widening lanes and shoulders, adding turn lanes, improving curves, and upgrading Rte 419/1662 signal

Project Location	Roanoke County
HB2 Area Type	B
Submitting Entity	Roanoke County
Total Project Cost	$19,305,742
HB2 Request	$12,946,546
Preliminary Engineering	Underway
Right of Way	Underway
Construction	Not Started
Expenditures to Date	$5,388,339
Key Fund Sources	Fed/State Disc.
Administered By	VDOT
Eligible Funding Program(s)	District Grant

2



3

Performance

VTrans Need: Cave Spring Urban Development Area

Click for details

	Project Benefit Score	HB2 COST	TOTAL COST
Final Score	1.4	1.1	0.7
Statewide Rank		177/287	186/287
District Rank		23/37	25/37

4

Congestion Mitigation		Safety		Accessibility			Environment		Economic Development			Land Use
15% of score		20% of score		25% of score			10% of score		20% of score			10% of score
50%	50%	50%	50%	60%	20%	20%	50%	50%	60%	20%	20%	100%
Increase in Daily Person Throughput	Decrease in Person Hours Delay	Reduction in Fatal and Severe Injury	Reduction in Fatal and Severe Injury Rate	Increase in Access to Jobs	Increase in Access to Jobs for Disadvantaged Populations	Improved Access to Multimodal Choices (Users Benefit Value)	Air Quality (Total Benefit Value)	Acres of Natural/Cultural Resources Potentially Impacted	Economic Development Support (Sq. ft.)	Intermodal Access Improvements (Tons Benefit Value)	Travel Time Reliability Improvement	Transportation Efficient Land Use
0	0.3	4.5	2.2	0	0	0	0	8.0		0	7.5	0

Figure 4.19: Virginia Sample SMART SCALE Project Scorecard
Source: (Virginia Department of Transportation, 2015).

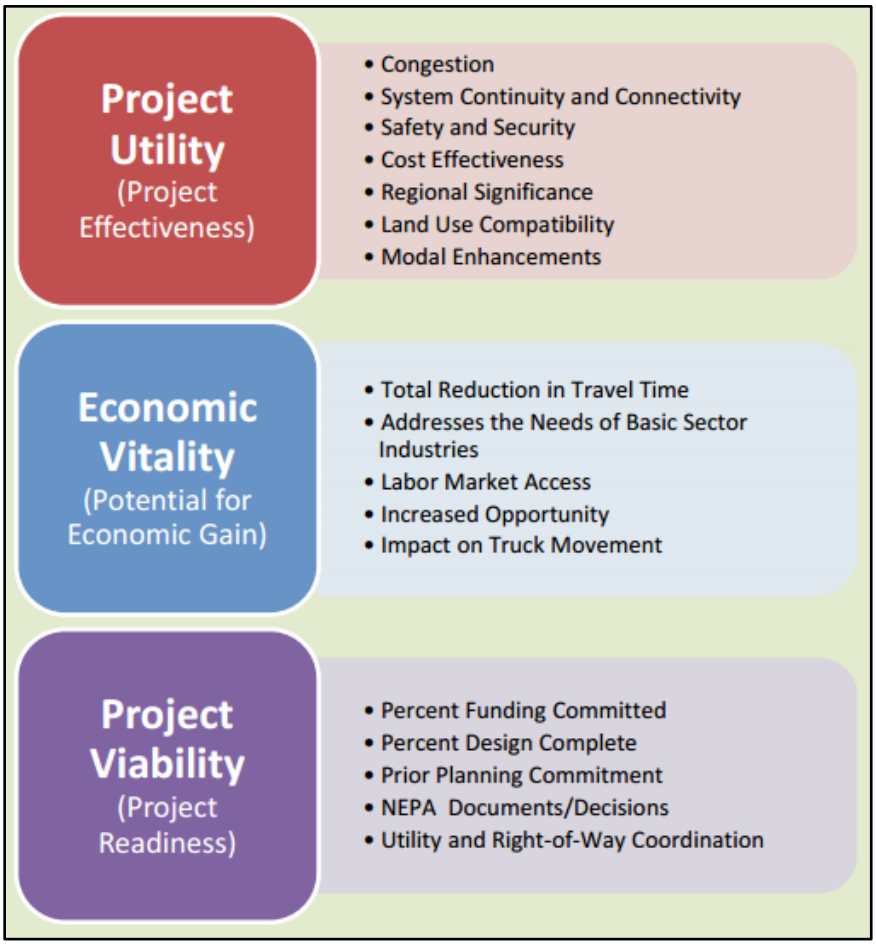


Figure 4.20: Hampton Roads TPO Project Prioritization Tool Criteria
Source: (Hampton Roads Transportation Planning Organization, 2015a).

Highway Projects Weighting Factors	
Criteria and Sub-criteria	**Weighting**
PROJECT UTILITY	
Congestion Level:	30.00
% Reduction in Existing and Future V/C Ratios (Daily Delay)	*10.00*
Existing V/C Ratio	*10.00*
Impact to Nearby Roadways	*10.00*
System Continuity and Connectivity	25.00
Safety and Security:	15.00
Crash Ratio	*8.00*
Improvement to Incident Management or Evacuation Routes	*7.00*
Cost Effectiveness (Cost/VMT)	15.00
Land Use/Future Development Compatibility	10.00
Modal Enhancements:	5.00
Enhances Other Categories	*3.00*
Improves Vehicular Access	*2.00*
PROJECT UTILITY TOTAL	***100.00***
PROJECT VIABILITY	
Percent of Additional Funding (sliding scale 0-50)	50.00
Prior Commitment (project included in the currently adopted LRTP?)	10.00
Percentage of Project Design Complete (sliding scale 1-10)	10.00
Environmental Documents Complete	15.00
Environmental Decisions Obtained	5.00
ROW Obtained/Utilities Coordinated	5.00
Additional Environmental Permits Obtained	5.00
PROJECT VIABILITY TOTAL	***100.00***
ECONOMIC VITALITY	
Total Reduction in Travel Time	30.00
Labor Market Access	20.00
Increase Travel Time Reliability	*10.00*
Increased Access for High Density Employment Areas	*10.00*
Addresses the Needs of Basic Sector Industries	30.00
Increases Access for Port Facilities	*10.00*
Increases Access to Tourist Destinations	*10.00*
Increases Access for Defense Installations	*6.00*
Facility part of STRAHNET	*4.00*
Facility part of "Roadways Serving the Military"	*3.00*
Increased Opportunity	20.00
Provides New of Increased Access	*10.00*
Supports Plans for Future Growth	*10.00*
ECONOMIC VITALITY TOTAL	***100.00***

Figure 4.21: Hampton Roads TPO Highway Project Weighting Factors
Source: (Hampton Roads Transportation Planning Organization, 2013).

4.6.5 Reporting

Like most every jurisdiction, Virginia and its MPOs produce ***ex ante* estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post* outcomes** from such investments.

5.0 SYNTHESIS

As we sought to understand whether states were spending transportation dollars in alignment with livability goals, it became important to understand how goals, criteria and performance measures are related. We also sought to understand how outcomes were measured and reported. Though we studied states and MPOs in detail, our summary here focuses on what our six case study states are doing.

In brief, our research asked four sets of questions:

1. **Planning**: What outcomes do we want? What investments will be effective?
2. **Governance and Finance**: What sources of money are available? How can it be used? Who decides how to use it?
3. **Programming**: What investments do we make?
4. **Reporting**: How did our investments perform? What do we tell the public?

Below we summarize what each state is doing in each of these areas.

5.1 PLANNING

Table 5.1: Summary of Planning in Case Study States

	CA	MA	MN	TN	UT	VA
LRSTP / # of Goals	Cal. Trans. Plan (2016): 6 goals	GreenDOT Impl. Plan: 6 goals	MinnesotaGo (2015): 8 guiding principles w/ objectives	Long-Range Transportation Policy Plan (2015): guiding principles	Long-Range Transportation Plan (2015): 3 goals	VTrans2040 (2015): 5 goals w/ objectives
# of Performance Measures	17 (CTP 2016)	14 (*weMove Massachusetts* 2014)	19 (*Minnesota GO* 2015)	5 (2004)	17 (LRTP 2015)	under development.
Goals / Performance Measures Alignment	crosswalk of goals and performance measures, many align with multiple goals	not clear	performance measures aligned with some objectives, but not all	not aligned	clearly aligned	performance measures in process

Planning focuses on how states identify desired outcomes and develop plans to achieve desired outcomes cost effectively. In this process, states identify goals and performance (or outcome) measures. Under goals, we describe when the most recent goals and performance measures were

adopted and describe whether these are linked. All states have adopted goals or guiding principles in their long-range plan. Some states, like California, adopted performance measures and goals in the same document, and clearly aligned performance measures with goals. The framework for establishing performance measurement varied considerably across states. While some states have been using performance measures for several years, like Tennessee, these performance measures sometimes exist for different purposes outside of the context of the long-range plan. In Massachusetts, the long-range planning is unique, as *weMove Massachusetts* technically serves as the long-range plan but focuses on funding scenarios and does not refer to goals.

In order to ensure desired transportation outcomes are achieved, goals and project selection criteria must be linked to performance measures. This is the crucial final step in implementing transparent and effective transportation programming, and including feedback loops from performance data into project selection. In some of the six case study states, efforts are underway to develop performance measures that are linked to goals and project selection criteria, but currently none of the six have an established performance measurement mechanism that fully integrates project performance into planning and programming.

California's recent CTP 2040 includes a crosswalk of goals and performance measures. However, the performance measures are not linked to project selection criteria. This missing step stunts the state's efforts to achieve performance-based transportation programming. Without linking performance measures to project selection, any effort to link performance measures to goals in the planning stage, as California does with its crosswalk in the CTP 2040, becomes ineffective.

Similarly, Minnesota links objectives to performance measures in its LRTP, *Minnesota GO*, but does not use performance data in selecting projects. Rather, Minnesota uses performance measures to establish programmatic spending levels for different objectives associated with plan goals. This use of performance measures is subjective, and does not fully close the loop between goals and project selection.

Though yet to be fully implemented, Virginia has developed in statute what promises to be a robust and performance-driven project selection system. HB 2 overhauled the state's project selection process. A new LRTP is still in development and will align goals and performance measures with the project selection criteria established in HB 2.

At the MPO level in California, MTC does a better job of linking performance measures with goals and project selection. Projects in the MPO's RTIP that receive funding from MTC are assessed through the Performance Assessment Analysis tool to score candidate projects based on a quantitative cost-benefit analysis and qualitative assessment of the project's progress toward achieving targets. The quantitative analysis uses performance metrics that are linked to plan goals, and the qualitative targets assessment is linked to the desired outcomes of those same goals and performance measures. Many local and county projects are not assessed by the tool because they are included in the RTIP but do not receive MTC funding, but for those projects that are selected using MTC's Performance Assessment Analysis tool, performance measures are aligned and integrated from plan goals through project selection.

5.2 GOVERNANCE AND FINANCE

Table 5.2: Summary of Governance and Finance in Case Study States

	CA	MA	MN	TN	UT	VA
% Federal Funding	21%	22%	23%	35%	25%	26%
Gas Tax Rate, Restrictions & Authorities	18¢/gal, not indexed, not limited to highways, statutory Part II Ch 10 § 8503	21¢/gal, not indexed, limited to transportation, not split by mode, statutory Ch 64A § 13	20¢/gal, not indexed, limited to highways, constitutional Art. XIV § 5.	20¢/gal, not indexed, limited to highways, statutory § 67-3-2001	24.5¢/gal, not indexed, limited to highways, constitutional Art. XIII § 13	17.5¢/gal, not indexed, not limited to highways, statutory § 58.1-22-89
Statutory Allocation	mandatory split of funding to MPOs: 75% (25% for Caltrans). Highway user fees: 44% to cities and counties, 44% to state, 12% to SHOPP	locals and MPOs get allocation of state funding (simple) after skimming off for bridges and state significance	statutory distribution to state, counties and locals	statutory transfer to counties and locals; limit on how much counties can spend on transit	70% to state; 30% to locals; allow for swapping	MPOs have special funding
Simplicity of Funds	multiple pots of funding guiding type of investment; funding from various accounts for ITIP, RTIP and SHOPP.	two funds	one state fund	one state fund	many state funding pots, many of which are voluntary transfers	separated into 3 categories: Fix it First, Federal Restricted, and all other funds (that are not restricted)
State / MPO role	MPO controls funds at regional level (CTC can veto but never has)	state has veto authority over MPOs.	board appointed by governor; larger MPOs have more autonomy than smaller MPOs.			
Do projects compete across modes?	at MPO level; unclear at state level	yes, under PSAC	not clear	not clear	project types have unique criteria	compare projects across modes
Who makes decisions: software vs. people?	California Transportation Commission	Secretary of Transportation	legislature	software	managers have discretion; Utah Transportation Commission	rating by state agency staff

Governance and finance focuses on the sources of funding available, how that funding can be used, and who decides how to make decisions about transportation funding. In this section we summarize the share of federal funding, restriction on gas taxes and statutory allocation of funding. We also look at who has the final say in decision-making and how projects compete across modes.

The relationship between state and MPO varies between the six states and has sizable effect on project selection decision-making at the MPO level. Some states—California and Massachusetts—hold veto power over projects selected by MPOs, although this authority is rarely exercised. The California Transportation Commission would have to veto the entire TIP and has never done so. In practice, California MPOs have a tremendous level of autonomy over decision-making. In Massachusetts, the MassDOT Secretary sits on the board of each MPO. Other states, either through statute, administrative rule or through local option taxes enabled by the legislature, differentiate between large urban MPOs and smaller MPOs. The two large MPOs in Virginia receive additional state funding. Two counties within the Wasatch Front Regional Council in Utah enacted a local option sales tax after 2015 legislation enabled such taxes. Five of seven counties in Minnesota's Metropolitan Council have local option sales taxes for transit, and Minnesota's larger MPOs have greater decision-making autonomy than smaller MPOs, which are subject to greater MnDOT oversight.

State gas tax revenues in Utah, Tennessee and Minnesota are limited to highway uses, either by state constitution or state statute. Gas tax revenues in California, Massachusetts and Virginia are not limited to highways and can be used for other modes. Massachusetts' gas tax is limited to roads, bridges and mass transportation lines.

All six states have some sort of statutory formula for distribution of state transportation revenues to municipal and county governments. Two states—California and Virginia—have special formulas for distributing state transportation revenue directly to MPOs. In California, 75 percent of all state transportation revenue to be programmed into the STIP is allocated to MPOs, and 25 percent is retained for STIP. This 75 percent exists on top of a statutory formula distribution of highway user fees to cities and counties. Thus, the role of the 75/25 percent split serves to ensure most project programming happens at the MPO level, not the state level. The practical result of this split is to make the State Highway Operations and Preservation Plan (SHOPP) Caltrans' primary programming responsibility, instead of new highway expansion programming, which largely occurs at the MPO level. In Virginia, HB 2313 created additional state-level sales tax increases in the state's two largest MPOs. In Hampton Roads MPO, this additional revenue is used to fund highway expansion projects, and in Northern Virginia Regional Commission, 30 percent of the revenue is transferred to localities and 70 percent is used to fund regional transit and highway projects.

Three of the states—Massachusetts, Minnesota and Tennessee—have just one or two state-level funds used for transportation. In two of those states—Minnesota and Tennessee—gas tax revenues are limited to highway purposes. The other three states—California, Utah and Virginia—have multiple state funds or accounts receiving transportation revenues. The use of each of these state-level funds, set aside in separate accounts, is often constrained to that fund's purpose. Some of these funds must be used for debt repayment; some for specific highway corridors; some for administration; some for capital; some for maintenance and repair; and some for specific transportation modes. For example, California's Greenhouse Gas Reduction Fund must be spent

on projects that will reduce greenhouse gases from the state's transportation system. Virginia's Priority Transportation Fund must be used to pay debt service on federal and state notes and bonds.

Whether all types of transportation spending are on an equal playing ground can greatly influence the efficacy of a performance-driven programming process. In all six states, large programmatic categories of spending are set before any project selection process begins. These categories often prioritize maintenance and rehabilitation, safety improvements or retrofits before new capacity projects. Whatever funding is left for new capacity projects is usually separated by mode, and projects within each mode compete with each other for selection and funding. In Virginia and Massachusetts, recent project selection reform legislation directs agencies to compare projects across modes, but the results of these reforms has not yet been measured.

5.3 PROGRAMMING

Table 5.3: Summary of Programming in Case Study States

	CA	MA	MN	TN	UT	VA
Goals / Criteria	criteria not clear	some goals have funding sources directly linked to them; not linked to goals	goals linked to objectives (but not criteria).	clearly aligned	not clear	under HB 2 (SMART SCALE) criteria being developed
How are criteria established?	state level criteria are not clear	not clear	not clear	state agency staff ranking	not clear	staff in agency and public comment (after direction from legislature)
How are weights set?	not clear	not clear; PSAC recommends projects competing across modes through differentiated weighting of same criteria for different project types	not clear	weights assigned to criteria based on agency staff.	not clear	weights vary by rural vs. urban
Criteria / Performance Measures	not clear	not clear	objectives and performance measures linked	not aligned	not clear	in process

Programming involves deciding which transportation projects ultimately receive funding. In discussing programming, we focus on the criteria used to make decisions and how those are linked to goals and performance measures. We look at how criteria are developed and how weights were established.

States are required by federal regulation to establish goals in state transportation plans, but no stringent requirement exists to establish decision-making criteria to assess whether a project complies with goals, despite FHWA guidance encouraging this linkage. Whether a state establishes and uses clear criteria linked to goals is a key bellwether for success in linking transportation expenditures to goals. Of the six states, only Tennessee clearly links plan goals to project selection decision-making criteria. In Massachusetts and Virginia, legislation was passed

to develop and implement project selection processes that clearly link goals to decision-making. Virginia has begun using its new process, but Massachusetts' new project selection criteria have not yet been implemented. State-level project selection criteria in California and Utah are unclear. In California, this is likely because MPOs have primary project selection authority because of the state's 25/75 percent capacity funding split between MPOs and the state, and the state's project selection authority is primarily in highway operations and preservation, through the SHOPP plan. Utah's state transportation commission developed different project selection criteria for four categories of goals, and the criteria are not directly linked to LRTP goals. Managers within UDOT make final decisions about project selection based on subjective reasoning and funding constraints, using a data-driven project ranking tool as a guide.

If project selection criteria are established and used, information on how the agency established those criteria illuminates how the criteria are, or are not, linked to goals and desired outcomes. In California's MTC, a decentralized system is used. Congestion Management Agencies (CMAs), cities, counties and transit agencies establish their own project selection criteria, but those criteria must be consistent with the goals of the MTC's RTP and the California Transportation Plan.

Tennessee convened a group of agency staff and executive leadership to develop project selection criteria that are linked to plan guiding principles. From these criteria, TDOT implemented a software-driven project prioritization and selection system. The technology-driven process aims to provide a level playing field for candidate projects to compete against each other. TDOT managers found, however, that the software selected the majority (82 percent) of projects that they expected to be funded, which might be an indication that managers' bias in selecting system criteria still influences programming results. Further, while Tennessee tracks system performance using a wide range of measures, performance data are not integrated into the software-based project selection process.

Once criteria for project selection are established, agencies often weight the criteria to achieve desired outcomes. In Virginia, weights vary by rural and urban districts. In Tennessee, managers selected weights to be used for each guiding principle in its software-based project selection system, and then changed those weights in the second year of using the system because managers decided the projects being selected were not ideal.

Similar to the role of weights, whether a project selection process evaluates projects across transportation modes, or only evaluates projects within the same mode, greatly affects the process's success in achieving goals.

5.4 REPORTING

Table 5.4: Summary of Reporting in Case Study States

	CA	MA	MN	TN	UT	VA
Use of performance measures?	☐	☐	☐		☐	
Outcomes compared to expected performance?						
Information about outcomes used to inform future decisions?						

Reporting focuses on analyzing outcomes and adjusting expectations while reporting returns on investments to the taxpayers. In this phase, states are expected to measure performance of

investments and evaluate how they performed in alignment with expectations. In this section, we look at how states use performance measures, whether outcomes are compared to expected performance, and information about outcomes are used to inform future decisions.

While most states use performance measures, in Tennessee performance measures are separate from the planning and programming process. In Virginia, performance measures are under development.

In general, we found that states and MPOs produce ***ex ante* estimates of outcomes** from transportation projects: modeling of projects. They also report **outputs** (i.e., a list of constructed projects: transportation investment programs). But researchers found as yet no systematic large-scale efforts to assess and report ***ex post* outcomes** from such investments.

6.0 SOME BETTER PRACTICES

While no states are doing everything needed to implement performance-based planning and programming, several states are using effective strategies to transform their transportation funding, planning and programming to performance-based processes.

From our in-depth look at six case study states , several trends emerge around planning, governance and finance, programming and reporting. Each of these states follows a different framework for transportation project programming, and each state's framework is influenced by unique government structure and legal constraints on transportation funding. Trends in funding, governance structure, project selection decision-making, performance management, and modal considerations are discussed below.

One of this project's key theses is that the failure to address the constraints imposed by existing governance and finance structures is the root of many state and MPO struggles to implement a performance- or outcomes-based approach. Figure 6.1 depicts these simultaneous frameworks, with planning and programming in blue and funding in green. The question mark in the graphic indicates where performance data is not clearly integrated into LRTP and STIP/TIP funding frameworks. Under an assumption that states and MPOs will spend transportation funding in a manner consistent with achieving plan goals, performance data must be integrated into not just the planning and programming framework, but also funding frameworks.

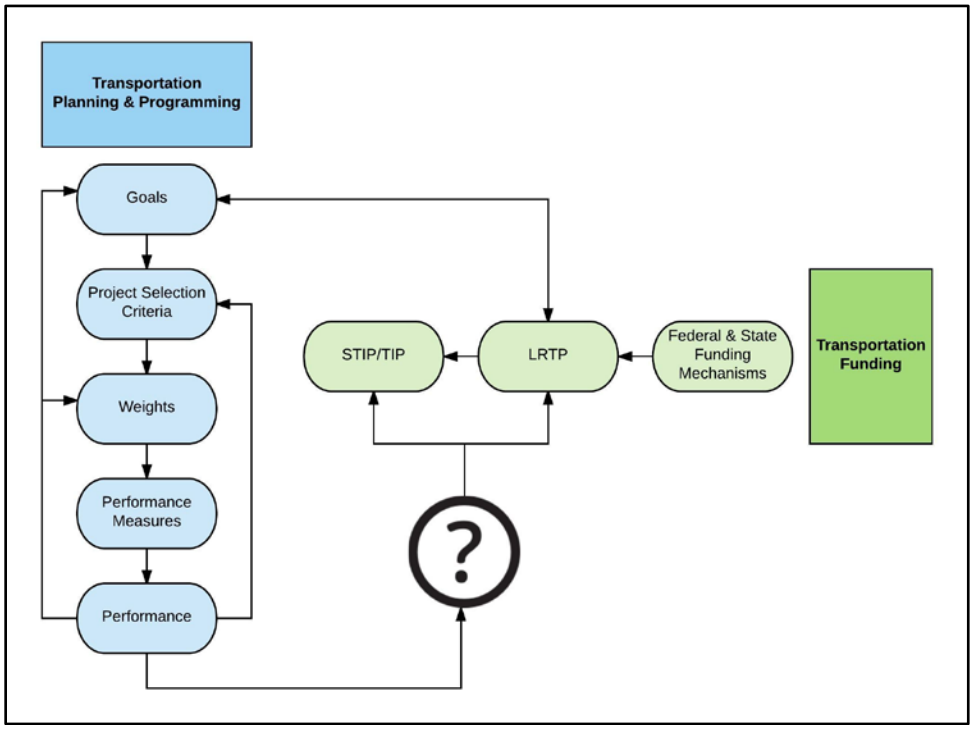


Figure 6.1: Planning and Programming vs. Funding Frameworks

An ideal comprehensive, performance-driven programming system would allow projects to compete across both programmatic categories (i.e., maintenance, safety, capacity) and modes (i.e., highway, transit) by including criteria that assess the costs and benefits of all projects. Performance data should not only inform programming and project selection processes, but also the allocation of funding. Just as planning and programming processes are evolving to better incorporate a performance- or outcomes-based approach, so too must governance and finance structures evolve to support investing the projects that most effectively advance goals.

Short of an ideal comprehensive approach, we highlight some better practices our research identified.

6.1 STRONG STATE DOT OR MPO

One better practice is to have a strong state DOT or MPO with the authority and resources to make effective investments for advancing goals. Virginia DOT and the Bay Area's Metropolitan Transportation Commission are good examples.

6.1.1 Virginia

Because that state owns and VDOT maintains a large amount of road miles, including many roads in municipalities, the state's programming authority is considerably larger than most other states. While two of the state's MPOs are large and primarily urban (Northern Virginia and Hampton Roads), VDOT and the Commonwealth Transportation Commission (CTC) exercise jurisdiction over funding, planning and programming much of the rest of the state's transportation system. This makes the state's recent project selection reform legislation, House Bill 2,[137] more significant than similar legislation in other states. The changes that HB 2 will bring immediately affects more roads, more cities and counties, and more people.

6.1.2 California

The success of the Metropolitan Transportation Commission (MTC) of the San Francisco Bay area in integrating a robust performance-based transportation programming process derives in part from the relative power vested in MPOs by the state. California delegates much of its transportation decision-making authority directly to MPOs. This happens in several ways. First, in 1997 Senate Bill 45[138] created a mandatory funding split between the state and MPOs. Under the law, the state retains statutory amounts for administration, maintenance, operations, and expenditure of the state highway system, and local assistance programs required by state and federal law. Of the remainder, 75 percent of "all transportation funds that are available to the state, including the State Highway

[137] House Bill 2, 2014 Va. Acts 726 ("Allocations within highway construction districts"), http://lis.virginia.gov/cgi-bin/legp604.exe?141+sum+hb2.

[138] Senate Bill 45, 1997 Cal. Stat. 622 ("Transportation funding"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=199719980SB45.

Account, the Public Transportation Account, and federal funds"[139] are allocated to MPOs, with the state retaining 25 percent for state control of interregional projects. SB 45 is set in statute:

> *(a) Funds made available for transportation capital improvement projects under subdivision (e) of Section 163 shall be programmed and expended for the following program categories:*
>
> *(1) Twenty-five percent for interregional improvements.*
>
> *(2) Seventy-five percent for regional improvements. …*[140]

Second, California made its MPOs the primary entities for implementing sustainable communities strategies and reducing greenhouse gas (GHG) emissions from transportation through 2007's Senate Bill 375.[141] Under the law, the California Air Resources Board sets GHG reduction targets for each of the state's MPOs, and requires them to show how the MPO would achieve the GHG reduction goal through RTPs. Although focused around GHG reduction efforts, this law empowered MPOs in California to implement performance-based planning and programming. MPOs were given a performance goal, and are statutorily required to implement project selection processes that ensure the goal will be met.

6.2 PROJECT SELECTION REFORM

Both Massachusetts and Virginia passed legislation aimed at reforming how the state selects which transportation projects will be programmed and funded. In Tennessee, it was the state DOT that led reform efforts.

6.2.1 Massachusetts

In 2013, Massachusetts passed House Bill 3535.[142] The bill established an advisory council to develop new project selection criteria including a formula process:

> *(a) There shall be a project selection advisory council which shall be charged with developing a uniform project selection criteria to be used in the development of a comprehensive state transportation plan as required by section 11.*

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[139] Cal. Sts. & High. Code § 163 ("Transportation Funding Plan"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=163.

[140] Cal. Sts. & High. Code § 164 ("Transportation Funding Plan"), http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=SHC&sectionNum=164.

[141] Senate Bill 375, 2008 Cal. Stat. 728 ("Transportation planning: travel demand models: sustainable communities strategy: environmental review"), http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375.

[142] House Bill 3535, 2013 Mass. Acts 46 ("An Act relative to transportation finance"), http://malegislature.gov/Bills/188/House/H3535.

…

(c) The project selection criteria developed under this section shall include a project priority formula or other data-driven process that shall include, but not be limited to, the following factors: engineering; condition of existing assets; safety; economic impact; regional priorities; and the anticipated cost of the project. The council may divide projects into several categories including, but not limited to: preservation and maintenance of existing assets; modernization of existing assets that improve safety; expansion projects that add to the existing system; and local construction. The factors chosen by the council may be weighted to prioritize specific factors and such weighting of factors may differ by project category as determined by the council.[143]

The bill also requires the state's long-range transportation plan to be consistent with the project selection criteria established by the advisory council:

The plan shall be consistent with the project selection criteria as established by section 11A.[144]

6.2.2 Virginia

Virginia passed HB 2 in 2014 to create a new statewide prioritization process for project selection that directly links goals to project selection:

The prioritization process shall be based on an objective and quantifiable analysis that considers, at a minimum, the following factors relative to the cost of the project or strategy: congestion mitigation, economic development, accessibility, safety, and environmental quality.[145]

The Legislature also directed the state's Commonwealth Transportation Board to weight the six factors according to regional needs:

The Commonwealth Transportation Board shall weight the factors used in subdivision 1 for each of the state's highway construction districts. The Commonwealth Transportation Board may assign different weights to the factors, within each highway construction district, based on the unique needs and qualities of each highway construction district.[146]

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[143] Mass. Gen. Laws ch. 6C, § 11A ("Project selection advisory council"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section11A.

[144] Mass. Gen. Laws ch. 6C, § 11 ("Publication of comprehensive state transportation plan"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section11.

[145] Va. Code § 33.2-214.1:B1 ("Statewide prioritization process for project selection"), http://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-214.1.

[146] *Ibid.* at § B2.

Notably, projects funded by federal funds are not subject to the project selection process created by HB 2.

6.2.3 Tennessee

The Tennessee Department of Transportation's (TDOT) shift to a software-driven project selection process was not the result of legislative directive. Rather, the Tennessee Commissioner of Transportation, who oversees TDOT, directed the agency to develop a transparent process for prioritizing projects. With this leadership, agency executive leadership contracted with a third-party, capital asset management software provider. TDOT started with its LRTP's seven guiding principles, and developed criteria aligned with each principle. The criteria are integrated into the software, which prioritizes all candidate projects based on the criteria and weighting decided by TDOT. The result is a much-reformed overall process for project selection, where projects are prioritized against each other based on staff criteria and weighting to help achieve desired project selection. Thus, the process is a mix of objective data-driven project selection with subjective inputs from staff to help prioritize desired project types.

6.3 FUNDING SWAP

Another innovation is to use funding swaps to get around constraints of how some types of transportation funding can be used.

6.3.1 Utah

Utah, like many states, has a restriction on the use of its state gas tax. When local agencies or other sponsors submit projects to the state or MPOs for inclusion in the STIP or TIP, they cannot rely on relatively unconstrained federal funds to pay for the project. Rather, project sponsors must supply match funding from either local sources or state allocations in order to access federal funds. This sometimes limits the type of projects that sponsors can pursue to highway projects because proceeds from the state gas tax are limited to highway uses. In order to provide greater flexibility for local governments, UDOT allows local governments to swap their local or state funding allocations for funding from the state's federal transportation funding apportionment. This allows local governments to use federal funding for the entire cost of a project. Because no state funding can be used on transit or active transportation projects, the funding swap reduces the limitations placed on MPO planning and programming efforts by funding constraints. By giving local governments as more funding flexibility, Utah opens the door for greatest possible use of performance-based planning and programming that is linked to goals, and not tied to funding constraints.

6.4 LEGAL ENFORCEABILITY

In the course of our research, we considered the question of what happens if a jurisdiction fails to plan to achieve certain outcomes.

6.4.1 Legal Challenges

Sometimes concerned citizens seek the enforcement power of the courts to challenge transportation agencies' efforts to meet plan goals. Litigation over transportation plans is rarely about whether substantive goals are being met, but is usually about the procedure of transportation agencies in developing plans.

Generally, so long as transportation agencies follow the proper procedures for planning and programming, as set out in either federal or state statute, their efforts will be immune from legal challenge, unless the agency fails to meet a specific statutory duty. Courts will not tell a government agency how to meet a statutory goal, or what type of policy choices are appropriate. Instead, courts will rule on whether the specific agency actions challenged are within the agency's legal authority.

Moreover, federal courts' jurisdiction is limited by the U.S. Constitution,[147] and state courts follow the same rule. The Constitution limits judicial jurisdiction to cases and controversies, and prevents courts from engaging in legislative policymaking. In the discussion of case law that follows, courts rule on whether agencies acted within their discretion, or failed to follow a legislative directive, but not whether transportation agencies made proper policy choices.

Because case law on transportation plans is sparse, we use examples from outside our case study states. In the meager case law that exists on transportation plans, many of the cases address the issue of transportation agencies' responsibility for meeting state GHG reduction goals. GHG goals can be thought of as a performance measure for MPOs and states.

In Washington, statutory GHG reduction goals were found to be unenforceable on MPO long-range transportation planning efforts. In *Cascade Bicycle Club v. Puget Sound Reg'l Council*, the court ruled that Puget Sound Regional Council (PSRC), the federally designated MPO and state-designated regional transportation planning organization, did not violate the state law framework in failing to show how it would meet GHGreduction goals in its regional comprehensive plan.[148] Washington's "current statutory framework does not require that the PSRC adopt a transportation plan for the Puget Sound region that achieves its proportional share of the state's goals for reducing greenhouse gas emissions."[149] The state Court of Appeals found that Washington's statewide GHG reduction limit applies broadly to the entire state, and that nothing in the statute requires the MPO to plan for how the region would meet a pro rata share of the statute's mandated GHG reductions, even though PSRC's four-county jurisdiction comprises more than half of the state's population.

The plaintiffs in the case argued that the statute required PSRC to plan for overall GHG reductions of 80 percent below 1990 levels over the plan's 20-year period in the PSRC four-county area. The court found no support for this interpretation of the statute. Rather, the court said, the statute left the question open of how the state would meet the GHG reduction limits, citing subsequent

[147] U.S. Const. art. III, § 2, cl. 1, http://www.law.cornell.edu/constitution/articleiii.

[148] *Cascade Bicycle Club v. Puget Sound Regional Council*, 175 Wn. App. 494 (2013), http://www.leagle.com/decision/in%20waco%2020130722565/cascade%20bicycle%20v.%20puget%20sound%20regional.

[149] *Ibid.* at 499.

legislative and executive actions that directed specific state agencies to achieve GHG reductions. The court further attacked the plaintiffs' argument on the grounds that PSRC can only affect on-road vehicle travel through its regional planning efforts. PSRC cannot affect through its planning efforts "freight rail, commercial or military aircraft, truck movements at industrial facilities, cargo-handling equipment, or oceangoing vessels."[150] PSRC's planning efforts could also not address clean fuels or cleaner vehicle technologies, the two other sources of transportation GHG reduction potential. Thus, the court reasoned, requiring the MPO comprehensive plan to show GHG reductions at the statutory levels would unfairly ignore contributions from sources out of PSRC's ability to plan for.

Washington's statutory scheme for reducing GHG emission lacked specific language in which economic sectors are targeted, which agencies are responsible, and what authority is delegated to agencies to regulate. Without such language, the court concluded, the state's GHG reduction goals are unenforceable.

Washington is not the only state to wrestle with whether planning efforts are the proper mechanism for implementing statutory GHG reduction goals. The court in *Cascade Bicycle Club* specifically found that because "the legislature has not enacted region- or sector-specific measures or standards," the court could not "hold PSRC to standards that do not exist."[151]

In contrast, in California, where the legislature has authorized a state agency to create regional GHG reduction standards through SB 375, a California appellate court found that the San Diego Association of Governments (SANDAG) LRTP must show how it will meet a GHG reduction goal established by executive order.[152] The state supreme court will review the decision's central issue of whether a regional transportation plan must include analysis for consistency with a 2005 executive order's GHG reduction goals.[153]

The plaintiffs in *Cleveland Nat'l Forest Found. v. San Diego Assn. of Gov'ts* challenged SANDAG's LRTP for noncompliance with the California Environmental Quality Act (CEQA), claiming the plan's Environmental Impact Report (EIR) was inadequate.[154] The court agreed that "SANDAG's decision to omit an analysis of the transportation plan's consistency with the Executive Order did not reflect a reasonable, good faith effort at full disclosure and is not supported

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[150] *Ibid.* at 506.

[151] *Ibid.* at 515.

[152] *Cleveland Nat'l Forest Found. v. San Diego Assn. of Gov'ts*, 231 Cal. App. 4th 1056 (2014), http://www.leagle.com/decision/in%20caco%2020141124055/cleveland%20national%20forest%20foundation%20v.%20san%20diego%20assn.%20of%20governments.

[153] *Cleveland Nat'l Forest Found. v. San Diego Assn. of Gov'ts*, 184 Cal. Rptr. 3d 725, 343 P.3d 903 (2015) (order granting petition of review), http://appellatecases.courtinfo.ca.gov/search/case/dockets.cfm?dist=0&doc_id=2096944&doc_no=S223603.

[154] *Cleveland Nat'l Forest Found. v. San Diego Assn. of Gov'ts*, 231 Cal. App. 4th at 1065 (2014), http://www.leagle.com/decision/in%20caco%2020141124055/cleveland%20national%20forest%20foundation%20v.%20san%20diego%20assn.%20of%20governments.

by substantial evidence because SANDAG's decision ignored the Executive Order's role in shaping state climate policy."[155] The structure of SB 375 was crucial to the court's decision on the reasonableness of SANDAG's omission of an analysis of the plan's consistency with 2005's Executive Order S-3-05[156] which requires an 80 percent reduction below 1990 GHG levels by 2050. SB 375 requires the California Air Resources Board to update regional transportation sector GHG reduction targets every eight years through 2050. Thus, it was clear to the court that the timeline of SB 375 and EO S-3-05 are to be considered in unison. SANDAG contended that without a corresponding statute or regulation to translate the Executive Order into "comparable, scientifically based emissions reduction targets," its EIR could not analyze the LRTP's consistency with the Executive Order.[157] The court firmly responded that SANDAG knew that state law requires a continual decrease in transportation-sector GHG emissions, and could not abdicate responsibility under CEQA to analyze the effects of its LRTP in light of state law. Further, the legislature "specifically found reducing greenhouse gas emissions cannot be accomplished without improved land use and transportation policy."[158] The court even makes a nod to the responsibility that authority over transportation funding imbues on transportation agencies: "[omitting 2050 GHG analysis] is particularly troubling where, as here, the project under review involves long-term, planned expenditures of billions of taxpayer dollars."[159]

Another type of challenge to a California MPO's implementation of GHG reductions via a long-range transportation plan came in *Bay Area Citizens v. Ass'n of Bay Area Gov'ts*.[160] In that case, a citizens group argued that the San Francisco Bay Area MPO "should have relied on emissions reductions already expected from preexisting statewide mandates to fulfill their statutory obligation, rather than adopting regional strategies to reduce emissions beyond those already expected from the statewide mandates."[161] This challenge was somewhat opposite to the challenge against SANDAG's LRTP in *Cleveland Nat'l Forest Found*. In *Cleveland Nat'l Forest Found.*, the plaintiffs argued that the MPO had done too little to show how 2050 GHG reduction goals would be met, whereas in *Bay Area Citizens* the plaintiffs argued that the MPO had done too much. The citizens group characterized the MPO's strategies to achieve reduced GHG emissions through land use and transportation strategies to reduce vehicle miles traveled as "draconian."[162] In finding the MPO's LRTP valid, the California Court of Appeals stressed the legislature's regional emphasis for reducing GHG emissions in SB 375 and its delegation of regional targets to the California Air Resources Board.[163] The citizens group also challenged the final LRTP under

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[155] *Ibid.* at 1072.

[156] Governor Arnold Schwarzenegger, Cal. Exec. Order No. S-3-05 (June 1, 2005), http://www.gov.ca.gov/news.php?id=1861.

[157] *Ibid.*

[158] *Ibid.* at 1073.

[159] *Ibid.* at 1075.

[160] *Bay Area Citizens v. Ass'n of Bay Area Gov'ts*, 248 Cal. App. 4th 966, 204 Cal. Rptr. 3d 224 (2016), http://www.leagle.com/decision/in%20caco%2020160630022/bay%20area%20citizens%20v.%20association%20of%20bay%20area%20governments.

[161] *Ibid.* at 975.

[162] *Ibid.* at 976.

[163] *Ibid.* at 1003. "We also conclude the Legislature intended by Senate Bill 375 that the Agencies would develop regional strategies resulting in emissions reductions that would be in

CEQA for inadequately considering alternatives and not responding to comments. The court rejected these challenges, concluded that the MPO had complied with CEQA's procedural requirements, and deferred to the substantive policy choices the MPO made, holding that the MPO's decision to adopt "a plan that did more than the minimum necessary to meet their Senate Bill 375 targets" was a valid "substantive choice a lead agency makes in approving a project."[164] The *Bay Area Citizens* decision reveals the authority that transportation agencies can legally exercise in planning for GHG reductions. Courts' acceptance of agency discretion gives transportation agencies the freedom to implement significantly reformed planning and programming efforts that intend to achieve GHG reduction goals. With SB 375, the California legislature paved the way for the MPO's GHG reduction strategies, and the court in *Bay Area Citizens* upheld the MPO's implementation.

6.4.2 Enforcement Mechanisms

Some states, including California and Massachusetts, have environmental review statutes similar to the federal National Environmental Policy Act (NEPA) that apply to state actions. The laws generally require analysis of the environmental effects of a proposed state project, and that those environmental effects be considered in the project decision-making process.[165] In both the California and Washington court decisions discussed here, plaintiffs brought their claims challenging regional plans' lack of conformity with state climate goals alongside claims alleging State Environmental Policy Act (in Washington) and California Environmental Quality Act (in California) violations. It is difficult to separate the state goal-regional plan compliance issue from the SEPA/CEQA-based legal claims. This is likely because transportation plans themselves provide no specific cause of action for plaintiffs, but instead can only be appealed under an environmental review statute (SEPA/CEQA) or a state administrative procedure act. Administrative procedure acts often leave plaintiffs to struggle with the "arbitrary and capricious" standard of review, which requires plaintiffs to prove that agency actions were taken without supporting analysis or good faith. Environmental review statutes, including SEPA and CEQA, provide "a basis for challenging whether governmental action is in compliance with the substantive and procedural provisions" of the laws.[166] The burden of proof under environmental review statutes is generally lower than in administrative procedure acts, and provide a great possibility of success for plaintiffs. But environmental review statutes also provide a great deal of discretion to

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addition to those expected from the statewide mandates based on our review of the key documents of the Board, the agency responsible for implementing Senate Bill 375. Specifically, the Board's Scoping Plan, and its endorsement of its staff's proposed targets report and technical evaluation of Plan Bay Area, indicate the Board interpreted Senate Bill 375 as calling for the development of such regional strategies to achieve additional reductions."

[164] *Ibid.* at 1021.

[165] See Cal. Pub. Res. Code 21000–21177 ("Environmental Quality"), http://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=PRC&division=13; Wash. Rev. Code § 43.21C ("State Environmental Policy"), http://apps.leg.wa.gov/rcw/default.aspx?cite=43.21c; and Mass. Gen. Laws ch. 30, § 61 ("Determination of impact by agencies; damages to environment; prevention or minimization"), http://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter30/Section61.

[166] See Wash. Rev. Code § 43.21C.075(1) ("State Environmental Policy » Appeals"), http://app.leg.wa.gov/RCW/default.aspx?cite=43.21C.075.

agencies. Generally, so long as alternative proposals are considered, a court will not replace an agency's preferred alternative decision with its own.

Inherent jurisdiction of the courts provides a third lever for challenging agency action or inaction. In Washington, plaintiffs in *Cascade Bicycle Club* sought and received a writ of review of the MPO's plan under the state Constitution granting the courts inherent constitutional power to review agency decisions.[167] Environmental review statutes provide one useful channel for the public to appeal an agency decision, but they are not the only channel. State administrative procedure acts and constitutional jurisdiction of the courts have proved to be feasible levers for enforcement actions against transportation planning and programming agencies. However, all three of these levers to compel enforcement are subject to agency discretion. Statutory direction is the only way to ensure that agencies are responsible for accomplishing specific actions or meeting certain goals. Plaintiffs in California and Massachusetts have succeeded in enforcing agency action because they showed that state agencies were not fulfilling clear statutory duties assigned by state legislatures to reduce transportation-sector GHG emissions.

None of the cases challenge agency programming or project selection processes. This speaks to the general discretion that transportation agencies enjoy in their decision-making. So long as their planning and programming processes following statutory and regulatory guidelines, transportation agencies have wide discretion to utilize whatever processes for programming and selecting projects they choose. The very nature of planning documents makes their language difficult to enforce. While federal law requires that programming decisions must generally be consistent with plans, the implementation of specific targets, actions or recommendations within plans is unenforceable. Plans are meant to guide development trends, but not be a blueprint for every agency decision. The effect of the unenforceability of plan language is twofold: (1) transportation agencies are incentivized to write LRTPs with broad, aspirational language that is not susceptible to specific legal challenge, and (2) without specific project selection criteria set out in the LRTP, a wide range of projects can be argued to fit within the broad, aspirational plan goals. Only a clear, enforceable duty, created in statute, will require transportation agencies to accomplish specific goals or meet specific targets.

[167] *Saldin Sec., Inc. v. Snohomish County*, 80 Wn. App. 522, 910 P.2d 513 (1996), http://www.leagle.com/decision/19961423910p2d513_11413/saldin%20securities,%20inc.%20v.%20snohomish%20county.

7.0 CONCLUSIONS

We set out to learn how effectively states and MPOs with their transportation investments are achieving important public goals, especially economic, health and other livability goals. We studied in-depth six case study states we anticipated would have better practices: California, Massachusetts, Minnesota, Tennessee, Utah and Virginia. We also studied a representative MPO in each state.

Throughout this research, we have been careful to *not* impose our own values on states and MPOs, to not judge whether a state or MPO is pursuing the "right" goals. Rather we took national, state and MPO goals as representations of public desires, and merely inquired about the extent to which states and MPOs are achieving what they assert are their goals.

Alas, we were unable to identify any large-scale systematic reports or data assessing the outcomes of transportation investments. Moreover, we have reason to believe that the lack of systematic self-assessment is not unique to our case studies, but actually the widespread practice with transportation investments in America.

Americans invest something like $320 billion per year in transportation. We know in some detail what outputs they get in return: so many roads, bridges, tunnels built or reconstructed; so much provide transit service; etc. But what we don't know is the extent to which these investments achieve desired outcomes. How effective have these investments been overall at reducing traffic congestion or travel times? Are we seeing the economic activity we expect from transportation investments? Are communities developing more or less as desired as a result of transportation investments? Are there fewer deaths and serious injuries? Are more Americans choosing active modes of transportation and enjoying better health as a result? Overall, we don't know.

To be more precise, such outcomes can and are measured independently. For example, we know that 2016 was the deadliest year on American roads in a decade (Korosec, 2017). But to what extent was that a result of more or less efficient transportation investments? What is the cause and effect from $320 billion spent annually (or the portion intended to improve safety) to a rise or fall in traffic deaths? Are safety investments effective or not?

Absent a clear understanding of cause and effect—these investments for these costs results in the measurable outcomes—one could sympathize with taxpayers skeptical that their money is being well spent.

7.1 RECOMMENDATIONS

We did not find sufficient data to answer our basic research question: to determine the effectiveness of transportation investments. But we recognize that our case study states and MPOs, even if not yet providing a level of accountability for delivering outcomes we hoped to see, are innovating and striving to do better.

Based on what we learned from our case studies, we recommend that transportation agencies interested in increasing accountability and transparency consider these actions:

1. Measure project performance and integrate performance into project selection. MAP-21 and the FAST Act require agencies to create performance measures, but agencies must take the extra initiative to implement performance-based programming and project selection processes.

2. Remove constraints on state-level funding. Once a performance-based project programming process is implemented, constraints on funding that might inhibit selection of projects in accordance with performance-based decision-making should be eliminated. The broad range of constraints—limitations on the use of gas taxes, formula splits for operations and capital expenditure, funding programs earmarked for modes or corridors, debt repayment, etc.—can prevent the availability of adequate funding to program GHG-reducing projects. While some formulas make sense for maintaining statewide equity, for example, rural-urban splits, an overall neutrality of available funds helps ensure that project selection decision-making will reflect GHG reduction goals. States with fewer state-level funds have greater flexibility to rely on a performance-based project selection system to program most available state funds. However, sometimes specialized or constrained state funds can help ensure that a GHG reduction goal is met.

3. However, sometimes specialized or constrained state funds can help ensure a particular goal is met. For example, the Greenhouse Gas Reduction Fund in California, which is funded by revenues from the state's carbon cap-and-trade program, is earmarked for transportation and land use projects that will reduce GHG emissions. While constrained state funds such as these can help secure funding for a particular goal in the interim, if a truly performance-driven system for project selection is implemented the need for constraints on funds disappears.

4. Integrate funding constraints into project selection processes. Some funding constraints cannot be removed, such as those attached to federal funding, or states with constitutional limitations on the use of gas tax revenues. These funding constraints should be integrated into the goal, project selection and performance measure feedback loop.

5. Require project sponsors to identify the source/color of money used for their match funding. This will allow MPOs and/or states to determine how state funding mechanisms influence the type of projects that are included in TIPs. When states and MPOs start comparing the type of projects that sponsors want to build versus the available funding sources and their constraints, they can advocate for fewer constraints on those funding sources in order to satisfy their transportation needs. For example, if transit projects score best in performance-based project selection processes, but large portions of available funding cannot be spent on transit due to constraints on funding (including restrictions on state gas tax revenues), agencies can show legislatures that existing match funding sources are inadequate.

7.1.1 Recommended Four-Phase, Outcomes-Based Approach

But what is really needed is less of an ad hoc set of recommendations and more of a refined approach to transportation decision-making that focuses on achieving desired outcomes effectively.

MAP-21 and the FHWA's guidance for performance-based planning and programming are steps in that direction. But by failing to emphasize **outcome** measures over **output** measures, and by failing to address the real-world obstacles that governance and finance structures can create to achieving desired outcomes effectively, such policy changes are necessary but not sufficient.

As an outgrowth of this research project, we developed a separate toolkit for practitioners. Drawing on what we learned from our case study states and MPOs, as well as other jurisdictions across the country, the toolkit offers a comprehensive, four-phase framework for outcomes-based, transportation decision-making. See Figure 7.1.

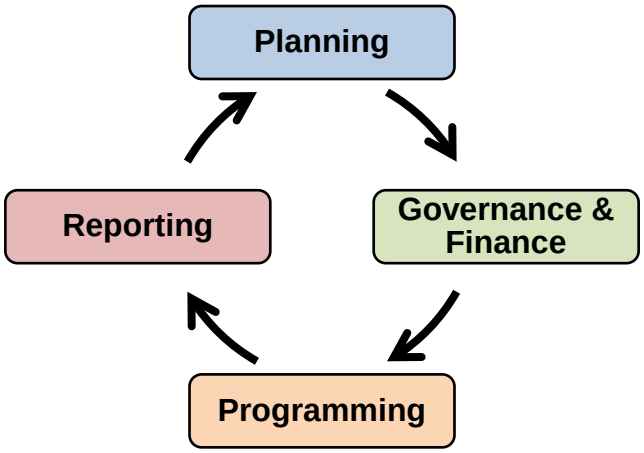

Figure 7.1: Comprehensive, Four-Phase Framework for Outcomes-Based Decision-Making

The toolkit offers practical suggestions in eight areas. See Table 7.1.

The ideas in the toolkit are not new, but rather build on performance management practices generally and especially on guidance from FHWA (2013c). Moreover, as it was beyond the scope of this project, the toolkit is not intended to be a definitive and complete how-to guide, but rather a high-level introduction with recommendations, examples and links to additional resources. Our hope is that this separate toolkit might spur discussion and innovation (Zako and Lewis, 2017).

Table 7.1: Summary of Toolkit Recommendations

Phase 1: Planning *What outcomes do we want? What investments will be effective?* ➢ Develop performance measures that reflect local priorities. ➢ Plan to achieve desired outcomes cost-effectively.
Phase 2: Governance & Finance *What sources of money are available? How can it be used? Who decides how to use it?* ➢ Tie sources of funding to desired outcomes. ➢ Provide flexibility to make cost-effective investments. ➢ Delegate investment decisions to policymakers with sufficiently broad authority.
Phase 3: Programming *What investments do we make?* ➢ Make cost-effective investments to achieve desired outcomes.
Phase 4: Reporting *How did our investments perform? What do we report to the public?* ➢ Analyze outcomes and adjust expectations. ➢ Report returns on investments to taxpayers.

7.2 NEXT STEPS

This research uncovered a potential shortcoming in how transportation decision-making is conducted today in America: a lack of accountability to taxpayers as to what outcomes their transportation investments provide. A future research project, for example, as a followup to AASHTO's recent 50-state review (2016) could be to determine which states, if any, are providing comprehensive reports on the effectiveness of their transportation investments in achieving desired outcomes.

We are encouraged by the incremental progress towards more accountable and transparent transportation decision-making we are seeing. Indeed, just over the course of our research project, several jurisdictions adopted significantly revised approaches, especially to how they select projects. Such innovations are partly spurred by MAP-21 but in several cases are prompted by jurisdictions looking to maintain or improve taxpayer trust in order to be able to develop sufficient revenues to invest in the transportation system. It would be worthwhile to check back with several jurisdictions after another LRTP or TIP cycle to determine what real-world lessons are being learned.

Another future research project would be to focus more closely on how to assess outcomes, and what political, economic or technical barriers exist to doing so comprehensively.

Finally, our practical toolkit (Zako and Lewis, 2017) is not intended to be a definitive guide to outcomes-based transportation decision-making, but more of a suggestive introduction that points the way. A future research project is to develop a detailed how-to guide for states and MPOs wanting to embrace a comprehensive, outcomes-based approach.

8.0 LIST OF ACRONYMS

The following acronyms are commonly used.

AASHTO	American Association of State Highway and Transportation Officials
BTS	(U.S.) Bureau of Transportation Statistics
CMAQ	Congestion Mitigation and Air Quality Improvement Program
DMV	Department of Motor Vehicles
DOT	Department of Transportation
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GAO	(U.S.) Government Accountability Office
GHG	greenhouse gas
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
ITS	intelligent transportation system
LRSTP	long-range statewide transportation plan
LRTP	long-range transportation plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	metropolitan planning organization
MTIP	metropolitan transportation improvement program
MTP	metropolitan transportation plan
NEPA	National Environmental Policy Act
NGO	non-governmental organizations

NRDC	Natural Resources Defense Council
NCSL	National Center for State Legislatures
OMB	(U.S.) Office of Management and Budget
PBPP	performance-based planning and programming
RTP	regional transportation plan
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users
STIP	state transportation investment program
STP	(U.S.) Surface Transportation Program
TEA-21	Transportation Equity Act for the 21st Century
TIP	transportation improvement program
RTIP	regional transportation improvement program
VMT	vehicle miles traveled
VHD	vehicle hours of delay
VHT	vehicle hours of travel

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