



PART III

Sustainable Transportation Systems

Chapter 11: Environmental Sustainability	11-1
Chapter 12: Climate Change Adaptation.....	12-1
Chapter 13: Livability.....	13-1

Introduction

The C&P report has traditionally focused on physical conditions—as measured by pavement ride quality, bridge deficiencies, and transit asset conditions, etc.—and on operational performance—as measured by levels of highway congestion, travel times, frequency of transit service, etc. However, given the impact of transportation on the human and natural environments, it is important to consider sustainability in order to evaluate overall system performance more comprehensively.

Social performance, or the performance of the system in enhancing the quality of life and the livability of communities, is also important, though an even more difficult area to measure. While performance metrics in transportation environmental and social arenas have not traditionally been tracked by transportation agencies, Part III of this report attempts to characterize the environmental and social performance of the system with regards to the “Environmental Sustainability” and “Livability Communities” goals identified in the *U.S. DOT Strategic Plan FY 2010–FY 2015*.

For environmental sustainability, the U.S. DOT goal is: “**Advance environmentally sustainable policies and investments that reduce carbon and other harmful emissions from transportation sources.**” In addition, the following outcomes have been identified:

- Reduction in transportation-related carbon emissions, improved energy efficiency, and reduction in use of oil in the transportation sector
- Reduction in transportation-related air, water, and noise pollution and impacts on ecosystems
- Increasing use of environmentally sustainable practices and materials in the transportation sector.

For livable communities, the U.S. DOT goal is: “**Foster livable communities through place-based policies and investments that increase transportation choices and access to transportation services.**” In addition, the following outcomes have been identified:

- Increased access to convenient and affordable transportation choices
- Improved public transit experience
- Improved networks that accommodate pedestrians and bicycles
- Improved access to transportation for people with disabilities and older adults.

Defining Sustainability

There are numerous ways to define sustainability. One of the most commonly cited definitions was developed by the 1987 United Nations (UN) World Commission on Environment and Development, also known as the Brundtland Commission. The Commission defined sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

A March 2010 Report prepared for the U.S. Federal Highway Administration (FHWA), entitled “*Criteria and Tools for Sustainable Highways*,” explores how organizations have “attempted to define sustainability and address it at strategic and programmatic levels.” The report discusses two views of sustainability in the transportation sector, including one that focuses only on transportation and another that takes a holistic approach viewing transportation as an aspect of sustainable development, but not the focal point. The report recognized that there are many definitions for sustainable transportation. However, in an effort

to create a more commonly understood definition, the report includes one of the more frequently used definitions, from the Centre for Sustainable Transport in Canada, which identifies the following as attributes of a sustainable transportation system:

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations.
- Is affordable, operates efficiently, offers choices of transport mode, and supports a vibrant economy.
- Limits emissions and waste within the planet’s ability to absorb them, minimizes consumption of nonrenewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

The American Public Transportation Association (APTA) has defined sustainability for the public transportation industry as:

- Employing practices in design and capital construction, such as using sustainable building materials, recycled materials, and solar or other renewable energy sources to make facilities as “green” as possible.
- Employing practices in operations and maintenance such as reducing hazardous waste, increasing fuel efficiency, creating more efficient lighting, and using energy-efficient propulsion systems.
- Employing community-based strategies to encourage land use and transit oriented development designed to increase public transit ridership.

One concept that adds context to sustainability is the triple bottom line. The triple bottom line includes three components—economic, environmental, and societal. In transportation, the triple bottom line relates to sustainable solutions in the areas of the natural environmental systems surrounding the transportation system, the economic efficiency of the system, and the societal needs (e.g., mobility, accessibility, safety, and equity). These three concepts are often used by the transportation industry—during transportation planning and design—to provide a basis for sustainability that is not a singular focus on building “green” roads and bridges, but a more comprehensive approach to transportation.

The triple bottom line themes—environmental, economic, and societal— will be prevalent throughout this discussion. The overarching term, “sustainable transportation systems,” encompasses all three components—environmental, economic, and societal. Some organizations use the terms “livability” and “sustainability” interchangeably, but for U.S. DOT purposes, the term “sustainability” is generally used in conjunction with environmental sustainability, while livability discussions largely focus on the society (community).

The Triple Bottom Line

The triple bottom line concept adds context to the definition of sustainability through the use of three components—economic, environmental, and societal. The concept of the triple bottom line was created in 1998 by John Elkington for private sector use in developing more sustainable business practices. The concept has since been adopted by other industries, including the public sector. In transportation the triple bottom line related to sustainable solutions in the areas of the natural environmental systems surrounding the transportation system, the economic efficiency of the system, and the societal needs (e.g., mobility, accessibility, safety, and equity). These three concepts are often used by the transportation industry—during transportation planning and design—to provide a basis for sustainability that is not a singular focus on building “green” roads and bridges, but a more comprehensive approach to transportation. Additional information on the triple bottom line can be found at <https://www.sustainablehighways.org/296/what-is-sustainability.html>.

HUD/DOT/EPA Interagency Partnership for Sustainable Communities

In June 2009, the U.S. DOT, Department of Housing and Urban Development (HUD), and the U.S. Environmental Protection Agency (EPA) initiated an Interagency Partnership for Sustainable Communities (Partnership) to improve access to affordable housing, provide more transportation options, and lower transportation costs while protecting the environment in communities nationwide. Six livability principles were established to act as a foundation for interagency coordination as follows:

- Provide more transportation choices
- Promote equitable, affordable housing
- Enhance economic competitiveness
- Support existing communities
- Coordinate policies and leverage investment
- Value communities and neighborhoods.

Through the Partnership, the three Federal agencies coordinate existing and new programs. The U.S. DOT and HUD provide staff and resources to support EPA's Smart Growth Technical Assistance Program. The U.S. DOT also collaborates with EPA in the administration of HUD's Sustainable Communities Planning Grants, designed to fund coordinated regional planning. In addition, HUD and EPA provided technical assistance in the evaluation of U.S. DOT's Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant applications, for which livability and sustainability were two key criteria. Twenty-two of the 50 projects that were awarded focused on livability by giving Americans choices about how they travel and improving access to economic and housing opportunities in their communities.

The TIGER II Grant Program furthered the collaborative process, with U.S. DOT, HUD, and EPA working together to evaluate applications for \$35 million in U.S. DOT's TIGER II Planning Grants and \$40 million in HUD's Sustainable Communities Challenge Grants. These grants encourage comprehensive planning activities that should ultimately lead to projects that integrate transportation, housing, and economic development.

In July 2010, U.S. DOT awarded nearly \$300 million in Urban Circulator and Bus Livability grants. The urban circulator grants will fund streetcar, bus, and other urban transportation projects that connect destinations and foster walkable, mixed-use redevelopment. The bus livability grants support Partnership principles by improving bus service and facilities; encouraging development around public transit; and giving riders better access to jobs, health care, and education.

The Partnership will continue to identify barriers to and strategies for coordinating transportation, housing, and environmental programs and investments. Modifications will be proposed to address barriers that are based on Federal administrative rules or regulations. Efforts will be undertaken to work with Congress to address barriers that require legislative action, such as changes to U.S. DOT's, HUD's, or EPA's planning requirements.

Chapter 11 and Chapter 13 each provide more information on specific initiatives under the HUD/EPA/U.S. DOT Partnership.

Organization of Part III

Part III of this report is broken down into three chapters, each of which provides a broad overview of the concept that will be covered and citations for where additional information on related topics can be found. Where relevant data are not available at this time, this section includes a discussion on potential additional data collection and performance indices that could be utilized to measure progress in the future.

Chapter 11, **Environmental Sustainability**, provides an overview of the transportation system in terms of its environmental impacts. The chapter looks at goals for sustainable transportation and some potential indices to measure progress.

Chapter 12, **Climate Change Adaptation**, provides information on anticipated potential future changes due to a changing climate, such as higher sea levels and increased temperatures, and the resulting impact on transportation. The chapter looks at steps to assess adaptation needs. Examples of the FHWA and State DOT adaptation efforts are also provided.

Chapter 13, **Livability**, presents an overview of how transportation can improve livability in communities across the Nation with a focus on the characteristics, goals, and benefits of livability. It also includes a preliminary discussion on potential livability indices to measure progress. This chapter provides data and information to provide awareness of the benefits of livable communities and the U.S. DOT and transportation's role in this effort.

