The National Center for Sustainable Transportation will address the U.S. Department of Transportation’s (DOT) strategic goal to advance environmentally sustainable policies and investments by asserting national leadership in reducing carbon emissions from transportation systems while supporting climate adaptation activities and continued mitigation of air pollution and other environmental impacts.

Many of the transportation sector’s most significant and damaging environmental impacts have been substantially alleviated, including impacts on air, water, natural ecosystems, and human health. One major impact that has so far received limited attention, however, is climate change. Climate change is a game changer for transportation, calling for sharp reductions in greenhouse gas (GHG) emissions from passenger and freight travel, as well as infrastructure resilience in preparing for extreme weather. Fortunately, almost all strategies to reduce GHG emissions from transportation also improve economic efficiency, energy security, social equity, livability and health, and other aspects of environmental sustainability.

The goal of the National Center is to transform the transportation system to improve environmental sustainability nationwide. We aim to provide leadership that produces meaningful action and outcomes by mobilizing innovative and accomplished research teams and partnering with influential individuals and stakeholder groups. To provide this leadership, we will build upon the well-established and highly influential transportation centers in our consortium to develop a self-supporting center that will launch influential research and education programs fully integrated with an aggressive program of engagement.

The National Center will:

- mobilize a network of universities to generate knowledge and tools that address climate change and environmental sustainability in transportation;
- design and evaluate real-world strategies that contribute to mitigation of GHG emissions and other environmental impacts; and
- deliver knowledge and tools to state DOTs, Metropolitan Planning Organizations (MPOs), local governments, and other stakeholders to support implementation of these real-world strategies.

To effect rapid and substantial change, the National Center’s research program will target high-priority transportation issues for government, industry, and community leaders. Our research initiatives are organized in the following four areas, though many projects will overlap these boundaries:
Low-Carbon Infrastructure and Efficient System Operation: Strategies to improve system efficiency usually also reduce energy consumption, GHG emissions, air pollution, and other environmental impacts for both passenger travel and goods movement. Strategies to reduce the carbon intensity of infrastructure often reduce overall costs and provide greater resiliency to commodity price fluctuations. The National Center will develop and assess strategies that reduce carbon emissions associated with infrastructure provision and systems operation. We will target better lifecycle use of materials and practices in roadway construction, maintenance, and operation. We will also target innovative Intelligent Transportation System (ITS) approaches that generate environmental benefits in addition to improving safety and mobility, including using information and communication technologies to create new mobility services, improve traffic flow, and motivate eco-driving.

Low-Impact Travel and Sustainable Land Use: State, regional, and local governments are increasingly pursuing land-use and transportation strategies that provide greater accessibility at substantially lower levels of energy and resource consumption with improved economic performance. The National Center will develop and assess strategies to promote low-impact travel and sustainable land use in urban, suburban, and rural settings for both passenger and goods movement. We will target strategies that shift travel from solo driving to more-efficient and low-carbon modes, including transit, walking and biking, and “new mobility” services; reduce “logistics sprawl” for goods movement; and shape land use to enhance the viability of sustainable driving alternatives while improving accessibility to jobs, housing, recreation, and services.

Toward Zero-Emission Vehicle and Fuel Technologies: Improvements in vehicle and fuel technologies are largely responsible for the tremendous progress that has been made in reducing air pollution, and they show great potential for doing the same for GHG emissions. The need to further improve energy efficiency and reduce GHG emissions is motivating a shift to new-generation vehicle and fuel technologies, particularly biofuels and the full range of electric vehicles, including battery, plug-in hybrid, roadway-powered, and fuel cell electric vehicles. The National Center will support the transition toward zero-emission vehicle and fuel technologies through research on lifecycle emissions, full private and social costs, consumer behavior, and regulatory and market policies.

Institutional Change: Advances in infrastructure and operations, land use and travel, and vehicles and fuels will require changes in the institutions that shape the transportation system, particularly within federal, state, regional, and local agencies. Agency roles must evolve, especially for state DOTs and MPOs, and new financial and regulatory structures are needed. The National Center will develop and disseminate innovative tools that agencies need to support implementation of policies and programs to reduce GHG emissions and produce environmental, economic, and social co-benefits, and will identify and evaluate best practices for institutional change to achieve meaningful progress.

Significantly reducing GHG emissions and adapting to climate change requires a comprehensive approach that addresses each of these areas, for all modes and settings for people, services, and goods. No single segment of the transport sector, public or private, and no one strategy on its own can achieve substantial reductions in GHG emissions. The National Center’s research will address this full range of issues within the context of the full breadth of environmental, economic, and social co-benefits.
Overview of National Center Activities

Research Areas with Crosscutting Dimensions