

**NEW ENGLAND TRANSPORTATION CONSORTIUM  
RESEARCH PROBLEM STATEMENT**

**Due to netc@ctcandassociates.com by January 24, 2020**

**I. PROBLEM TITLE**

Data and Information to Support Cost Effective Transportation GHG Mitigation in Rural Communities.

**II. RESEARCH PROBLEM STATEMENT**

*Clearly define the problem and provide sufficient evidence to support its importance to the New England region. The statement should discuss the gaps in current knowledge, literature, and studies that demonstrate the research need.*

The need to reduce greenhouse gas (GHG) emissions from the transportation sector is widely acknowledged and there have been many studies evaluating the effectiveness of different types of mitigation strategies (1–10). However, there remains a large gap in understanding what strategies would be effective in small communities and rural regions where homes and destinations are less dense and the population is more automobile dependent (11, 12). The lack of rural transportation GHG mitigation research is highlighted in the concluding remarks of a TRB 2<sup>nd</sup> Strategic Highway Research Program (SHRP 2) study on GHG mitigation decision making which states that “By far, and not surprisingly, most of the research on GHG emissions reduction strategies has focused on metropolitan areas or at the national and state levels.” and that “...very little attention has been given to nonurban areas.”(11).

At the same time, most New England states have adopted aggressive GHG reduction goals. Transportation has become the largest GHG producing sector in New England and will therefore require substantial reductions if states are to meet their climate mitigation goals. In fact, many New England states are expected to adopt a cap on carbon emissions from on-road transportation fuels as part of the Transportation and Climate Initiative (TCI). Prior research not only raises concerns about the lack of knowledge regarding the effectiveness of many transportation GHG mitigation strategies in rural areas, but also the potential for carbon pricing policies to have negative impacts on rural communities that are often poorer and more automobile dependent (8, 13, 14). As New England states work to reduce transportation GHGs, there is an urgent need to better understand how to design mitigation strategies and targeted infrastructure investments that achieve GHG mitigation goals in rural and small communities while also supporting equitable outcomes and economic development.

The overall goal of this project is to provide DOTs and their regional partners with new information that can be used to support transportation GHG mitigation strategies in New England’s many small communities and rural areas. To accomplish this, the project will evaluate existing knowledge and data in the region that can be used to support the implementation of cost effective and equitable GHG mitigation strategies and infrastructure investments in rural areas that may also enhance economic development opportunities. The project will also identify opportunities for collecting additional data that can be used in existing analysis frameworks or to develop new tools to better support GHG mitigation decisions in smaller communities and rural areas.

## References

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### III. RESEARCH OBJECTIVES

*Define specific research objectives. These may be more specific than the broad need described in Section II. These should be project objectives (expected results) and not tasks or methodology.*

***Objective 1: Develop a Comprehensive Understanding of State DOT Climate-Related Transportation Planning Needs.***

The purpose of this objective is to develop a comprehensive understanding of the planning and decision-making needs of New England DOTs and the regional transportation planning agencies they support for implementation of cost effective and equitable GHG mitigation projects, policies and plans in small communities and rural regions. This includes surveying agency staff (and possibly other important stakeholders) involved with planning, policy and project development in small communities and rural regions through questionnaires, interviews, or focus group meetings. The outcome of this objective will include a prioritized table summarizing current transportation GHG mitigation decision-making needs in small communities and rural regions.

***Objective 2: Identify current best practices and innovations.***

The purpose of this objective is to identify how state DOTs within and outside of New England currently evaluate GHG mitigation strategies and plans in smaller communities and rural regions, including what data are collected and used, what models and tools are used, and how decisions are made. The focus will be on DOTs and regional transportation planning agencies that plan for areas with populations in small communities and rural regions. The research will identify current best practices with a focus on those that have been demonstrated to support cost effectiveness and equitable outcomes and those with potential to enhance rural economic development opportunities. The research will also identify innovative practices that show potential for use in the New England region. The outcome of this objective will be a summary of best and innovative practices prioritized by applicability to decision-making needs in rural and small communities in New England.

***Objective 3: Catalog and evaluate existing data resources and decision support tools.***

The purpose of this objective is to identify existing sources of data and tools that may be used to support transportation-related GHG mitigation decisions in rural and small communities. While there are many guidance documents, tools and models to help support transportation-related GHG mitigation decisions, most have been developed for urban areas and many may be invalid or infeasible in small communities and rural regions. For example, the data and research supporting most guidance and modeling tools is from urban areas and necessary data may be missing or difficult to collect in smaller communities and rural areas. The outcome of this objective will include: (1) a table of existing decision support guidance and tools that includes a summary of capabilities (e.g., what types of decisions can they support, their ability to support GHG reductions, cost-effectiveness, equitable outcomes, and economic development opportunities) and an assessment of which are based on research that applies to small communities and rural regions and (2) a catalog of existing data resources that may be used to support GHG mitigation decisions in small communities and rural regions.

***Objective 4: Gap Assessment***

The purpose of this objective is to synthesize the findings from Objectives 1-3 and to identify gaps in current data and analysis methods for supporting the GHG mitigation decision-making needs of DOTs and the regional planning agencies they support in small communities and rural regions. The outcome of this objective will include a gap assessment matrix identifying (1) current decision-making needs, (2) existing data and methods to address needs, and (3) gaps that could be addressed to better support decision-making needs. The gap assessment will also discuss a range of steps that state DOTs could take to address identified gaps including current best practices and innovative practices as well as additional data collection and research. The gap assessment will provide both short term and long term steps to increase state DOT capacity

to implement cost effective and equitable transportation GHG mitigation strategies and infrastructure investments in small communities and rural regions that support GHG reductions and economic development.

#### **IV. COST ESTIMATE**

*An estimate of the funds necessary to accomplish the objectives described in Section III.*

Approximately \$175,000 over two years to support personnel and regional travel costs associated with the project.

#### **V. RESEARCH PERIOD**

*An estimate of the number of months necessary to complete the research. In addition, include preparation of a Draft and Final Report and its review by the NETC project Technical Committee (90 days).*

Each of the 4 research objectives is expected to take approximately 6 months to complete. The final objective includes the preparation of a draft and final report. The research period is therefore estimated to be 24 months.

#### **VI. URGENCY AND PAYOFF POTENTIAL**

*A description of the urgency of the need for this research in relation to the transportation needs of the six New England States. A discussion of the potential benefits to be derived from the anticipated research results i.e., time/cost savings, enhanced practice/performance, improved safety, other.*

Most New England states have already adopted aggressive GHG mitigation goals and are implementing and considering strategies to reduce GHG emissions from their transportation sectors. Furthermore, many New England states are expected to adopt a cap on carbon emissions from on-road transportation fuels as part of the TCI in the near future. There is very little existing research and guidance on transportation related GHG mitigation decision making in smaller and more rural communities. Concerns about the impact of carbon pricing policies on rural regions have also been raised by government officials, the public and the research community. While there are many possible strategies to reduce transportation GHG emissions in small communities and rural regions and address the potential negative impacts of carbon pricing strategies on rural regions, little is known about how effective and equitable these strategies are in rural and small communities, and guidance to support decisions in more rural contexts is currently absent. The outputs of this project will provide state DOTs and the regional partners they support with urgently needed information about existing data and methods they can use to make more cost effective and equitable GHG mitigation policy, planning and infrastructure investment decisions in the smaller communities and rural regions that make up much of New England. The project will also identify gaps in necessary data and decision support tools and strategies for addressing these gaps in the future.

#### **VII. IMPLEMENTATION POTENTIAL**

*To aid NETC in deciding whether to fund this project, describe:*

- *The intended DOT audience(s) for using the research products.*

This project aims to provide information to support the cost effective and equitable mitigation of transportation GHG emissions in small communities and rural regions. The intended DOT audience are staff involved with GHG mitigation policy and engineers and planners (agency staff and consultants) that need better information about how to design and plan projects in small communities and rural regions to minimize GHG emissions. Some research outcomes are expected to provide information that can be immediately used to support decision making needs (for example, practices used by other DOTs in rural regions or data resources that may exist but are currently underutilized) while other outcomes will identify areas where additional data collection and research is needed. The research will identify strategies and rural infrastructure investments that support equitable and cost effective GHG mitigation and may also increase rural economic development opportunities and increase the value of existing rural transportation infrastructure.

- *Type of implementation anticipated as a result of the project (i.e. confirm existing, adopt new or eliminate current standards, specifications, processes, policies, regulations or drawings, GIS application).*

The project will identify existing data, tools and other resources to support cost effective and equitable transportation GHG mitigation in small communities and rural regions. This will provide information that can positively impact GHG mitigation decisions in the near term. The project will also identify data and knowledge gaps. The gap assessment will provide DOTs with information for developing strategic research plans that identify additional cost effective and equitable strategies and infrastructure investments for mitigating GHG emissions in small communities and rural regions while also supporting economic development.

- *Activities to facilitate implementation (e.g. brochures, posters, exhibits at conferences, tech sheet summaries, webinars, presentations, training workshops, peer exchanges, pilot or demonstration project at host agency) to help create awareness and facilitate implementation of the research results.*

Implementation will be facilitated through several products including:

- A comprehensive research report that describes current resources, the gap analysis and strategies for addressing knowledge gaps.
  - A presentation that summarizes the main findings of the study at a meeting of DOT stakeholders or as a NETC webinar.
  - A 2-page policy brief that describes the main study findings and next steps that DOTs can take to increase their capacity for implementing cost-effective and equitable transportation GHG mitigation strategies and infrastructure investments in small communities and rural regions while supporting economic development.
  - Presentations about the study findings by the research team at professional and research conferences with the aim of highlighting transportation research needs in small communities and rural regions.
- *Anticipated barriers or constraints to implementation and ways to overcome them.*

The first objective is designed to minimize barriers to adoption by ensuring the research team fully understands the current needs and constraints of each agency. This includes



\_\_\_\_\_  
Signature\*

Date

\*Attached email/correspondence may substitute signature

**NOTE: To expedite the processing of Research Problem Statements, NETC requires submittal by e-mail from signing Advisory Committee member to ([netc@ctcandassociates.com](mailto:netc@ctcandassociates.com)) by January 24, 2020.**