

## Vermont Smart Growth, VMT and GHG Research

### PROJECT TITLE

Vermont Smart Growth, VMT and GHG Research

### STUDY TIMELINE

July 2022 – June 2024

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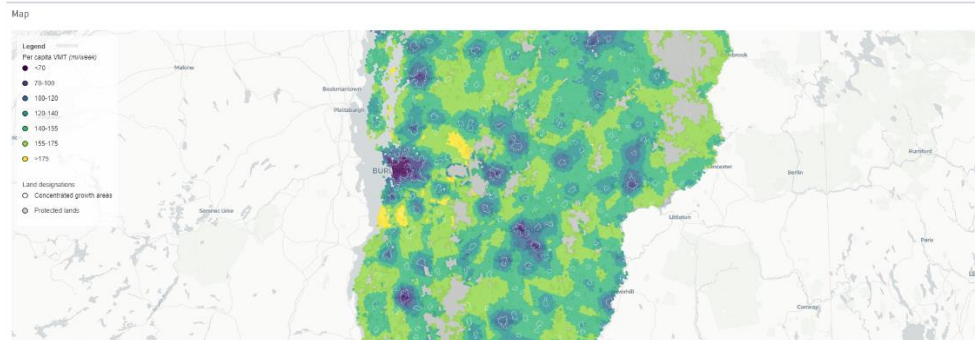
\$140,000



More information about the VTrans Research Program, including additional Fact Sheets, can be found at:  
<http://vtrans.vermont.gov/planning/research>

## Introduction

The Global Warming Solutions Act (GWSA) targets an 80% reduction in greenhouse gas (GHG) emissions below 1990 levels by 2050. Given transportation makes up the largest share of GHG emissions in the state, the Climate Action Plan identifies reduction of vehicle miles traveled (VMT) as a key pathway to achieving the GWSA targets and recognizes the need to quantify the potential for smart growth strategies to reduce VMT and GHG. This project has leveraged big data to understand how compact, mixed-use development in Vermont affects VMT, GHG emissions, and other VMT reduction co-benefits (i.e. health, safety, and reduced maintenance costs) compared to more dispersed development patterns.



## Methodology

The research team has developed a model estimating VMT based on passively collected location-based services data and built environment factors across Vermont. The model is linked to downstream estimates of changes in GHG emissions, health impacts, and other co-benefits associated with VMT reductions. The project team, in coordination with stakeholders, developed several future growth scenarios, modeling the implications of land use policies and influential built environment parameters. The various future scenarios and adjustable parameters are embedded in an interactive dashboard tool (see above or follow [link](#)) to enable exploration by decision makers and the public.

## Conclusions

The most effective scenario evaluated in this research prioritized growth in low VMT areas and emulated prototype communities in Vermont with smart growth characteristics. Based on the GHG reduction required to meet GWSA targets, this smart growth scenario was able to achieve over 15% of the annual reduction required to meet the target by 2050. Moreover, this concentrated growth, balanced land use scenario demonstrated the benefits of smart growth strategies for Vermont communities aimed at emulating places that achieve low per capita VMT. Benefits of this scenario included:

- Reduced GHG emissions by over 13,000 metric tons annually;
- Avoided 1 traffic death per year;
- Avoided over 31 traffic injuries per year;
- Reduced physical inactivity mortality by nearly 4 lives annually;

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- Reduced annual maintenance costs by over \$1.5 million; and,
  - Avoided 364 additional road miles.

Combined with the results from each scenario, case studies of a selection of Vermont communities, including Rutland, Springfield, and Morrisville, revealed key research takeaways, including:

- Denser, mixed land uses require job proximity to achieve targeted VMT reductions;
- Vermont's historical settlement patterns and landscape of denser centers surrounded by more rural areas lends itself inherently to smart growth strategies; and,
- Regional neighbors influence VMT where condensed movement patterns within town centers may serve some needs complemented by more expansive travel patterns to adjacent communities to serve other needs.

## **Potential Impacts and VTrans Benefits**

The project helps VTrans and other stakeholders understand how land use policy and future development patterns may help meet GHG emission reduction targets as promulgated in the Vermont Pathways Analysis Report. Further, this project seeks to understand how smart growth development patterns may improve safety outcomes, reduce infrastructure maintenance costs, and provide health benefits in Vermont communities.

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