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New England
University Transportation Center

Year 25 Final Report

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Project Title:

A Multi-Scalar Model to Identify the Causes of Decreased Vehicle Miles Traveled (VMT) in the United States

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Problem Description

This project sought to understand the causes of the recent downturn in vehicle miles travel (VMT) in the United States, a phenomenon that has been labeled "Peak VMT" or "Peak Travel." Peak VMT is important because transportation funding mechanisms are strongly tied to VMT levels where fuel tax revenues are directly impacted by driving levels and vehicle fuel efficiency. With respect to expenditures, governments in the U.S. at multiple levels often use VMT totals to allocate highway and roadway funds. Assuming the trends of the previous 50 years to continue, transportation policy-makers are predicting continued VMT increases into the future despite the peak and decline that is now observed across the U.S. Using estimates that do not recognize or account for Peak VMT will result in planning and building transportation systems that fail to meet societal demands as well as result in significant funding shortfalls as expected revenues fail to materialize. Accordingly, it is important to understand why Peak VMT is occurring in order to build appropriate sustainable, resilient and cost-effective transportation infrastructure for the future. In addition, continued transportation planning that fails to coordinate with greenhousegas reduction planning (which often calls for strategies to reduce VMT) will result in competing rather than complementary approaches, and will threaten the effectiveness of both planning processes.

The overarching question of the first part of the research was: "What are the causes and consequences of the recent trajectory of VMT in the United States?" It was informed through the following project objectives:

1. Develop a multi-scalar, multi-step model that incorporates socioeconomic variables impacting travel behavior to assess how changes in these variables have affected travel behavior in the recent past and to identify which specific variables should be utilized as predictors of travel behavior into the future.

2. Determine the specific cause(s) of this historic reversal in travel behavior.

3. Educate policy-makers and practitioners regarding research project findings.

The second part of this project involved switching to the scale of the individual city to better understand how local policies regarding automobiles (such as those relating to parking policies and freeway construction) affected urban form and hence VMT. This aspect of the project essentially involved doing in-depth historical research into land use for the City of Bridgeport and comparing it to what exists in the current day to visualize the extent to which land use has been given over to automobiles. Research in other related projects has linked parking provision definitively to increased VMT. Details about the data, methodology, and results can be found in Timothy Garceau's Doctoral Dissertation as well as publications that he was the primary author on (see list of Products as well as appendices). His research was supported by this UTC project.

Results

The work conducted under this grant has been impactful in identifying that the downward trend in VMT in the US is not a recent phenomenon. In fact, when VMT data are analyzed at the state level, it is evident that VMT decreases date back as far as twenty years, beginning with the state of Washington. This is very important because policy-makers have been

interpreting this phenomenon as something that happened recently, and adopting a "wait-and-see" approach. VMT is an important determinant of many policy-oriented issues, most importantly funding. The pre-existing notion was that VMT and economic growth were positively correlated—so the more VMT, the more growth and vice versa. Our research shows that economic growth is able to take place within an environment of declines in VMT which suggests that the entire way that VMT metrics are used in policy need to be rethought. Presentations at the Transportation Research Board in January 2015 and the news article written by the Washington Post about the research garnered a great deal of attention. The data associated with the project have been made publicly available via the Washington Post website to extend discussion and analysis of this phenomenon.

Once this portion of the work was completed, we shifted the scale of our analysis to individual cities to better understand the linkages between urban form and VMT. This work was undertaken by MSc student, Kristin Floberg. The major finding of her work was across cities, the amount of land used for streets was fairly stable, at around 25%. Other automobile-related uses such as freeways and parking were associated with higher rates of automobile-dependence.

This work reinforces findings from earlier studies funded by this UTC, and builds upon it by presenting visualizations of changes in the urban fabric in different cities that illustrate changes in the walkability of urban environments that are designed for the automobile.

Impact

This work has highlighted the variation from place to place of the trends in VMT, and looked more in-depth at how specific public policies regarding automobiles (as reflected in policies related to parking provision and freeway construction) play a role in shaping mode choice and VMT in particular cities. Through our upcoming Symposium, we will share our findings with a wide range of stakeholders to help them better understand how to revitalize cities.

Web links

https://www.cnu.org/publicsquare/2017/05/24/stubborn-reliance-facts
https://events.r20.constantcontact.com/register/eventReg?oeidk=a07eeih6xud75e121c3&oseq=&c=&ch=

Dissertation

A Multi-Scalar Model to Identify the Causes of Decreased Vehicle Miles Traveled (VMT) in the United States, Timothy J. Garceau, PhD Dissertation, University of Connecticut, 8/3/2015
http://digitalcommons.uconn.edu/cgi/viewcontent.cgi?article=7078&context=dissertations

Thesis

Change in Urban Fabric Through Space and Time at Differing Levels of Automobility, Kristin A. Floberg, Masters Thesis, University of Connecticut, 12/18/2016
http://digitalcommons.uconn.edu/cgi/viewcontent.cgi?article=2131&context=gs_theses

Journal publications
Garceau, T., Atkinson-Palombo, C., and Garrick, N., Peak Car Travel in the United States: A Two-Decade Long Phenomenon at the State Level *Transportation Research Record*, (Accepted
03/15).

Garceau, T., Atkinson-Palombo, C., and Garrick, N., Peak Travel and the Decoupling of Vehicle Miles Travelled and Gross Domestic Product: A Synthesis of the Literature, *Transportation Research Record: Travel Behavior* (2014), 1, 2412, 41-48.

Garceau, T., Atkinson-Palombo, C., Garrick, N. and Ahangari, H., Decreasing Vehicle Miles Traveled (VMT) per capita in the United States: The Role of the Back-to-City Movement, Smart Growth Policy, Demographic Changes and Increased Poverty, Transportation Research Board, 2016 Annual Meeting (submitted 8/1/2016). **This publication was not accepted for publication or presentation. It is currently under revision:** Garceau, T., Atkinson-Palombo, C., Garrick, N. and Ahangari, H., The State of Driving in the United States: A Study of Travel Behavior Factors at the State-Level, Under Revision for submission to the Journal of Transport Geography.

Floberg, K., Atkinson-Palombo, C., and Garrick, N., An Assessment of How Land is Used in Cities at Different Levels of Automobility, Transportation Research Board Annual Meeting, 1st August 2016. (This paper received good reviews but was considered not yet ready for publication. The paper was revised and resubmitted.)

Floberg, K., Atkinson-Palombo, C., and Garrick, N., Walkability Lessons from the Past, Congress for New Urbanism. Submitted for presentation at the CNU Conference in Seattle, May
2017, and for publication on the CNU website. Accepted 3/23/17.

Books, dissertations, or one-time publications
Garceau, T. PhD Dissertation on "Vehicle Miles Travelled: An Analysis of Trends and Implications", August 2015.
Floberg, K, MSc Thesis: Walkability Lessons from the Past. Defended: December 2016.

Other publications, conference papers and presentations
Explaining Peak Car Travel: Analyzing State-Level Patterns to Identify Factors Related to Driving Reductions in the United States. *Association of American Geographers 2015 Annual Meeting*, Chicago, IL (Apr. 2015)

Invited: Peak Car Travel at the State-Level in the United States. University of Massachusetts Transportation Engineering Transportation Seminar. Amherst, MA (Apr. 2015)
Peak Car Travel in the United States: Two-Decade Long Phenomenon at the State Level. *Transportation Research Board 94thAnnual Meeting*, Washington, D.C., lectern session 15-3449 (Jan. 14, 2015)

Peak Car Travel in the United States: Two-Decade Long Phenomenon at the State Level. *Transportation Research Board 94thAnnual Meeting*, Washington, D.C., poster

presentation P15-6155 (Jan. 13, 2015)

Keene State College, Sustainability Planning Course 2/24/15; Guest lecture / delivered a variation of the TRB talk

Central Connecticut State University 3/23/15: Research Talk on Peak Car Travel
Floberg, K., Atkinson-Palombo, C., and Garrick, N., Walkability Lessons from the Past, American Association of Geographers, Annual Conference, Boston, April 2017. Presented in Session on Re[Evaluating] Transportation Sustainability.

Floberg, K., Atkinson-Palombo, C., and Garrick, N., Walkability Lessons from the Past, Congress for New Urbanism. To be presented at the Congress for New Urbanism Conference in
Seattle, May 2017.

The findings of Ms. Floberg's research, along with other work done by students in the Atkinson-
Palombo/Garrick lab (the Sustainable Cities Research Group) is to be presented to stakeholders
at a Symposium to be held in Hartford, Connecticut, on October 20th 2017.

Media
The Washington Post: The American Decline in Driving Actually Began Way Earlier Than You Think. http://www.washingtonpost.com/blogs/wonkblog/wp/2015/01/16/the-american-declinein-
driving-actually-began-way-earlier-than-you-think/