Information

For the

Senate Committee on Transportation & Homeland Security

The Role of Land Use in Reducing On-Road Mobile Source Emissions

Provided by:

Josias Zietsman, Ph.D., P.E.
Director
Center for Air Quality Studies

Texas Transportation Institute
The Texas A&M University System
College Station, TX

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Addressing Interim Charge 1: Recommend ways to maximize the contribution of alternative transportation modes and evaluate what impacts they have on congestion and air quality.

Mobile source emissions can be divided into two categories: on-road and non-road. On-road mobile source emissions are the focus of this testimony and include highway vehicles ranging from light-duty vehicles operating mostly on gasoline to heavy-duty vehicles operating mostly on diesel fuel. Emissions produced by these vehicles include seven criteria pollutants such as oxides of nitrogen (NOx) and carbon monoxide (CO), numerous air toxics such as formaldehyde and benzene, and a few greenhouse gases such as carbon dioxide (CO₂). The emissions impact of on-road mobile sources can be reduced by:

- technology improvements;
- improved traffic operations; and
- reductions in vehicles miles of travel (VMT), and to a much lesser extent, vehicle trips.

Land use strategies can have a direct impact on reducing VMT and the number of vehicle trips by:

- reducing the number of trips (with the added benefit of fewer cold starts);
- shortening trip lengths; and
- facilitating the use of alternative modes such as transit and walking.

These effects can be achieved through the following land-use strategies:

- compact developments (higher density of land uses);
- intermixing and balancing of complimentary land uses (some land uses are complimentary – for example, retail, residential, and office); and
- transit-oriented developments (developments created around transit stations and nodes).

In a study by the Harvard Kennedy School of Government, it was shown that *compact developments* could have a significant impact on VMT. For example, doubling the residential density across a metropolitan area can reduce VMT by up to 25%. However, such a reduction can only be achieved with a greater concentration in employment.¹ The Texas Transportation Institute (TTI) performed a study looking at the percentage of trips internally captured by *mixed-use developments*. It was shown in this study that two such developments - Legacy Town Center in the Plano area and Mockingbird Station in the Dallas area can reduce the number of trips by 25-to-40% by internally capturing such trips as pedestrian trips.² Arrington and Cervero have shown that the transit mode share at *transit-oriented developments* is between 5 and 50%.³ In TTI’s study of mixed-use developments, it was shown that 15% of external trips to the different land uses at Mockingbird Station – a transit-oriented development – arrived by transit (train or bus).⁴

These land use strategies can be achieved by:

- infill developments as opposed to sprawled developments;
- redevelopment of obsolete uses;
- careful mixing and balancing of compatible uses; and
- appropriate development around transit stations and nodes.
In conclusion, appropriate land use strategies can reduce VMT by reducing the number and lengths of trips and promoting the use of alternative modes. A reduction in VMT will reduce the amount of criteria pollutants, air toxics, and greenhouse gases emitted into the atmosphere improving public health and reducing the impact on the environment.

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iv Bochner, Brian, Kevin Hooper, and Benjamin Sperry. *Improved Method For Estimating Internal Capture For Mixed-Use Developments*. Draft final report, NCHRP Project 8-51, November 2009,