FY 2010 RESEARCH PROBLEM STATEMENT

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ODOT Research Unit
200 Hawthorne Ave. SE, Suite B-240
Salem, OR 97301-5192

Office Phone: (503) 986-2700
FAX Phone: (503) 986-2844

TITLE (*more info*)

Quantification of GHG Emissions

PROBLEM (Description of need) (*more info*)

The 2008 Transportation Energy Data Book published by the U.S. Department of Energy indicates the average passenger-mile energy efficiency of automobiles (including cars and light trucks), is significantly better than the average passenger-mile energy efficiency of bus transit service on a national basis. Tables 2.13 and 2.12 may be found here: http://cta.ornl.gov/data/chapter2.shtml . This sort of information is highly variable by location and is not readily available at the state or local level. This is also true for Oregon.

Oregon is about to launch several policy initiatives designed to reduce GHG emissions from transportation. It is important that these initiatives are based on sound data regarding fuel efficiency (on a passenger-mile basis) and GHG emissions. It is also important to understand where transportation managers' decisions are likely to have a significant impact on these data. This implies the tasks below may be very important to informing transportation policy-makers as they develop policies to reduce GHG emissions from transportation activity.

PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY (*more info*)

1. Develop a current energy consumption per passenger-mile estimate for the primary bus transit provider in each of Oregon's six MPO areas. Adjust for fuel type to estimate GHG emission intensity per passenger-mile. Exclude paratransit services, but include fuel used during deadheading and adjust for out-of-direction passenger-mileage. Compare the results to similar estimates for automobiles (including out-of-direction mileage by automobiles).

2. Discuss how technology, fuels and energy efficiency (on a passenger-mile basis) are likely to change for new buses within the next five years.

3. For comparison, discuss how technology, fuels and energy efficiency (on a passenger-mile basis) are likely to change for new automobiles within the next five years.

4. Estimate and discuss by transit provider, the sensitivity of bus transit energy efficiency per passenger-mile to:

    a) The ratio of peak to off-peak bus hours
    b) Labor agreements restricting split-shift schedules and part-time work
    c) The price of fuel
    d) Incremental capital costs of new technology buses
    e) ADA requirements
    f) Relationship of other policy goals of bus transit providers to energy efficiency (e.g., providing ubiquitous service, serving the transportation disadvantaged, maintenance of "system effects" on ridership, etc.)
    g) Other management decisions identified during research.

5. Discuss automobile occupancy rates during peak and off-peak hours, how these affect relative energy efficiency between automobiles and bus transit service, and their policy implications for energy efficiency and bus transit service.

6. Discuss implied changes to bus transit management priorities necessary to make or keep bus transit services more energy and GHG efficient than automobiles.

7. Identify factors, circumstances, or community characteristics (e.g., topography, demographics, size of system relative to size of population, extent of "smart" development, etc.) other than management decisions that are likely to have a major

influence on the ability of bus transit systems to make or keep their services more energy and GHG efficient than automobiles.

8. In travel sheds, automobiles and buses affect each other. During peak hours, buses reduce congestion, allowing automobiles to operate more efficiently, thus reducing GHG emissions from automobiles. Park and ride lots are places where inter-modal trips are facilitated. Discuss how such joint effects should be considered.

9. If data on different bus types is available, estimate the percentage of capacity utilization that results in GHG emission equivalency with automobiles by bus type. If data by specific bus type is not available, discuss this topic in general terms.

10. Develop conclusions regarding the ability of bus transit service to reduce GHG emissions by displacing market share from automobiles within the next 10 years.

BENEFITS (*more info*)

This project would result in the development of actual data on GHG emissions per passenger-mile for each of Oregon's major bus transit systems. The data would be comparable to similar data on automobiles. Issues that confuse the comparison would be addressed to enable reasonable comparisons to be made. As reduction of GHG emissions becomes a priority, this data will enable better resource allocation decisions to be made by the Governor's Office, the Legislature, and the OTC.

The research will also identify and examine management decisions that affect bus transit GHG emissions on a passenger-mile basis. When GHG emission reduction is a priority, this information will help bus transit operators minimize GHG emissions from their systems.

CONTACT INFORMATION:

Name[1]: *Jack Svadlenak*

Name[2]:

Address[1]: *555 13th Street NE, Suite 2*
Salem, OR 97301

Address[2]:

Email[1]: *John.R.Svadlenak@state.or.us*

Email[2]:

Phone[1]: (503) 986-3261

Phone[2]:

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