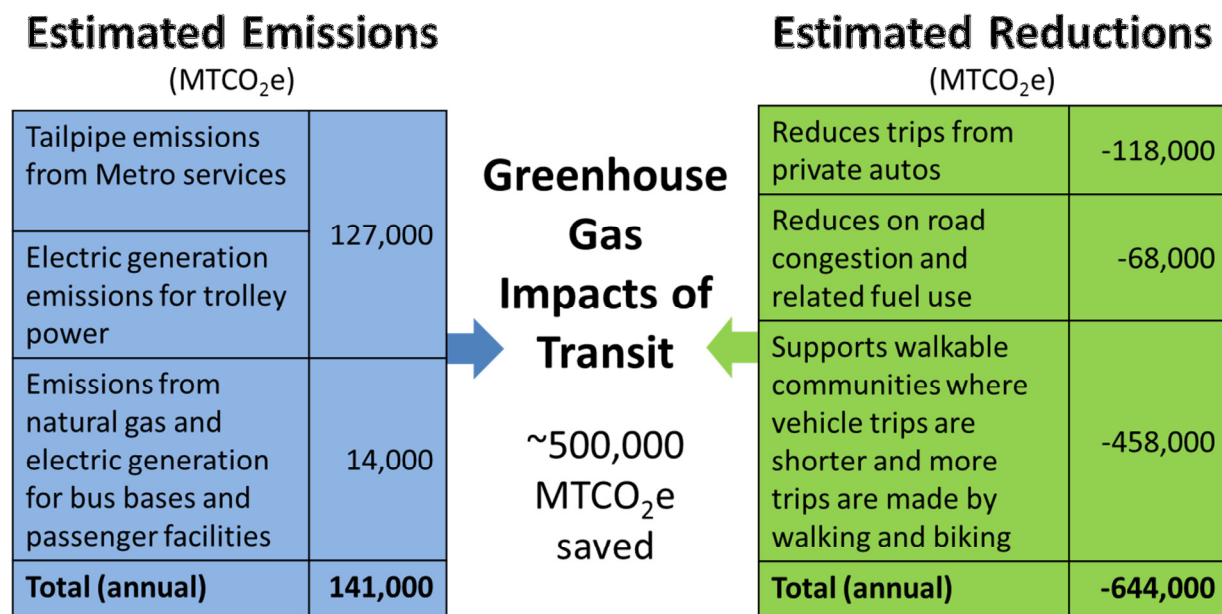


King County Metro Transit Greenhouse Gas Emissions and Displacement

King County Metro Transit (Metro) has a significant and beneficial impact on the region's greenhouse gas (GHG) emissions. By taking cars off the road, reducing traffic congestion and facilitating more efficient land use, Metro reduces, or 'displaces' approximately 500,000 metric tons of carbon dioxide equivalent (MTCO₂e) annually, a net benefit of roughly 3.5 times more greenhouse emissions than it generates.

Metro's net displacement is determined by comparing its total emissions and total displacement, as shown in Figure 1. The steps in making this comparison are described in more detail below.

Figure 1: Net Regional GHG Emissions and Displacement from Transit



Emissions

Metro's primary sources of greenhouse gas (GHG) emissions are from the combustion of diesel and gasoline by transit buses and non-revenue fleet vehicles, electricity used by trolley buses,¹ natural gas and electricity consumed in facilities, and the carbon embodied in the use and disposal of purchased goods and services, including construction. In 2011, Metro's combined

¹ Electricity in King County has a significantly lower GHG emissions footprint compared to gasoline and diesel fuel. By moving from fossil fuel based sources to cleaner sources of energy including electricity, Metro can reduce its overall GHG emissions.

revenue fleets generated nearly 127,000 MTCO₂e and fixed assets such as transit bases and passenger facilities contributed an additional 14,000 MTCO₂e. Metro's GHG emissions from diesel fuel, by far the agency's primary energy source, account for more than half of all energy-related GHG emissions by King County operations.²

Displacement

Metro's public transportation services displace GHG emissions in three ways described in more detail below:

- 1) Mode Shift.** Reducing the number of trips that otherwise would have been made by private vehicles.
- 2) Congestion Relief.** Reducing fuel wasted from traffic congestion.
- 3) Land Use Multiplier.** Contributing to more efficient, compact land use and better community design that facilitates more walking and bicycle travel as well as shorter vehicle trips.

1) Mode Shift to Transit

The average private vehicle emits about one pound of CO₂ for every mile driven.³ When a private vehicle driver shifts to transit, a savings of up to 2.2 MTCO₂e per private vehicle per year is possible⁴. Metro's 2011 Rider/Non-Rider Survey found that if public transportation were unavailable in King County, people would make 62 percent of their usual trips by private vehicle. In 2011, potential driving diverted by public transportation spared close to 118,000 MTCO₂e, nearly as much as Metro's combined fleets generated that year.

2) Congestion Relief

Public transportation reduces the number of vehicles on the road, especially during commute times when traffic volumes are highest. Less congestion reduces GHG emissions from idling and stop-and-go traffic. According to the Texas Transportation Institute (TTI) 2012 Annual Urban Mobility Report, peak period congestion occurs for six hours per day and costs the average auto commuter more than \$1,050 per year. TTI estimates that the congestion relief benefits from public transit saved Puget Sound area drivers 16 million hours in travel time and \$366 million in fuel and time costs. In addition to transit providing savings in time and money, TTI estimates

² King County Government Operations GHG Inventory. Details available:
<http://your.kingcounty.gov/dnrp/measures/performance/en-climate-protection.aspx>

³ Science Applications International Cooperation. Public Transportation's Contribution to U.S. Greenhouse Gas Reduction. September 2007. Page 2.

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that public transportation saves the region nearly eight million gallons of gasoline per year as well⁵ as GHG savings of nearly 68,000 MTCO₂e.

3) Land Use Multiplier

The combination of higher density, mixed-use development, and increased transit use contribute to significant reductions in transportation-related GHG emissions and energy consumption. Compact development enables residents to take shorter and fewer vehicle trips and to take more walking, biking, and other non-motorized trips. Transit supports compact land use by reducing the need for parking and roadway vehicle capacity, promoting bicycle and pedestrian travel, enabling dense development, facilitating the integration of multiple trips, and influencing reduced household vehicle ownership. A forthcoming report from the Transportation Cooperative Research Program based on data for 300 of the largest metropolitan areas estimates that for every ton of emissions reduced by transit through mode shift, an additional 3.9 MTCO₂e are reduced by changes in land use patterns. Locally, this amounts to over 458,000 MTCO₂e savings, more than three times Metro's total carbon footprint and the largest single environmental benefit of public transportation.

⁵ 2012 Urban Mobility Report. Texas Transportation Institute. September 2012.