Policy Brief Infrastructure and Automobile Shifts: Positioning Transit to Reduce Life-cycle Environmental Impacts for Urban Sustainability Goals

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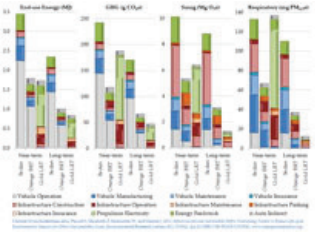
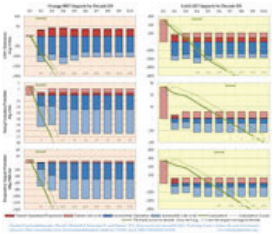
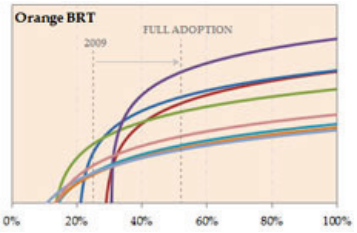
Study Overview

Public transportation systems are often part of strategies to reduce urban environmental impacts from passenger transportation, yet comprehensive energy and environmental life-cycle measures, including upfront infrastructure effects and indirect and supply chain processes, are rarely considered. Using the new bus rapid transit and light rail lines in Los Angeles, near-term and long-term life-cycle impact assessments are developed, including consideration of reduced automobile travel. Energy consumption and emissions of greenhouse gases and criteria pollutants are assessed, as well the potential for smog and respiratory impacts. Life-cycle infrastructure, vehicle, and energy production components significantly increase the footprint of each mode, and emerging technologies and renewable electricity standards will significantly reduce impacts. Life-cycle results are identified as either local or remote, and show how the decision to build and operate a transit system in a city produces environmental impacts far outside of geopolitical boundaries.

Critical Findings for Decision Makers

- Life cycle vehicle, infrastructure, and energy processes significantly increase the energy use, greenhouse gas emissions, and potential for respiratory impacts and smog formation, however, transit systems will for the most part have lower environmental impacts per passenger mile traveled than automobiles;
- Energy and environmental assessments of transit deployment decisions should consider improvements in vehicle technologies, changing electricity mixes, and automobile shifts to transit. In the long-term the energy use and environmental impacts of the LA transit systems will decrease between 42-93%;
- The construction of the transit infrastructure produces significant impacts that are paid back within one decade for rapid buses and between 30 and 60 years for light rail (the latter due to heavy use of concrete). Mitigation measures are possible to reduce infrastructure impacts and improve payback times;
- For door-to-door trips that access or egress transit by automobile, the energy use and environmental impacts are likely to be lower than unimodal automobile trips.

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