MASS TRANSIT

OVERVIEW OF A HIGH-IMPACT DRAWDOWN SOLUTION

Public mass transit includes modes such as buses, trains and streetcars. When people rely on mass transit instead of cars, it reduces GHG emissions.

TECHNOLOGY AND MARKET READINESS

The technology for mass transit options is readily available and there are well-established markets for it in Georgia. Behavioral shifts, however, will be required to achieve maximum GHG reduction potential [1]. More specifically, the trend in public transit ridership has not followed a favorable trajectory as compared with competing travel options (e.g., ride-hailing). If ridership can be sustained or increased, it could open the door to large emissions reductions from this solution, driven by more advanced vehicle technology and routing intelligence.

LOCAL EXPERIENCE AND DATA AVAILABILITY

Georgia has MARTA, GRTA and Cobb County Transit in the Atlanta metro area and Chatham in Savannah. As a result, significant data is available on ridership demand and vehicle and system efficiency. While large deployments of electric vehicles have not been undertaken in Atlanta, a growing dataset is available from other urban transit systems which would be relatively translatable.

TECHNICALLY ACHIEVABLE CO2 POTENTIAL

For a rough order of magnitude comparison, it is estimated that mass transit options in Georgia (MARTA in Atlanta in particular) releases .245lbs CO2/passenger mile, compared to .891lbs CO2/passenger mile for a single occupancy vehicle personal vehicle.[2] While a true trip comparison and consideration of ridership would be required to complete the analysis, this notional difference suggests that CO2 potentials are technologically achievable. This figure decreases further as ridership percentages rise, since the system increases in efficiency. There is potential for significant avoided emissions for most trips so long as ridership is sufficiently high. Beyond directly replacing existing trips, the availability of transit alters land use patterns that result in fewer or shorter vehicular trips, which in turn helps to reduce tailpipe emissions. In reviewing the literature, one comprehensive study found that CO2 emissions can be on the order of 70% lower than diesel emissions for EV bus applications in a simulation of European and California contexts (Lajunen and Lipman, 2016).

COST COMPETITIVENESS

Government subsidies for transit can reduce the cost per trip. For passengers, mass transit can frequently be the cheapest mode of travel (and the lowest CO2 option), replacing the financing, operating, and maintenance costs associated with owning personal vehicles with a small fare or a monthly pass. While this option may incur longer commutes, the direct cost savings can be considerable. In a given benefit cost comparison, an EV bus was found to have a capital cost of 2 to 3x that of a diesel bus in an identical application, but a net operating cost of less than 1.5x, due to reduced energy, maintenance and operating expenses (Lajunen and Lipman, 2016). Finally, the EV-Diesel transit bus cost gap is expected to approach parity by about 2030.

BEYOND CARBON ATTRIBUTES

Co-Benefits. These include improved air quality from reduction in higher emission vehicles [3], potential for increased business and property values in areas around mass transit stations (Stjernborg and Matisson, 2016), improved quality of life and reduced obesity (She, et al., 2017), and reduced vehicle traffic and congestion in cities (Stjernborg and Matisson, 2016). Potential equity benefits include low-cost access to transportation in low-income communities and for those who cannot drive or do not have a driver's license [4].

Co-Costs: In terms of potential adverse impacts, there will likely be concerns resulting from the acquisition of new corridors and consequential segmenting of land and neighborhoods. Other concerns include the potential for an increase in crime related activities in neighborhoods around stations (Di, 2017).

References:

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Endnotes:

1. https://atlantaregional.org/wp-content/uploads/climate-change-white-paper-final.pdf
2. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf
3. https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/transit-environmental-sustainability/transit-role
4. https://www.huduser.gov/portal/pdredge/pdr_edge_research_071414.html

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