Alternative Fuels for Urban Transit: 
Phase 1: Life-Cycle Assessment (LCA) of Alternative Fuel Buses 
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**Introduction**
Switching to alternative fuel buses will have long-lasting implications for the sustainability of a transit organization. We conduct a Life Cycle Assessment of three alternative fuel buses and a diesel bus using the method of EIO-LCA and focusing on costs and greenhouse gas (GHG) emissions.

**Research Questions**
- What is the difference in cost and GHG emissions over the lifecycle between diesel and alternative fuel buses?
- How do infrastructure investment, change in fuel prices, and change in demand affect the costs and GHGs of alternative fuel buses?

**Scope of LCA**

**Conclusions**
- Alternative fuel buses, especially Hydrogen Fuel Cell buses can result in significant GHG savings, if the hydrogen is produced using renewable sources.
- At projected future prices and with renewable sources of hydrogen, HFC buses have the lowest marginal cost ($/GHG)
- At current prices, CNG and Hybrid buses are much more cost-accessible while still reducing greenhouse gas emissions.
- Infrastructure and level-of-service issues have significant impacts on lifetime costs and emissions of buses. Sustainable, cost-effective decision making requires holistic consideration of these and other factors.

**Data Sources and Methodology**
- Data on alternative fuel bus demonstration projects came from the National Renewable Energy Laboratory, U.S. Department of Energy
- LCA for some components was conducted using the Economic Input-Output Life Cycle Assessment (EIO-LCA) tool, Carnegie Mellon Green Design Institute, http://www.eiolca.net.