

Motivation

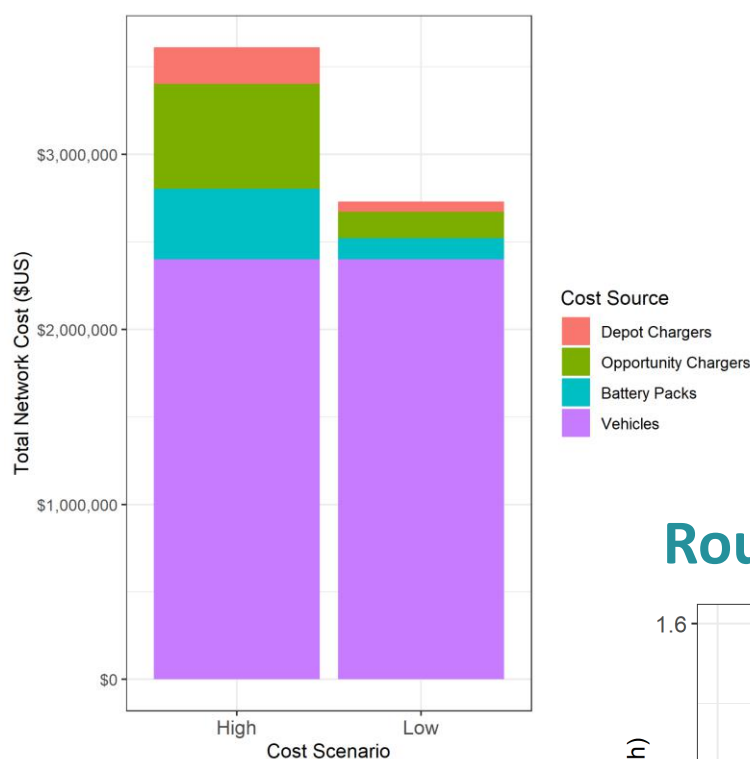
- Over 3,000 battery electric buses deployed in the US
- Many more in China and Europe
- High transition costs, tradeoffs between spending on batteries vs spending on infrastructure



Research Question

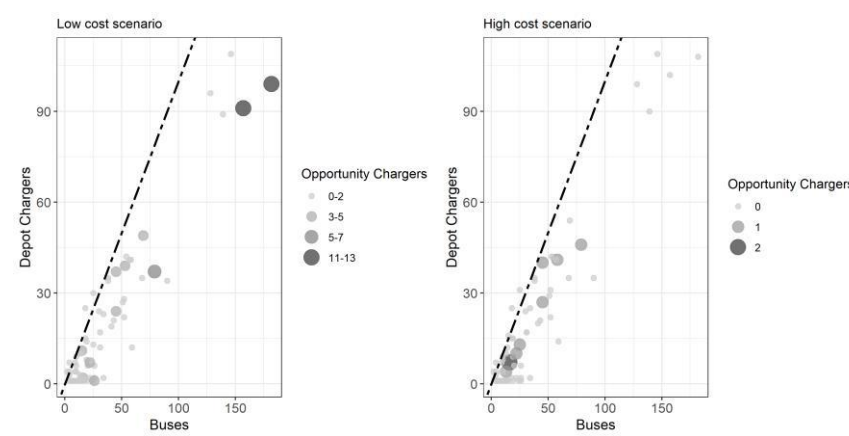
Examining 78 transit bus networks, when would opportunity charging be the preferred strategy over depot charging for fleet electrification? What impacts does this choice have on the rest of the network?

Cost Distribution in Example Network

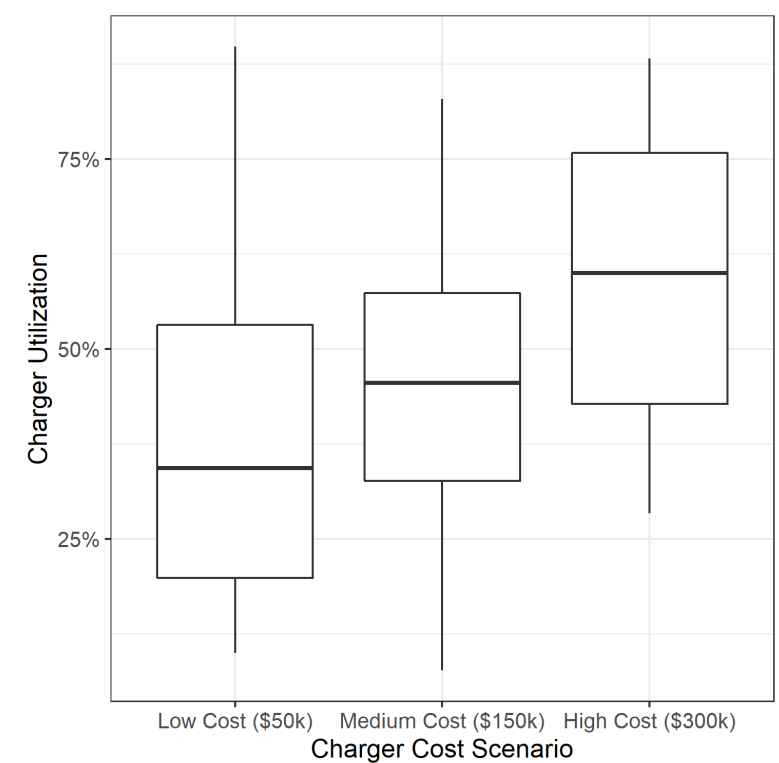


Results

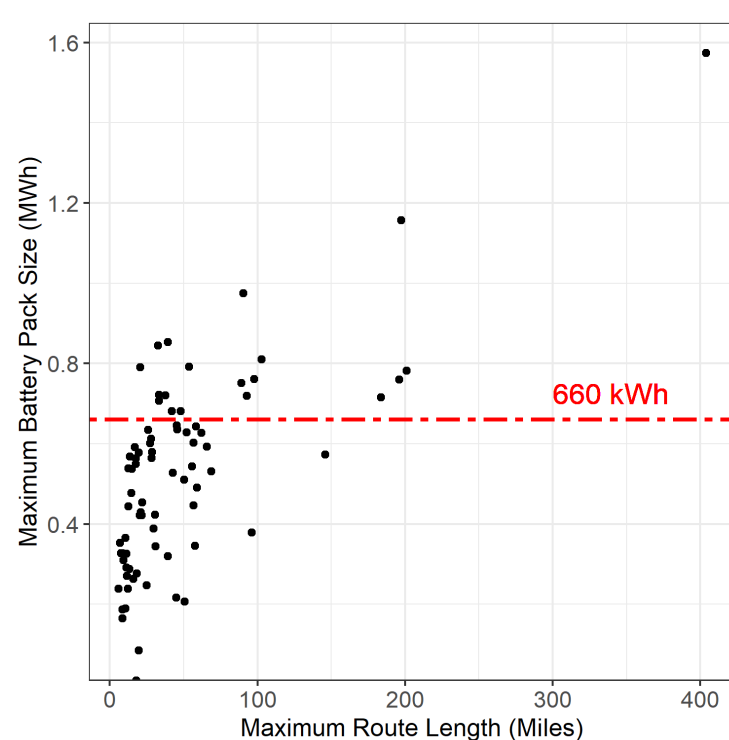
Depot Charging vs Number of Buses



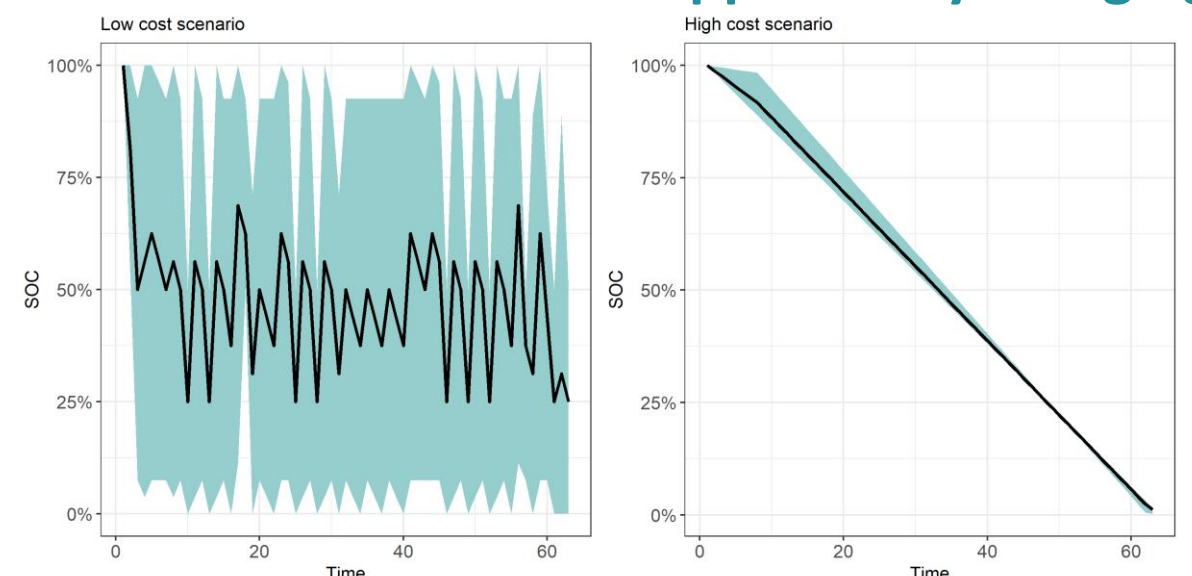
Charger Utilization v Cost



Route Length and Pack Size



Bus SOC with and without opportunity charging



Conclusions and Implications

- Opportunity charger cost is one of the largest determinants in optimal network architecture
- Opportunity chargers can decrease the need for large battery packs
- Scheduling for opportunity charging should be as exact as possible to allow for high charger utilization throughout the service day
- Battery Buses cannot yet service all the types of routes necessary for a 100% fleet transition – gaps due to long, rural routes