

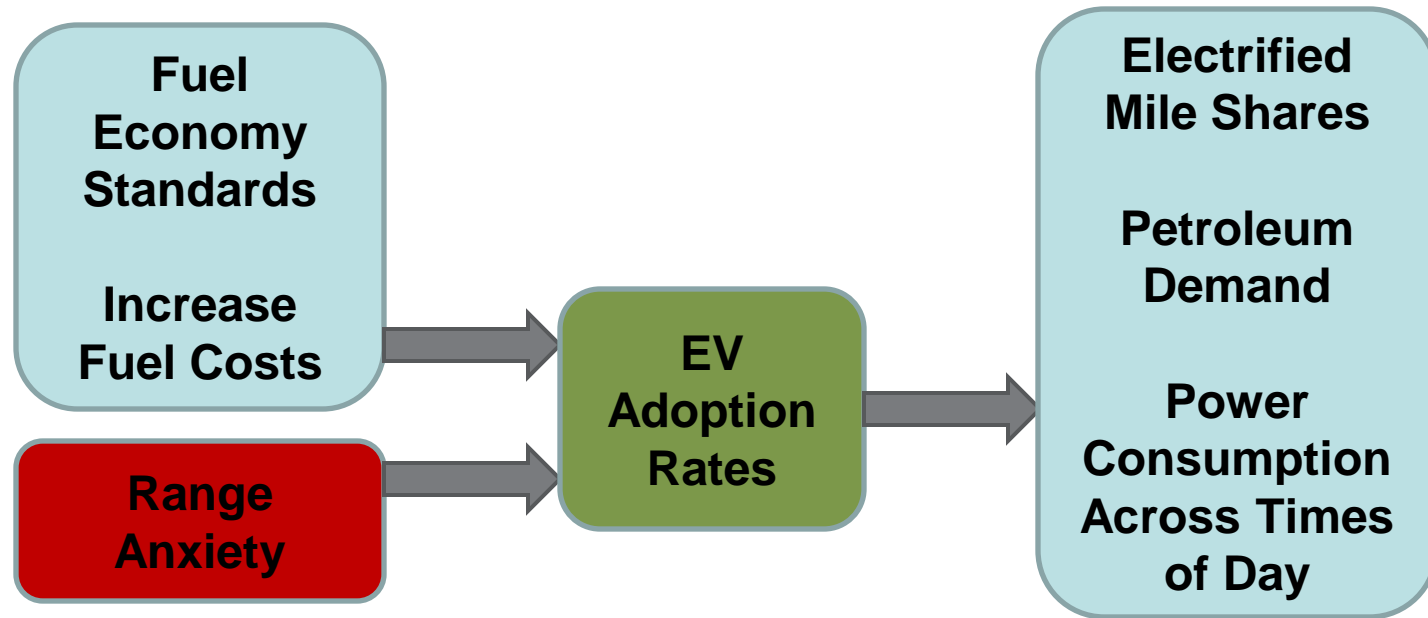
The Electric Vehicle Charging Station Location Problem

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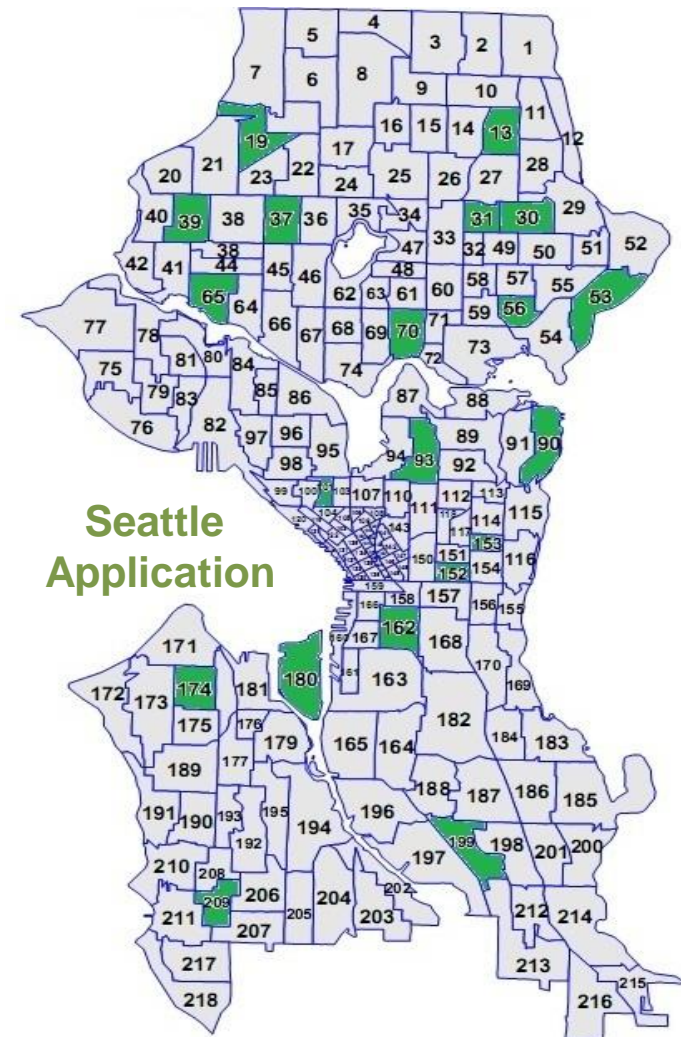


Potential solution: Public **charging station** provision

- **High installation costs** (\$3,000 to \$40,000 per station)
- Energy providers, cities, & metropolitan planning organizations (MPOs) need a **methodology to optimally locate** public charging stations that...
 - Serve **charging demand**,
 - Minimize **access costs** for EV drivers,
 - Meet constrained **budgets**.

A Parking-Based Assignment Method

- **Behavioral models** calibrated to predict when & where EVs are likely parked.
 - **Zone-level** parking demand based on **land use attributes** of destination zones.
 - **Trip-level** parking demand based on individual **trip characteristics**.
- **Optimization routine** (MIP) identifies charging station locations in order to...
 - **Minimize** station **access penalties** for EV drivers, while...
 - **Satisfying budget** constraints, &
 - Ensuring **minimum station spacing** requirements.



Future Research: Optimal Charging Locations for a Shared & Autonomous Fleet

- With **shared vehicles**, parking is no longer a primary concern for charging.
- With **autonomous vehicles**, travel costs decrease
- New Vehicle Routing Problem
 - Inputs:
 - **Network travel patterns** (trip tables by trip purpose)
 - **Travel times & costs**
 - Decision variables:
 - **Charging station locations**
 - **Shared EV Fleet Size**