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