Project proposal

Project title: Superchargers: Cost vs Range

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1. Brief description of the problem. If you'll be using real data, where will you find it and how much will you need?

- Distribution of electric vehicles by region
- Growth of electric vehicles
- Distribution of charging stations by location
- Percentage (by time) utilization of existing charging stations (to determine whether adjacent stations should be closer rather than farther)
- Amount of sunlight available

2. Type of model (LP, QP, MIP, etc.) and an approximate count of the number of variables and constraints in the model:

- LP
- Decision variable (incidence matrix of possible locations of superchargers – dimensions variable upon number of stations that we are willing to build)
- Proposed charging stations should be at least 50% utilized in the current time period, and in the future (so that past stations are not made too redundant)
- Reduce down-time of stations by having other stations be "near-enough"
- Maximize total range of a car's travel, while minimizing total cost of supercharger stations
- We prefer to build in areas with more sunlight, because this would reduce the cost of electricity for Tesla.
- We prefer to place stations at locations where drivers expect to spend long periods of time at (such as at malls, movie theaters, parking garages, and hotels). For hotels, these chargers will have lower cost because they don't have to be Superchargers, they can charge more slowly.

- Growth of charging stations should match growth of electric vehicles somehow (don't want to build more stations than there are users presently)

References:

https://ark-invest.com/research/supercharger-cost-comparison#fn-6240-2

https://www.tesla.com/supercharger

https://en.wikipedia.org/wiki/Tesla_station

http://luskin.ucla.edu/sites/default/files/Non-Residential%20Charging%20Stations.pdf