Campus EV Charging Behavior Study

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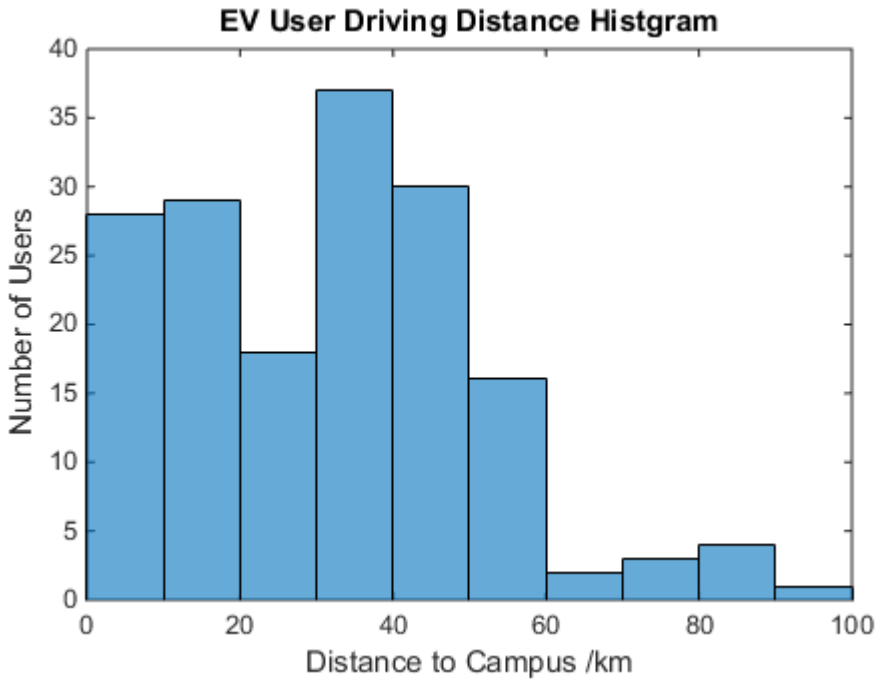
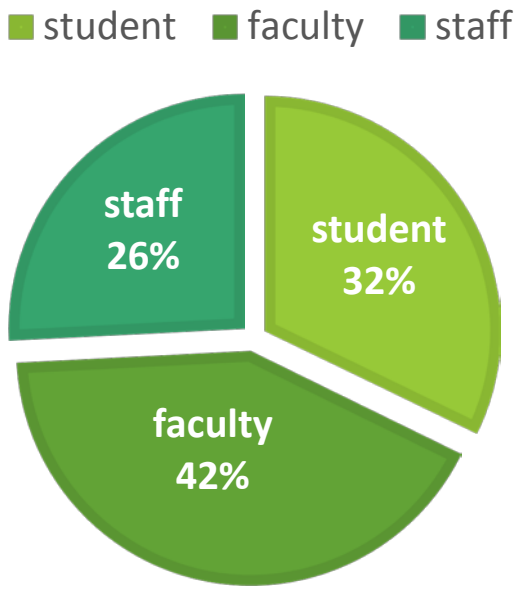
Background

- Infrastructure:
  - More than 150 electric vehicles on campus
  - Leaf accounts for more than 90 percent
  - 10 dual=port Level II chargers in visitor-accessible locations
  - Currently, most of the new charging stations are not heavily utilized due to parking permit policies
- Data:
  - One year of EV charging data from Georgia Tech hotel and conference center parking station
  - EV owner information including user ID, zip code, charging sessions

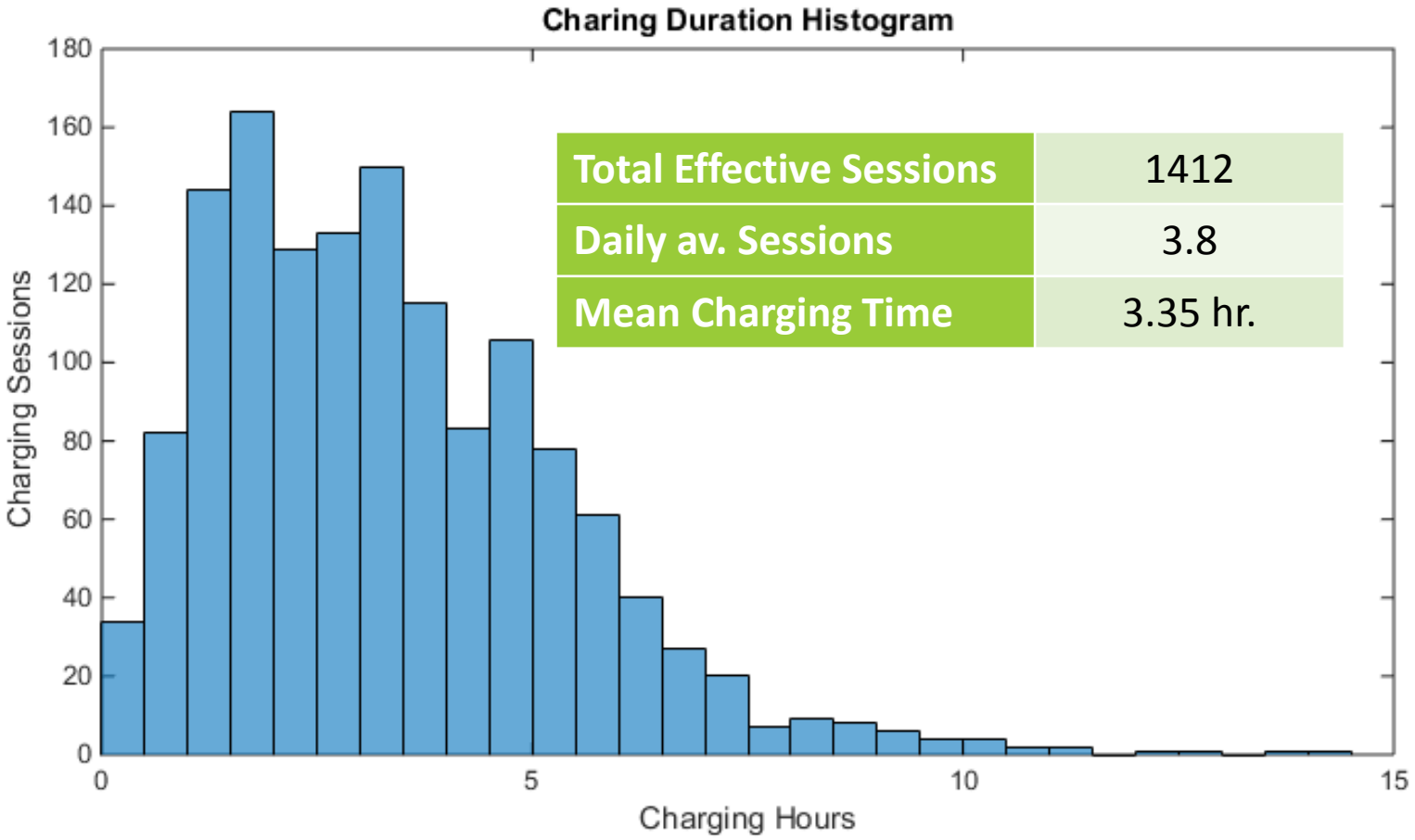
EV User Information





Average driving distance is 31 km

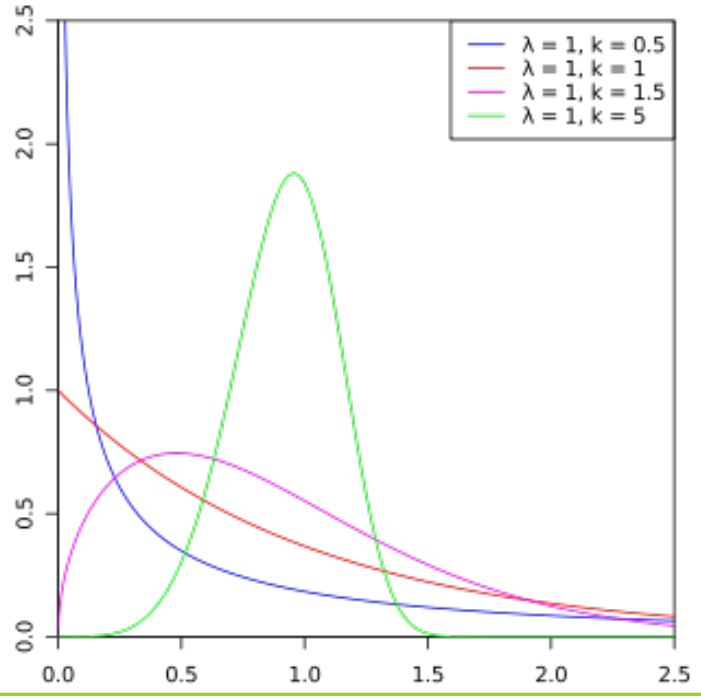
EV Charging Data

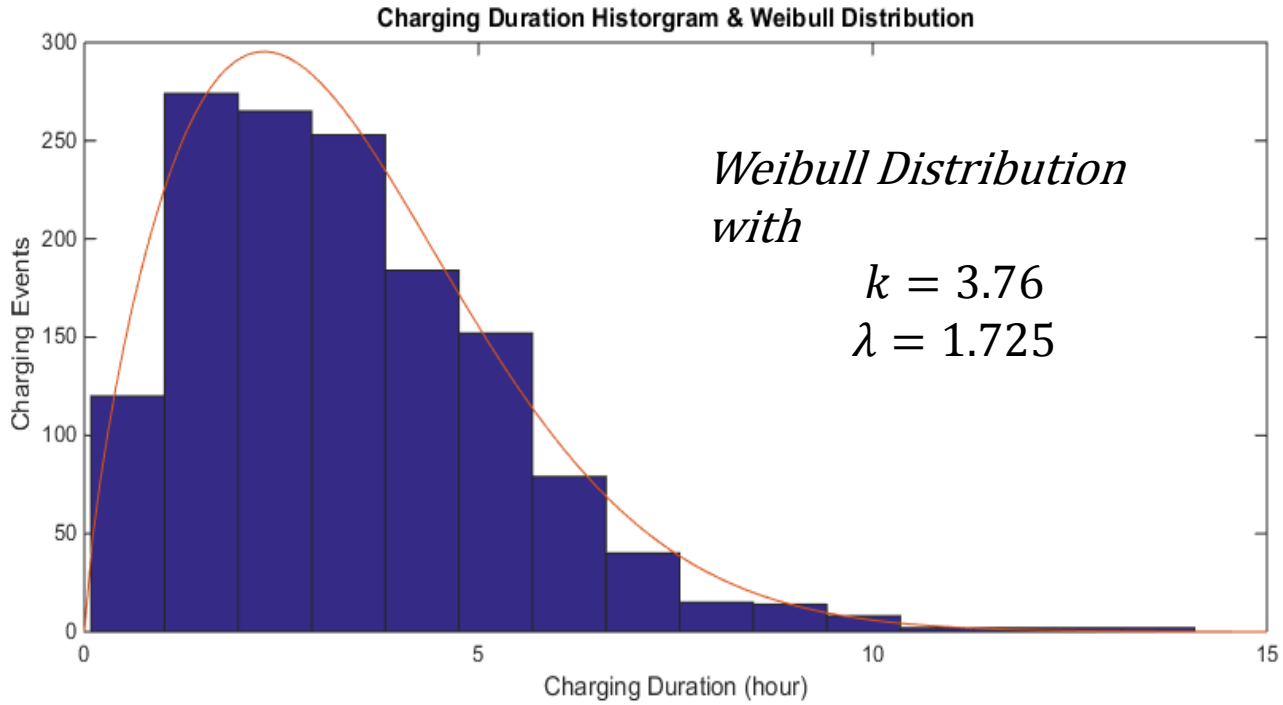


Charging Duration Modeling

Weibull Distribution

$$f(x;\lambda,k) = \begin{cases} \frac{k}{\lambda}\left(\frac{x}{\lambda}\right)^{k-1} e^{-(x/\lambda)^k} & x \geq 0, \\ 0 & x < 0, \end{cases}$$



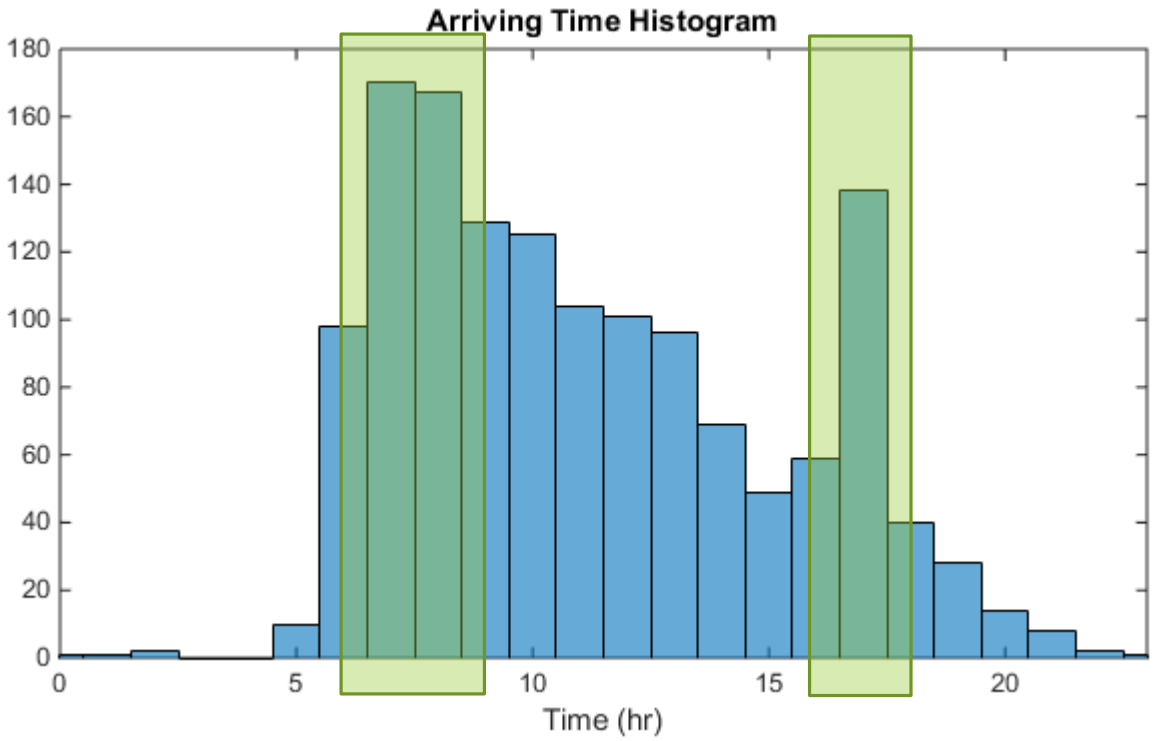


Weibull Distribution with

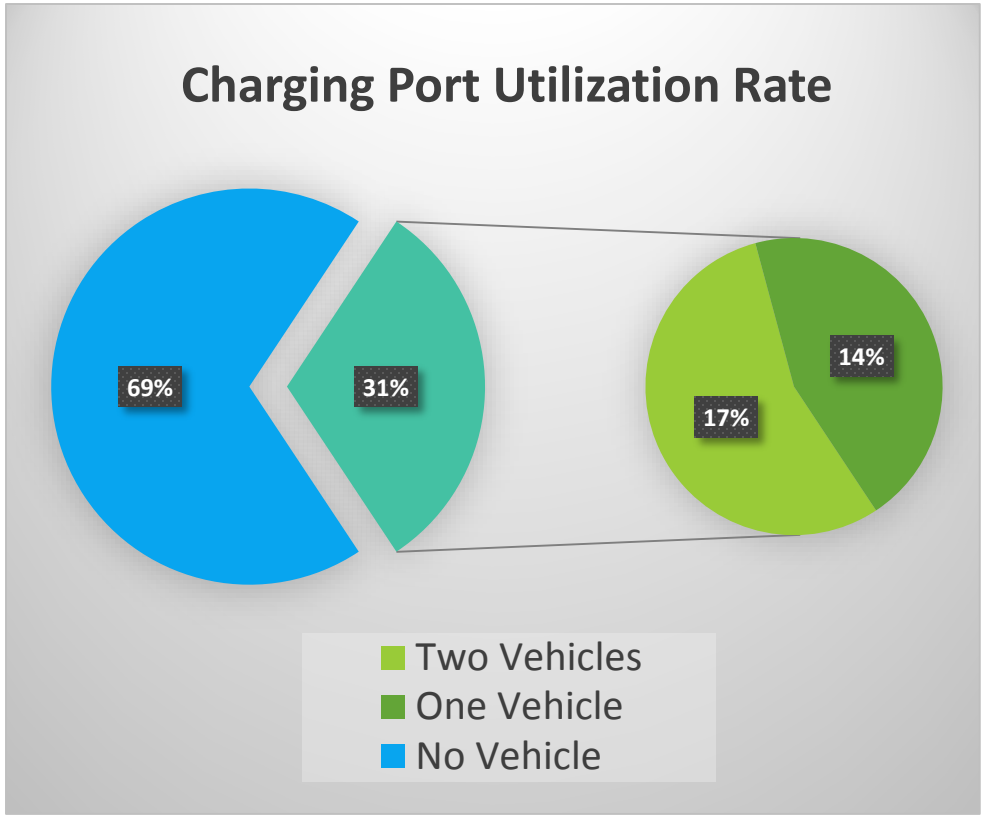
$k = 3.76$

$\lambda = 1.725$

Utilization Study

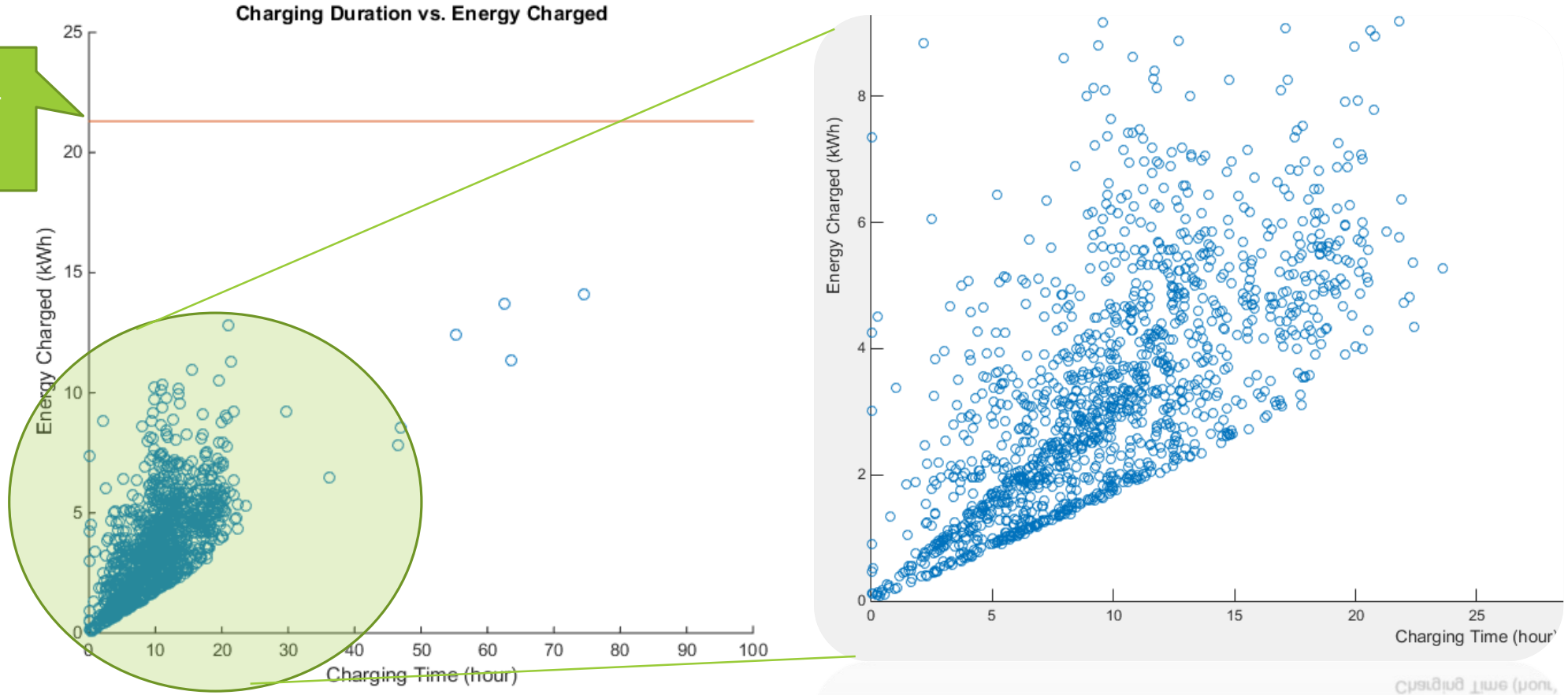


Peak arriving time is from 7 am to 9 am
Afternoon peak arriving time is from 5 pm to 6 pm

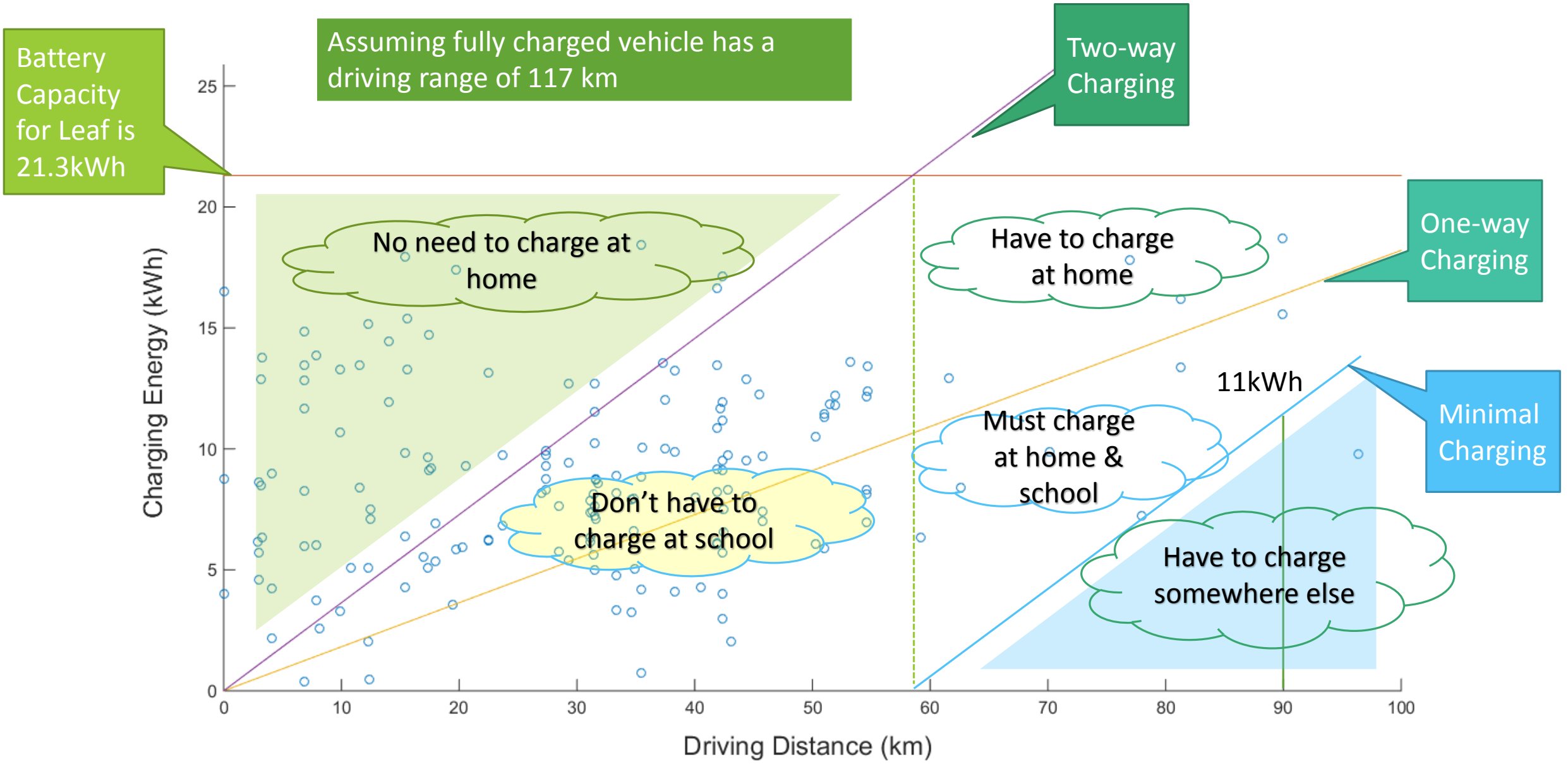


Effective Charging Behaviors

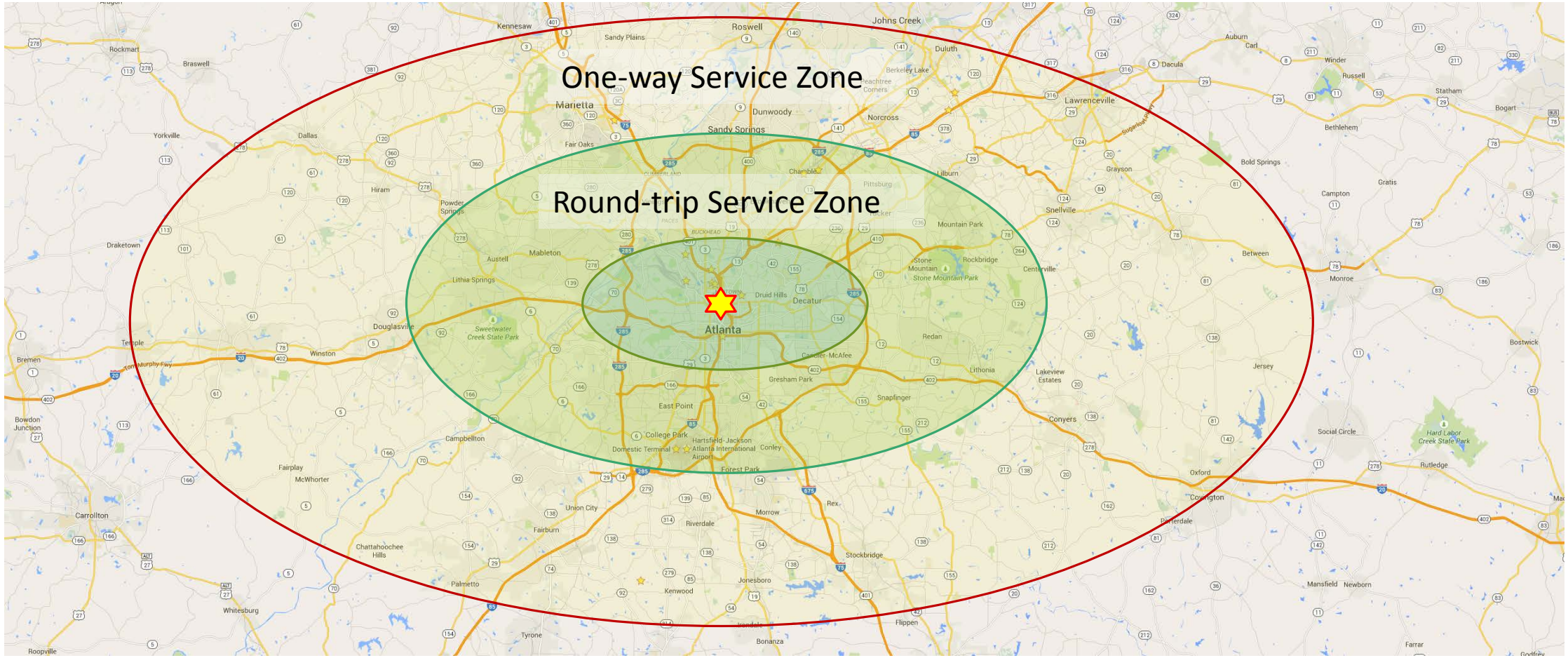
Battery Capacity for Leaf is 21.3kWh



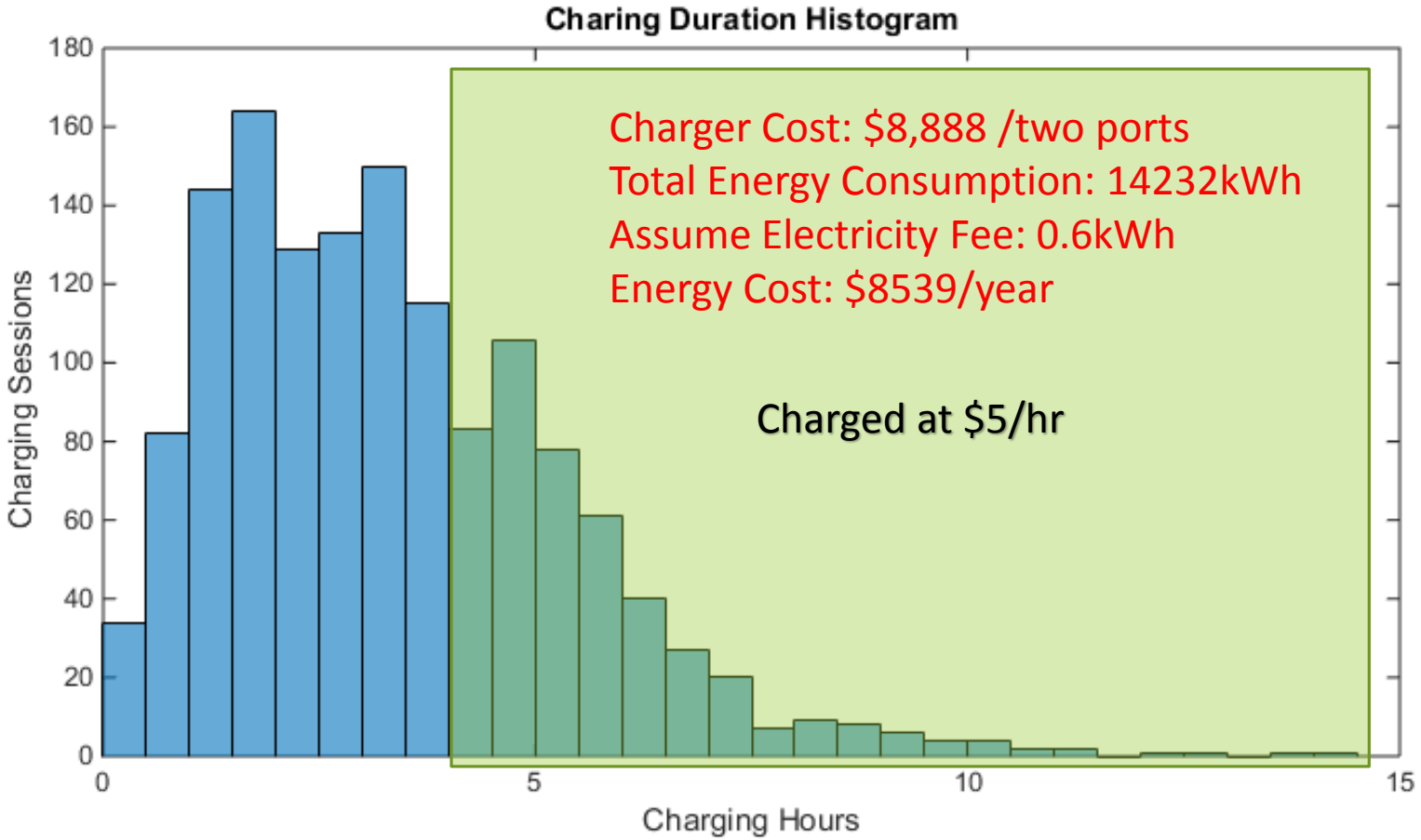
Charging Behavior Study

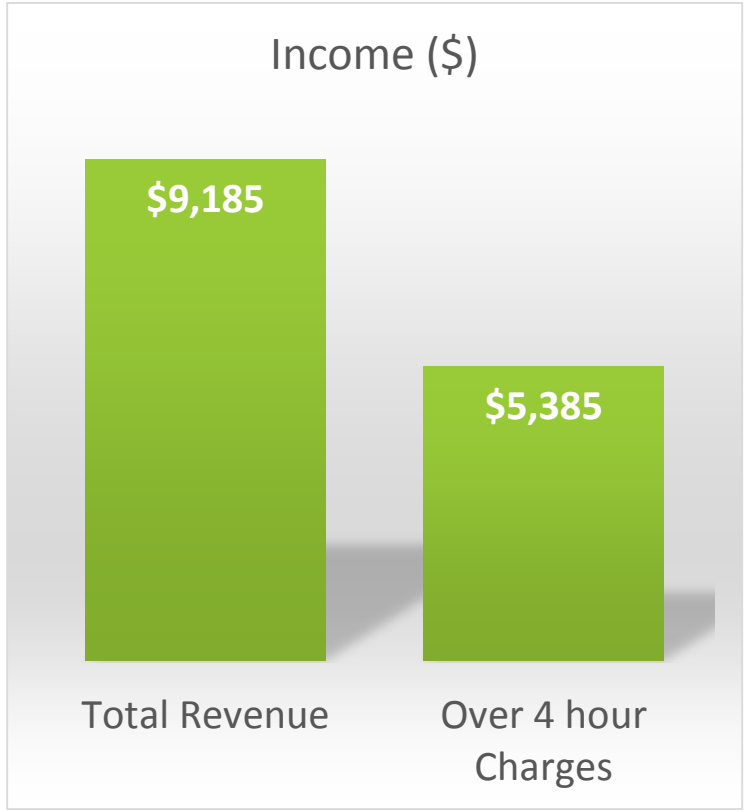


Service Range Analysis



Payback Years According to 2014 data:





Questions?