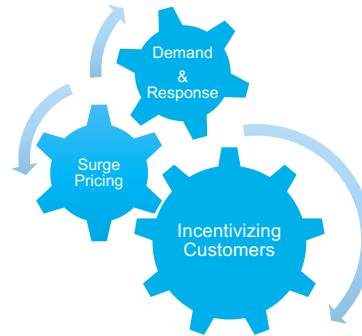# Techno-Economic Analysis of a Wireless Charging Infrastructure Model for Electric Vehicles in Pennsylvania

Energy Science Technology & Policy
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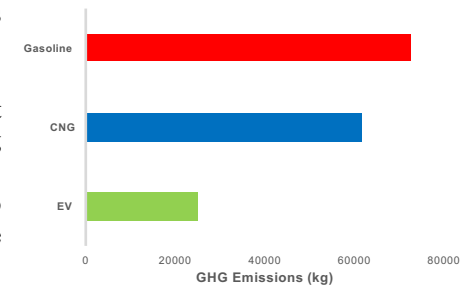
Objectives

- In today's market, mass adaptation of electric vehicles (EV's) depend on successful mitigation of range anxiety and lack of charging infrastructure.
- Wireless Charging provides a convenient solution for a universal charging standard that can be adopted by vehicle manufacturers.
- This study conducts a feasibility analysis **in Pennsylvania** regarding incentivizing EV owners to adopt wireless charging stations.
- An innovative business model is also proposed to incentivize customers while reducing cost of ownership in the long run.
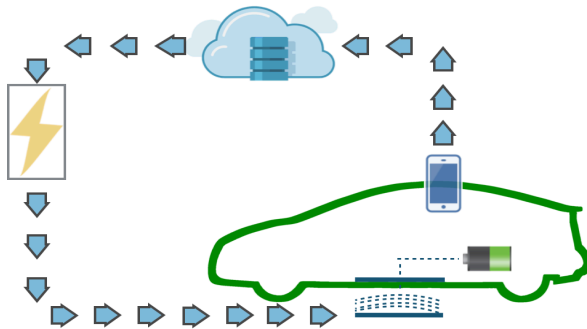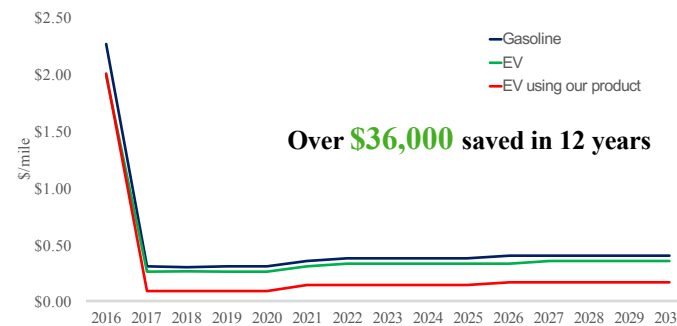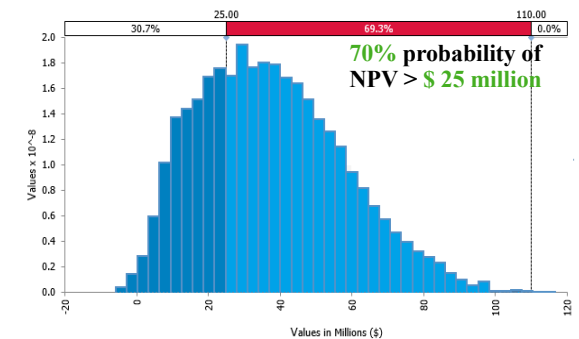
Product & Service

- Principle of magnetic resonant induction is used to transfer power via couplers to charge the vehicle's battery.
- An application based platform is provided for users to select the desired charging station based on distance and price.
- Owners can rent out their charging stations that can be utilized by other EV's.
- This application helps in adding to the current charging infrastructure, while having provisions to deal with potential grid overloads in any given location.
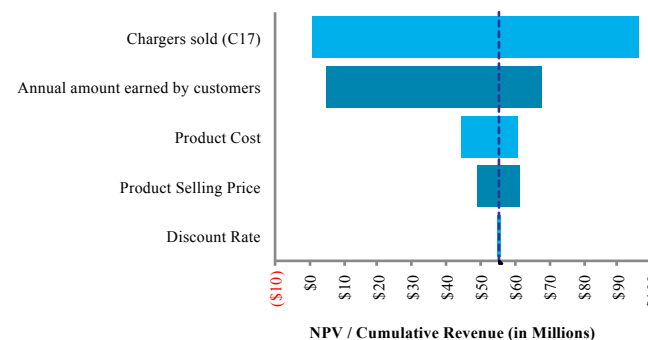
Business Model

Demand & Response — Surge Pricing — Incentivizing Customers

- We design and sell wireless chargers for Electric Vehicles.
- Product is priced at **$ 3000**.
- Customers are incentivized to list their chargers in our charging network.
- Our revenue model is linked to product sales and a small service charge levied on customers.

Value Proposition for Customers

Over $36,000 saved in 12 years

Sensitivity Analysis

NPV / Cumulative Revenue (in Millions)

Comparing GHG Emissions

Quantifying Success Rate

70% probability of NPV > $ 25 million

Conclusions and Recommendations

- A shared charging infrastructure model is an effective way of incentivizing the population to switch to EV's.
- This idea is capable of sustaining itself without any government subsidies.
- Future work – Different technologies such as graphene batteries or a hybrid of Li-ion and supercapacitors should be utilized to improve charging time.