Although humans have been living on Earth for over 200,000 years, it was not until 1751 that we began using fossil fuels for energy. Since then, we have emitted 345 billion metric tons of CO₂ from fossil fuel consumption, which has resulted in a 1°C increase in global temperature. A large contributor to this fossil fuel use comes from cars. An average car emits about six tons of CO₂ every year. Now multiply this by the 1.5 million registered vehicles in Connecticut (CT) and the 253 million cars in the U.S. Given that the U.S. transportation system is dependent on cars, it is critical that we switch to vehicles that run on alternative energy sources.

Electric vehicles (EVs) are now becoming more affordable and have witnessed a number of technological advances; however, they are still mostly overlooked by consumers. Why is that? It is because EVs are usually priced higher than gasoline-powered cars, and many do not know what to expect in terms of performance and battery life nor are unaware of the environmental impacts of gasoline vehicles.

This is where my project comes into play. I worked with CT municipalities to inform them about the economic and environmental benefits of EVs as well as make them aware of various incentives in place to promote EV use. I used other municipality EV use (e.g. Stafford) to demonstrate feasibility.

### Electric Vehicles VS Gas-Powered Vehicles

- **EV MARKET IS GROWING FAST:** More than 7,000 plug-in and all-electric vehicles were sold in October 2015, making it the highest month of electric car sales to date (Fig. 1).

- **EVs ARE A HIGHLY EFFICIENT:** Up to 80% of battery energy is transferred directly to power the car versus 14-24% of energy from gasoline.

- **CHEAPER ENERGY SOURCE:** In the U.S., electricity costs between 3-25 cents per kilowatt-hour while February 2017’s national average for a gallon of gasoline was $3.42. It costs $1 for today’s all-electric vehicles to travel the same distance as a similar-sized gasoline car would on a gallon of fuel. This adds up to savings of > $2 a gallon or $1,000 per year in refueling costs (Fig. 2).

- **EVs REQUIRE LITTLE MAINTENANCE:** Consumers will save money over the life of the car due to less maintenance. For example, EV break pads last three times as long as the life of the car due to less wear, and EVs have lower fuel costs because as billions of dollars of capital are expended opening these charging stations.

### Project Objectives

1. **Compile resources needed to introduce EVs to towns with energy committees.**
2. **Work with at least three towns in CT and introduce them to the idea of starting a fleet of EVs.**

### Electric Vehicles Resources Guide

- **CHEVROLET VOLT PACKAGE** (Fig. 3): I focused on the 2017 Chevrolet Volt because it is currently the most affordable EV on the market and is not a full EV in that it uses a gasoline-powered motor to recharge batteries and can be turned off and on manually or automatically. Cost → $32,197.00
- **KIA SOUL EV:** Cost → $34,000.00
- **FIAT 500E:** Cost → $22,600.00
- **VW E-GOLF:** Cost → $33,495.00

### Rebates/Incentives

- **REBATE FROM STATE OF CT:** All EVs qualify for rebate of $3,000.
- **MANUFACTURER REBATE:** Most manufacturers offer $1,000-$3,000 rebate on their EVs. For example, Chevrolet offers a $1,000 rebate on the Volt.

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### References