UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE of ENGINEERING
Industrial Solutions Laboratory

Company Information

Company Name	*Duke Energy*	**Date Submitted**	*4/5/2021*
Project Title	*Design of a Frictionless Charging Station* **(DUKE_FRICTION)**	**Planned Starting Semester**	*Fall 2021*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.
Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	2
Computer	1	Systems	
Other ( )			

Company and Project Overview:

Duke Energy is one of the largest electric power holding companies in the United States, providing electricity to 7.6 million retail customers in six states. Duke Energy has approximately 49,500 megawatts of electric generating capacity in the Carolinas, the Midwest and Florida – and natural gas distribution services serving more than 1.6 million customers in Ohio, Kentucky, Tennessee and the Carolinas.

One of the growing uses of energy is electric cars. While the number of electric cars on the roads is relatively small today, it is expected to grow very fast:

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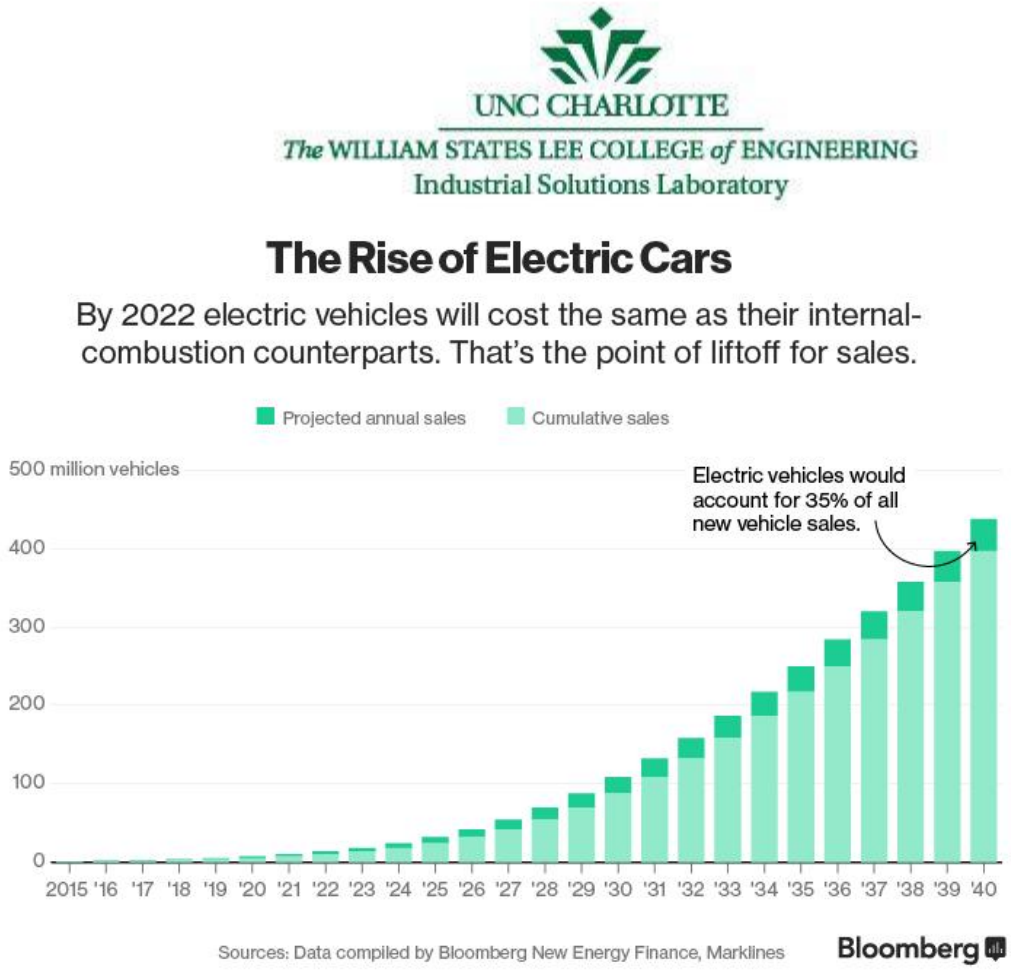

To facilitate this growth, EV charging stations are going to be needed throughout the transportation network. This project examines one aspect of technology that is required to facilitate EV acceptance and use.

Project Requirements:

Barriers to adoption of EV technology include items such as cost, limited range, range anxiety, low availability of charging stations, charging time and apprehension of using unknown technology in charging stations. The objective of this project is to survey currently available charging stations and develop a "frictionless" use technology for the station. By "frictionless", we mean, simple and easy to use. Duke is interested in removing the charging station interaction as one of the barriers of entry, so that is the focus. How can the consumer park at the station, plug in their vehicle and have all transactional information occur without their involvement – or with as little as possible involvement and technical knowledge. Note, charging speed is not the focus of the project, just ease of use.

Expected Deliverables/Results:

- Full concept of operations developed for the use case scenario.
- Design with drawings and bills of material for prototype "frictionless" charging station
- Prototype which demonstrates the full usage of the system, from user initial interaction to electricity flowing. Full electrical loads do not need to be simulated, but the proto-type should have plugs, receptacles, electricity flow, etc. to simulate the full experience for the car charging customer.

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Industry Supporter. The work product is displayed at the last Expo then immediately handed over to the supporter unless arrangements have been made to deliver at a future date.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Interest in contactless communications
- Energy concentration