Here, AC shore power comes into the power panel (240V, 50A), for the from AC to DC into the battery. An average DC fast charging station also inverter requires 42kW (at a 20% safety factor from the battery pack). Finally, the inverter can deliver up to 50A (AC) back to the power panel and power to drive the truck motor. This system can provide the appliances 85 kWh over (4 hours cook time, 2 hours idle) and supports a peak draw of 22.4 kW by the SCL AC shore power and DC fast charging are both inputs of electrical energy. Of interest is the capability of options for appliance sets, on-board charging, battery packs, inverters, and converters.

Interior layouts of new and retrofit eFood Trucks will depict workspaces for a variety of menus/appliance sets.

In order to better understand eFood Truck economics, income statements will be provided for example designs. Income analyses will aid in understanding the benefits of eFood Truck investments and in the development of business plans.

The qUWalified green food truck rating system will promote truck and appliance selection and operating
to climate change based on the USDOE’s GREET LCA tool.

To get a sense of the number, types, and locations of Seattle Food Trucks served by SCL, resources such as the Washington State Food Truck Association and seattlefoodtruck.com have proved valuable.

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In-person and on-line Food Truck questionnaires
• In order to better understand the needs of the food truck community, a short questionnaire was developed. The questionnaire is intended for food truck owners and operators and spans a wide range of topics, including truck operation, water and waste disposal, scheduling, and more.

eFood Truck equipment databases
• In order to better understand available options, databases of appliances, inverters, generators, etrucks, and charging stations are being developed. Critical design information includes product dimensions, weight, initial and operating costs, and energy use (thus expanding data available through the USEPA’s Energy Star program).

Design data collection

Design requirements
• Design requirements in 10 groups are being used to develop design concepts.
  1. Performance
  2. Features
  3. Reliability
  4. Durability
  5. Serviceability
  6. Conformance
  7. Aesthetics
  8. Perceived quality
  9. Health and safety
  10. Energy conservation/reduction in GHG emissions

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The UW Team thanks Lori Johnson (Executive Director of the Washington State Food Truck Association and Board Adviser of the National Food Truck Association) and Chris Balton (PACCAR Technical Center) for their substantial guidance and resources provided for this project.

UW-Seattle City Light Food Truck Electrification Senior Capstone Design Project
Cole Burge, Nahom Ghirmay, Matt Kim, Robert Pedersen, and Xiangue Wang
UW Mechanical Engineering (UWME)
Jacob Fink, Joanna Rose Garcia, Ivan Iturriaga, and Lapat Pattaraarayakul
UW Industrial and Systems Engineering (UWISE)

The UW-SCL TEAM

Design requirements in 10 groups are being used to develop design concepts.

PROJECT GOAL AND OBJECTIVES
The goal of this project is to design a system for food truck electrification in Seattle. The project objectives are to explore the design of new and retrofitted food trucks, charging bays, and food truck plazas while considering opportunities to:
• Improve the viability and operation of Seattle food trucks.
• Reduce Seattle’s greenhouse gas (GHG) emissions and the reliance of fossil fuels in line with the City of Seattle’s GHG reduction goals.

PROJECT SCOPE
1. An evaluation of existing state-of-the-art all electric food trucks and charging bays available on the market.
2. The layout and design of example all-electric food trucks for use in Seattle.
3. The layout, design, and the identification of steps needed to retrofit example existing fossil-fueled food trucks to all electric appliances for use in Seattle.
4. The layout and design of example curb-adjacent electric food truck bays for Seattle streets and parking garages.
5. The layout and design of example electric food truck plazas for Seattle.

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