MANAGED EV CHARGING

STUDENTS: JAMES CLOUGH, KELSEY FOSTER, TRAN QUACH, CARMEN TWITCHELL

ADVISORS:
- LUCIE HUANG (SCL)
- DANIEL KIRSCHEN (ECE)
- JAN WHITTINGTON (URBDP)

SPONSOR:
- SEATTLE CITY LIGHT

Project Objectives and Requirements

- Write a transportation electrification plan including solar generation for UW Transportation and for Recology
- Develop a software tool to schedule and allocate charging for an EV fleet that meets operational requirements while optimizing the demand for solar grid capacity

Key Milestones

- Software Tool Features
  - Algorithm to minimize the overall cost of charging by scheduling charging operations when electricity is less expensive and utilizing solar generation when it is available
  - Controlled using a Raspberry Pi
  - Local wi-fi communication of software tool and SteVe server with EV chargers
- Web interface where users can view the system status and initiate a new charging transaction
- Automatic calculation for optimal charging schedule for each vehicle. The schedule is recalculated every 15 minutes, and whenever a charging transaction begins or ends.

Software and Hardware Implementation

- Project Outputs
  - Energy requirements for an electrified fleet
  - Solar generation estimate
  - Financial estimate
  - Managed and unmanaged charging schedules
- Infrastructure preliminary design
- Software and hardware prototype for managed charging

Conclusion and Future Work

- The software tool and transportation electrification designs will help UW transportation achieve its goal of reducing the University's carbon footprint to 45% in 2030 and help Recology to electrify its fleet efficiently in the near future.

Acknowledgements and References

Thank you to:
- Sponsor - Seattle City Light
- Industry Advisor - Lucie Huang
- ECE Advisor - Prof. Daniel Kirschen
- Teaching Assistant - Shrih Mario
- ENGINE Capstone Professor - Prof. Payman Arabshahi
- Other partners - Danny Eden from UW Transportation, Ryan Rizor from Atom Power, Derek Rushman from Recology, Jeremy Park from UW Facilities, Joe Martek from SCL

We really appreciate everyone’s support and advising for this project and hope to continue managed charging efforts at UW and in the Seattle area!

References