

Electric Vehicle Charging Station Use on Campus

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BACKGROUND

Transport electrification of the University of Illinois Urbana-Champaign campus can help promote other sustainability efforts on campus

The study examines **how people are using electric vehicle (EV) chargers** on campus, **how frequently** they are charging, and provide **suggestions** to improve charging infrastructure on campus

Data sources include:

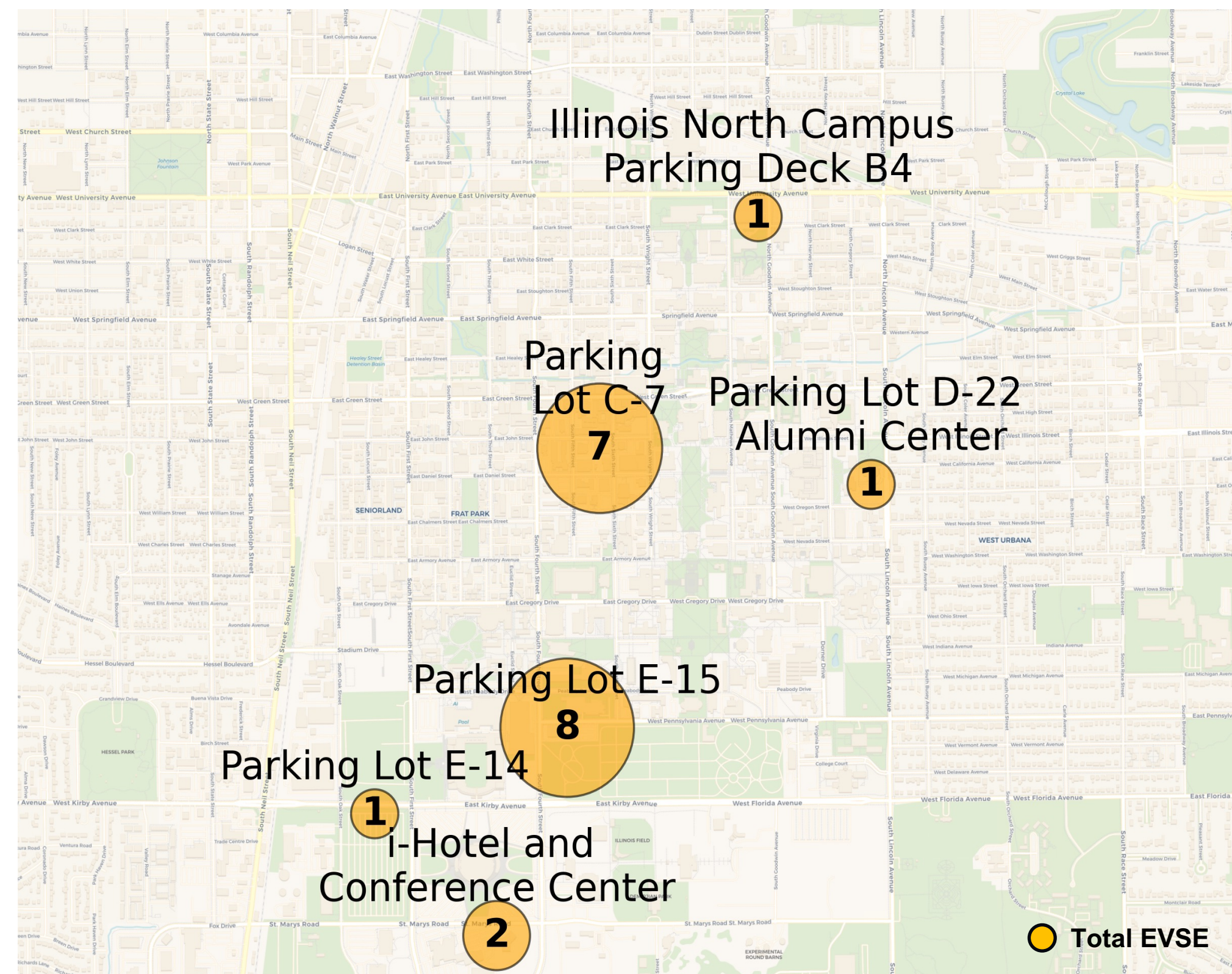
- Charging Record Data
- Campus Survey Data

UIUC Charging Station Map

Source: Charge Point Dataset on UIUC Campus

Period: January 1 – December 23, 2024

- 6 charging stations** with **20 EVSE ports**
- 2,963** charging session records
- 925** unique vehicle usages



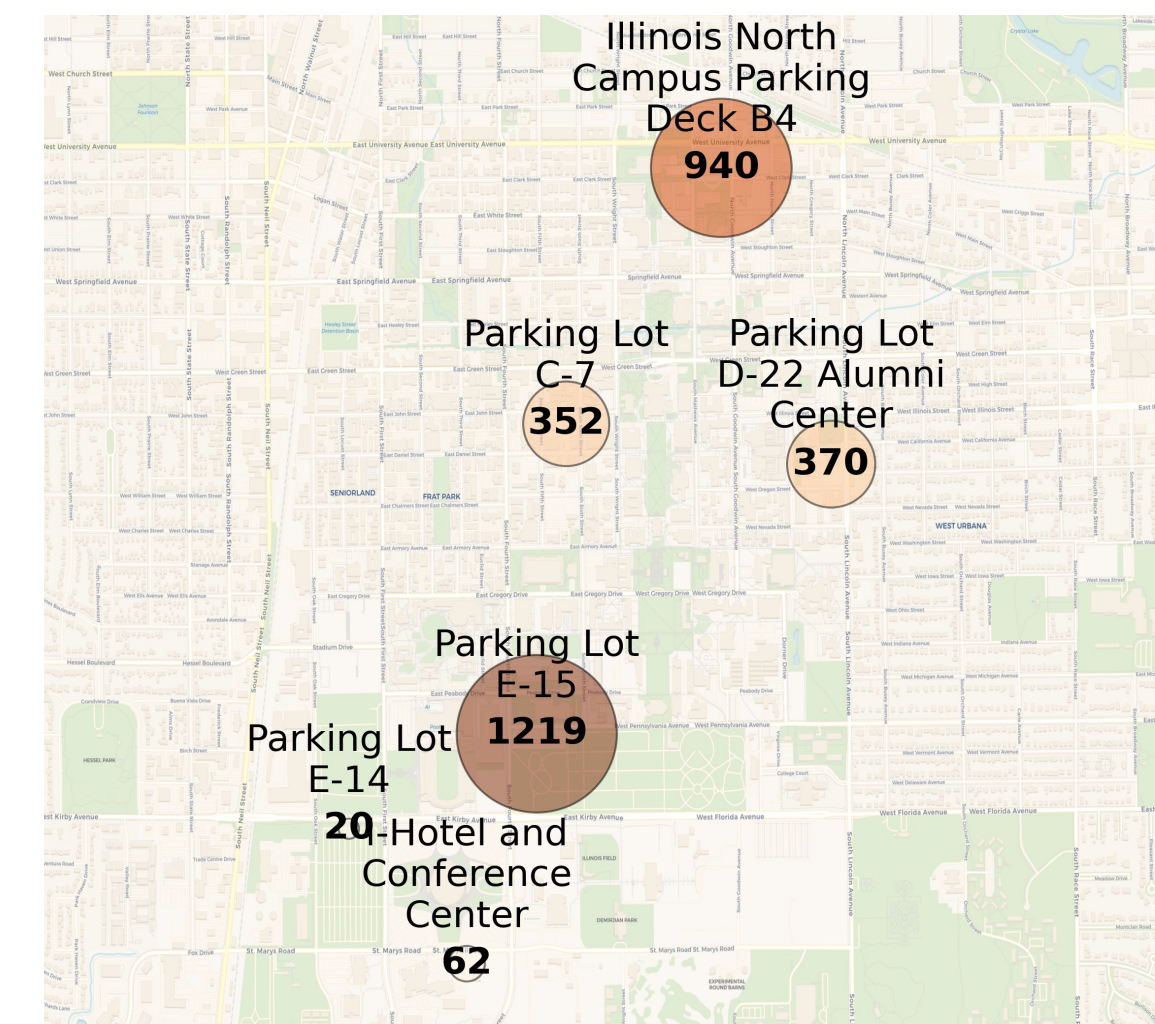
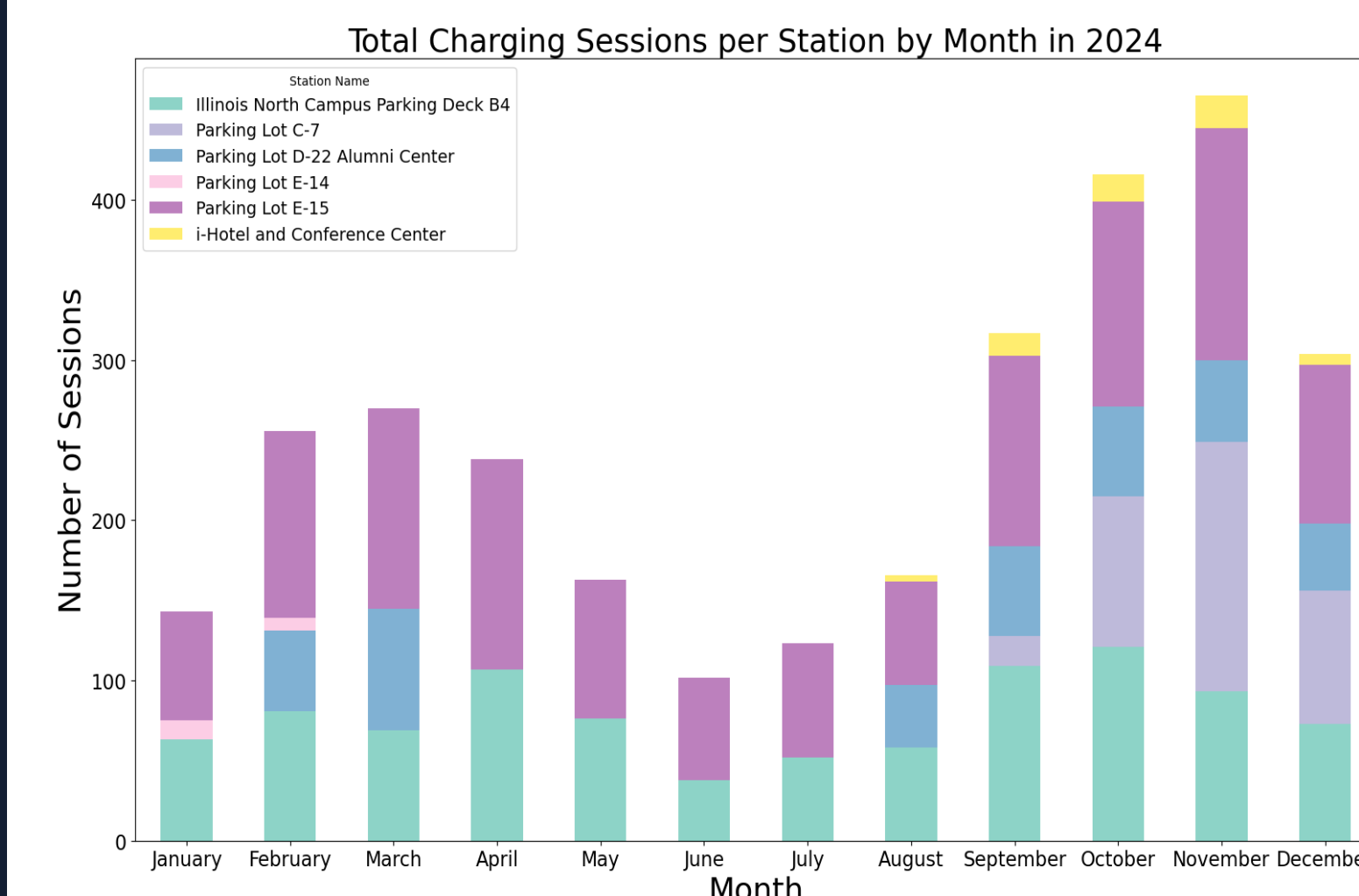
RESEARCH OBJECTIVES

- To understand the **utilization** of chargers on campus
- Uncover patterns in charging to better **understand needs** of the EV users
- Understanding if students/alumni/staff/faculty know about the **multiple resources available** and the benefits for switching to EVs
- Explore **demographics** interested in EVs and future ownership
- Use the data to derive **impactful solutions** that will be suggested to campus entities for sustainability gains

ACKNOWLEDGEMENTS

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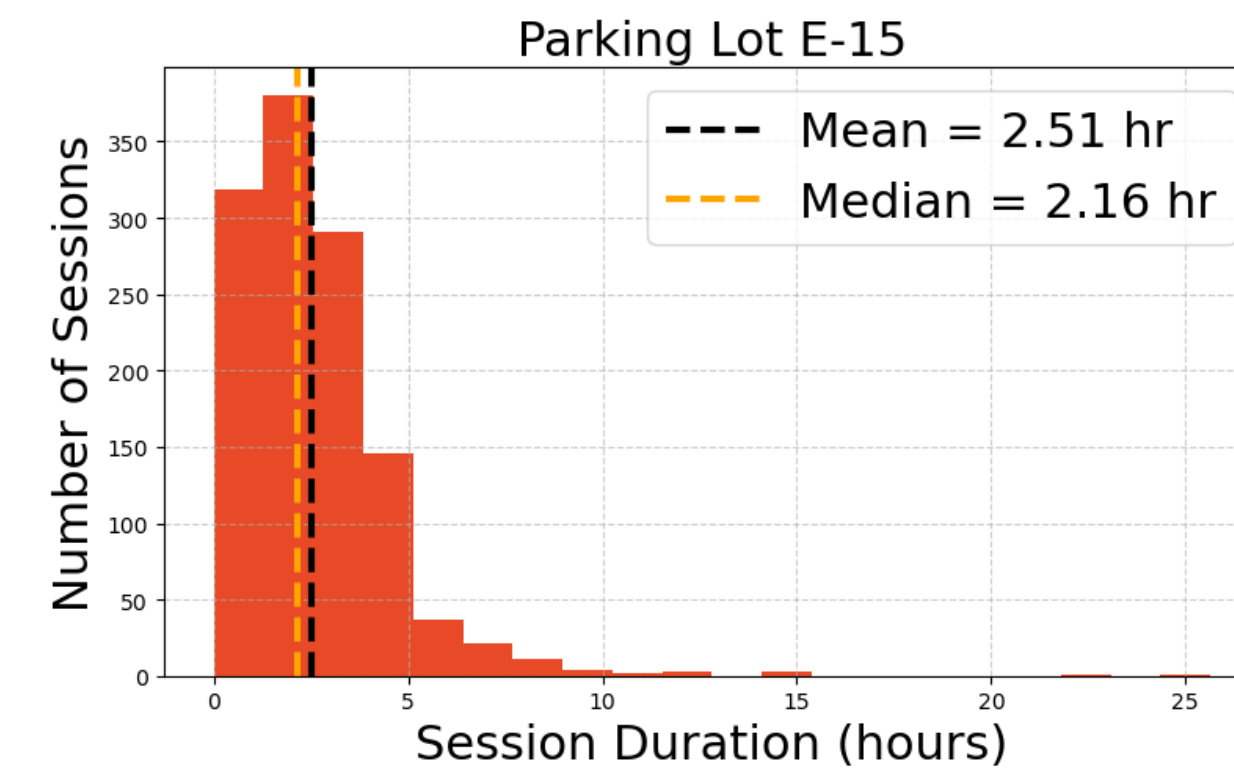
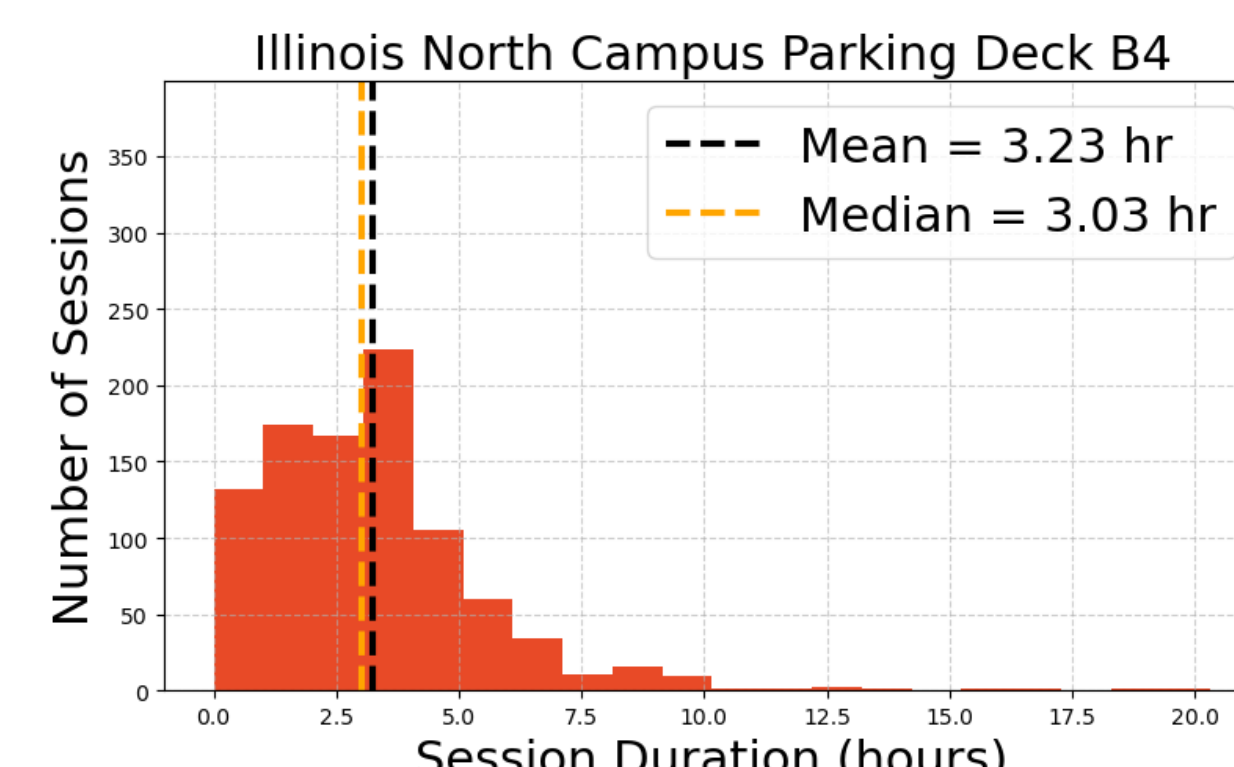
CHARGING SESSION PATTERNS



We focused on the **year 2024** for our data review. Total charging **sessions per station by month** in the year 2024 along with the **different locations** highlights the pattern of usage by location and serves as the **reason** for choosing **Parking Deck B4** and **Parking Lot E-15** to focus on.

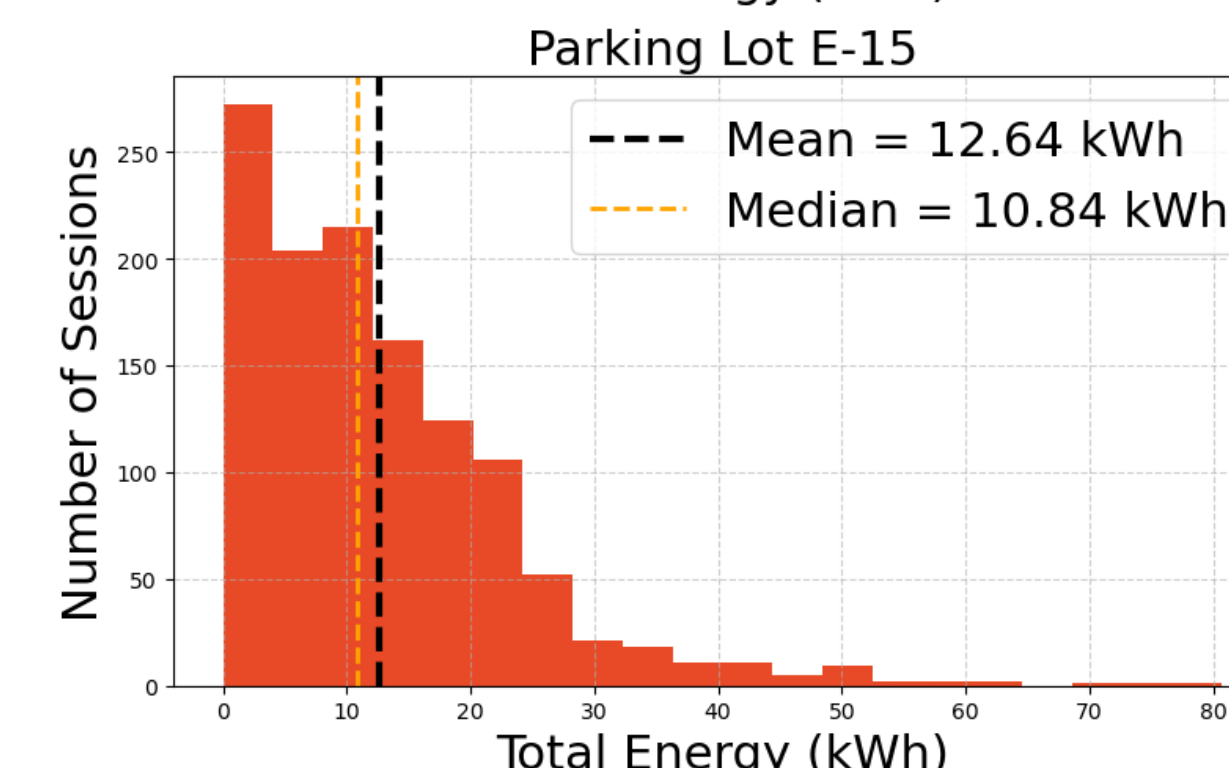
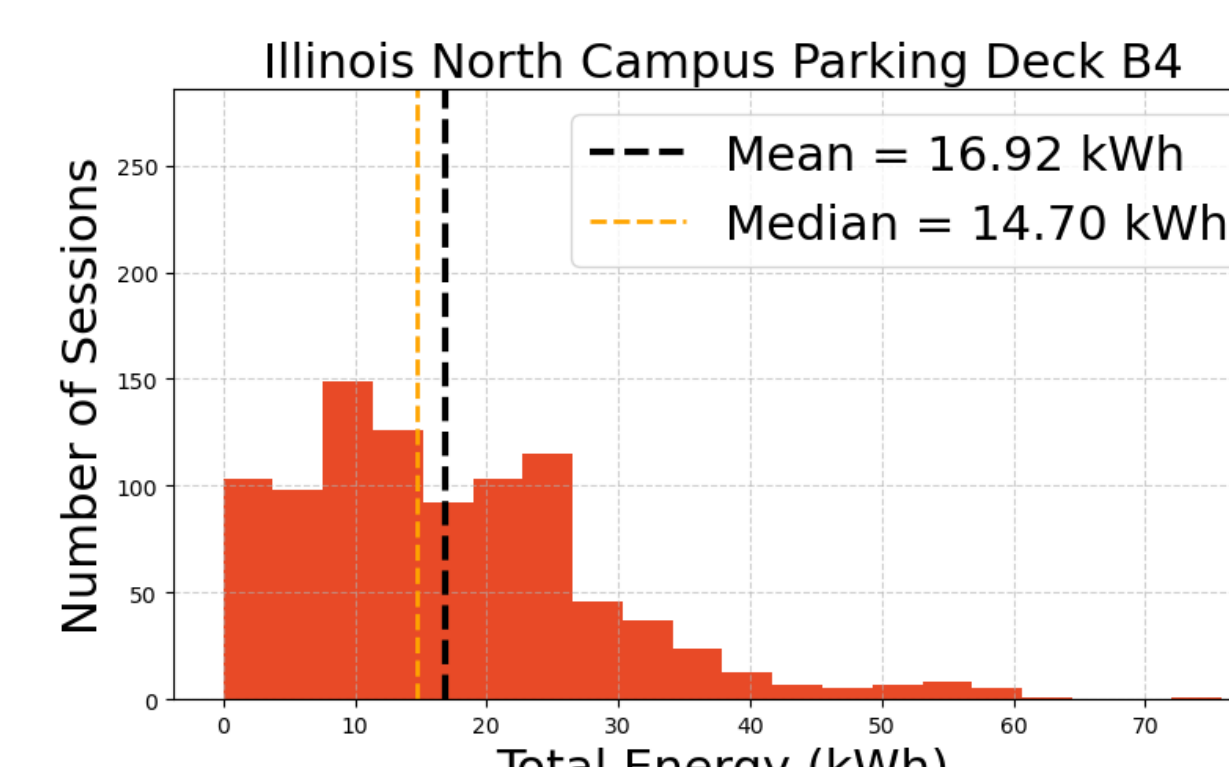
Charging Session Duration

The histogram marks the **mean** and **median** of the session duration data and notes usage per station for the **north and south sides of campus**



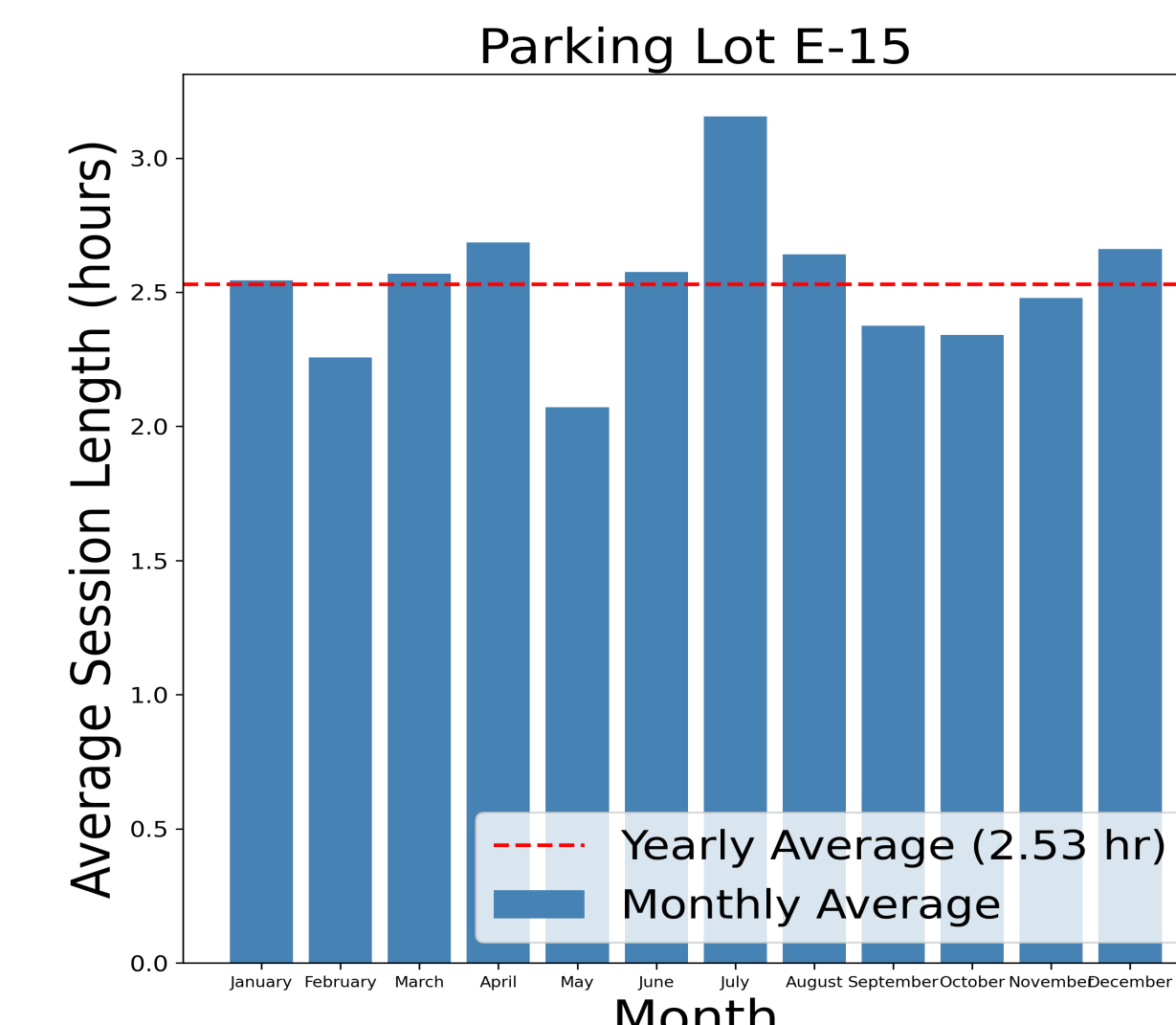
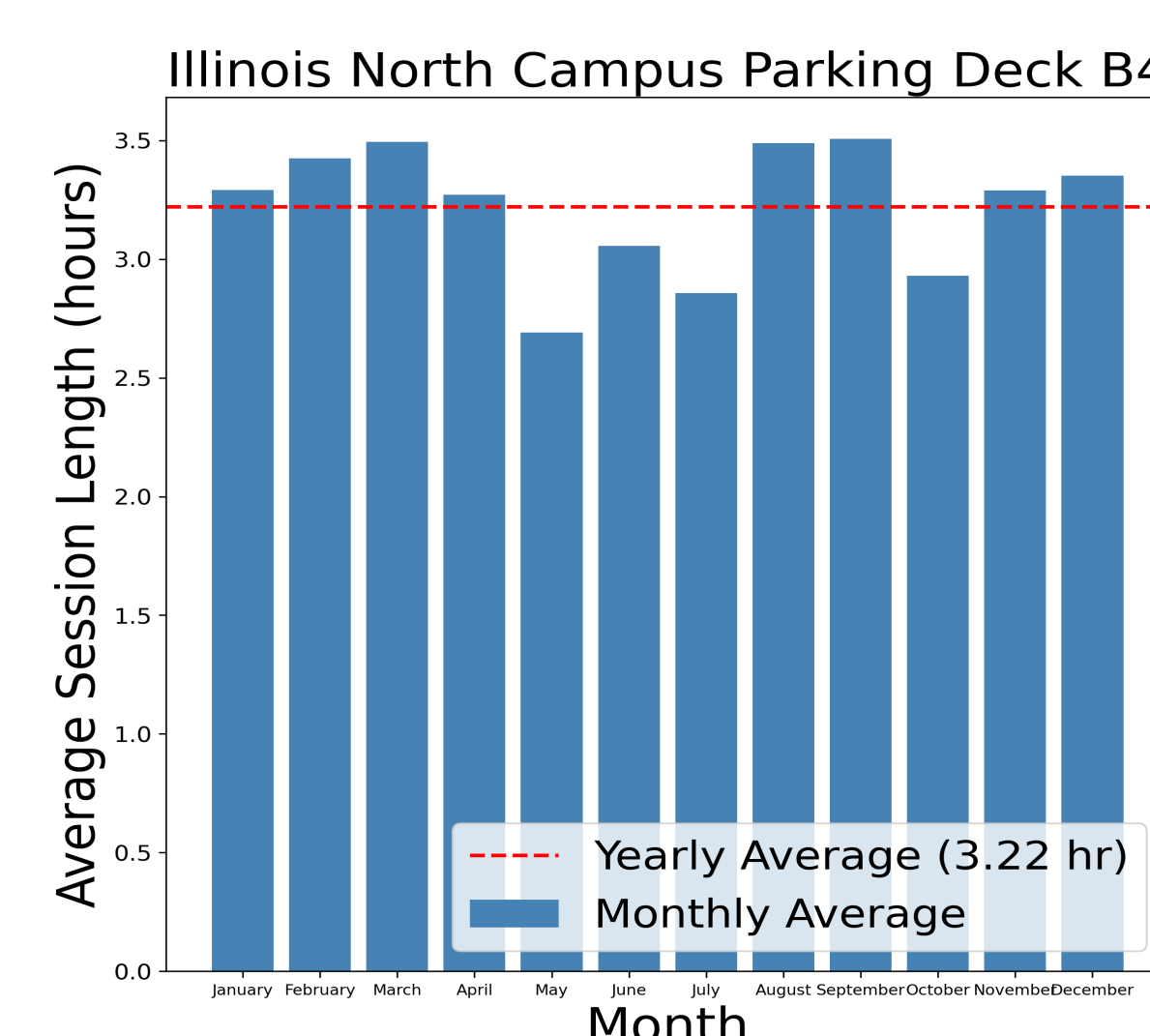
Energy Consumption per Session

The histogram shows **energy consumption per session** in the year 2024 along with the **mean and median** for Parking Deck B4 and Lot E-15



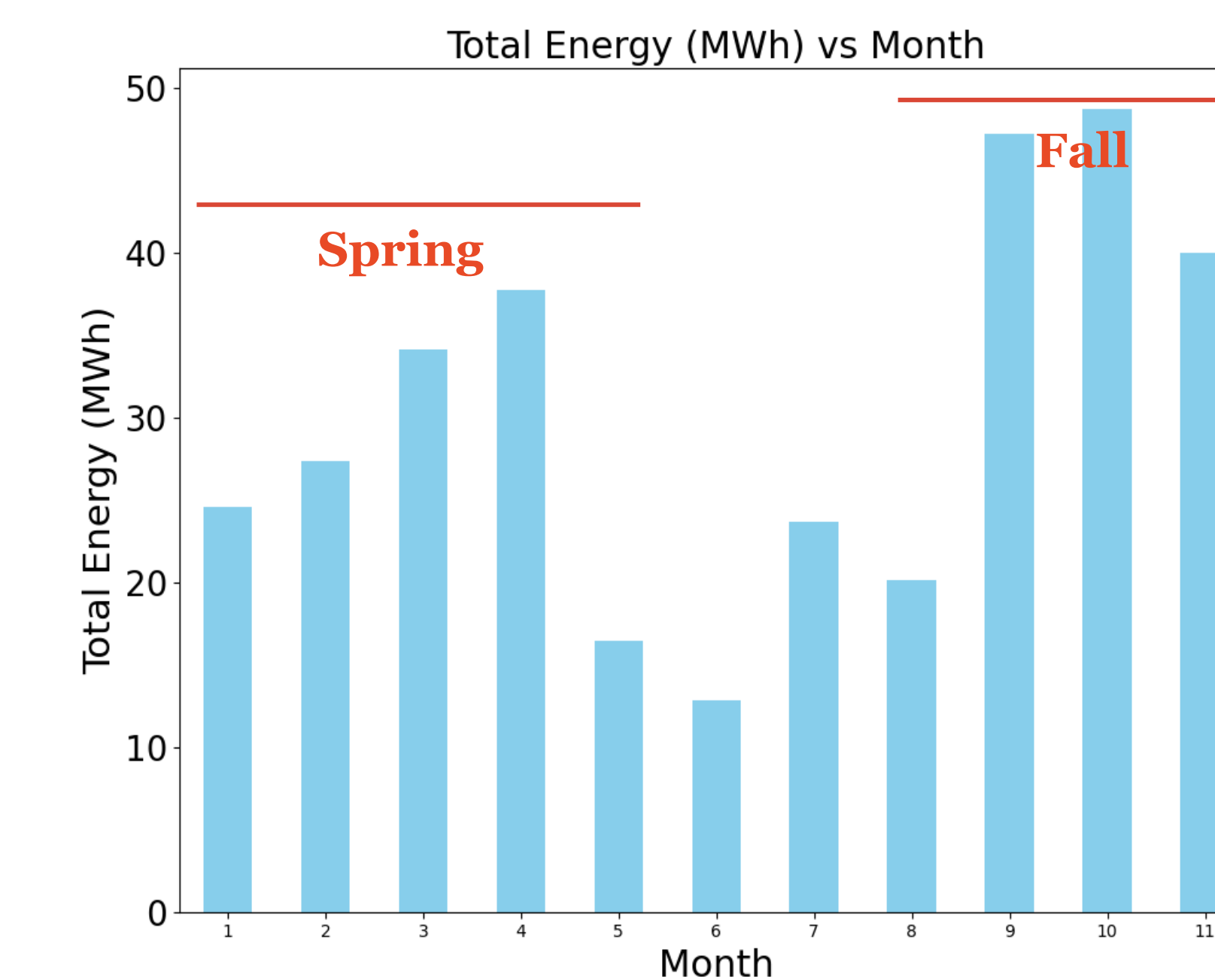
PATTERN RECOGNITION FOR DECK B4 AND LOT E-15

- The average charging session length is **3.22 hours** for Parking Deck B4 and **2.53 hours** for Parking Lot E-15
- Average length by month does not significantly vary, apart from a **decrease in sessions duration** in all charging stations in **May**



CHARGING UTILIZATION PATTERNS

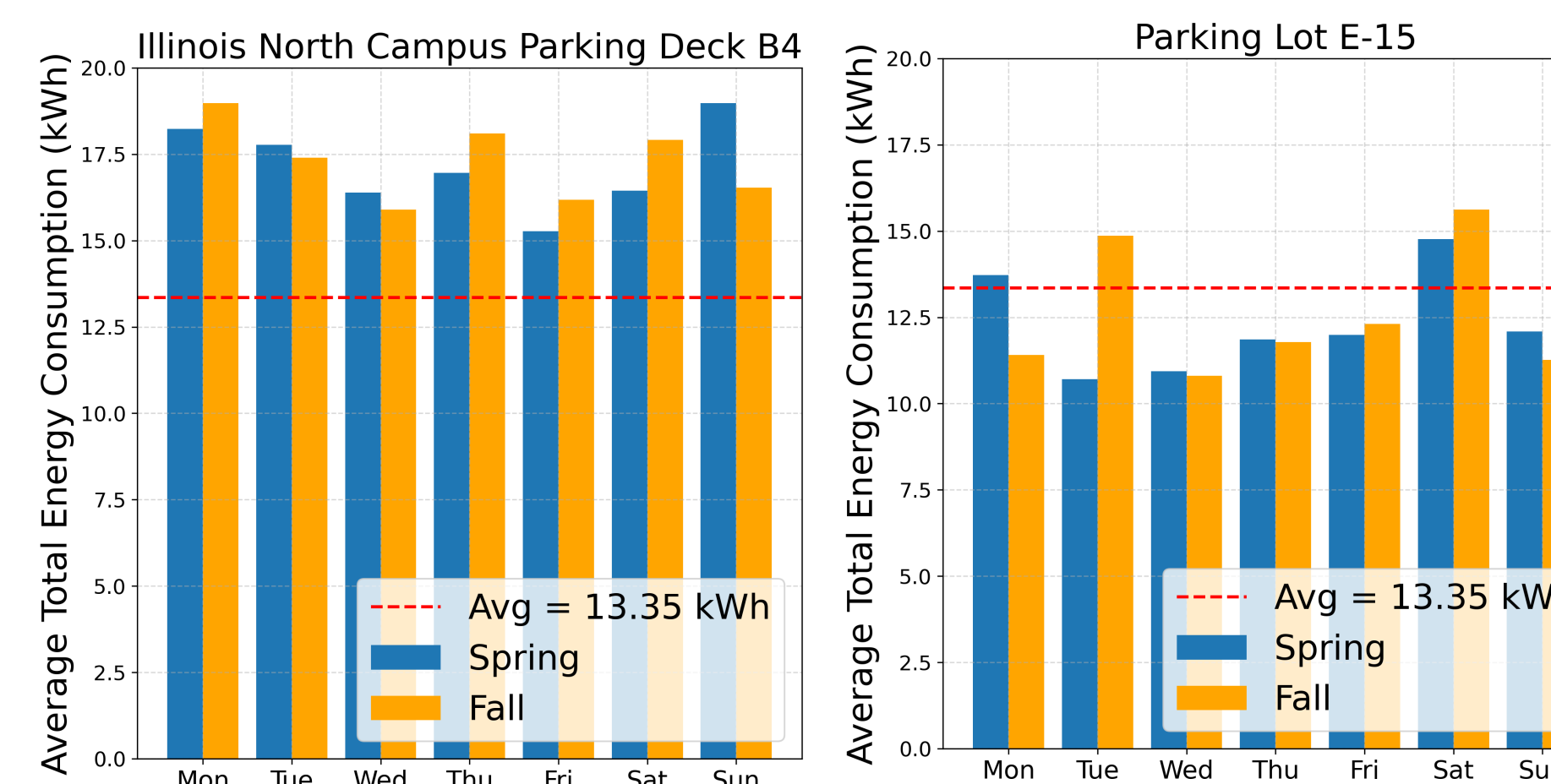
(A) Total Energy Use per Month



HIGHLIGHT #1

- November** has the highest total energy consumption probably due to multiple weekends attracting alumni
- Fall** has a higher usage than spring because of weather restrictions and highest traffic weekends such as welcome week and homecoming
- Spring** sees a consistent high average usage
- Summer break and winter break** have the lowest usage due to low population/activities during breaks

(B) Weekly Energy Consumption Patterns



HIGHLIGHT #2

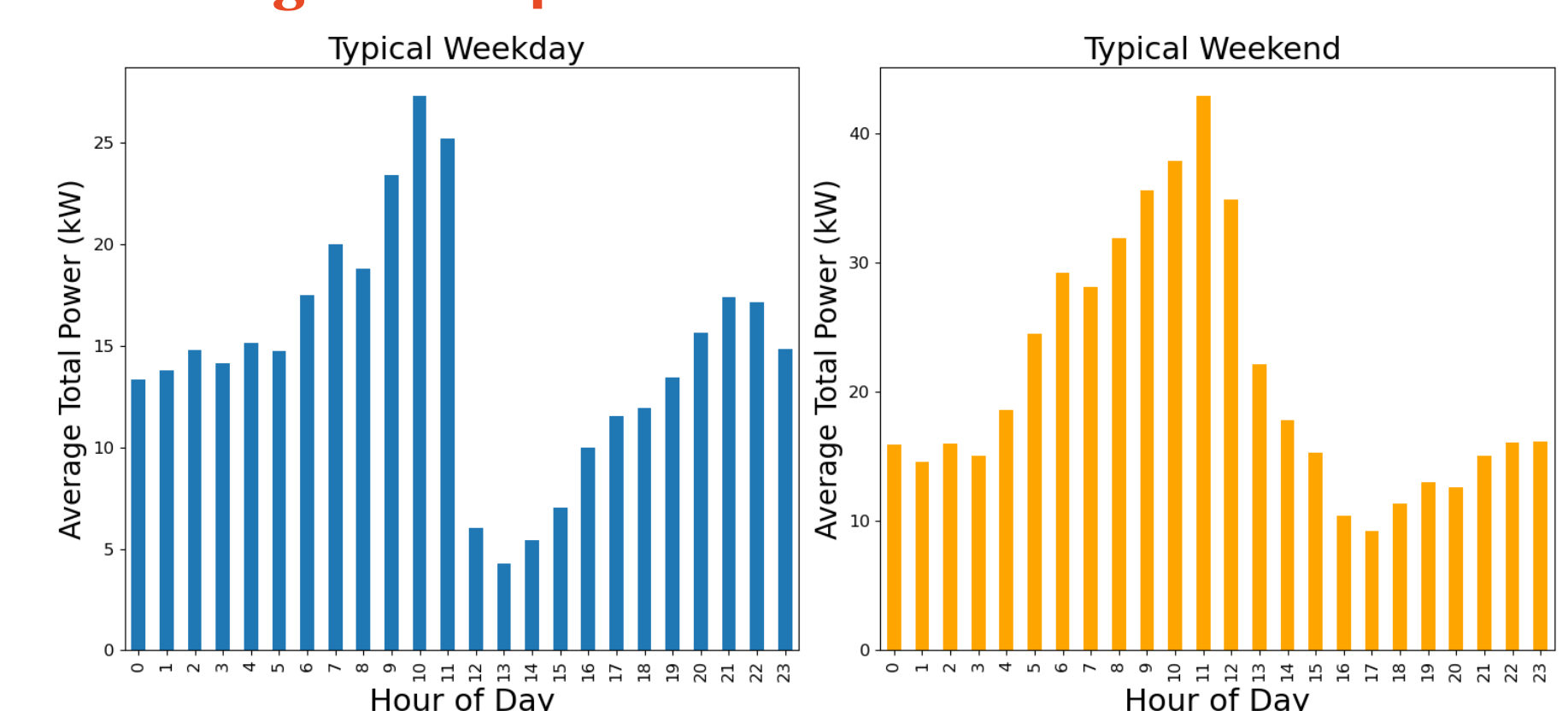
- No significantly different pattern between **Spring and Fall** semester in B4 and E15
- Parking Deck B4, Monday and Sunday** have the highest total energy and **Thursday** has the lowest
- Parking Lot E-15** has similar energy consumption levels throughout the week

(C) Daily Power Patterns

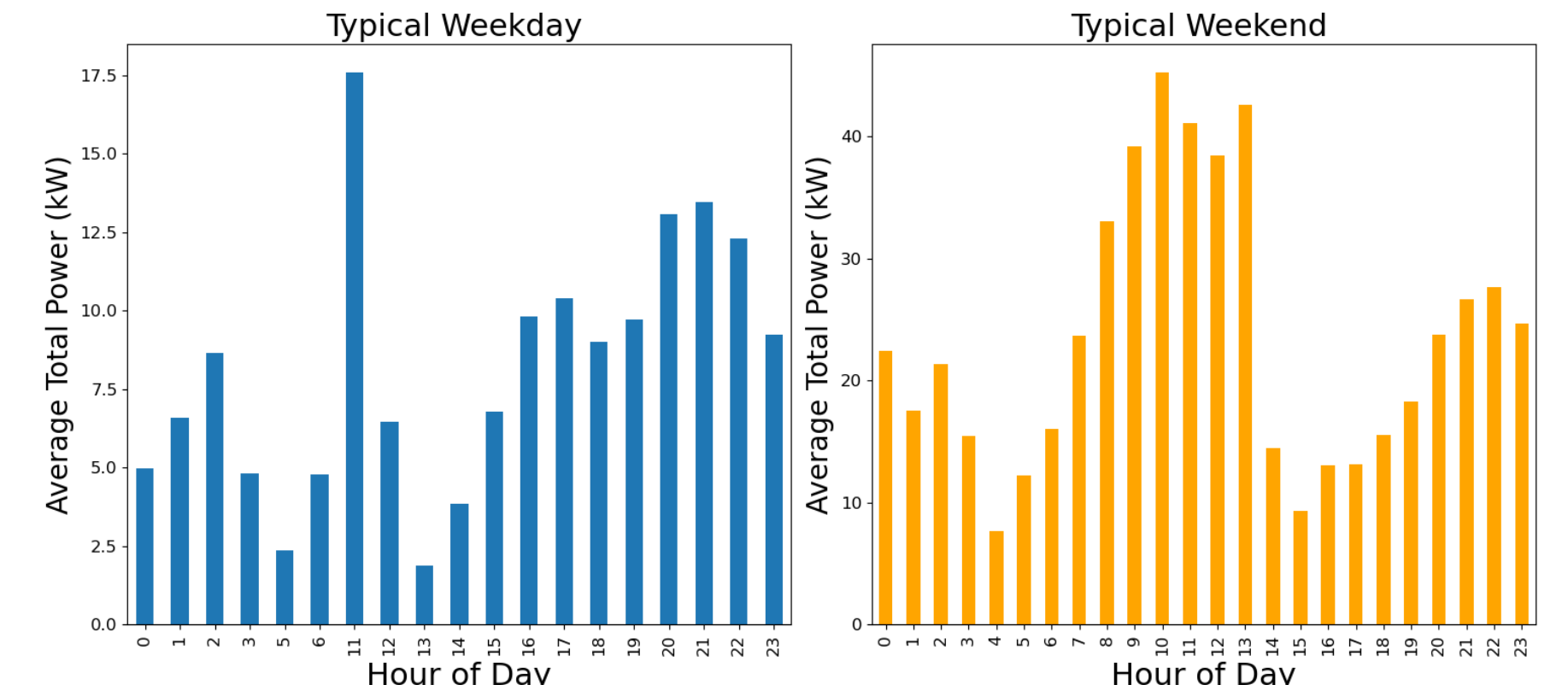
HIGHLIGHT #3

- Parking Lot B4 and Lot E-15's** total power profiles over the weekday and weekend
- For Lot B4**, weekend peaks are even higher than weekdays. This might be because Lot B4 is an on campus charging station and research activities continue during the weekends.
- For Lot E-15**, similar trends are observed, hypothetically due to the research park or students looking for parking

Parking Deck B4



Parking Lot E-15



HIGHLIGHT #4

- All chargers' usage is affected by **location, time of day, day, and month**
- Conducted survey would provide clarifications on **EV user needs** and patterns and **uncover behaviors associated with charging energy use**
- The survey would showcase public attitudes toward EV **infrastructure, resources and benefits available** on campus to make sure if they need to be better advertised