

# Electric Vehicles & Community Charging Overview

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DECEMBER 5, 2023

DANAE PRESLER  
CLIMATE ANALYST  
SUSTAINABILITY DIVISION



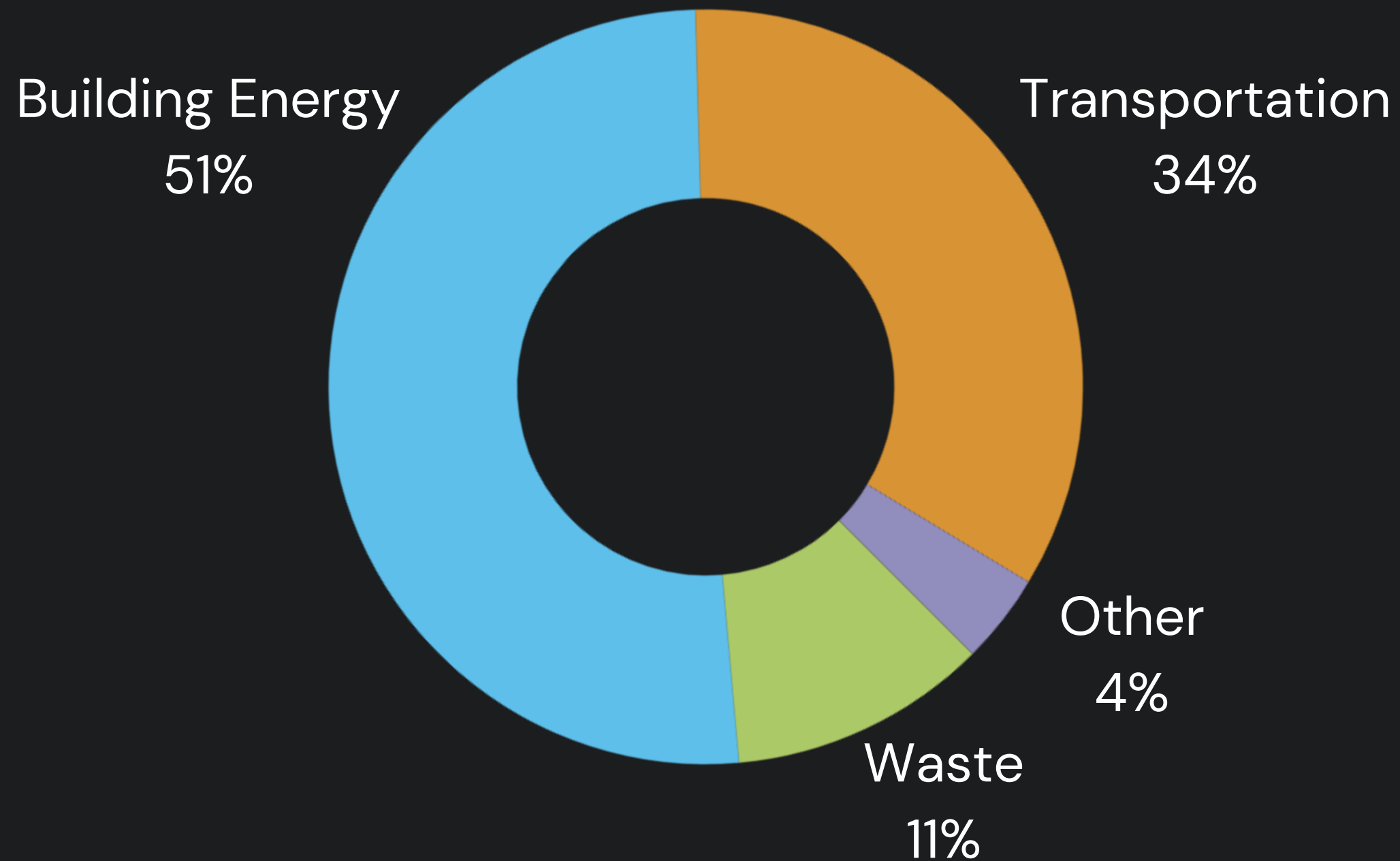
# Topics

- Why this Matters
- Types of Electric Vehicles (EVs)
- Market Trends
- Driving Factors
- Emissions Comparisons
- Challenges and Opportunities

- Day to Day Operations of an EV
- Charging Overview
- City of Flagstaff Charging Stations
- Next Steps

# Why this matters

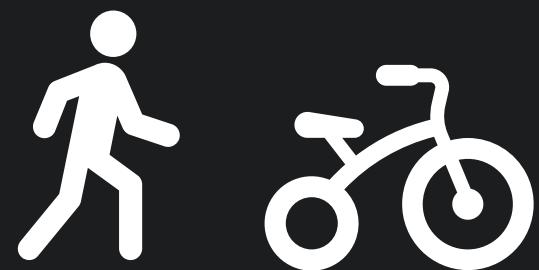
## GHG Emissions (2021)



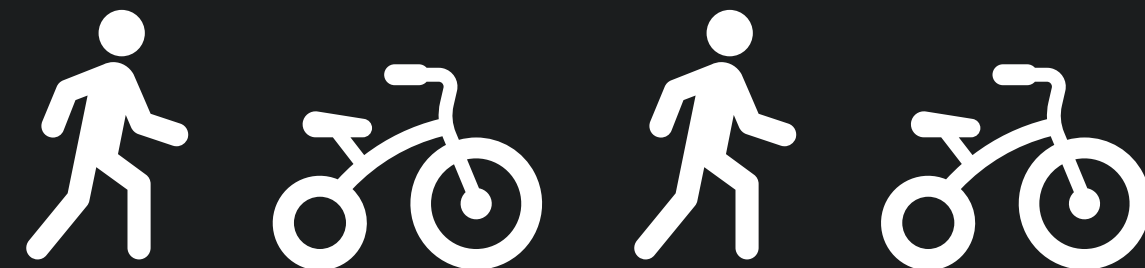
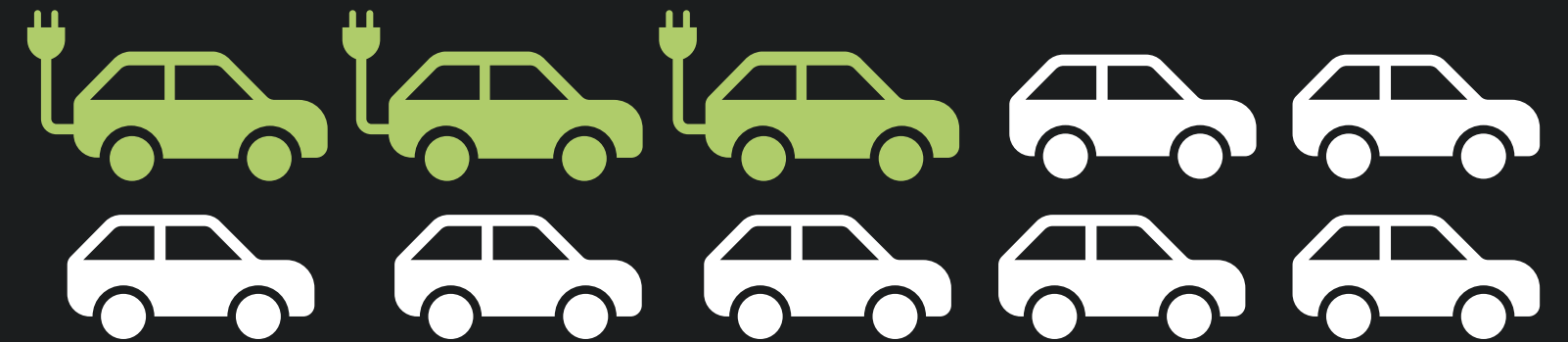
**Transportation is the second largest source of emissions in Flagstaff.**

# EVs are one part of reducing transportation emissions

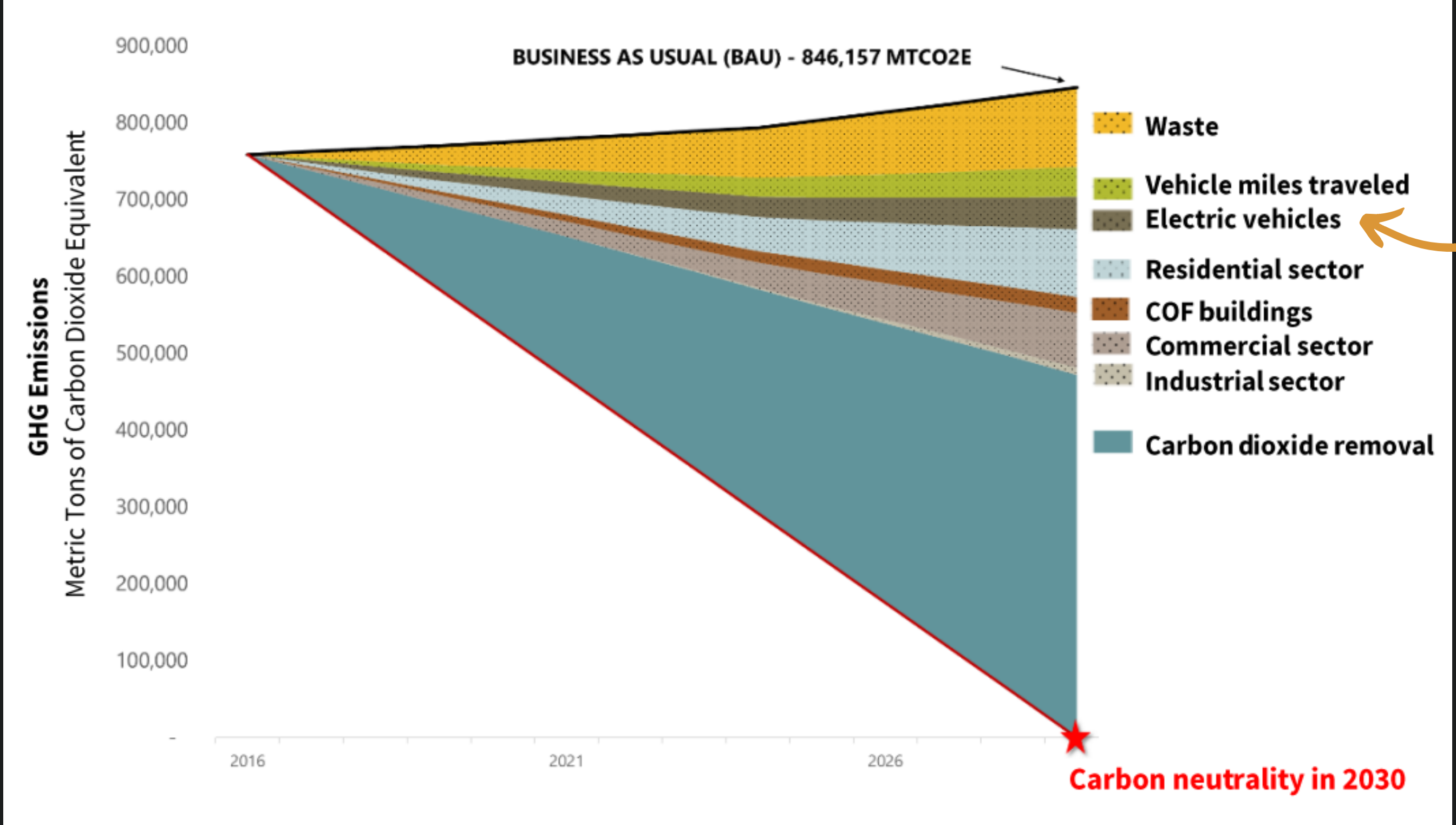
Today



Goal



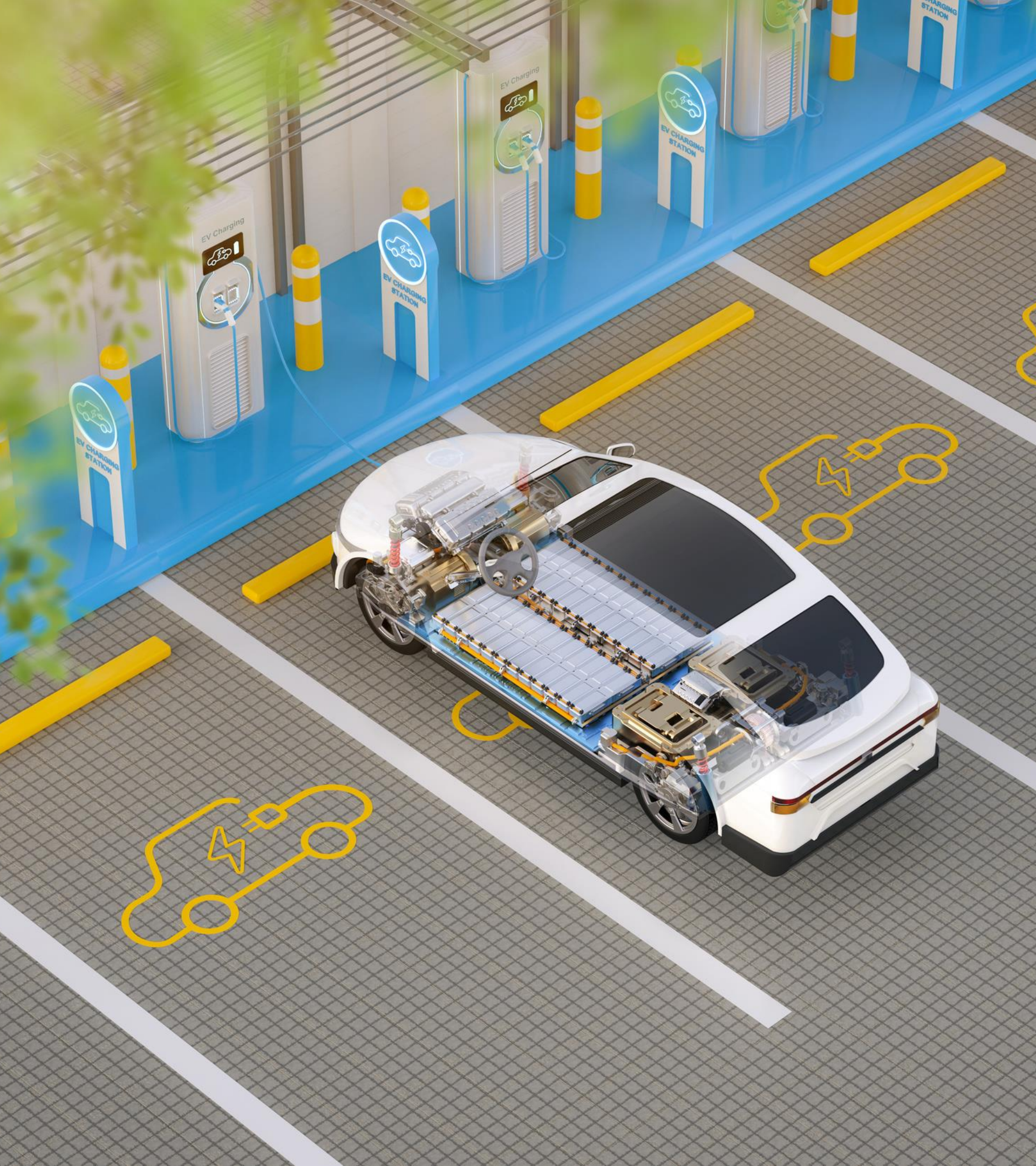
# Why this matters



**2030 Goal:**  
**30% of**  
**vehicle**  
**miles will**  
**come from**  
**EVs**



**Why this matters**

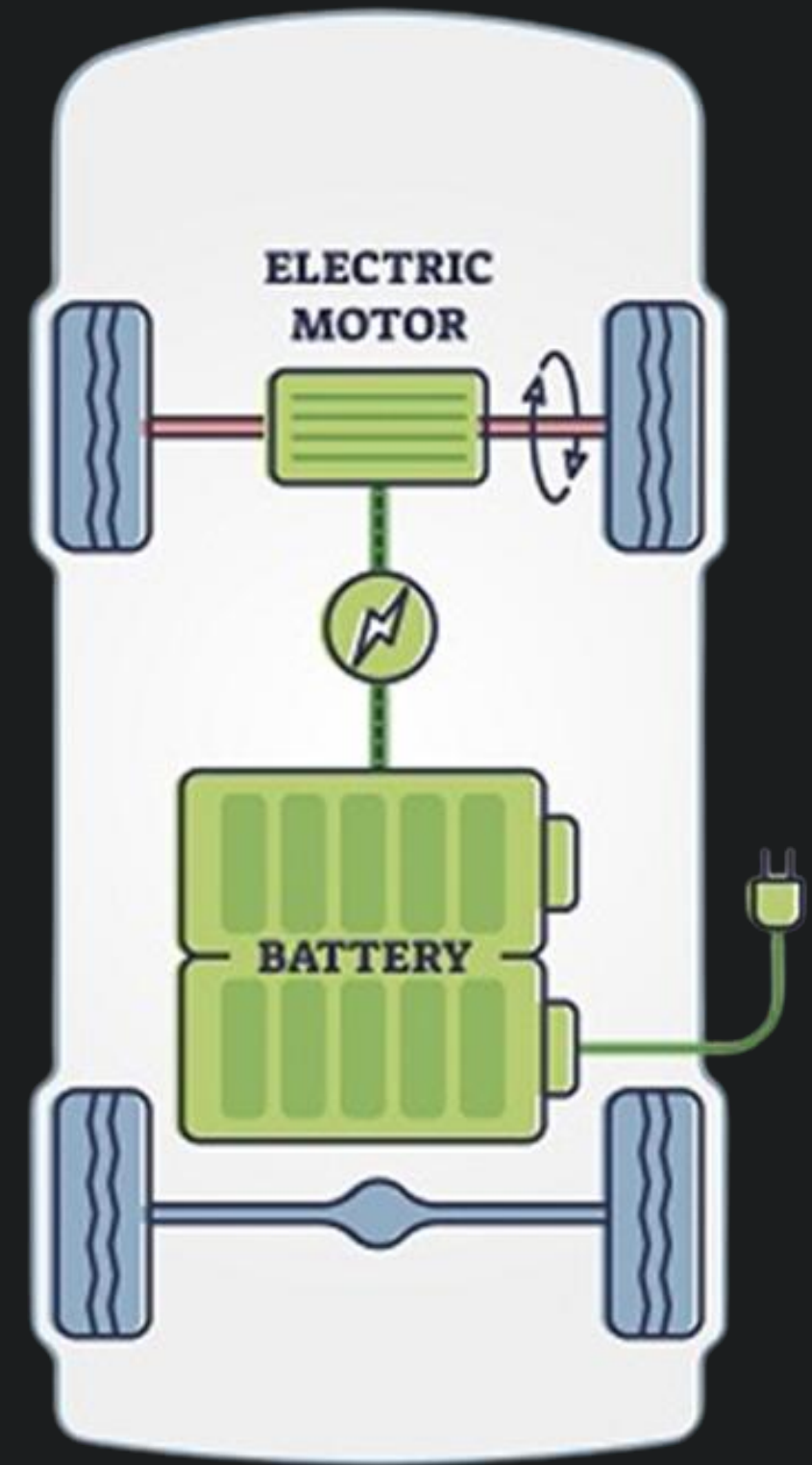


# What is an Electric Vehicle (EV)?

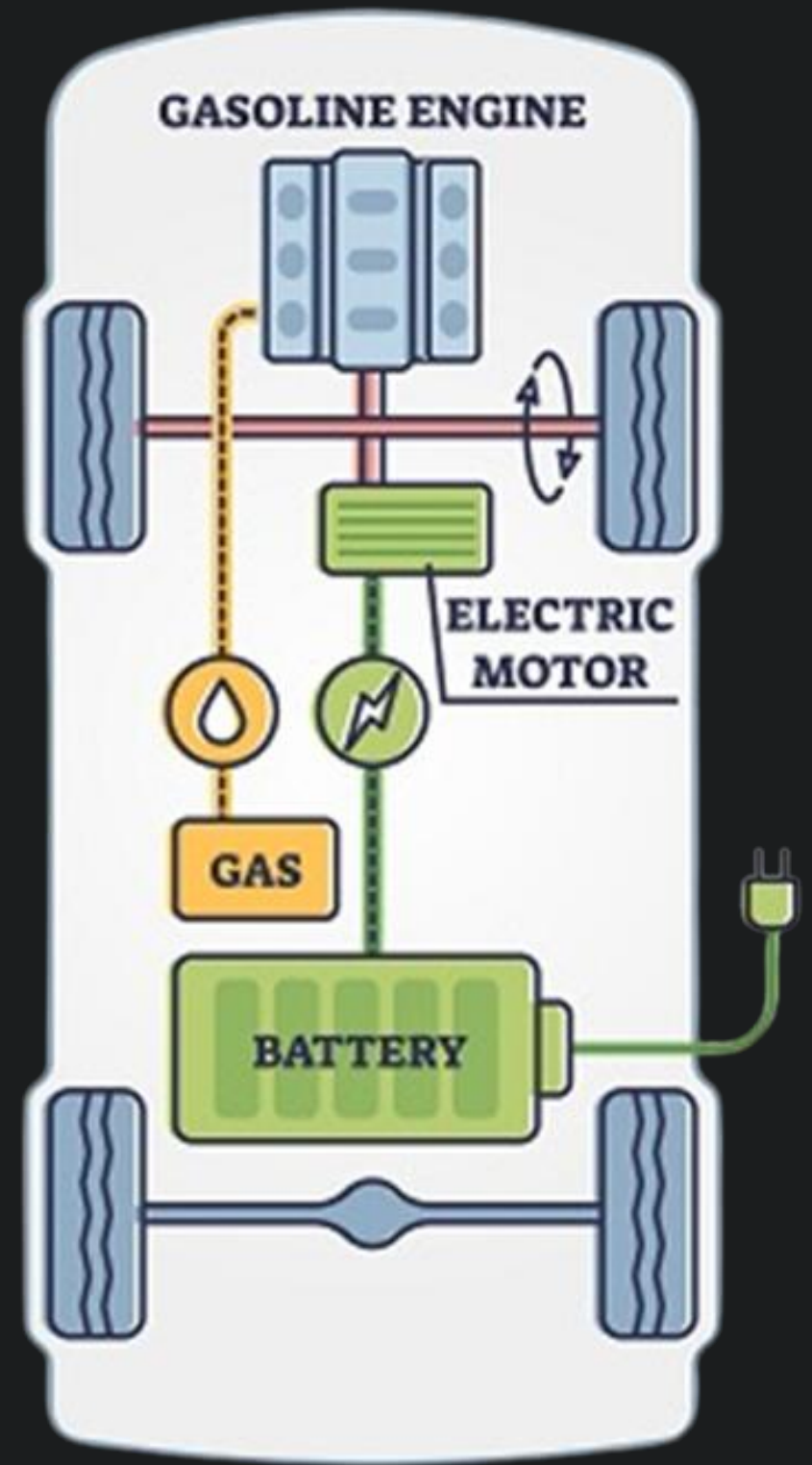
A vehicle that is powered by an electric motor that draws electricity from a battery.

# Types of Electric Vehicles

## Battery Electric Vehicle (BEV)

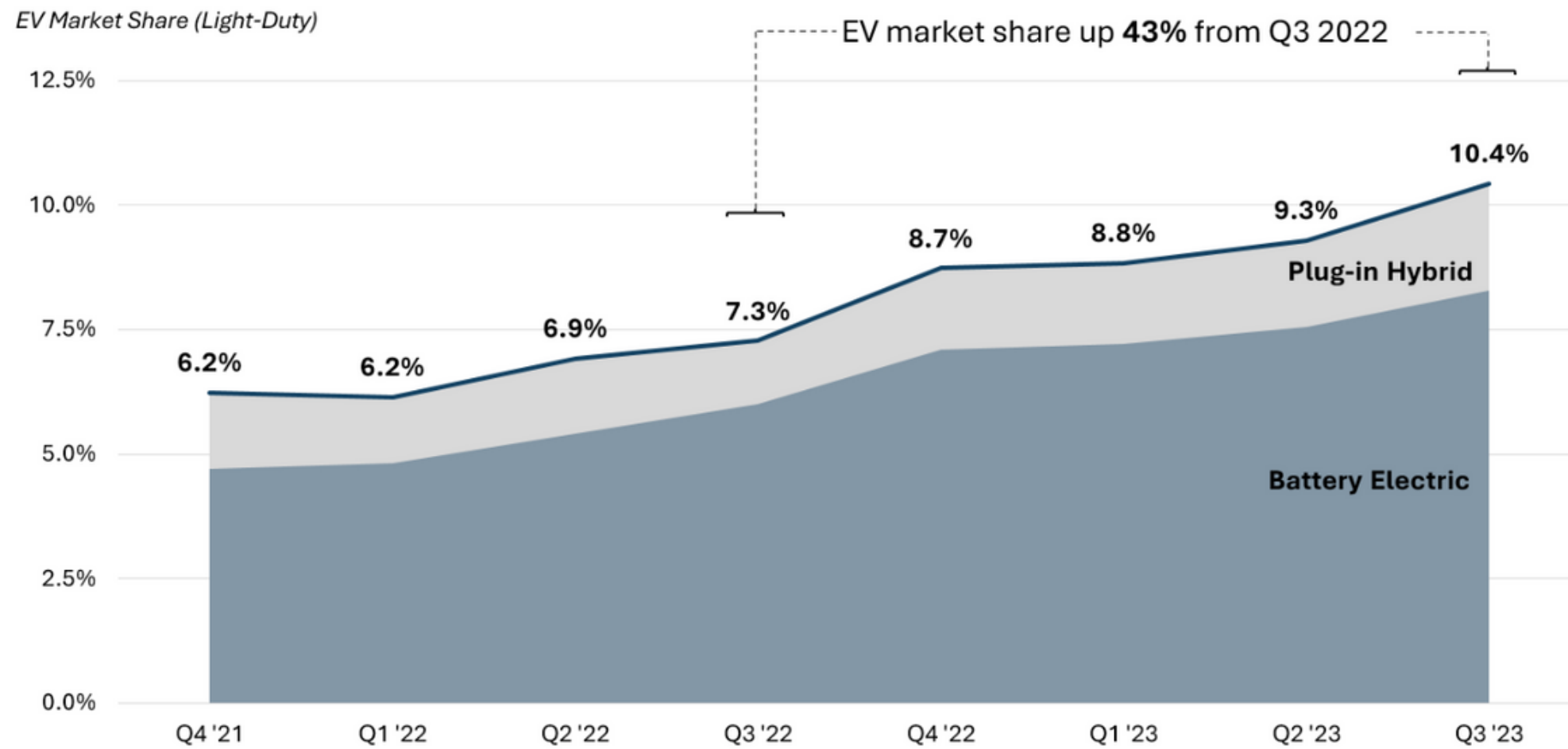


## Plug-in Hybrid Electric Vehicle (PHEV)



# Market Trends

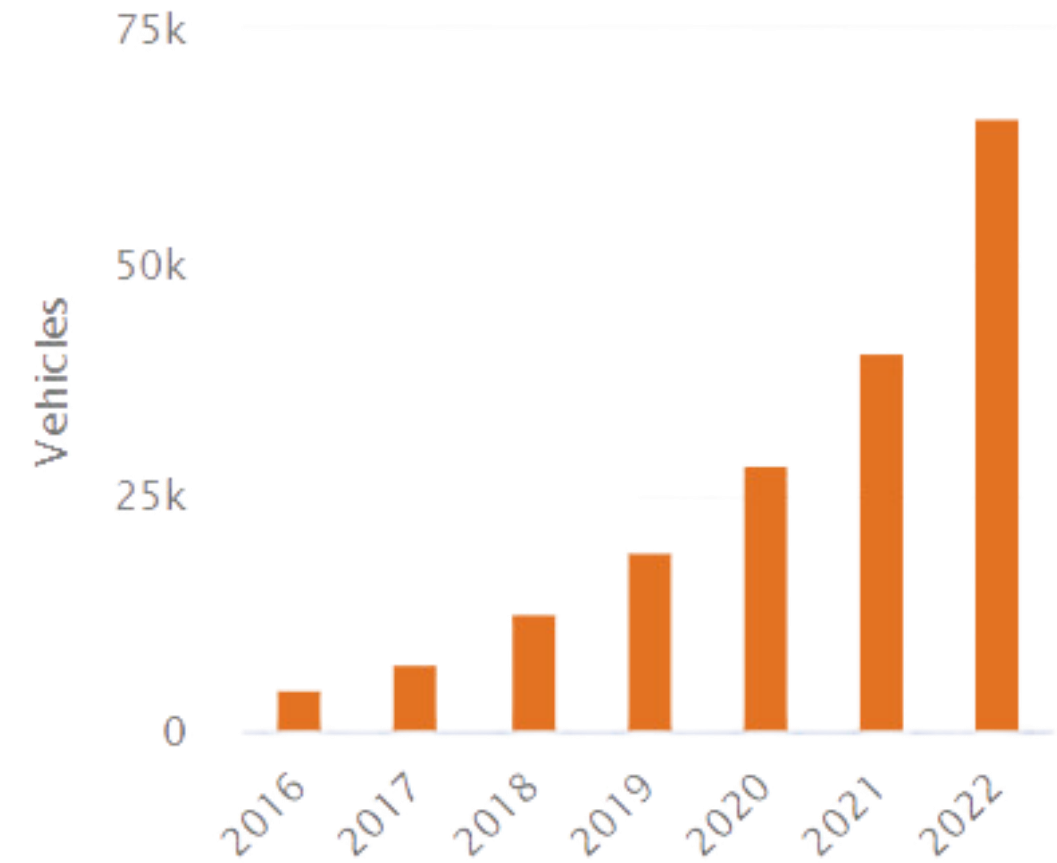
For every 10 light-duty vehicles sold in the U.S., one is an EV



Atlas EV Hub - Automakers Dashboard

Arizonans are buying more EVs

## EV Registrations in Arizona



DOE Alternative Fuels Database

EV Market Share in AZ: <1%

# Market Trends

## Auto Manufacturer Commitments

Only sell zero-emission vehicles by 2035



50% sales EV by 2030



40% sales EV by 2030



## Investments

**\$8.2 Billion**

Awarded in Federal Funding for  
EVs, Batteries, and Charging  
Infrastructure in past two years

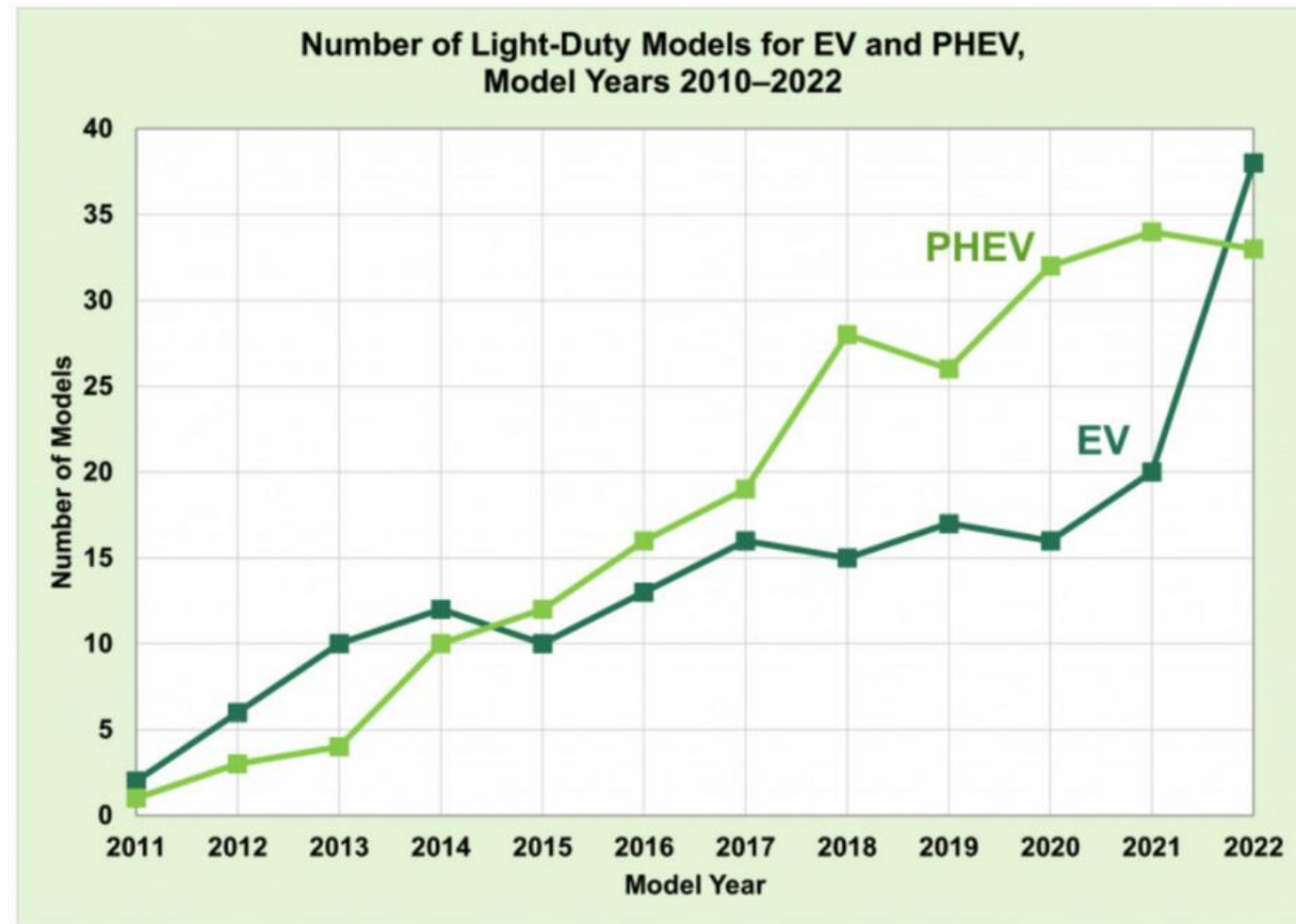
**\$271 Billion**

In private investments for EVs  
since 2016 (66 companies)

Source: Atlas EV Hub

# Driving Factors

## More Electric Models are Becoming Available



Number of EV and PHEV models - U.S. DOE

## Better Batteries = Better Range

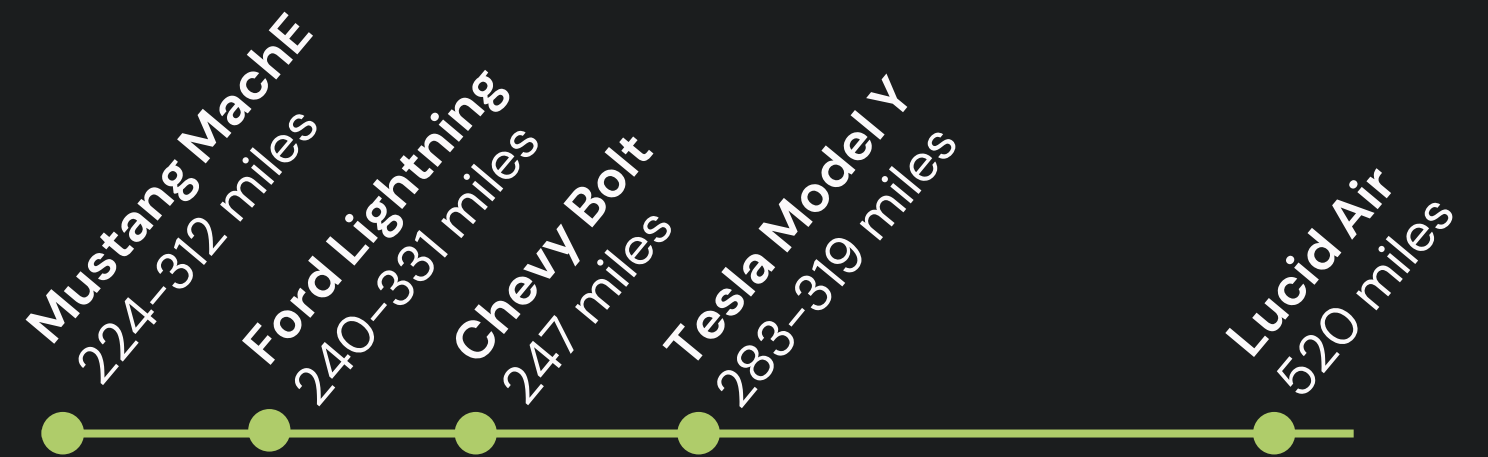


The average range of EVs has increased **4x** since 2011

Average range of EVs purchased today:

**291 miles**

Range:



# Driving Factors



## Affordability

- EV prices continue to decline

Avg. price for EV: \$50,683

Avg. price for gas vehicle: \$47,899  
\$2,784

Federal Tax Credit for EV: \$7,500

- More used options are available

Federal Tax Credit for Used EV: \$4,000

- Cheaper to Fuel & Maintain

Avg. lifetime savings of EVs: \$6,000 – \$10,000

## Starting Prices:

- **Chevy Bolt:** \$26,500
- **Tesla Model Y:** \$43,990
- **Mustang MachE:** \$43,495
- **Ford Lightning:** \$49,995
- **Lucid Air:** \$82,400

# Driving Factors



## Better Charging Infrastructure

Faster, and more, chargers are available



## Enhanced Performance

Fun to drive



## Better for the Environment

Fewer emissions and no tailpipe pollutants



# Life Cycle Emissions

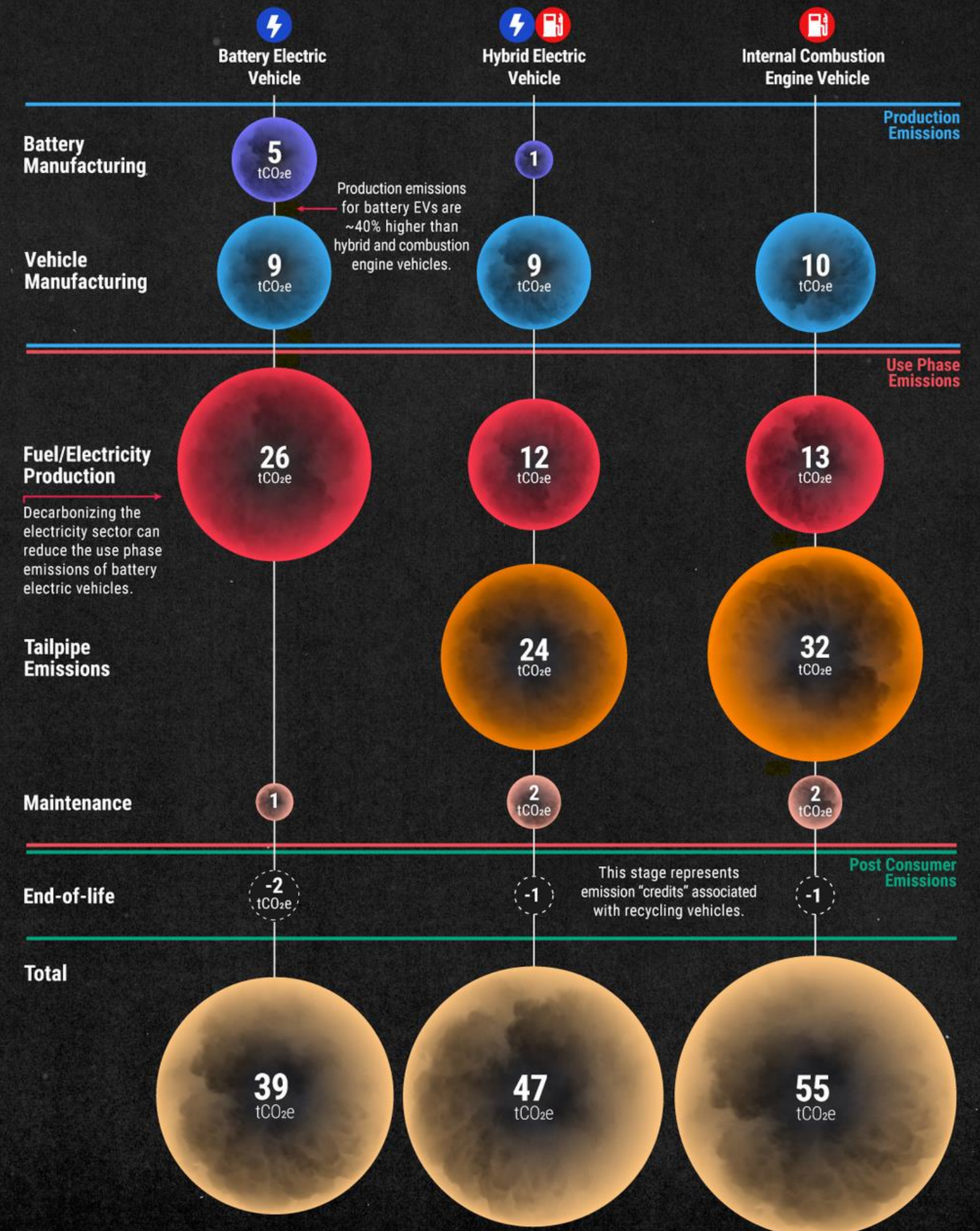
Emissions are produced when a vehicle is manufactured, used, and at the end of its life.

EVs produce ~30–40% fewer emissions than gas vehicles over their lifetime.

It takes a typical EV about 1 year to reach “carbon parity” with a gas-vehicle

EVs emit less when the electricity grid is cleaner.

The City of Flagstaff generates solar power and participates in the Green Power Partners Program to achieve a clean energy mix.



Each vehicle segment displays life cycle emissions for a medium-sized vehicle over 16 years and 240,000 km. Numbers may not add up due to rounding.

# Challenges

Range  
Anxiety

Material  
Sourcing

Model  
Availability

# Challenges

Range  
Anxiety

Material  
Sourcing

Model  
Availability

EV Charging  
Infrastructure

# Opportunities

# Challenges

Range  
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EV Charging  
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Circular  
Economy

# Opportunities

# Challenges

Range  
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EV Charging  
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Circular  
Economy

R&D  
Investments

# Opportunities

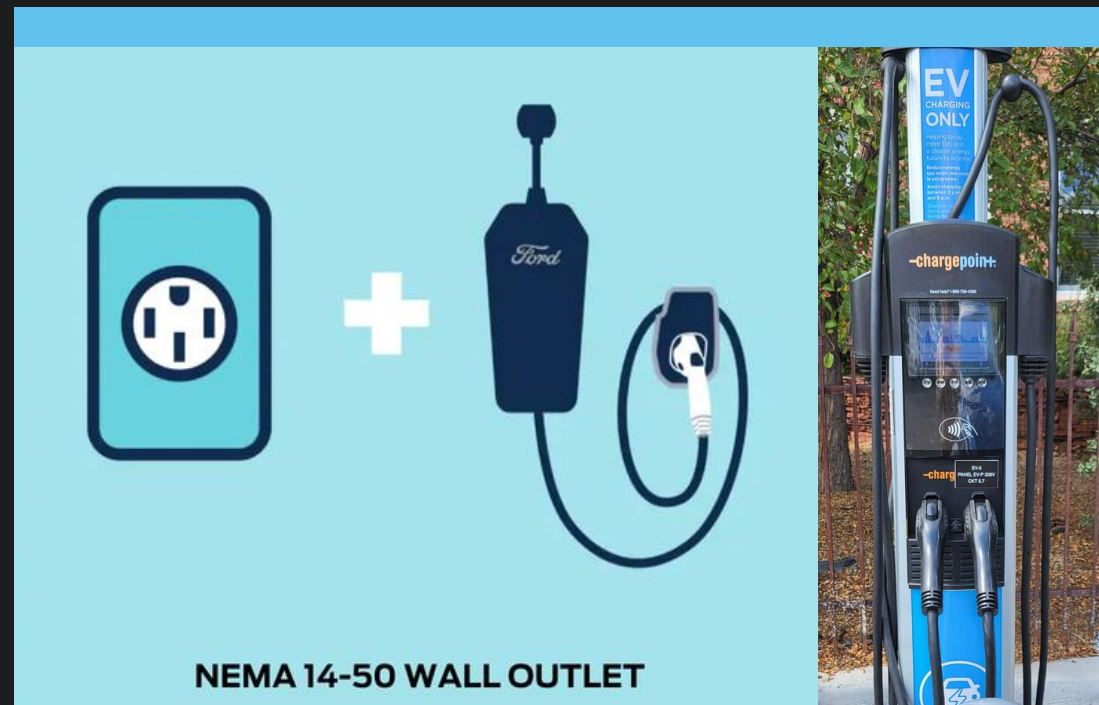
**Next: EV Charging**

# Types of Chargers



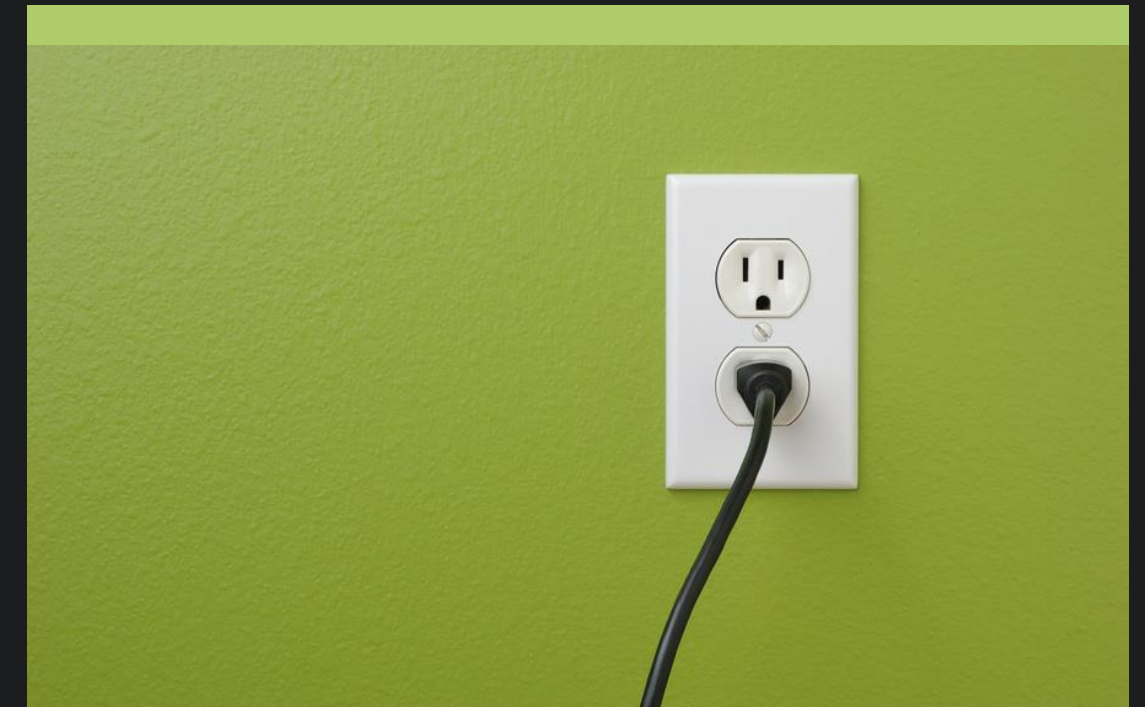
**Level 3**

DC Fast Charge



**Level 2**

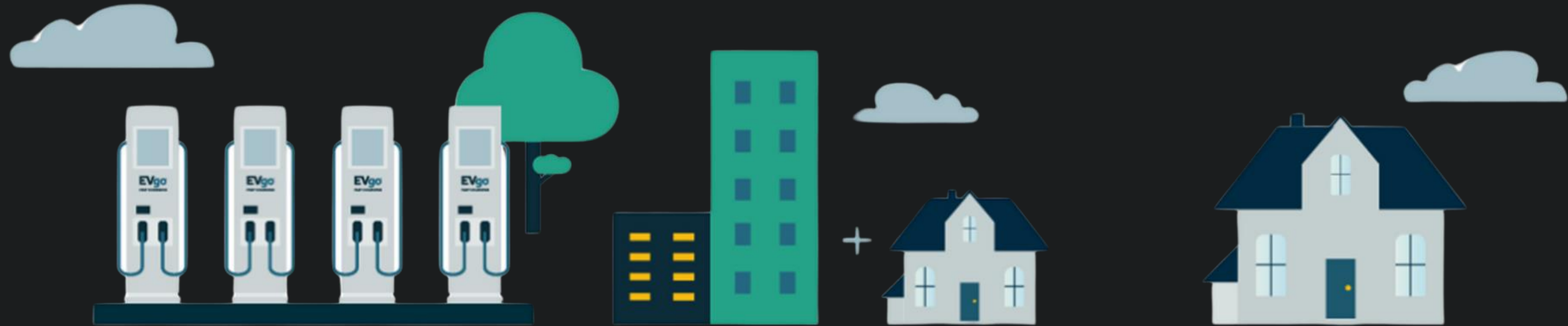
240V



**Level 1**

120V

# Charging Speeds



Fast Charging

Public Charging & Retail

Level 2 Charging

Best for Work & Multifamily

Level 1 Charging

Best for Homes

Charge Time

15 - 45  
Minutes

5 - 6  
Hours

20+  
Hours

# Day to Day: Charging an EV

Average daily miles driven in the U.S. = <40

Average EV range = 200+ miles

Charging an EV is kind of like charging a phone.  
There are lots of options!

- Most EV owners charge overnight at home
- Fast Chargers are increasingly popular
- Some rely on public and/or workplace charging

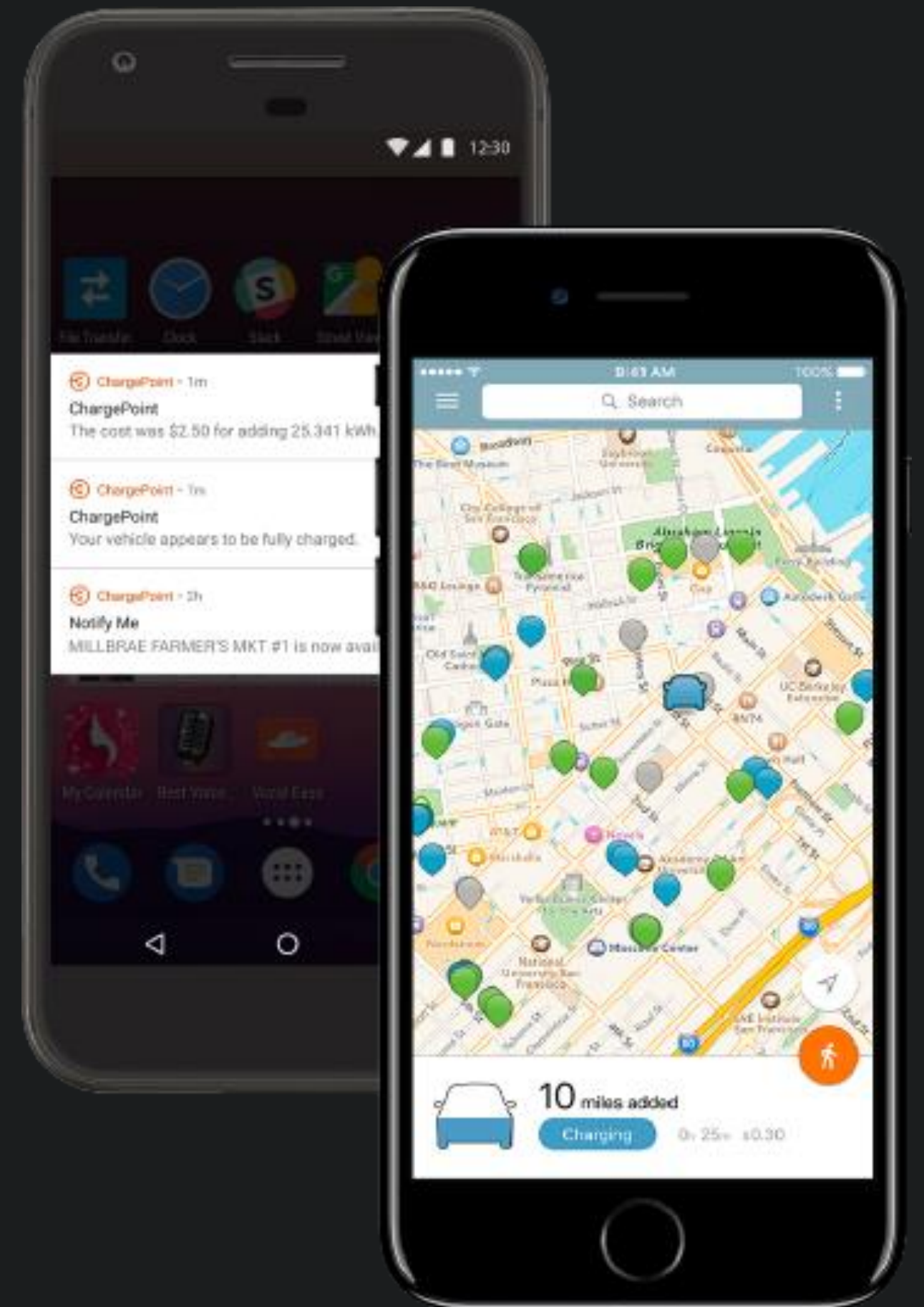
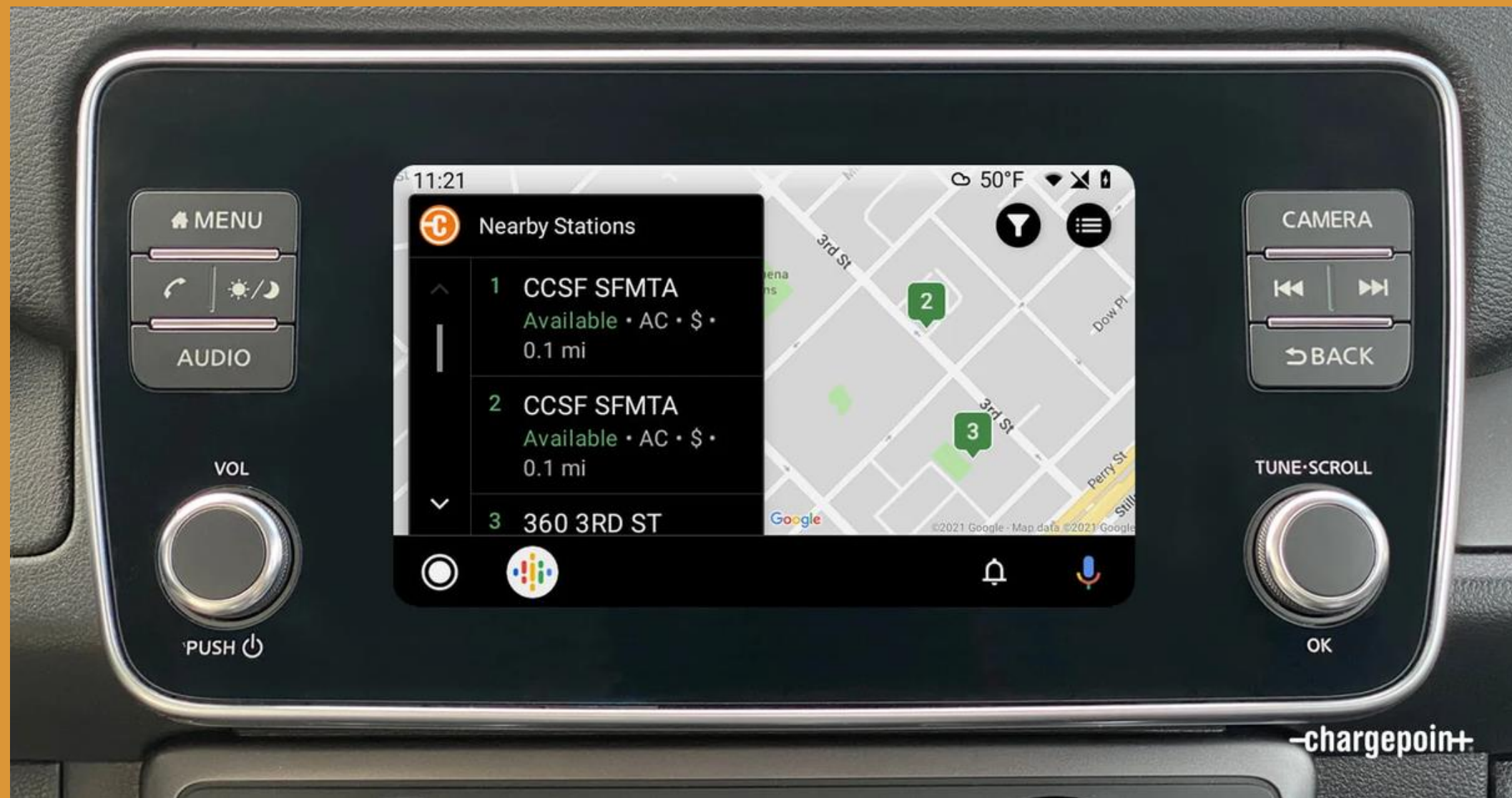
Want to go greener?

The most sustainable time to charge an EV is from 10 am–2 pm when solar energy is plentiful.



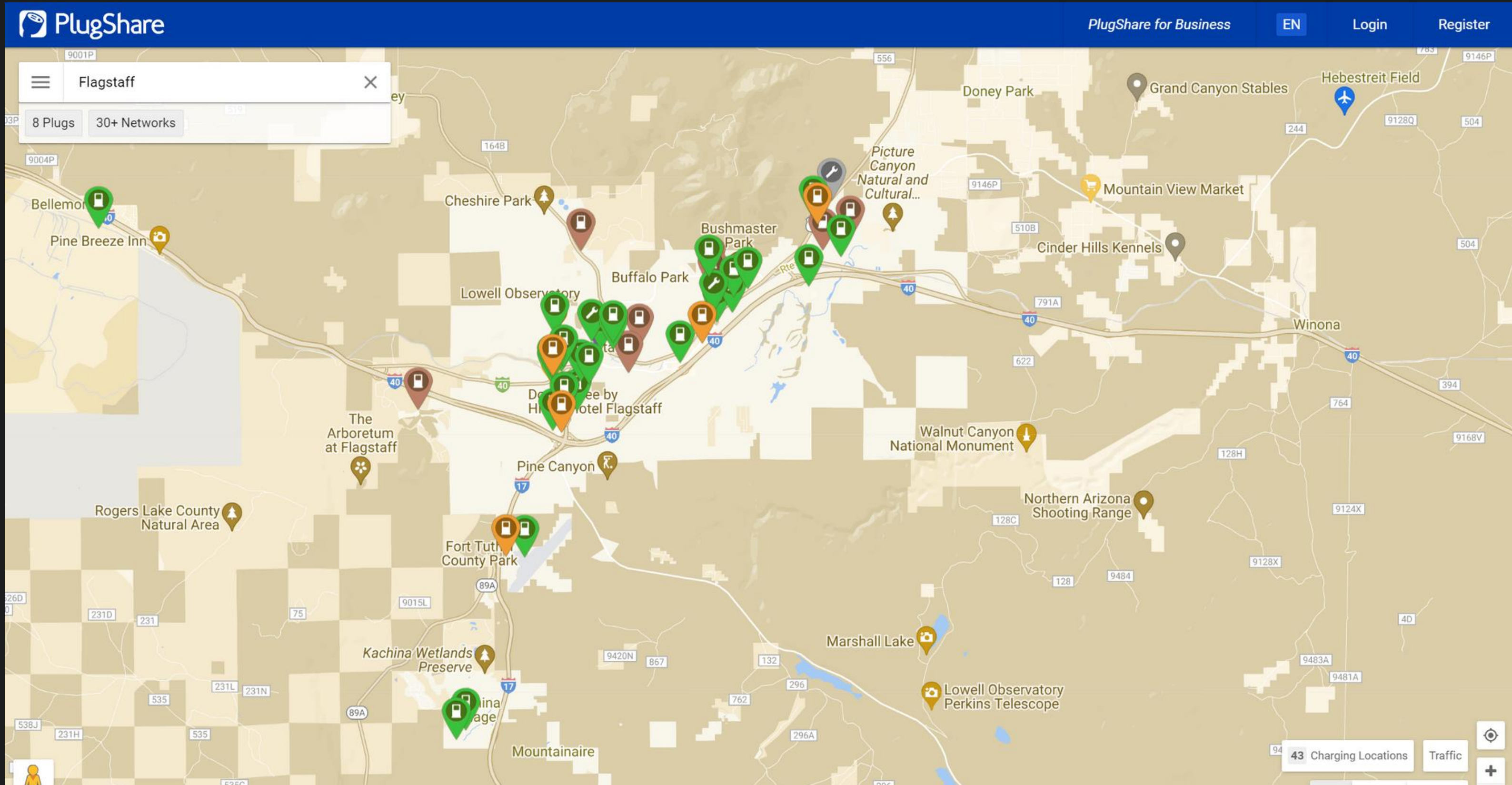
# Day to Day: Charging an EV

Vehicle can locate nearby stations



App provides charging details

# Charging Stations in Flagstaff



Questions about EVs or  
charging?

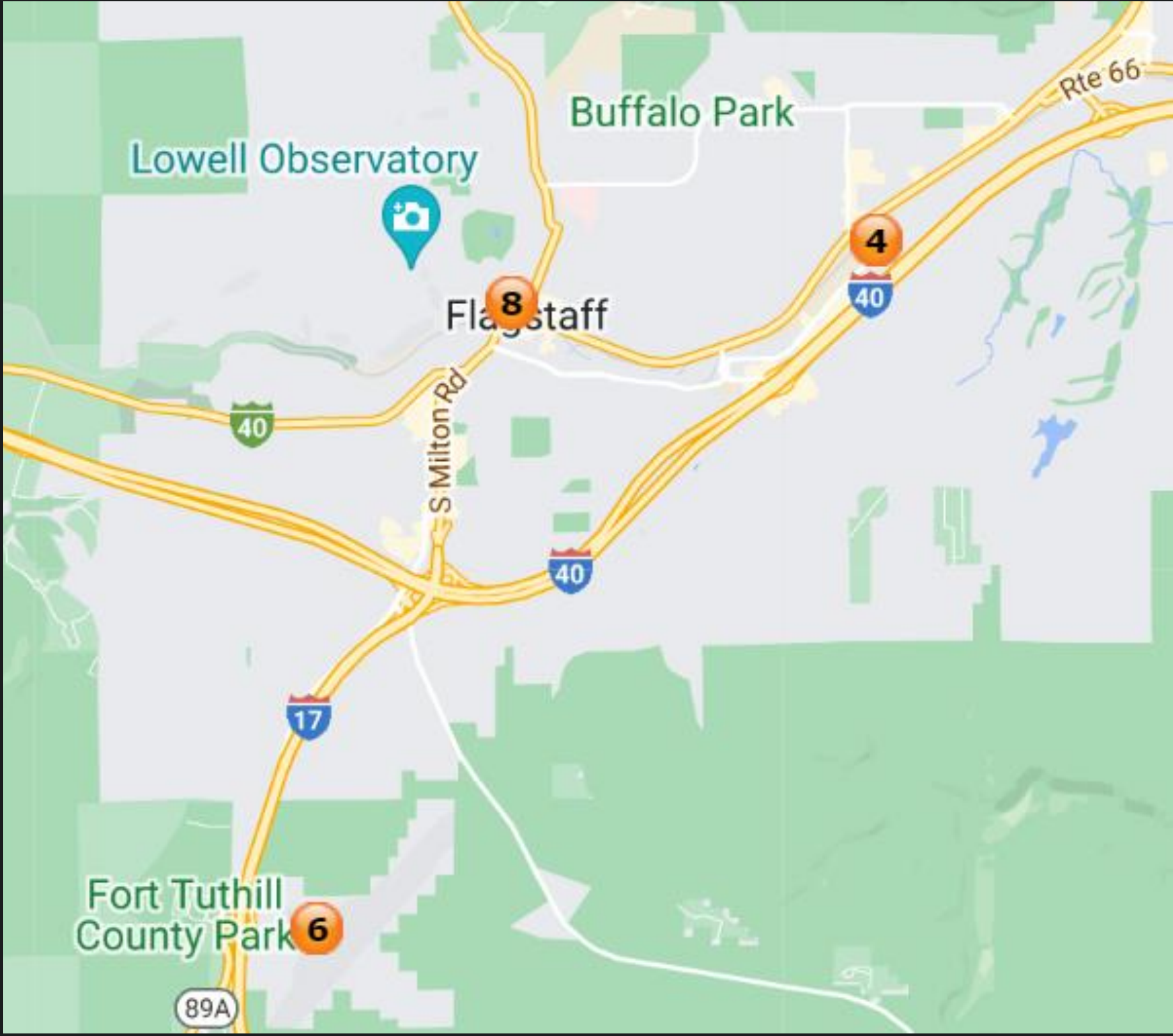
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Next: City of Flagstaff-owned  
charging stations.

# City-Owned Public Chargers

	# of Stations	Sessions / Year
<b>City Hall:</b>	4	3,174
<b>Visitor's Center:</b>	4	2,448
<b>Aquaplex:</b>	6	617
<b>Airport:</b>		

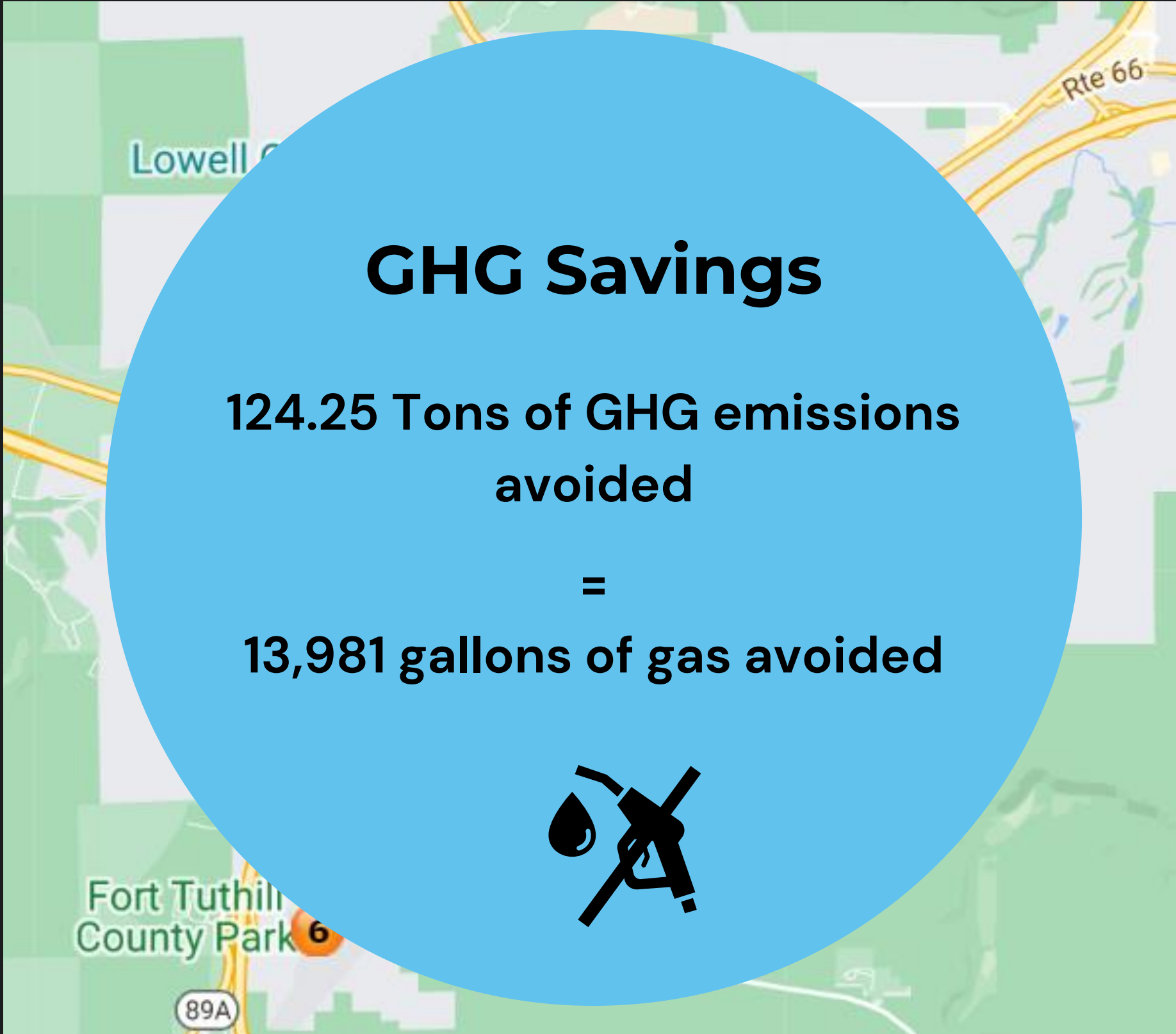
All stations were installed through the APS Take Charge Program



# City-Owned Public Chargers

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**GHG Savings**

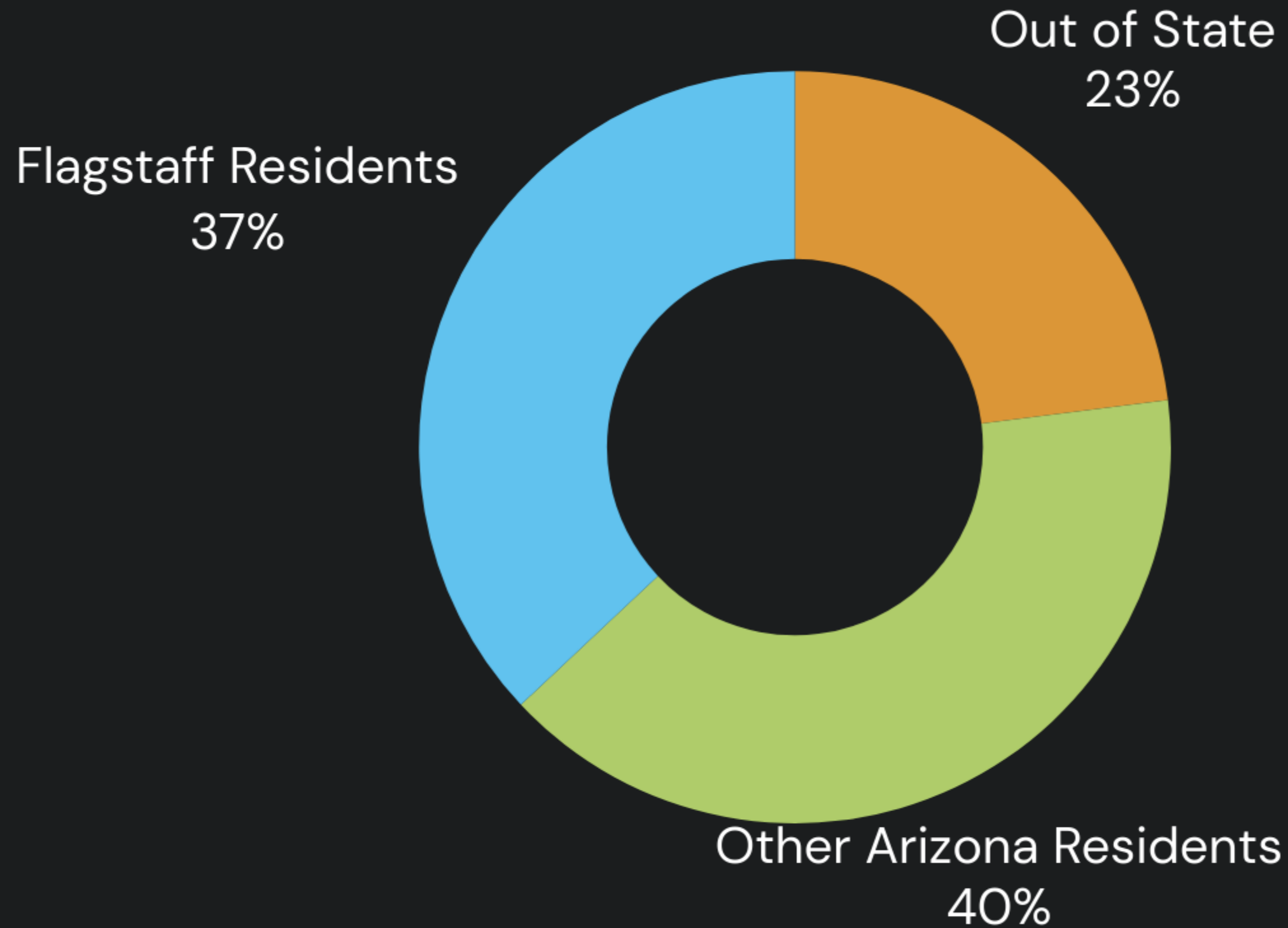
124.25 Tons of GHG emissions avoided

=

13,981 gallons of gas avoided



# Charging Patterns



**63% of people who used the City's public chargers were from other cities and states**

# Charging Behaviors

	# of Stations	Sessions / Year	Typical Session Duration	% of Time Plugged in, Not Charging
<b>City Hall:</b>	4	3,174	2 hr.	21%
<b>Visitor's Center:</b>	4	2,448	1.5 hr.	16%
<b>Aquaplex:</b>	6	617	Varies	63%
<b>Airport:</b>				



# Next Steps

Discussion on EV Charging **Fees**

December 19, 2023 City Council Meeting

Fleet Electrification **Assessment**

Present to City Council in Jan/Feb 2023

City Council **Ride and Drive**

Early 2024

# Thank You



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