Part 3 of the Neighborhood Knowledge Series

# THE FUTURE IS ELECTRIC: EVERYTHING YOU NEED TO KNOW ABOUT EVS

# Meet Your Presenters!

**Emma Heins**

*Principal*

Advanced Energy United

**Dr. Rose Daily**

*Sustainability & Resilience Manager*

City of Sun Prairie

# TABLE OF CONTENT

# Why are you here today?

# Electric Vehicles 101

Emma Heins

*With significant contribution from the Electrification Coalition*

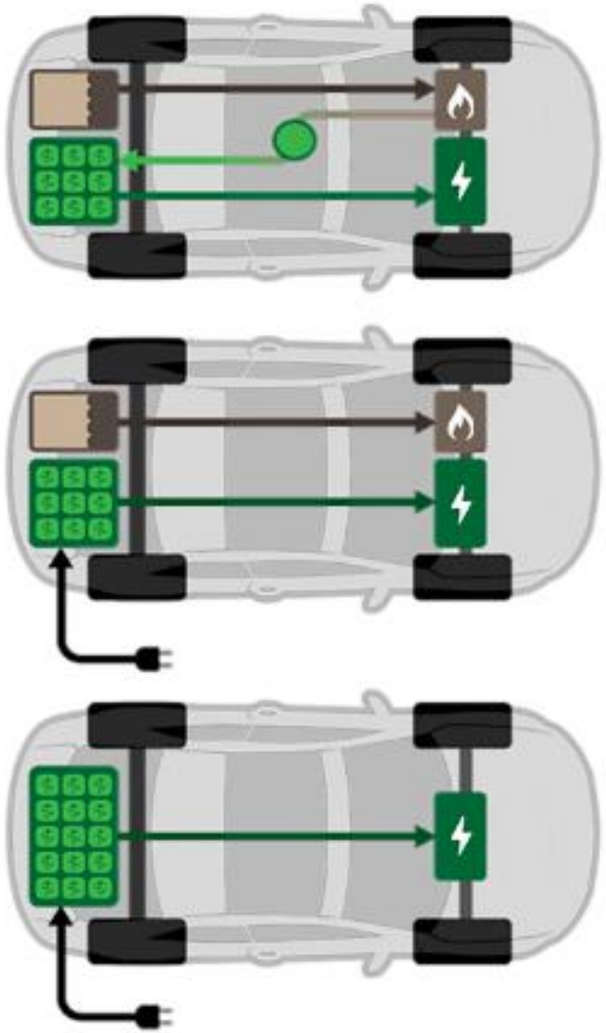
Electrification Coalition

# Why Go Electric?

- Cost Savings
- Public Health Benefits
- Environmental Benefits
- National Security
- Better Performance

# EV Basics

# Electric Vehicle Types



**HYBRID VEHICLE** (not considered an EV)

Internal combustion engine is the primary energy source. Cannot be charged through a plug, but it does have an electric motor and a battery that can be recharged through regenerative braking as well as by the engine.

**PLUG-IN HYBRID ELECTRIC VEHICLE** (PHEV)

PHEVs are powered by an internal combustion engine AND an electric motor. The vehicle can be plugged into an electric power source to charge the battery. Some can travel up to 100 miles on electricity alone, and all can operate solely on gasoline if needed

**BATTERY ELECTRIC VEHICLE** (BEV)

BEVs use a battery to store the electric energy that powers the motor. EV batteries are charged by plugging the vehicle into a power source. Because there is no internal combustion engine, zero tailpipe emissions are produced.

# Types of EVs

**HYBRID**

Toyota Corolla Hybrid

Toyota Tundra Hybrid

**PHEV**

Toyota Prius Prime

Mitsubishi Outlander PHEV

**BEV**

Chevrolet Bolt EUV

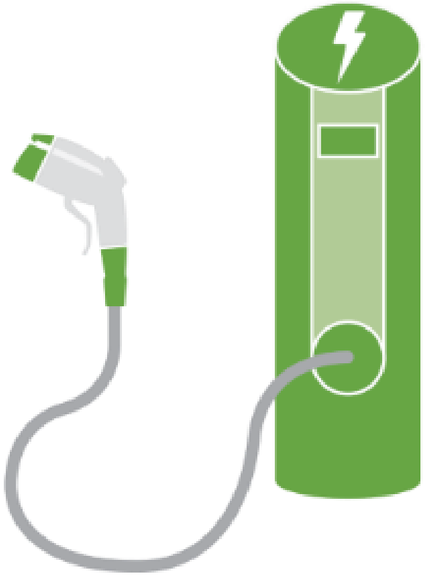
Ford F150 Lightning

# What are charging levels?

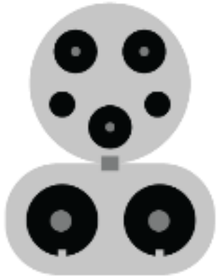
**Level 1 chargers** use standard 120V outlets. 120V circuits are also used by most home electronics. 1 hour = 1.5 kW. Used at home.

**Level 2 chargers** use 240V circuits. 240V circuits are also used by dryers and stovetops. 1 hour = 7 – 20 kW. Used at home, in public or at work.

**Direct Current (DC) fast chargers** use 480V circuits at public charging stations. 1 hour = 50kW+.



# Charging Ports



| *Level 1 & 2* | *DC Fast Charging* | | *All Levels* |
|---|---|---|---|
| **J1772** | **CHAdeMO** | **CCS Combo** | **NACS** |
| *Almost All Vehicles*<br>Ford F-150<br>Ford E-Transit<br>Ford Mustang Mach-E<br>Rivian R1T | Nissan LEAF<br>Mitsubishi Outlander | *Most Vehicles*<br>Ford<br>Rivian<br>Freightliner<br>Volvo | Tesla<br>Ford*<br>General Motors*<br>Rivian* |

**beginning in 2025*

# Charging Ports

- NACS has been selected as the national standard charging connector
- Most EVs either are already equipped with NACS or will be compatible using an adapter
- The charging experience is getting faster and easier by the day

*All Levels*

**NACS**

Tesla

Ford*

General Motors*

Rivian*

*beginning in 2025

# Where would I charge?

# At Home

- Home is the best place to charge your car on a daily basis
- Plug it in each night, wake up with a “full tank” every morning!
- For most cars, it’s usually recommended to charge to 80% for regular use, easy to bump up further if needed for routine driving or when you’re going on a road trip.

*(Some cars use a different kind of battery and should normally be charged to 100%. Your car will indicate this on its dashboard screen or app.)*

# At Work

- Some workplaces offer charging
- Very convenient even with slow chargers, because your car will recharge while you work

# On the Road

- America’s charging infrastructure continues to grow, making it easier than ever to take an electric road trip
- There are several large fast-charging networks, including Tesla, Electrify America, EVgo, and many fast chargers across the country from smaller networks
- Driving long distances typically involves making a few short stops along the way of around 10-25 minutes, ideal for stretching your legs, grabbing a snack, and taking a bathroom break

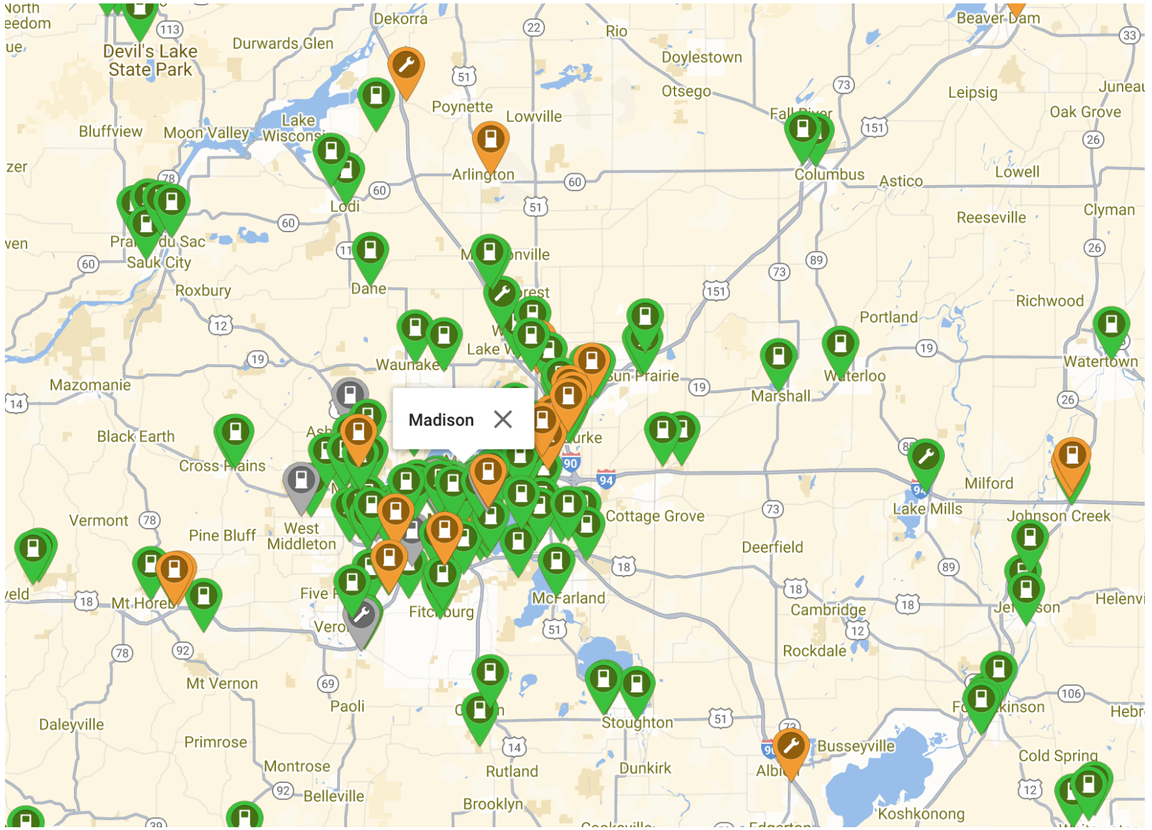

*New fast-charging station in West Salem, WI. Photo from PlugShare*

# On the Road

- Many EVs have a built-in Trip Planner, which enables you to just tell the car where you want to go, and it will figure out when and where you need to charge (automatically taking your current charge level, local weather, distance, and real-time charger availability into account)
- Some stations are simply “Plug and Charge,” while others use an app or credit card. To be prepared, it’s a good idea to download apps like Electrify America, Tesla, EVgo, and ChargePoint
- The most useful EV app is **PlugShare**

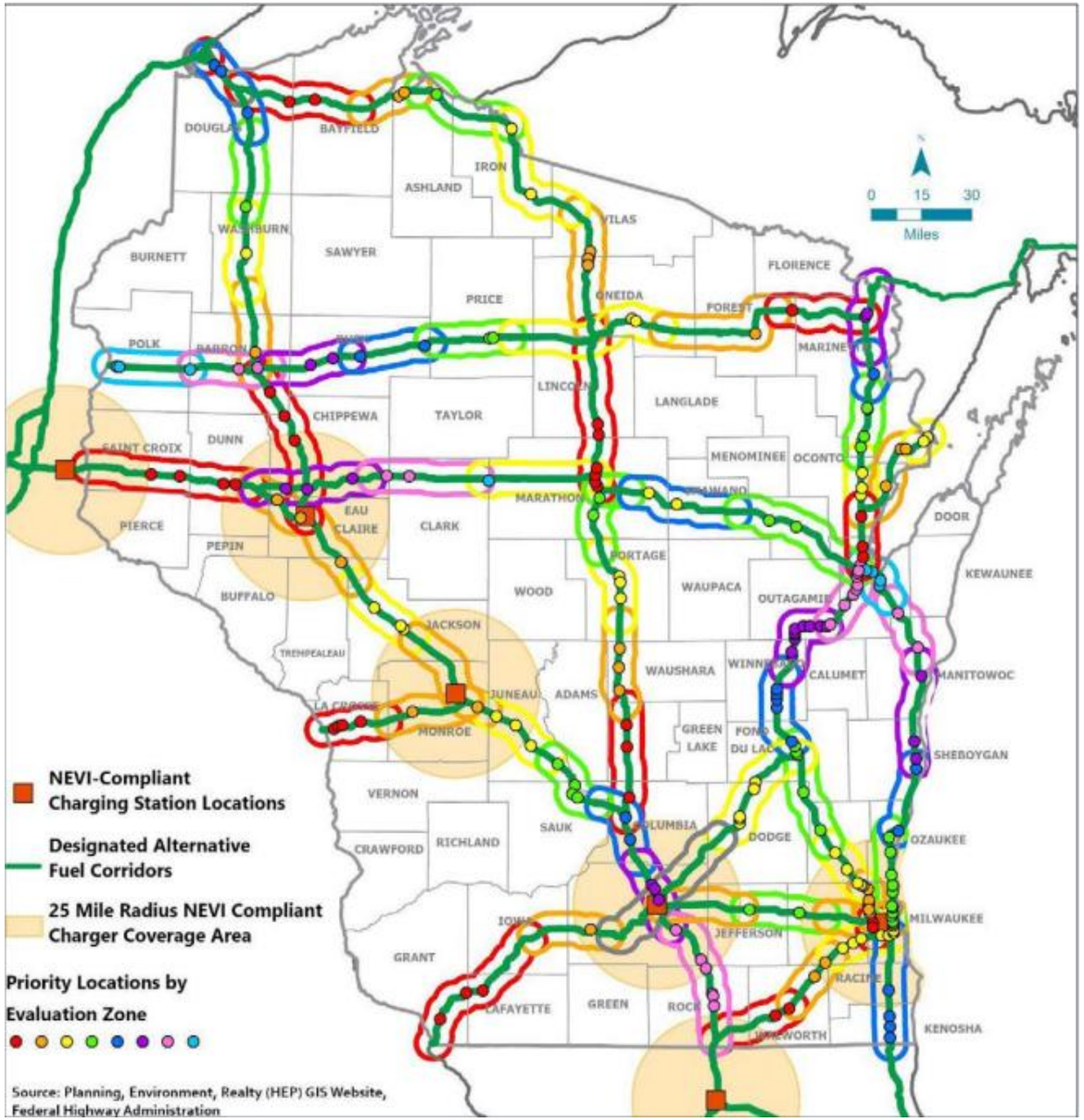
# Plug share

- PlugShare is a free app that shows over 250,000 charging stations in the US and Canada
- Tell it the make and model of your EV, and it will highlight compatible chargers
- Green pins indicate Level 1/Level 2 chargers, while Orange pins are Level 3/DC fast chargers
- You can tap on a charger to see photos, the cost, what amenities are around, availability, reviews, and tips from fellow EV drivers who have charged there



# “WEVI” Charging stations

- Wisconsin will receive approximately $78M to build out EV fast charging network
- Managed by Wisconsin DOT
- At most 65 NEVI-compliant stations



# Cold Weather Tips

- Cold weather temporarily reduces the range of an EV
- It can really help to “pre-condition” your car – heating the cabin and battery – while plugged in
- This is easy to schedule, so your car can be ready for when you go to work/school
- Many EVs have heated seats and/or a heated steering wheel to keep you warm and cozy while consuming less energy

# New Wisconsin Law

# 2023 Wisconsin Act 121

- Requires a $0.03/kWh excise tax on most public charging, and exempts EV charging from sales tax
- Prohibits the government from mandating that private developers install or allow installation of EV charging stations on their property, but specifically allows them to set up charging voluntarily
- In changing the law for electricity pricing, the Legislature recently made Wisconsin eligible to receive millions of dollars in federal grants to build more chargers, both in communities and on the highways

# 2023 Biannual Budget

- Established a $175 annual registration fee for EVs and a $75 annual registration fee for PHEVs
- This is based on the idea that EV drivers do not contribute to the gas tax, and therefore do not pay their fair share in gas taxes
- Several issues with this approach

# Benefits of EVs

# Benefits of Going Electric

- EVs are capable of regenerative braking (“regen”) – as you brake/drive downhill, energy is added to your battery! Free fuel!
- Not nearly as much maintenance required – no engine means no oil changes, and regen reduces wear and tear on brake pads
- The most frequent maintenance on EVs is tire care and periodically adding windshield wiper fluid
- Some EVs feature a front trunk (“frunk”) – this can be used for luggage, groceries, storing supplies, and even tailgating

*Frunk on Ford Lightning*

# Even More Benefits of Going Electric

- Keep the lights on! EVs are great in emergencies. Since there are no emissions, you can safely have the car on in your garage. In a power outage, you can stay warm (or cool in the summer), easily charge up your devices, or on certain EV models, even use your huge car battery as a backup to power your house.
- Remotely turn on climate control – great feature for Wisconsin
- Some EVs have Pet Mode – keep your car cool or warm while letting bystanders know that your pet is safe

# Used EVs

- They are coming!
  - In 2023, EV leases were up 355% YoY
  - In 2024, EV leases are up 88% YoY
  - In 2026, returns are forecasted to to spike 230%
- Battery Health
- Tips if test-driving a used EV:
  - Ask for a 48 hour test drive
  - Self-check on Battery Health
  - Drive it at all speeds
  - Previous Ownership?

# Tax Credits

# Consumer EV Tax Credit

$7500- Use them while you can!

- Purchase for personal use
- Must be used primarily in the US
- Adjusted Gross Income:
  - $300K filing jointly
  - $225K head of household
  - $150K for all other filers
- > 7 kWh battery capacity
- <14,000 lbs
- Final Assembly in North America
- Critical mineral and battery component
- MSRP cap
  - $80K for van, SUV, Trucks
  - $55K for cars

# Used EV Tax Credit

30% of the sale price, up to $4000- Use them while you can!

- Must be used primarily in the US
- Adjusted Gross Income:
  - $150K filing jointly
  - $112.5K head of household
  - $75K for all other filers
- > 7 kWh battery capacity
- <14,000 lbs
- Sale price <$25K
- Vehicle at least 2 years old
- Purchased from a dealer
- 1st time application of credit

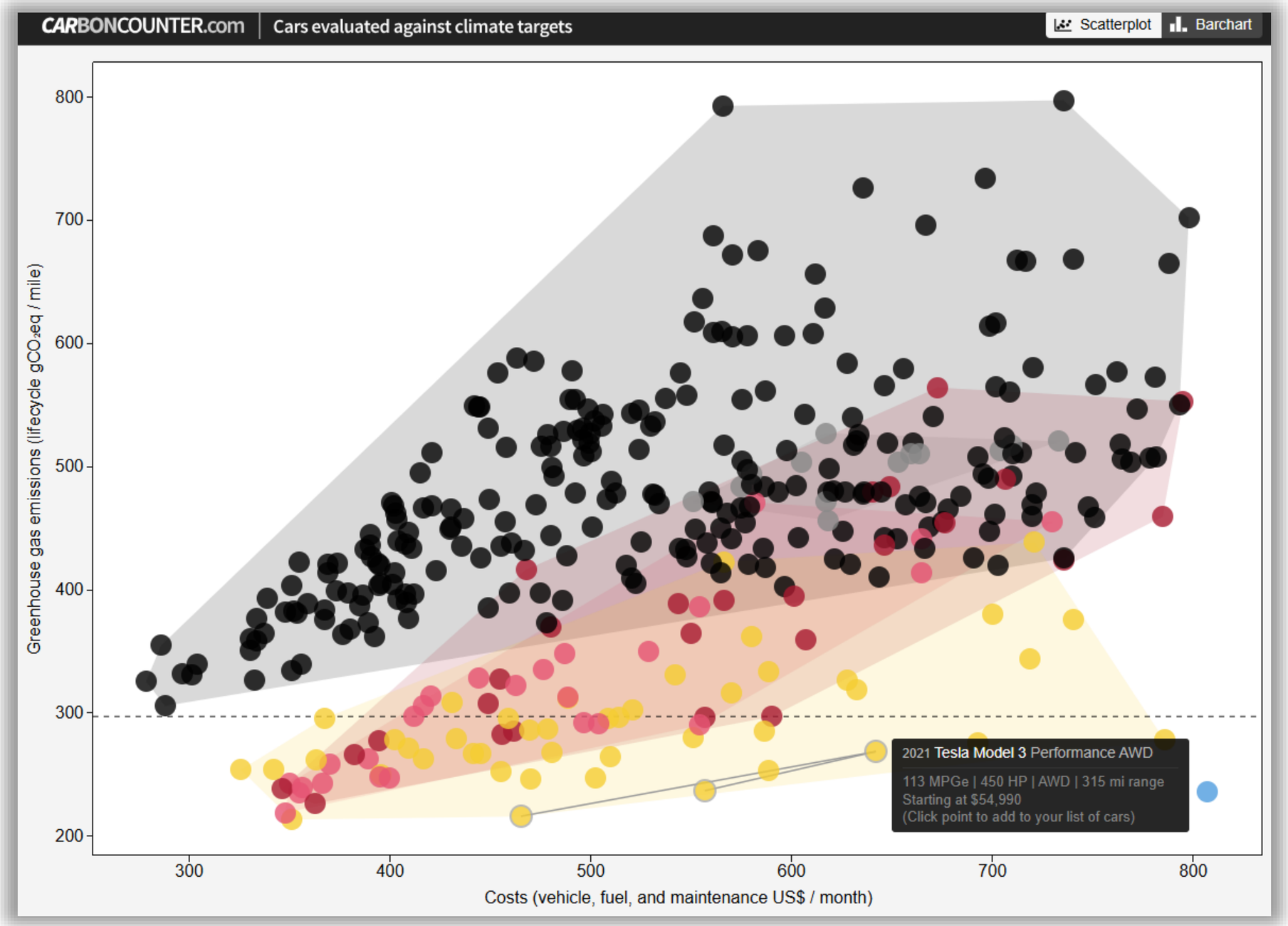
ADVANCED ENERGY UNITED™

# Point of Sale Credits

- These tax credits work differently than most credits where you have to wait until the April of the year after you make a purchase
- These are taken off the initial price of the car, like a sale
- The dealership then claims the tax credit and receives the payment from the IRS
- Helpful for buyers because the $7500 isn’t factored into your auto loan/monthly payment
- The dealership gives you a form to keep for your records that the tax credit was transferred

# MIT TOOL + CITY ELECTRIFICATION

# MIT Carbon Counter Tool



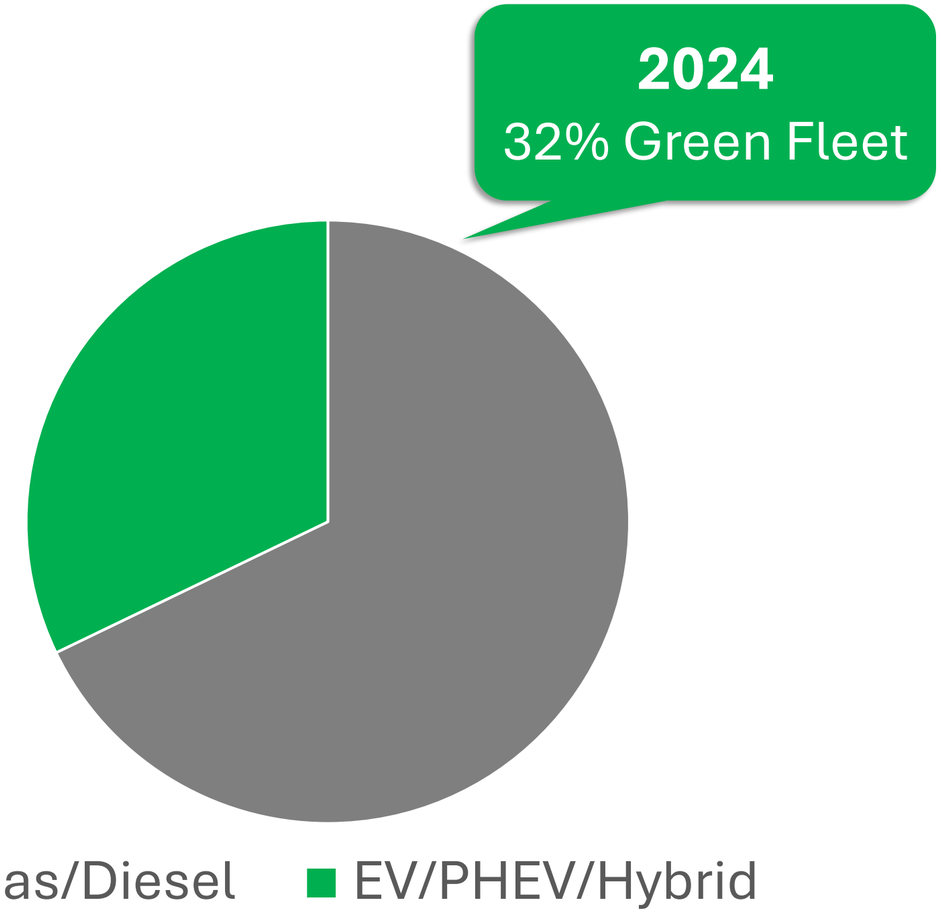

Carboncounter.com

SUN PRAIRIE

# FLEET ELECTRIFICATION

**Resolution** (adopted 8/2024):

Achieve a 50% fully electric light-duty fleet by 2035 with all other light-duty vehicles being a hybrid at a minimum.



SUN PRAIRIE

# CHARGING STATIONS


**FREE Level 2 Charging at City Hall**

- 4 ports total
- Station 1 open 8am-2pm M-F
- Station 2 open 24/7

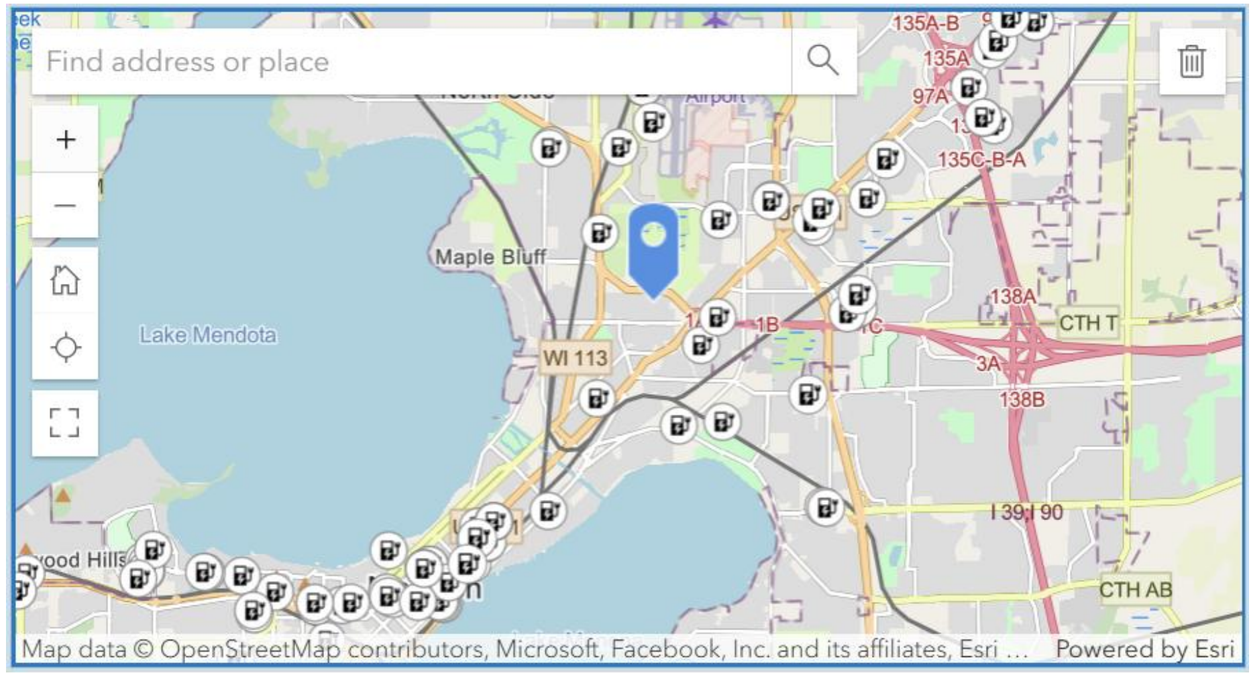
**Free Level 2 Charging at Sun Prairie Utilities Facility** (125 W Main St.)

- 2 ports total
- Station open M-Sun 5:30pm-12am

**Level 2 EV charging stations coming to the Sun Prairie Public Library as part of the expansion project!**

# Charge Up Dane County

- 25% of all registered Wisconsin EVs are in Dane County
- $13.2 million grant to install an EV charging corridor
- Suggest EV charging station locations
- Stay informed




https://www.daneclimateaction.org/initiatives/Charge-Up-Dane-Co

# MYTH VS FACT GAME

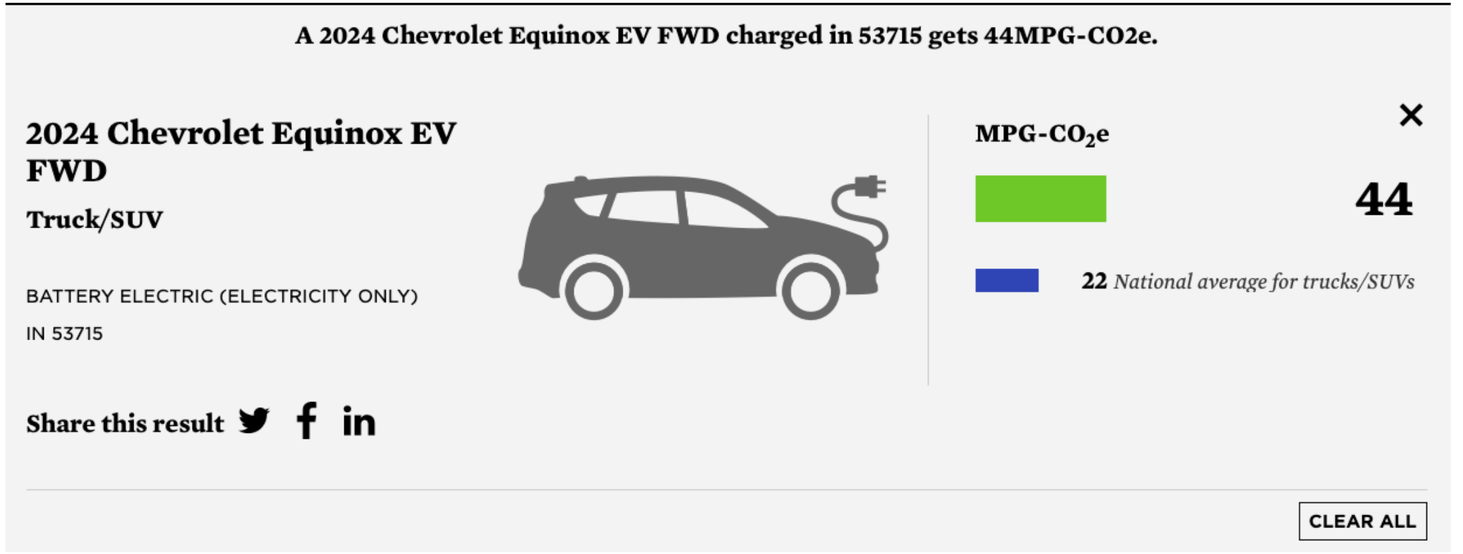
*Test Your Knowledge!*

# Q: Even though I’m using electricity, the Wisconsin grid is still dirty so it’s worse than gas

# MYTH

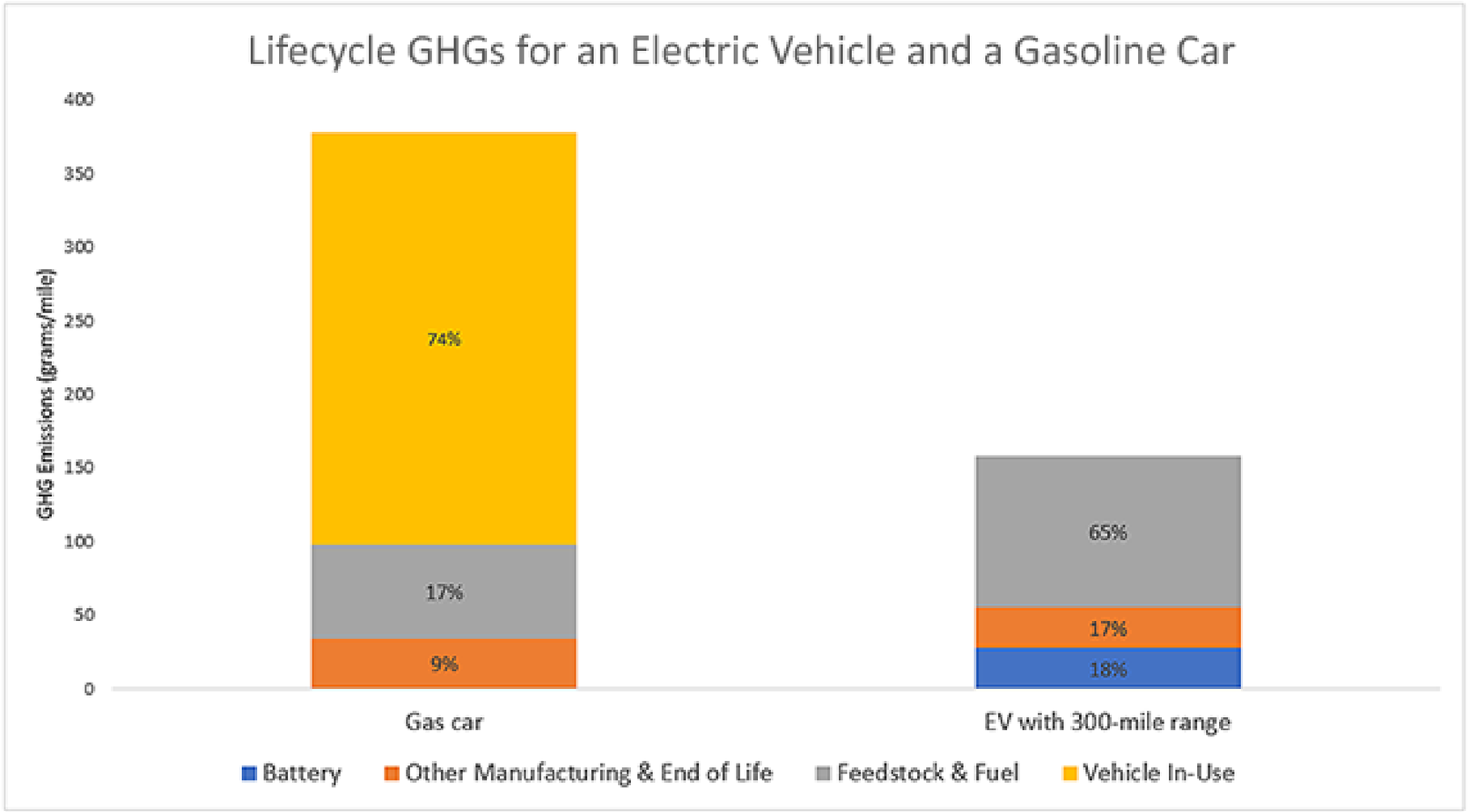
- We underestimate how inefficient internal combustion engines are, and even though MISO (the Wisconsin grid) is the dirtiest in the US, it is still 2x as clean as a gas car
- EVs are the only kind of vehicle that will get cleaner the longer they drive because so much clean energy is coming on to the grid right now

Calculator from Union of Concerned Scientists



# Q: The battery manufacturing process produces more emissions than driving a gas car

# MYTH




US EPA, 2024

# Q: Without tax credits, you won’t save money on an EV

# MYTH

CLEAResult® | ChooseEV

## How far does **$4.40** drive your car?

**Understanding your savings potential.**

The values are an approximation of today's electricity and gasoline rates. Customize the inputs to see what kind of benefits you might get when you switch from a gasoline-powered car to an electric vehicle (EV).

EV gets you this many more miles for the price you pay for a gallon of gas.

**90 mi**

Gas **28** miles

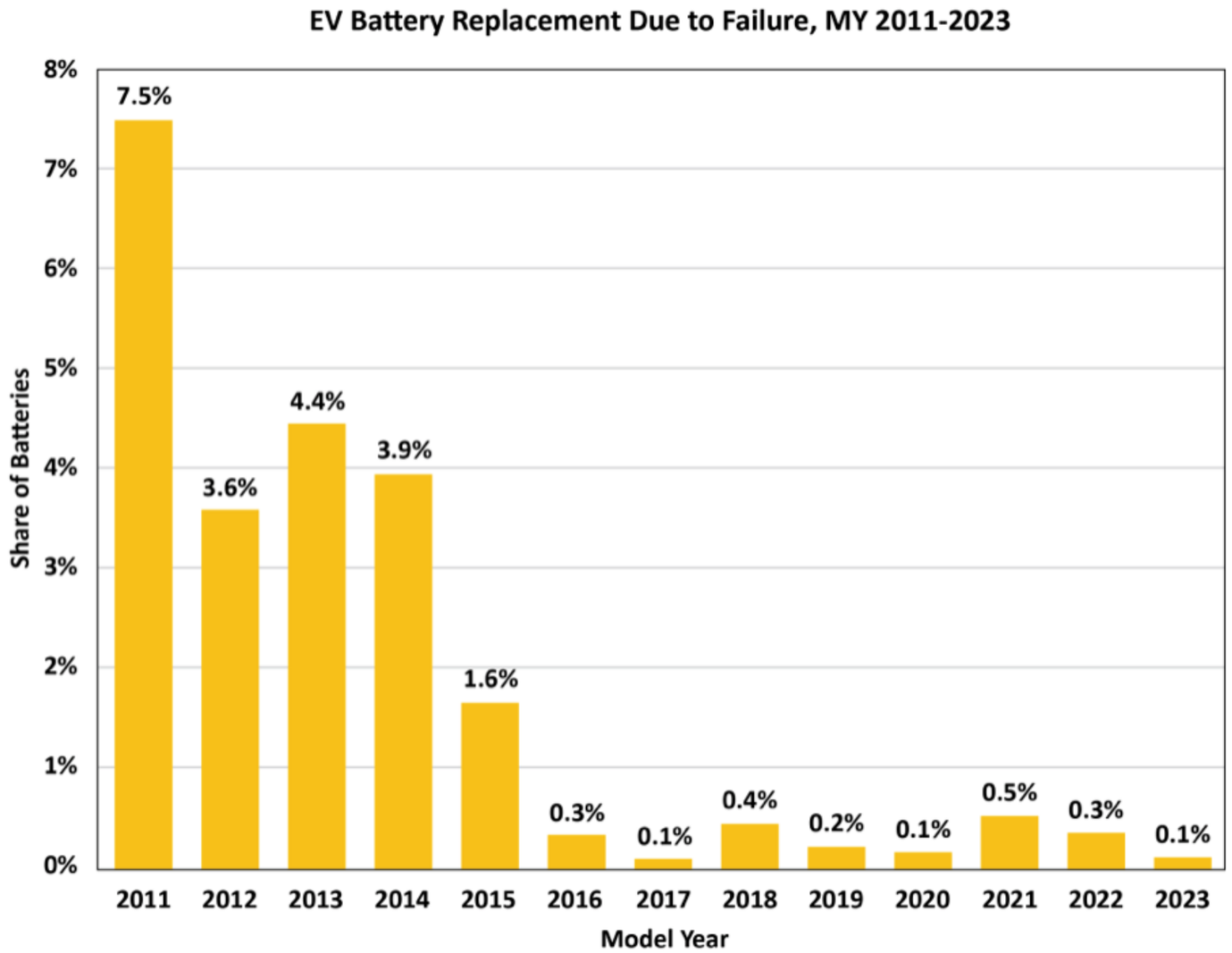
EV **118** miles

| Local fuel price/gallon | Est. MPG of gas vehicle | | Est. mile/kWh for EV | Utility kWh rate* |
|---|---|---|---|---|
| $ 4.40 | 28.00 | RESET ALL | 3.220 | $ 0.1200 |
| | 2024 | | 2024 | |
| | Chevrolet | | Chevrolet | |
| | Equinox FWD - Automatic 6 | | Equinox EV FWD (3.22 mi/k\ | |

ChooseEV.com, 2025

# Q: Replacing EV batteries is uncommon for drivers

# FACT




(Source: U.S. DOE, citing Recurrent, 2023)

# Q: We don’t have enough electricity ready on the grid to power all of these EVs

# MYTH*

- ** If everyone that drove a car switched to an EV tomorrow, we might have some problems*
- The supply chain and demand for EVs would never allow everyone to switch tomorrow
- We DO have enough electricity to keep up with demand and
- Utilities are well aware that there will be increasing demand for EV charging electricity
- We have excess energy at night which is a great time to charge your EV
- Many utilities offer time-of-use (TOU) rates at night for EV charging

# Community Spotlights

*Welcome, Jonathan!*

# EV Makes/Models

- **2018 Tesla Model 3 Long Range RWD**

95,000 miles
Maintenance (not including tires):
Cabin Heater $900
Front suspension components - $1,544.59
AC Desiccant replaced - $299.73
Brake Lubrication - $132, $122
Cabin Filters - $40, $35
Total: $3,073 ($628 of scheduled maintenance)

- **2020 Chevy Bolt LT**

Sold with 15,000 miles
No maintenance

- **2023 Tesla Model Y Long Range AWD**

16,645
No maintenance

# Charging setup

Originally had a 40 amp breaker for 32 amp NEMA 14-15 outlet and Tesla Mobile charger.

Current Setup

- 100-amp sub-panel in garage
- 100-amp cable to each side of garage
- 60-amp breakers for 48-amp Gen 3 Tesla Wall chargers

# Electricity cost per mile

- **Model 3**

$420 in charging last 12mo: 95% home, 3% ‘other’, 2% SC

-$0.026 per mile for electricity (0.284kWh/mi * $0.09/kWh)*

- **Model Y**

$432 in charging last 12mo: 90% home, 5% other, 5% SC

$0.027 per mile for electricity (0.301kWh/mi * $0.09/kWh)*

- 2008 Honda Civic at 30mpg and $3.07 = $0.10

*When charging at home with TOU nighttime rates from Sun Prairie Utilities

# Savings – Model 3

- 95kmiles driven on the Model 3 at $0.07 per mile savings for $6,650 savings
- Model 3 scheduled maintenance - $268 vs $3,568 estimated for Honda Civic for $3,300

Total Savings: $9,950

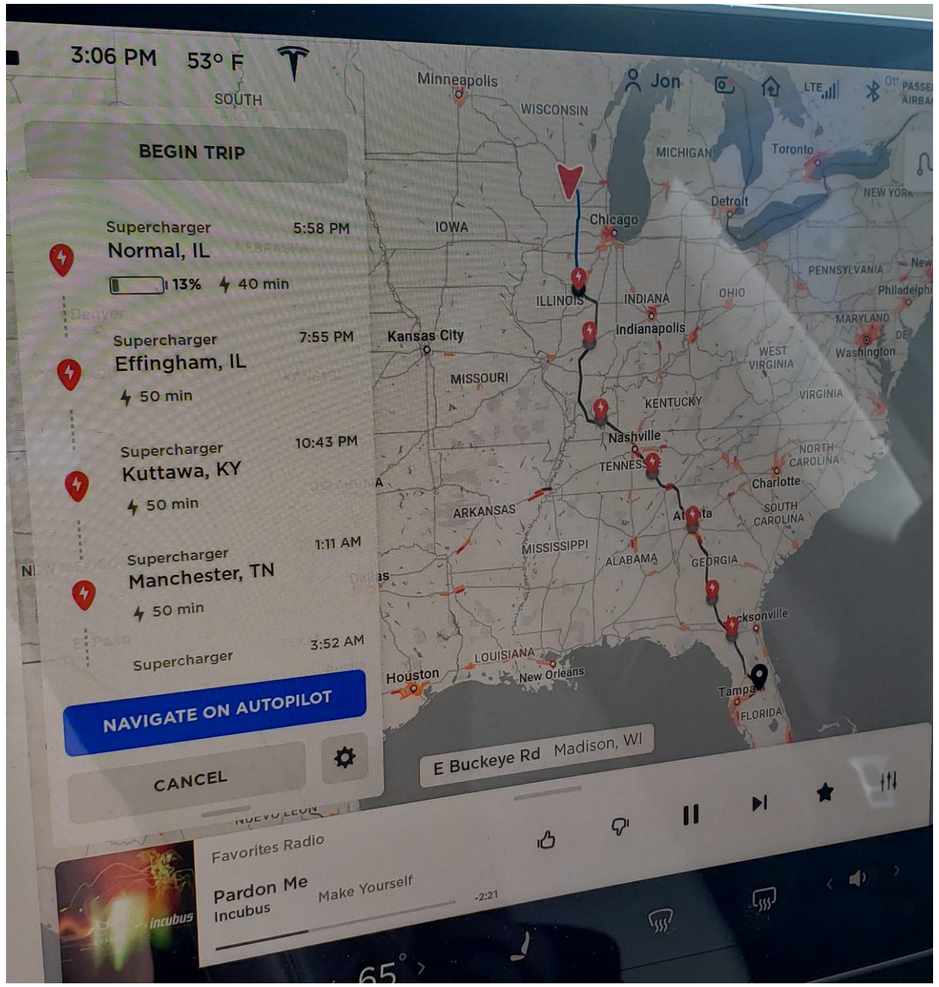
# Why buy EV?

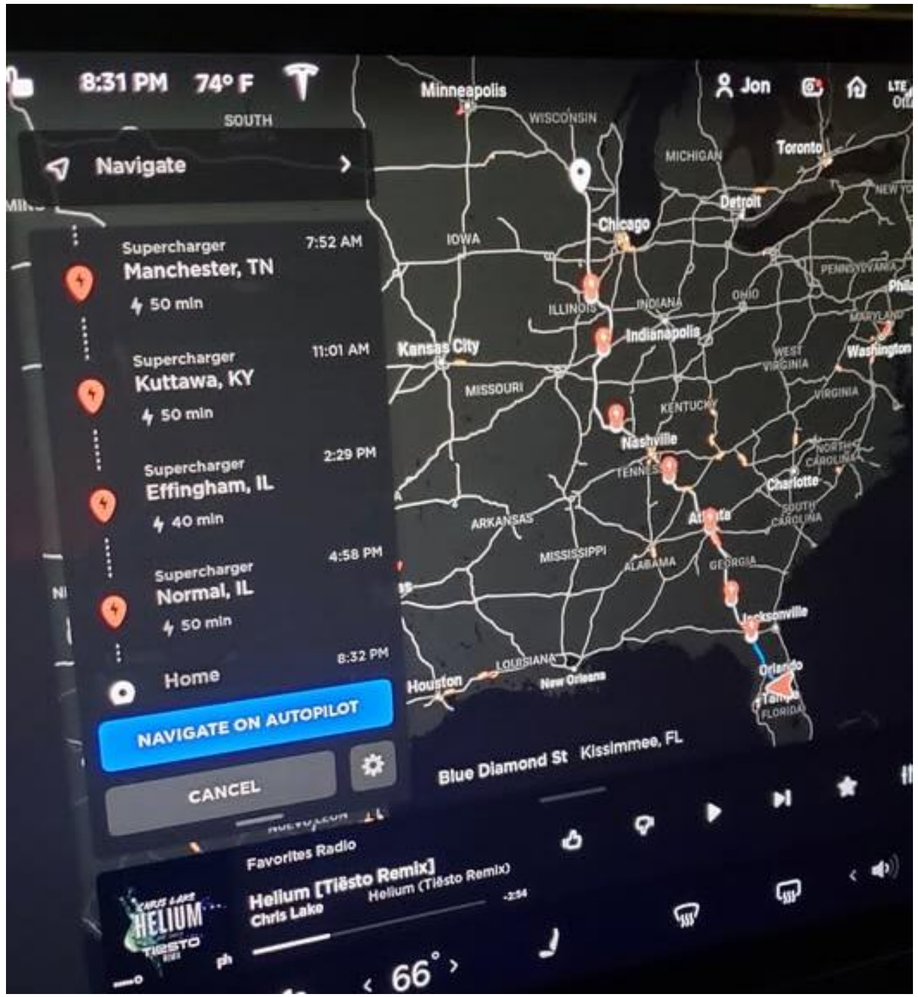
- Driving Dynamics
- No more cold winter morning drives
- No more gas station stops
- Supercharger network
- Highest safety ratings

New reasons that was not yet available in 2018:

- Sentry mode
- 360 dashcam
- Cabin Overheat Protection
- Pin-to-Drive

# Supercharging



# Family of EV owners

- Father – 2021 Model X (46k miles)
- Mother – 2022 Model Y
- Brother – 2016 Model S (264k miles), 2018 Model X
- Brother – 2024 Model X
- Brother – 2016 Model S
- Brother – 2017 Chevy Bolt
- Uncle – 2018 Model X
- Uncle – 2018 Model 3
- Cousin – 2018 Model 3 (120k miles)

# Pros and Cons

- Go through tires a little faster, but brakes last forever
- Supercharging offers little savings vs gas (assuming economy gas car)

# Community Spotlights

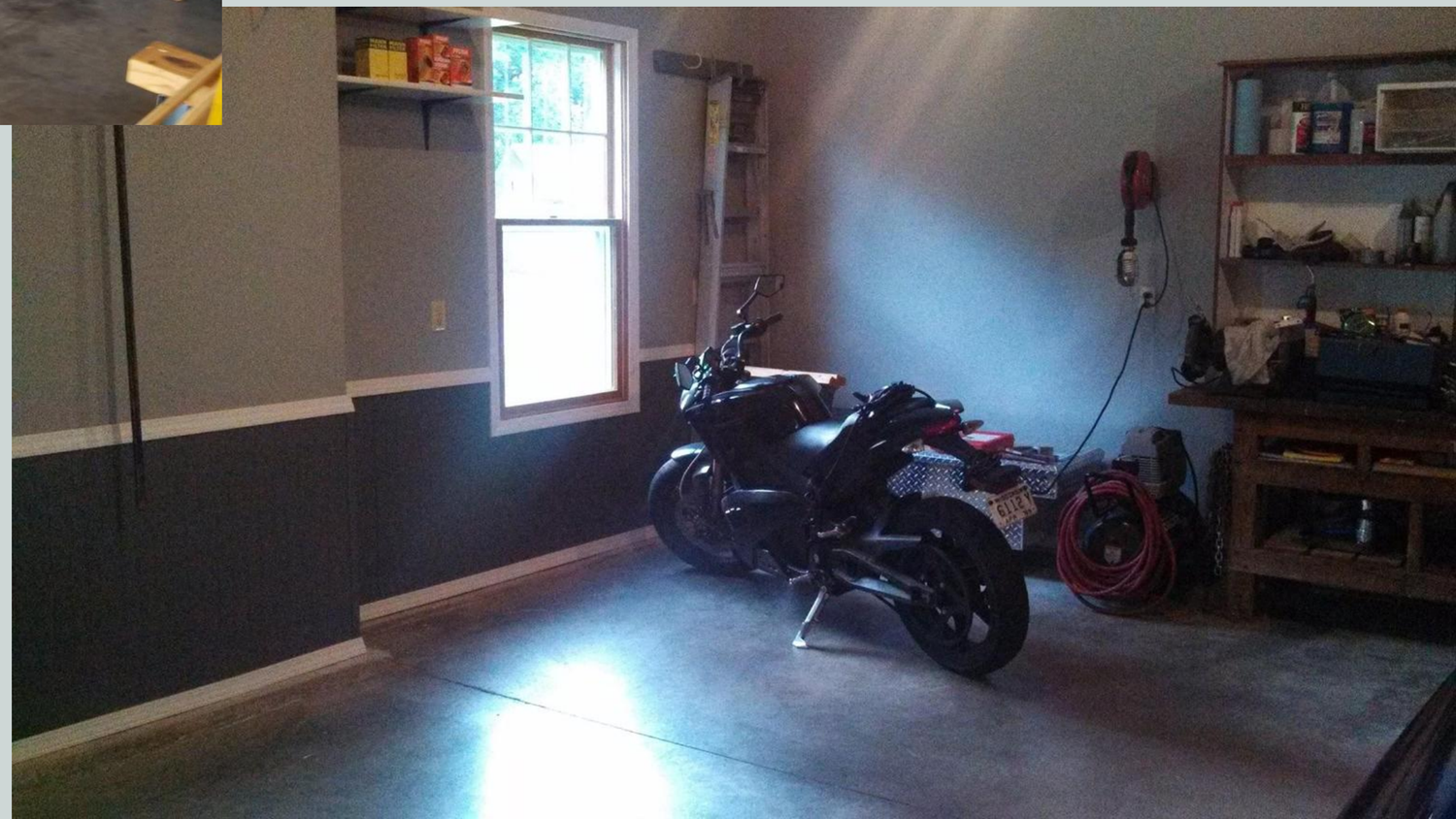
*Welcome, Jim!*

# Electric Journey


40
20
20
mph
0
180
120
200
km/h
220
140
200000
miles 1012.7

# 2013 Zero S

137 miles in the city
85 miles highway
11.4 kWh Battery
70 ft/lbs torque - 54 hp
0-60mph 5.5 seconds
Top Speed 95 mph
Charge Time: 10 hours



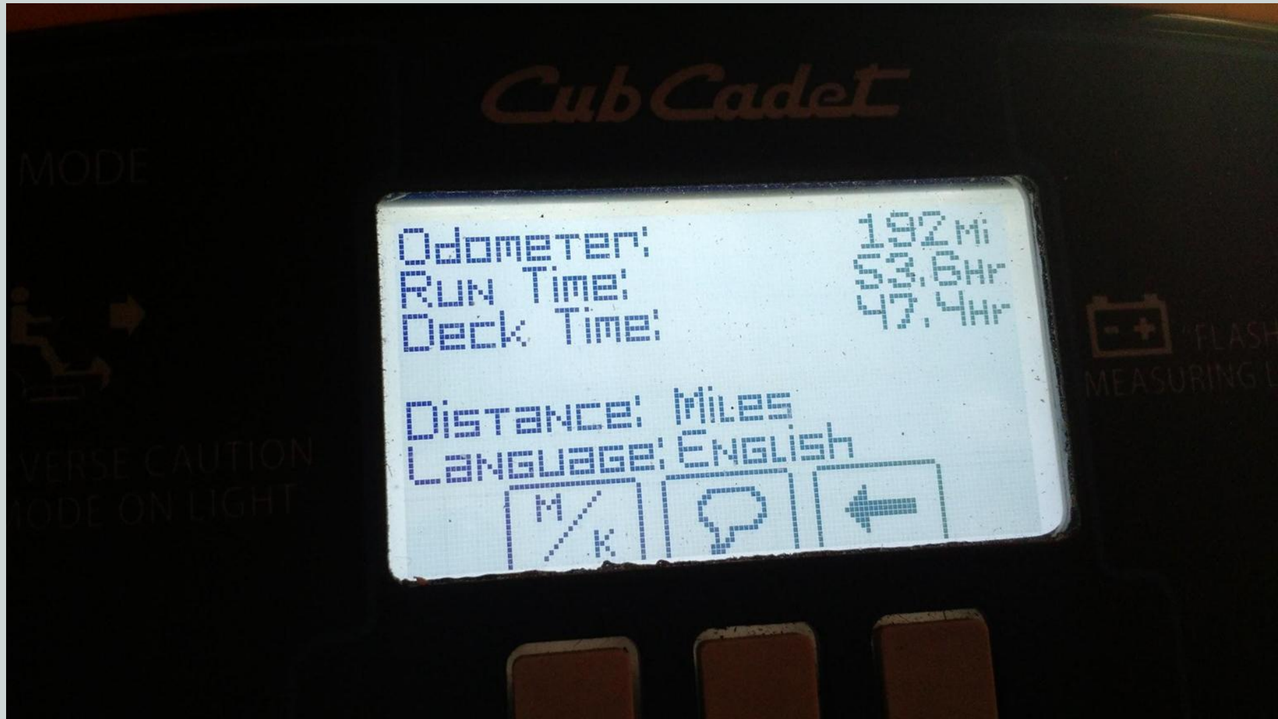

Oct 2015 the motorcycle got a friend.

185 City
115 Highway (at 55mph)
12.5 kWh Battery
ABS
106 ft/lbs Torque - 67 hp
0-60  3.3 Seconds
Top Speed 102 mph
Charge Time 12 hours


# 2015 Zero SR



Charged overnight and ready
to go the next day the miles
just rolled on by… weather permitting



June 2016

https://www.benswing.com/2016-road-trip-blog

2014 “Kick Gas: Ride The Future Tour"


2017 Nissan Leaf
Mixed Driving 108 Miles
30kWh Battery
187 ft/lbs torque - 107 hp
ABS/Traction Control
0-60 10.2 Seconds
Top Speed 89 mph
Level 1 30 hours wall outlet
Level 2 4 hours
Level 3 45 Minutes (80%)

## 2020 Harley Davidson Livewire (#90)

146 City
70 Highway (at 70mph)
15.5 kWh Battery
ABS/Traction Control/Anti-Wheelie
86 ft/lbs Torque - 106 hp
0-60 3.12 Seconds
Top Speed 110 mph
Level 1 12.5 hours
Level 2 12.5 hours
Level 3 40 minutes (80%)

## 2020 Zero SR/F

176 City
117 Highway (at 55mph)
15.5 kWh Battery
ABS/Traction Control/Heated Grips
140 ft/lbs Torque - 110 hp
0-60 3.0 Seconds (or 3.7)
Top Speed 124 mph
Level 1 12 hours
Level 2 4.5 hours

# April 2023


**2018 Tesla Model 3 (Long Range All Wheel Drive)**

**310 Miles Range (Mixed)**

**75 kWh Battery**
**ABS/Traction Control/Heated Seats**
**317 ft/lbs Torque 258 Horsepower**
**0-60 4.2 Seconds**
**Top Speed 140 mph**

```
 70,000   2017 Leaf traded in
 36,997   2013 Zero S
 31,106   2015 Zero SR
 68,117   2018 Tesla Model 3 (bought at 27k)
  9,985   2020 HD Livewire
 22,254   2020 Zero SR/F
============
211,459   Electric Miles and counting
```


TESLA

# Community Spotlights

*Welcome, Andy!*


# EV Presentation

EV Spotlight Panel

Andrew Hirvela – Interim Utility Manager


# A little about myself…

- Interim Utility Manager for SPU
  - November 2024
- Supervisory Engineer for SPU
  - Fleet and Inventory
  - Water Supervisor
- Resident of Sun Prairie since 2001

# My EV Background

01

Hirvela Outreach Vehicle

- 2020 Tesla Model Y
- Long Range – Dual Motor Model


02

SPU Community Outreach Vehicle

- 2024 Kia Sportage
- Plug-in Hybrid Vehicle

# My TESLA Model Y Experience

# (So Far)

# Purchase and Delivery Experience

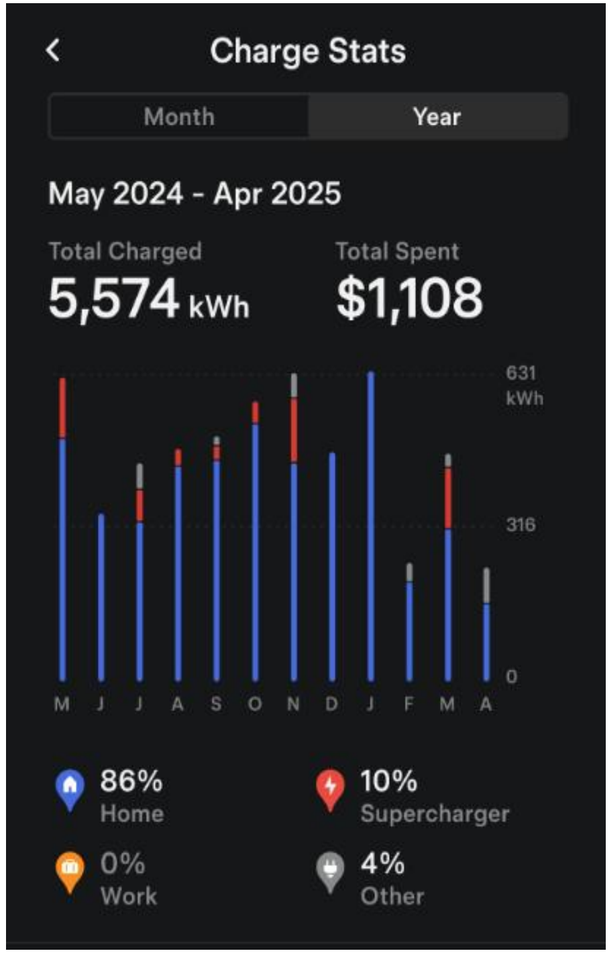
- Purchase and Trade-in coordinated through the Tesla website
  - Wisconsin and Telsa – The Factory Store Law
    - »Not Eligible for Tesla Financing
  - Motivating Factors: Fuel Costs, Family Experiences, and Innovation
- Delivery Experience Coordinated through the Tesla App
  - Live assistance, if needed.
  - Inspection of vehicle is a MUST

# At-Home Charging Setup

- Tesla wall-mounted charger with NACS connector
  - Coordinated through Tesla purchasing experience for local electrician installation.
    - Electric Panel Space?
    - 200A Main Breaker – or Sub Panel?
  - North American Charging Standard (NACS)is emerging as preferred connector with more automakers transitioning.
    - Ability to charge through the Tesla Supercharger Network

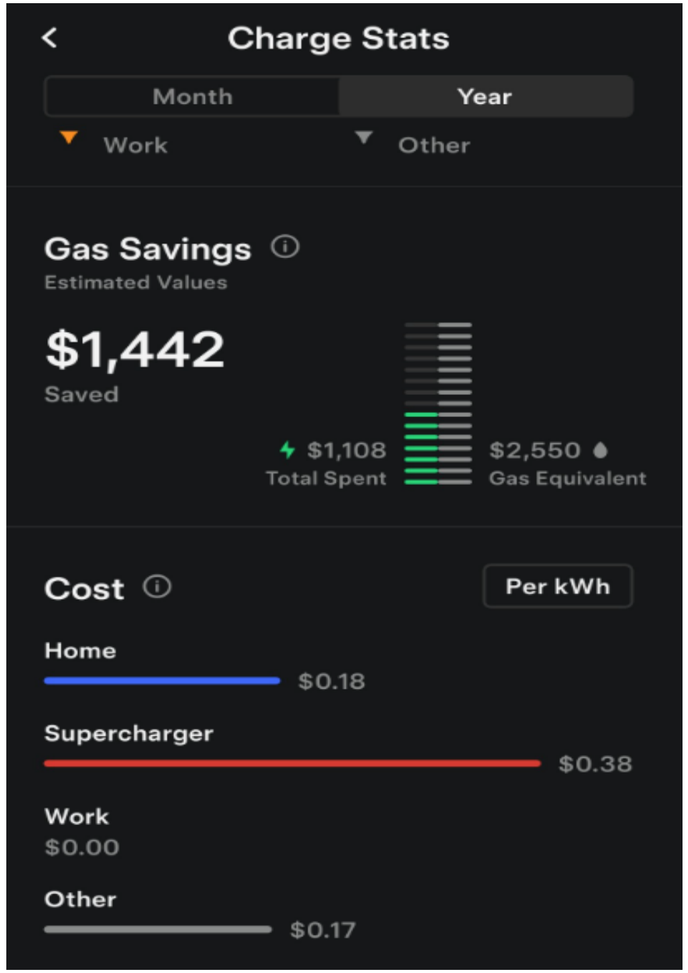
# Energy Comparison

- Comparison Tools inside the Tesla App



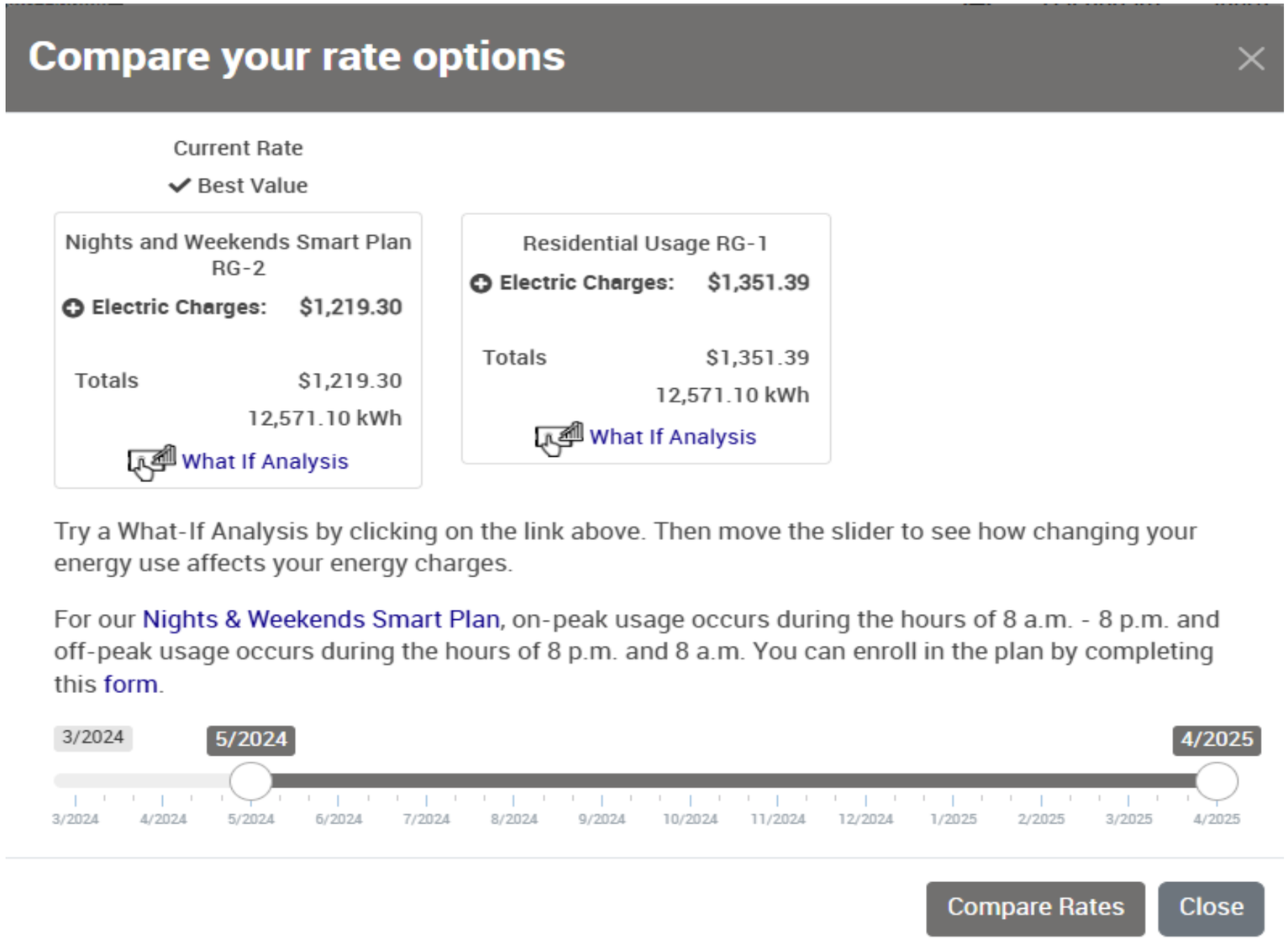

BREAKDOWN:
Monthly Electric Cost : $92.33

Before EV Fuel Cost
Gas Cost Monthly: Approx. $180.00



# Energy Comparison

- SPU MyAccount
  - Rate Comparison Tool
  - Available for all SPU Customers



# Pros and Cons of EV Life

## Pros

- Commuter Vehicle
- Steady Stream of Improvements via Wireless Updates
- Vehicle Conditioning in Hot or Cold Weather – It will start and able to program conditioning for different drivers
- Customize (almost) Everything
- Self-Driving and Safety Features
- Service via the Tesla App with updates, texting the tech, estimates, and no contact service
- Mobile Service capabilities – a tech to the home or business
- Climate Modes – Dog, Camping
- Vehicle Monitoring thru App
- Storage
- One Pedal Driving

## Cons

- Insurance and EV registration in Wisconsin
- Computer on Wheels – some glitches
  - There is a restart
- Tire Decision with Performance
- I may not know what is wrong with it

# EV Culture Challenges

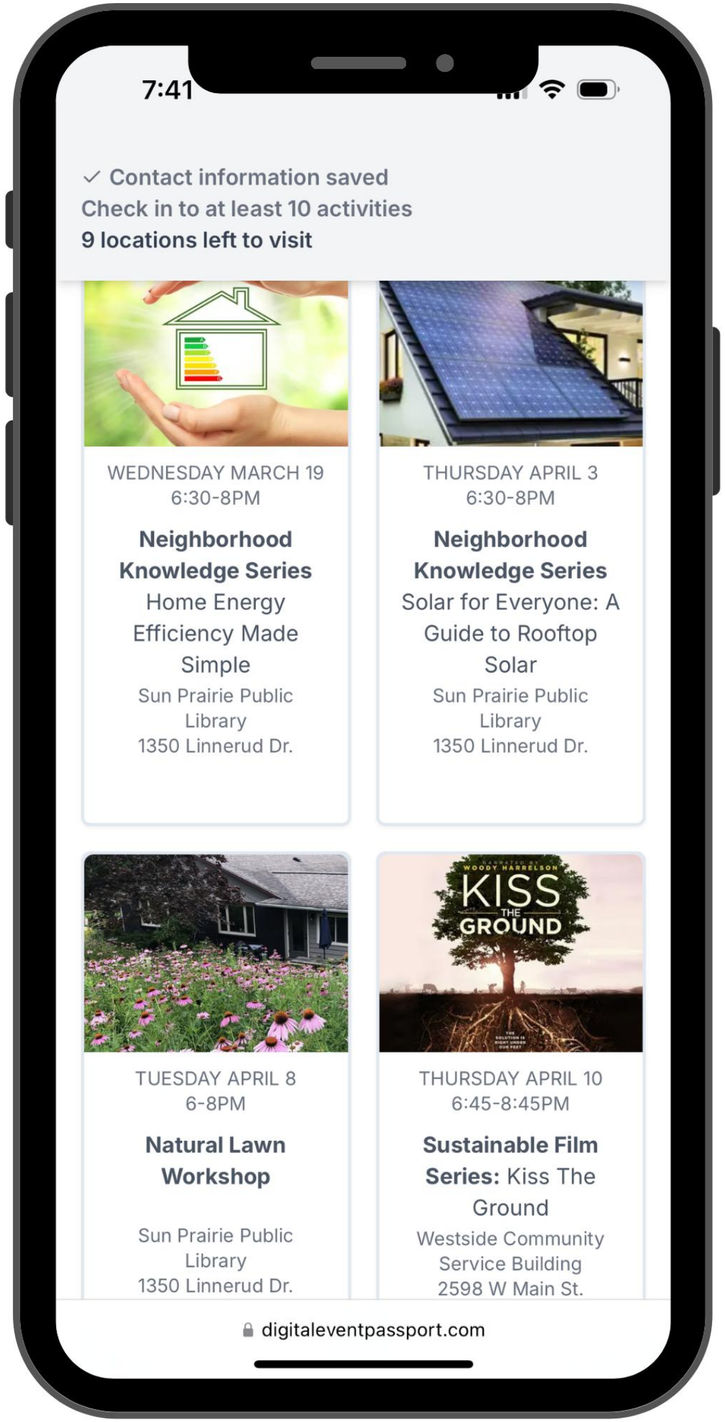
- One Pedal Driving
- Still Having a Maintenance Schedule
- Is it Running?
- Hear Noises that you may not in ICE vehicle
- Planning your Trips
  - Uphill or Downhill?
  - Hot or Cold?
  - Fast or Slow?
  - Purposeful stoppage time

# QUESTIONS


**Andrew Hirvela, Interim**
**Utility Manager**

Phone: 608.445.7035
Email: ahirvela@myspu.org

# Announcements




# Earth Month Digital Passport

1. Register for the passport
2. Attend our Earth Month events (be sure to check-in!)
3. Win prizes!

Passport

***BONUS* $1,000 off a solar array**

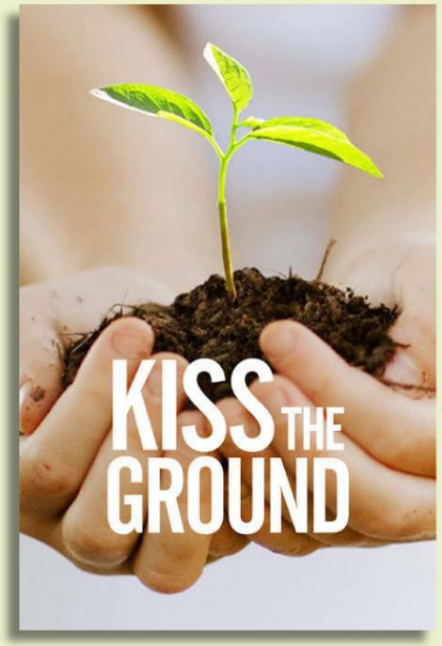
for everyone who registers for the passport & attends one event

GLOW SOLAR

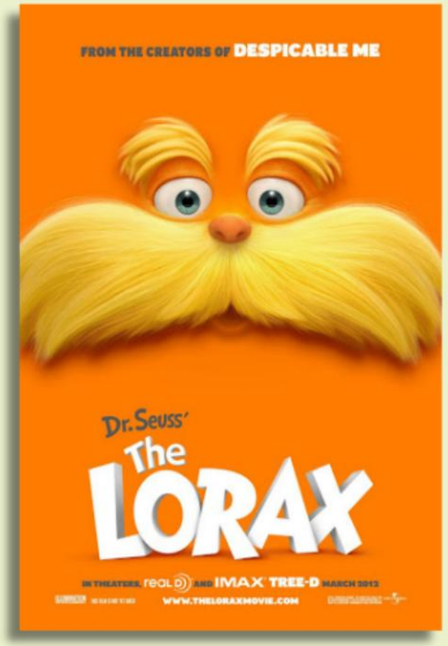
*2nd Annual*

# SUSTAINABLE FILM SERIES

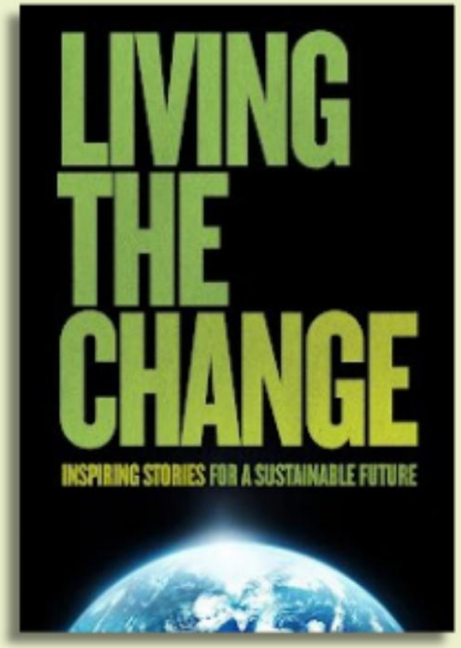
Throughout Earth Month, join the City of Sun Prairie for screenings of award winning environmental films that explore soil sequestration, conservation, and community change. Following each film, a subject matter expert will engage the audience in a brief dialogue. All screenings are free and open to the public. Popcorn will be provided.




**APRIL 10 @ 6:45PM**
Westside Community Service Bldg
2598 W Main St.




**APRIL 16 @ 6:00PM**
Sun Prairie Public Library
1350 Linnerud Dr.




**APRIL 24 @ 6:45PM**
Westside Community Service Bldg
2598 W Main St.

SUN PRAIRIE For more info and to explore other Earth Month events, visit: cityofsunprairie.com/1620/Earth-Month

# Sun Prairie Arbor Day Seedling Giveaway 2025

April 25, 2025 ♦ 12-4 PM ♦ 115 E. Main St. Sun Prairie, WI

Allegheny Serviceberry (small tree)

American Hazelnut (shrub)

Nannyberry (shrub)

Bur Oak (large tree)

Sycamore (large tree)

Eastern White Pine (large tree)

SCAN HERE

Seedlings are first come, first serve while supplies last.
To reserve a seedling, scan the QR code or visit:
https://form.jotform.com/SPPRF/arbor-day-seedling-giveaway

SUN PRAIRIE

*community*

# MURAL PAINTING

*session 1:*
**Saturday April 12**
**10AM-12PM**

*session 2:*
**Thursday April 24**
**5:30-7:30PM**

**Westside Community Service Building**
*(2598 W Main St)*

**Everyone is welcome!**
*No artistic skills required*

cityofsunprairie.com/2010/Wetmore-Park-Mural-Painting

# SUN PRAIRIE SUSTAINABILITY FAIR

Carbon Neutral Event • Electric Vehicle Showcase • Food Trucks
Live Music • Activities & Demos • Prizes • Mural Unveiling

**August 2, 2025**
WETMORE PARK
10am - 4pm

Sun Prairie Sustainability Fair 2025

***Attendee, sponsor, & exhibitor details***

https://cityofsunprairie.com/1917/Sun-Prairie-Sustainability-Fair

# THANK YOU!

## Any questions?


rdaily@cityofsunprairie.com

eheins@advancedenergyunited.org

cityofsunprairie.com/sustainablesunprairie


SUN PRAIRIE
revolves around you

GLOW SOLAR

willy street co-op

Green Life Trading Co.

# PASSPORT CHECK-IN

Neighborhood Knowledge Series  The Future is Electric: Everything You...

# EV WALKTHROUGH