CLEAN FUELS MICHIGAN

ELECTRIC VEHICLES 101: IS ONE FOR YOU?

September 27, 2022

Presented by
Jane McCurry

WHO WE ARE:

Clean Fuels Michigan is a nonpartisan nonprofit dedicated to advancing the clean transportation industry in Michigan and across the region. We are a coalition of leading companies and organizations working together to achieve a future where clean transportation is the norm. The economic, jobs, public health, and security benefits of clean fuels are too large to be left on the table.

Our core belief is that if we work together to support effective clean transportation solutions, everybody wins.

WHAT WE DO:

We advocate for policies and programs that increase the adoption of cleaner vehicles today and into the future.

Hi! My name is **Jane McCurry**.

I am the Executive Director of Clean Fuels Michigan and a University of Wisconsin grad.

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Agenda

4 goals for today

1

Understand the benefits of driving electric

2

Know how to charge an electric vehicle in public and at home

3

Know how to evaluate whether an electric vehicle is right for you and how to take the first steps

4

Understand additional ways to support clean transportation in your community

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What is an electric vehicle?

In short: an electric vehicle uses electric motors powered by a battery to propel the vehicle, as opposed to a combustion engine powered by gasoline.

COMMON ABBREVIATIONS

EV = electric vehicle
BEV = battery-electric vehicle
PHEV = plug-in hybrid electric vehicle
FCEV = fuel cell electric vehicle
ZEV = zero-emission vehicle

Photo belongs to General M otors

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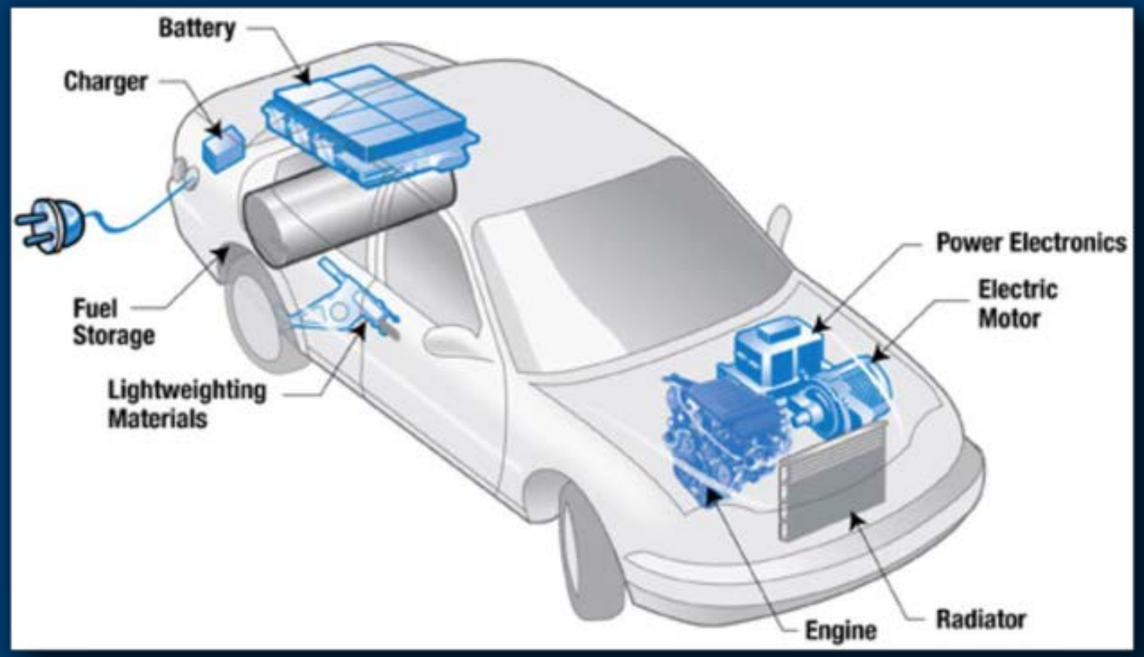
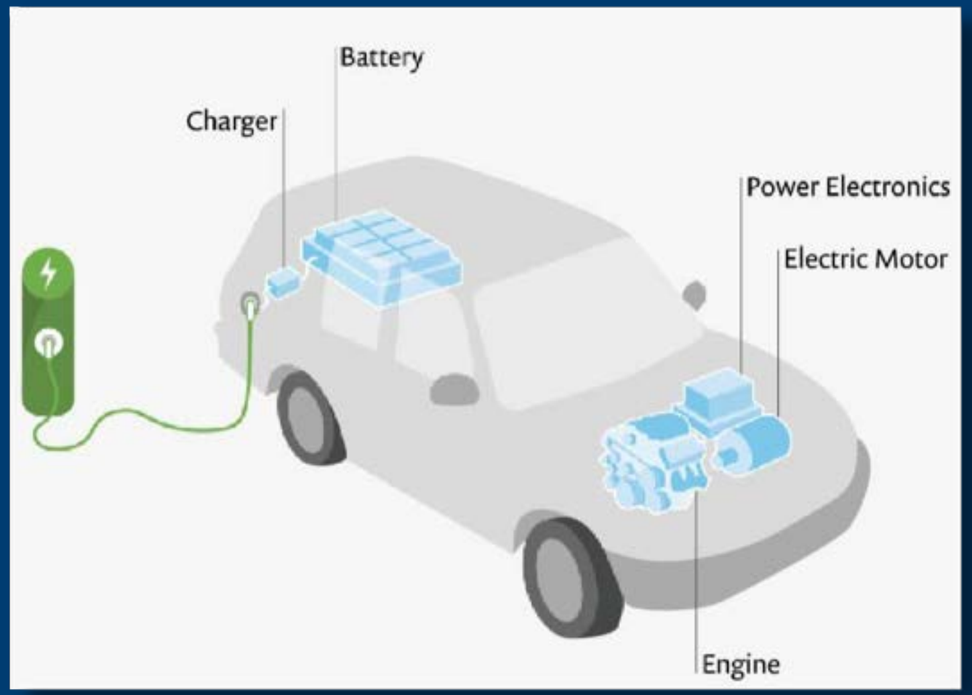
Which is the PHEV?





There's a lot to love about driving an EV

No gas smell

Instant torque

Fast

Cheap fuel

Quest

No gas station visits

If you drive electric,
tell us your favorite thing
about it in the comments!

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Most new EVs have a range of over 250 miles

Range = how far you can drive before running out of charge

Mustang Mach-e: ~250 miles
Ford F-150 Lightning: ~240 miles
Tesla Model 3: ~270 miles
Chevy Bolt EUV: ~250

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Charging can be as simple as plugging into a wall socket

There are three main charging speeds

LEVEL 1

110 V Wall Outlet

Great for PHEVs

Short commute, overnight charging

LEVEL 2

240 Volts

Full charge overnight

Many cars come with this plug now!

DC FAST CHARGER

440 Volts +

Public fast charging

Good for road trips, places you spend less than an hour

Photo belongs to General Motors

Typical charging behavior

Mostly: Overnight at home
Sometimes: "Top off" in public when convenient
Rarely: At DC fast chargers on long trips

Like an iPhone

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Cost to Charge

AT HOME

Drivers pay for their EV charge on their utility bills. You pay per kilowatt-hour of electricity, just like any other appliance. Utilities often offer time-of-use rates that allow you pay less for your electricity overnight, getting extremely cheap "fuel."

IN PUBLIC

Many chargers bill you based on how long you are plugged in. Some may charge based on how much electricity you use. Typically this is paid by credit card. Charging in public is more expensive than charging at home, but still less than gasoline.

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Let's take an example!

In 2015, I bought a 2010 Ford Escape for $12,500.
In 2019, I bought a 2019 Tesla Model 3 for $39,900.

Why Tesla

In 2019, there weren't many options! We bought a used Tesla Model 3 mid-range with 270 miles of range.

Why then

We drove A LOT. And every summer the Escape needed thousands of dollars of maintenance.

How I charged

At our apartment in Madison. We moved to an apartment with a free charger and rooftop solar.

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Fuel cost analysis

As of 9/19/2022, gasoline is $3.33 per gallon
Assuming average driving habits (30 miles per day)

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2010 Ford Escape FWD Gasoline	448 gal	0 kWh	$1,491	$3,695	$0.34	10,743
2021 Tesla Model 3 Standard Range Plus RWD EV	0 gal	2,635 kWh	$383	$2,448	$0.22	3,961
	Graph	Graph	Graph	Graph	Graph	Graph

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Fuel cost analysis - what if we look at peak gas prices?

In May, gas prices were as high as $4.29 per gallon in Wisconsin
Still assuming average driving habits (30 miles per day)

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2010 Ford Escape FWD Gasoline	448 gal	0 kWh	$1,920	$4,125	$0.38	10,743
2021 Tesla Model 3 Standard Range Plus RWD EV	0 gal	2,635 kWh	$383	$2,448	$0.22	3,961
	Graph	Graph	Graph	Graph	Graph	Graph

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Total cost analysis

As of 9/19/2022, gasoline is $3.33 per gallon
Assuming average driving habits (30 miles per day)

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2010 Ford Escape FWD Gasoline	448 gal	0 kWh	$1,491	$3,695	$0.34	10,743
2021 Tesla Model 3 Standard Range Plus RWD EV	0 gal	2,635 kWh	$383	$2,448	$0.22	3,961
	Graph	Graph	Graph	Graph	Graph	Graph

OVER $1200 IN YEARLY SAVINGS

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Environmental analysis

As of 9/19/2022, gasoline is $3.33 per gallon
Assuming average driving habits (30 miles per day)

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2010 Ford Escape FWD Gasoline	448 gal	0 kWh	$1,491	$3,695	$0.34	10,743
2021 Tesla Model 3 Standard Range Plus RWD EV	0 gal	2,635 kWh	$383	$2,448	$0.22	3,961
	Graph	Graph	Graph	Graph	Graph	Graph

EQUIVALENT OF ADDING 140 MATURE TREES

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Analysis for big drivers

As of 9/19/2022, gasoline is $3.33 per gallon
Lets say you drive closer to 60 miles per day...

Vehicle	Annual Fuel Use	Annual Electricity Use	Annual Fuel/Elec Cost	Annual Operating Cost	Cost Per Mile	Annual Emissions (lbs CO2)
2010 Ford Escape FWD Gasoline	758 gal	0 kWh	$2,525	$5,125	$0.28	18,198
2021 Tesla Model 3 Standard Range Plus RWD EV	0 gal	4,381 kWh	$637	$3,004	$0.16	6,584
	Graph	Graph	Graph	Graph	Graph	Graph

OVER $2000 IN YEARLY SAVINGS

EQUIVALENT OF ADDING 240 MATURE TREES

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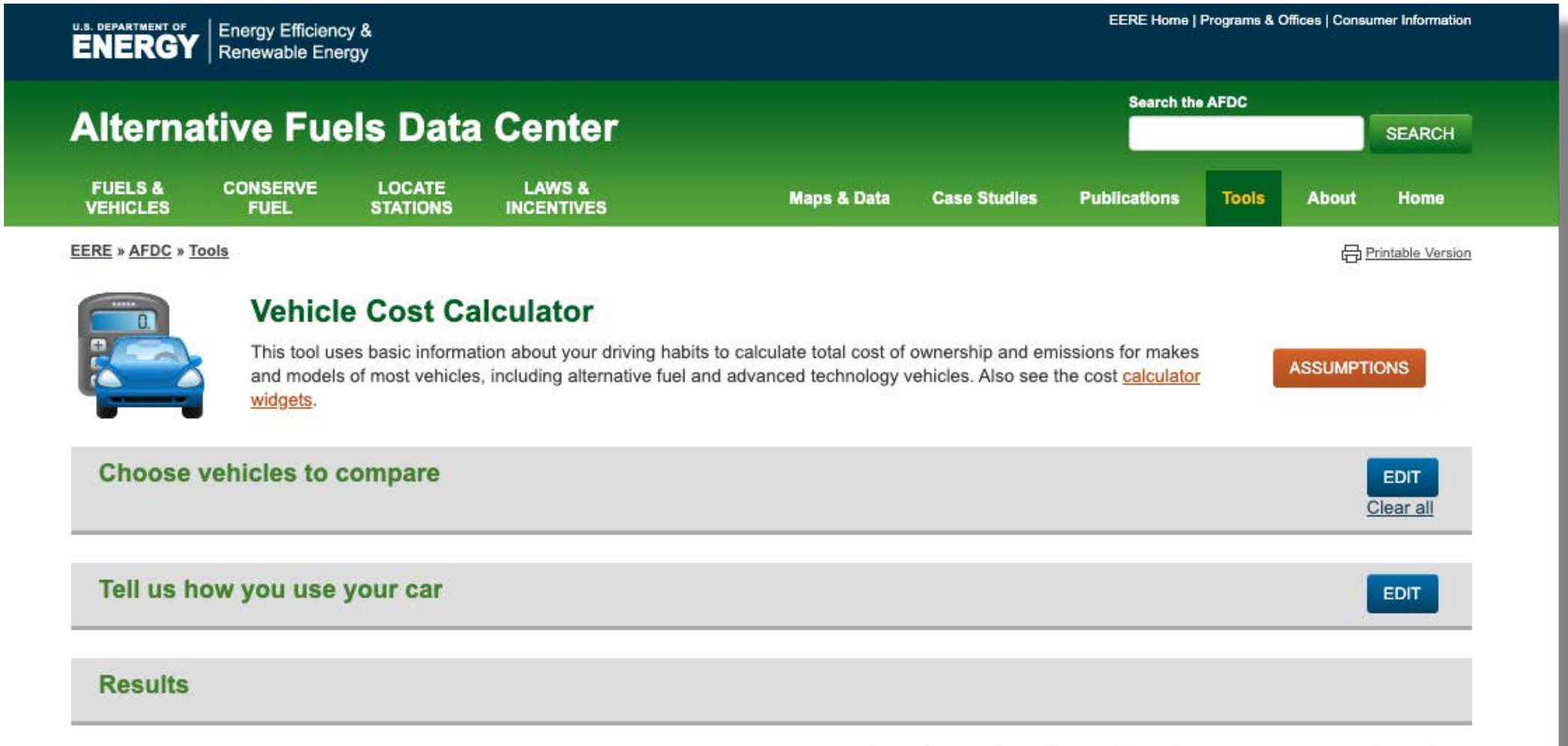
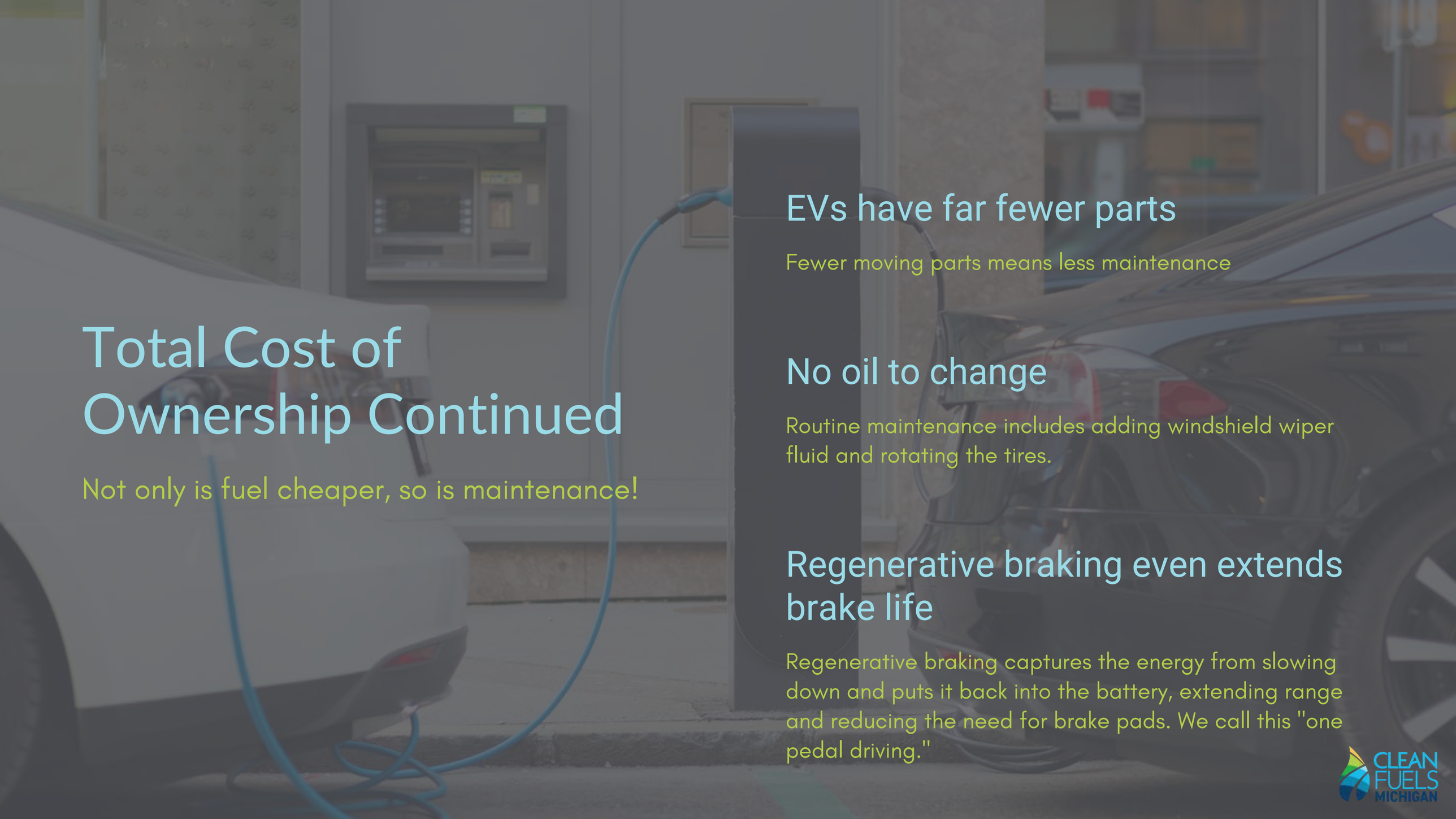
Try it for yourself!

LINK HERE

Alternative Fuels Data Center Vehicle Cost Calculator





Total Cost of Ownership Continued

Not only is fuel cheaper, so is maintenance!

EVs have far fewer parts

Fewer moving parts means less maintenance

No oil to change

Routine maintenance includes adding windshield wiper fluid and rotating the tires.

Regenerative braking even extends brake life

Regenerative braking captures the energy from slowing down and puts it back into the battery, extending range and reducing the need for brake pads. We call this "one pedal driving."

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Lifespan of an EV

EVs are durable!

Plus, federal regulations mandate that the warranty for the battery pack is at least 8 years or 100,000 miles.

The way you use your EV impacts the battery lifespan

Lots of fast charging, miles driven, and time spent in hot climates can make the battery deteriorate faster.

What's the deal with battery materials?

CRITICAL MINERAL SUPPLY

Electric vehicle batteries, like other electronics, use a combination of lithium, cobalt, manganese, nickel, and graphite. Lithium is abundant, though there is only one mine in the US. Manufacturers are working to eliminate cobalt due to humanitarian issues at mines.

BATTERY RECYCING

Supply chains are being built to repurpose or recycle batteries at the end of their useful life in a vehicle. There is still a lot value in used batteries!

ENERGY INTENSIVE

It takes a lot of energy to mine materials and assemble a battery. EVs are more energy intensive to make than ICE cars.

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Environmental analysis continued

EVs are only as clean as the power that charges them... and it turns out that's pretty good!

Electricity can be truly renewable

There is more solar and wind being added to the electricity grid at a pace faster than ever. Plus, you can have solar on your home to power your car with the sun! Internal combustion engines (ICE) can use ethanol blends, but require fossil fuels.

Electric vehicles don't have a tailpipe

No combustion means no tailpipe, reducing pollution in highly congested communities.

Emissions equivalent of a vehicle with mpg of about 45 in WI, 55 in MI, 134 in CA

Based on a Union of Concerned Scientists analysis looking at electricity sources in those states.

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Good for the environment, Good for public health

Transportation makes up 27% of greenhouse gas emissions in the United States

Fewer emissions means fewer pollution-related illnesses and early deaths

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This all sounds great, but I need more info about charging in public

Because we all take vacations, work trips, and more.

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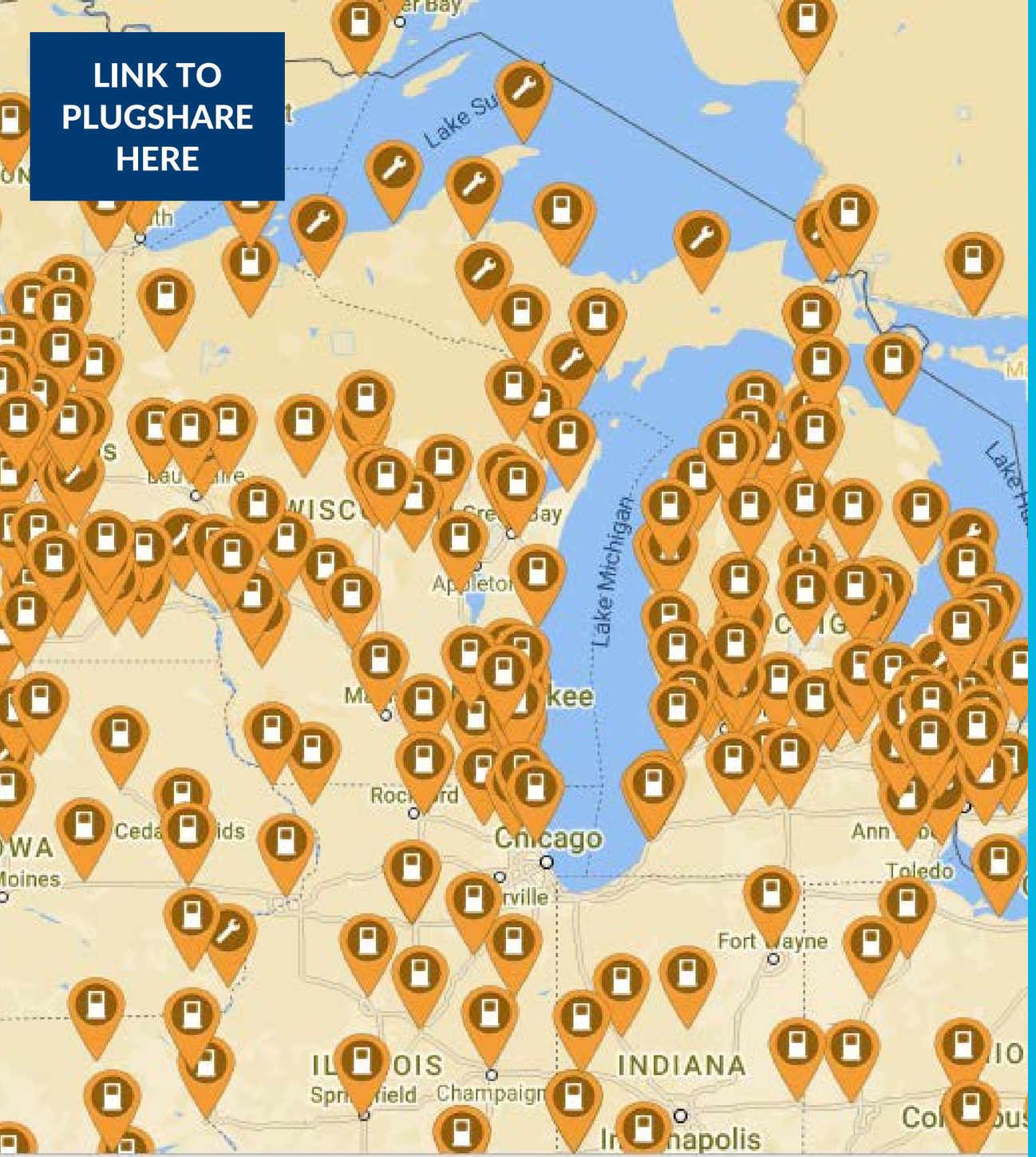

DC Fast Chargers

EVs can only use one type of plug

Just like you know what type of gas to pump into your car, you know what plug to use. Seach based on the plug type.

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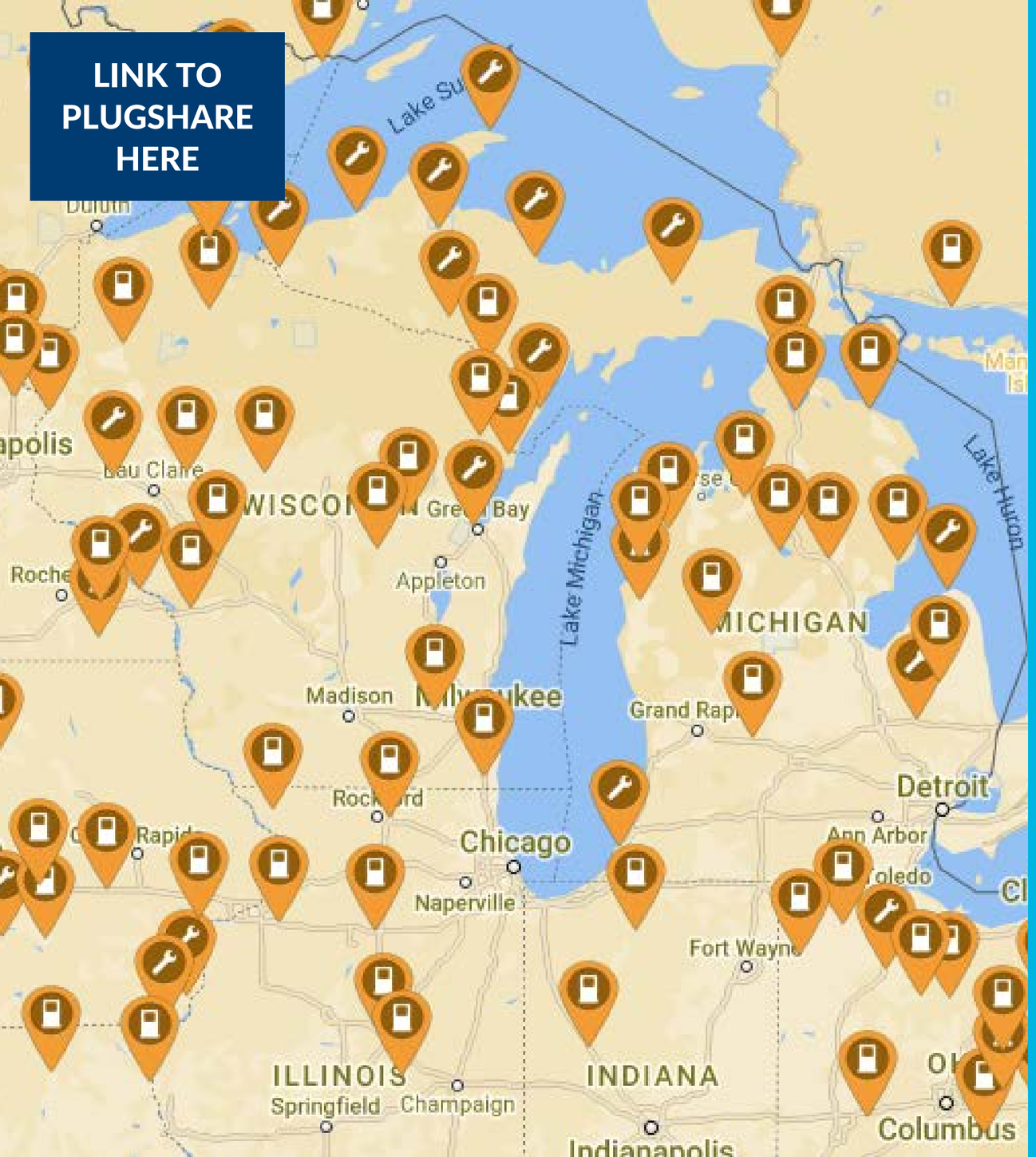

DC Fast Chargers

There are more new, universal chargers coming!

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The Bipartisan Infrastructure Bill provides $7.5 billion to build EV chargers nationwide.

$110M to Michigan
$78M to Wisconsin

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More makes & models available than ever

Including SUVs, pick up trucks, and more

Photos belong to Ford

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Towing Capacity

Ford F-150 Lightning: 7,700 lbs

Compared to ICE F-150 that can tow 5,000 - 11,000 lbs

Rivian R1T: 11,000 lbs

Photos belong to Ford

Siri, are EVs here to stay?

automakers switching to electric

All News Shopping Images Videos More

About 10,700,000 results (0.62 seconds)

https://www.caranddriver.com › news › future-electric-...

Future EVs: Every Electric Vehicle Coming Soon

Jan 6, 2022 — Every Electric Vehicle That's Expected in the Next Five Years · Chevrolet Blazer **EV** (Expected: Spring **2023**) · Honda Prologue (Expected: 2024).

2023 BMW i7 · 2023 Audi A6 e-tron · 2023 Mercedes-Benz EQE · Prophecy concept

https://topelectricsuv.com › Featured

2023 Electric Cars List: 43 models to watch out for [Update]

Kia Niro **EV** — **2023** will be the year with the highest number of new electric car unveils and launches. More than 40 new **EV** models are debuting or launching ...

Fisker Ocean · Polestar 3 electric SUV · Hyundai Ioniq 6 · Nissan Ariya

https://fortune.com › 2021/11/16 › general-motors-gm-...

GM is making a $35 billion shift to an all-electric future

Nov 16, 2021 — **General Motors** said it would stop selling vehicles with internal combustion engines, and would **go all electric** by 2035. **GM's** Zero Emissions plan ...

https://www.nbcnews.com › business › autos › gm-go-a...

GM to go all-electric by 2035, phase out gas and diesel ...

Jan 28, 2021 — **General Motors** plans to completely phase out vehicles using internal combustion engines by 2035, Chairman and Chief Executive Officer Mary ...

https://www.barrons.com › Currencies › Other Voices

Buick Is Going All-Electric. It's a Long-Term Plus for GM ...

Jun 1, 2022 — **General Motors** (ticker: **GM**) said Wednesday that Buick will be **all-electric** in North America by 2030. The company also redesigned its logo and ...

Videos

Bill Ford on Ford Motor future: "We're going all electric"

YouTube · Fortune Magazine
Mar 21, 2022

4 key moments in this video

Ford Takes Bold Steps Toward An All-Electric Future In Europe

YouTube · Ford News Europe
Mar 14, 2022

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Okay I'm in!
Get me in an EV!

Let's find the right car for you.

1. Evaluate your lifestyle
2. Narrow down your vehicle options
3. Make a plan for charging
4. Look into available incentives

1 EVALUATE YOUR LIFESTYLE

Determine the minimum range that would make you feel comfortable.

How much do you drive per day?
Is this your main vehicle?
Are you patient enough to charge in public?

Determine what is most important to you.

Price?
Features?
Available charging network?
Domestic manufacturing?
Local dealership?

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2 NARROW DOWN VEHICLE OPTIONS

Edmund's EV Buying Guide

Sort by vehicle name, MSRP, rating, and range

LINK HERE

EVadoption.com

BEVs and PHEVs
Sort by vehicle name, MSRP, range, battery size

LINK HERE

Friends, family, facebook groups

Talk to people you know who drive electric, or look for the local facebook group of EVs drivers

3 MAKE A CHARGING PLAN

Charging at home

Look into utility programs

Order a level 2 charger if you want one and your card doesn't come with one

Schedule an electrician visit if you need it

Charging in public

Maybe you'd like to charge at work or the grocery store

Download the charging apps you might need now!

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4 LOOK INTO AVAILABLE INCENTIVES

Utility Programs

Your local utility may have a residential charging program or rebate that can make it cheaper & easier to install a level 2 charger.

They may also have a time-of-use rate or even an EV rebate!

Tax Credits

There is a federal tax credit. Check the Alternative Fuels Data Center to see if your chosen vehicle qualifies!

Some states also have state-wide incentives, like Illinois offers a $4,000 rebate.

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More on federal tax credits

Before Aug 16, 2022

$7,500

Except Tesla and General Motors vehicles because they hit the 200,000 vehicle cap

Aug 17 - Dec 31, 2022

$3750 Critical Minerals
$3750 Battery Components

Tesla dnd General Motors still excluded

Final assembly must be in North America

Income cap of $300,000 for married, $150,000 individual

MSRP Cap of $80,000

Jan 1, 2023 on

Phased in % to qualify for rebates

All manufacturers eligible

Final assembly must be in North America

Income cap of $300,000 for married, $150,000 individual

MSRP Cap of $80,000

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More on federal tax credits

Used Vehicles Credit!

$4,000

Limited to 30% of the sale price

Model year must be 2 years earlier than sale's calendar year

Can only be claimed once per vehicle

Must be purchased from a dealer

Individuals can only get one credit every 3 years

Sale price of $25,000 or less

Income cap of $150,000 married or $75,000 individual

Maybe an EV isn't for you right now.

That's okay too! There are plenty of ways to support clean transportation in your community.

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NON-AUTOMOTIVE TRAVEL

Walking and biking

Talk about zero emissions!

Electric bicycles

Interest in e-bikes is growing fast. This is a great way to commute.

Transit

Take the bus! And ask your local bus fleet to incorporate clean fuel buses.

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Get involved in your community!

Electric school buses and other municipal fleet vehicle electrification is a win-win-win. Cheaper to operate, healthier for the community, and better for the environment

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Let me know if you have any questions

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