EV Readiness
Insights for PRTPO Work Program

PRTPO Executive Board Meeting June 18, 2021

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EV Readiness
Resources for the Peninsula Region

Go to:
https://www.prtpo.org/ev-resources

Local Agency Documents

EV Studies or Plans
Integrating EVs into a City Fleet: Final Internship Report for City of Sequim, June 2020
Transportation Innovations: Preparing for Electric Vehicles and Connected Autonomous Vehicles Plan - CWCOG, June 2020

Municipal Codes
Electric Vehicle Infrastructure - Sequim

Demand, Forecast, or Feasibility Analysis
City Vehicles Suitable for AVF Replacement - Sequim, Nov 2020
EV Charging Implementation in Grays Harbor - Issue Report (4.2019)

Agreements
Interlocal Agreement b/w City of Sequim and Clallam County PUD 1

State Plans and Strategies

Planning Strategies & Tools for Highway Corridor ZEV Infrastructure - Nov 2020
Electrification Assessment of Public Vehicles in Washington - Nov2020
WA State EV Action Plan 2015-2020

Prior EVIPP Proposals

US 101 South
Pacific County EDC 2017 Application Packet

US 101 North
NODC 2017 EVIPP Proposal Write-up
NODC Letters of Support - 2017 EVIPP Proposal
2017 EVIPP Budget Worksheet

Other Resources

ChargEVal - Tool for Evaluating Charging Network Changes - Nov 2020
ChargEVal Website and Documentation

Electric Truck Bootcamp Webinar Series, Through August

Business Models for Financially Sustainable EV Charging Networks - 2015, JTC Study

Federally Recognized EV Charging Corridors - map

EV Funding Resources

Green Transportation Capital Grants - WSDOT
Public transit agencies are eligible. Biennial process. Next call for projects in 2022.

Zero Emission Vehicles Infrastructure Partnerships - WSDOT
Local, state, tribal governments and non-profits are eligible. Next call for projects anticipated in 2021.

Regional Mobility Grants - WSDOT
Public transit agencies are eligible. Biennial process. Next call for projects in 2022.

Clean Energy Fund - Grid Modernization Grants - Dept. of Commerce
Retail electric utility providers are eligible. Special priority on projects that address tribal system needs or those of vulnerable populations. PROPOSALS DUE MAY 18, 2021.

Volkswagen Enforcement Action Grants - Dept. of Ecology
Eligible entities and activities based on each grant program. No calls for projects are currently scheduled.

Low or No Emissions Vehicle Program 5339(c) - Federal Transit Admin.
Public transit agencies. Annual program is currently closed.

Presentation Overview

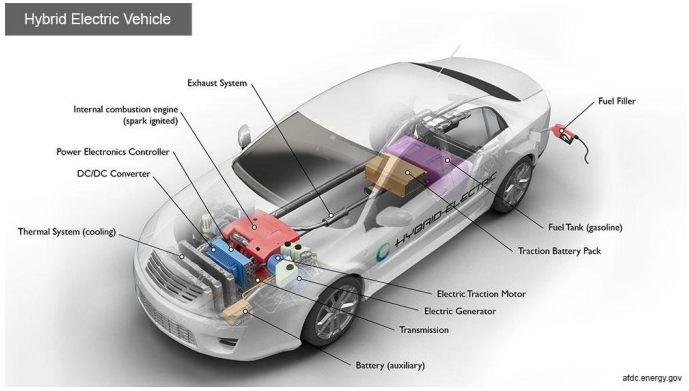
1. Electromobility 101
2. Benefits of EVs
3. EV Adoption Forecasts
4. Emerging Trends in Electromobility
5. EV Charger Funding Opportunity

Presentation Overview

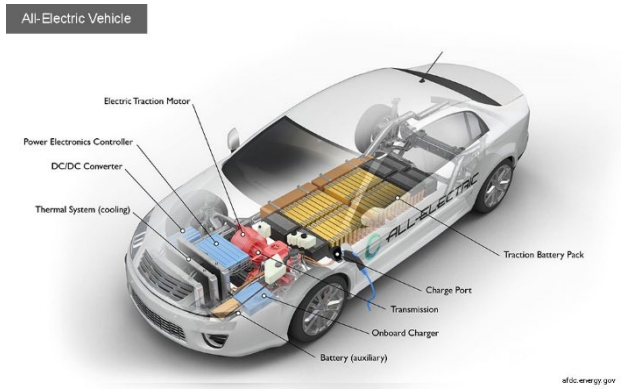
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Electromobility 101: EV Types

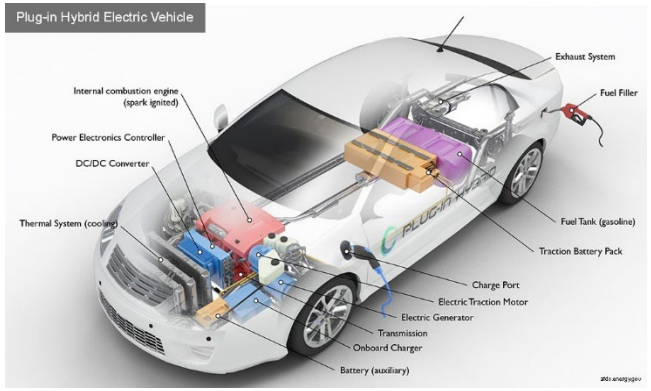
Hybrid electric vehicles (HEVs)



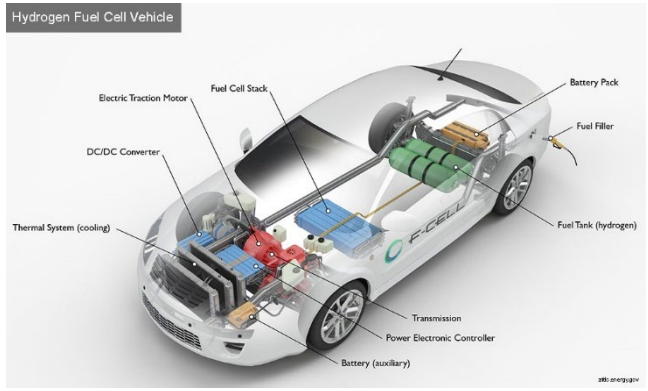
Battery Electric Vehicles (BEVs)



Plug-in hybrid electric vehicles (PHEVs)



Fuel Cell Electric Vehicles (FCEVs)



Electromobility 101: EV Charging

KNOW YOUR EV CHARGING STATIONS

AC Level One



VOLTAGE
120v 1-Phase AC

AMPS
12–16 Amps

CHARGING LOADS
1.4 to 1.9 KW

CHARGE TIME FOR VEHICLE
3–5 Miles of Range Per Hour

AC Level Two



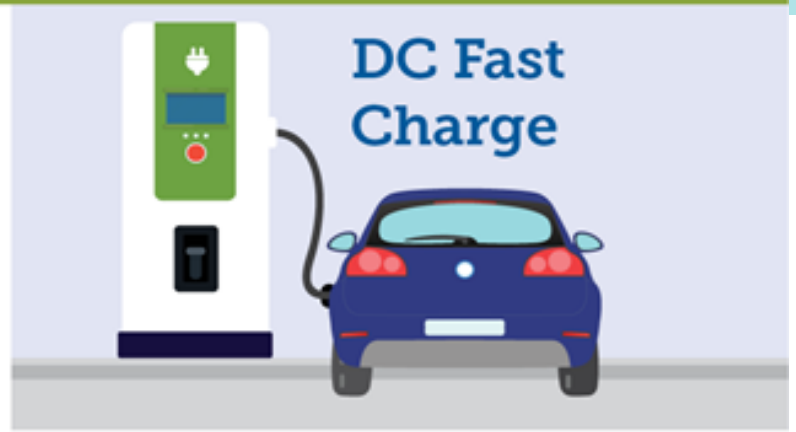
VOLTAGE
208V or 240V 1-Phase AC

AMPS
12–80 Amps (Typ. 32 Amps)

CHARGING LOADS
2.5 to 19.2 kW (Typ. 7 kW)

CHARGE TIME FOR VEHICLE
10–20 Miles of Range Per Hour

DC Fast Charge



VOLTAGE
208V or 480V 3-Phase AC

AMPS
<125 Amps (Typ. 60 Amps)

CHARGING LOADS
<90 kW (Typ. 50 kW)

CHARGE TIME FOR VEHICLE
80% Charge in 20–30 Minutes

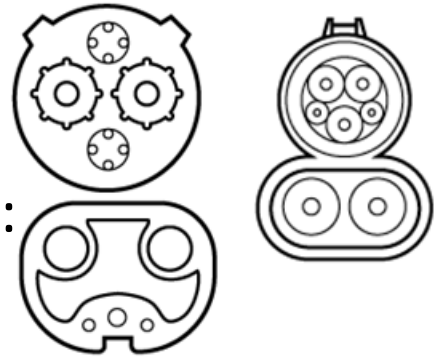
Electromobility 101: EV Charging Types

DKS

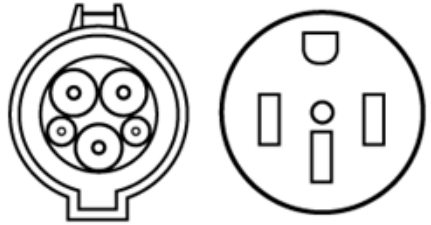
The Charging Pyramid

Power Level	Vehicle Dwell Time	Cost to Charge
DC Fast Charging	*Travel* 20 min	$$$$
High Power AC	*Public* 0.5 - 3 hours	$$$
Mid Power AC	*Workplace* 4 - 8 hours	$$
Low Power AC	*Residential* 8 - 10 hours	$

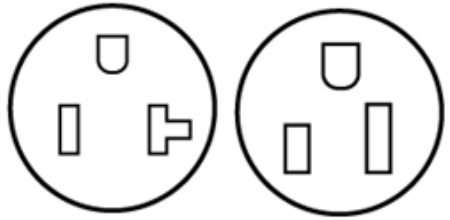
DCC Fast Charging:



Level 2 Charging:

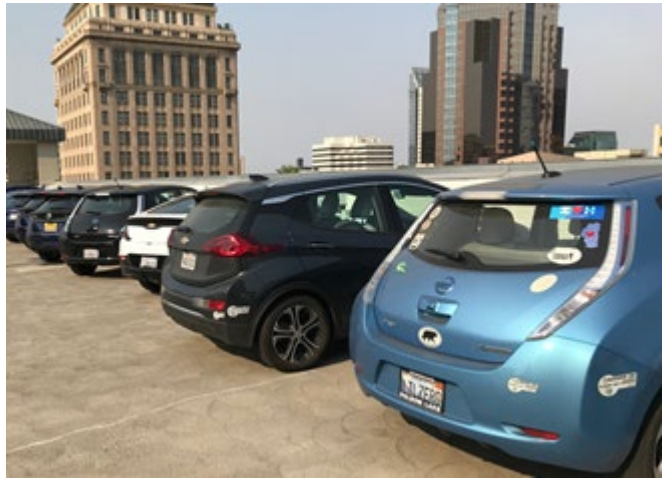


Level 1 Charging:



Electromobility 101: Charging Applications





CHARGING APPLICATIONS

- Residential
- Workplace
- Opportunity
- Destination
- Fleet

WEST COAST ELECTRIC HIGHWAY

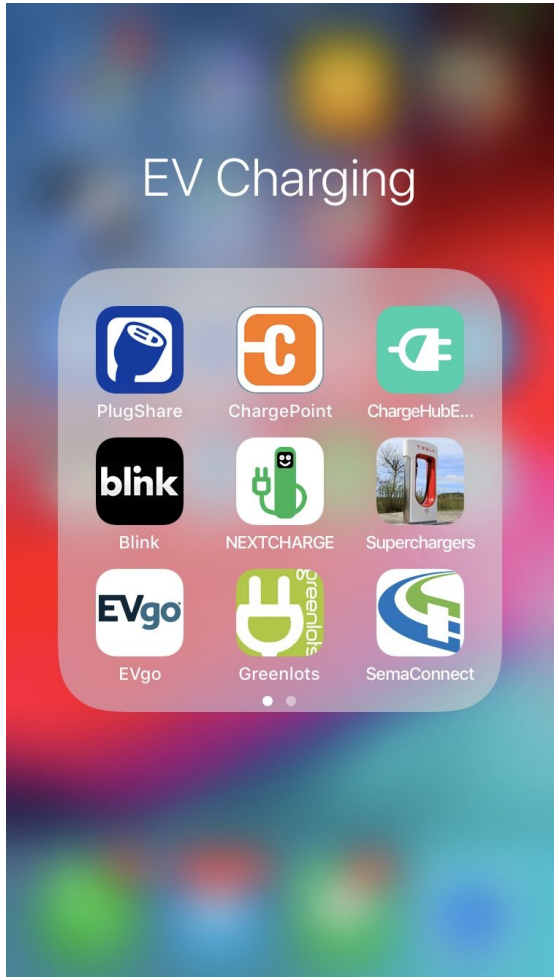


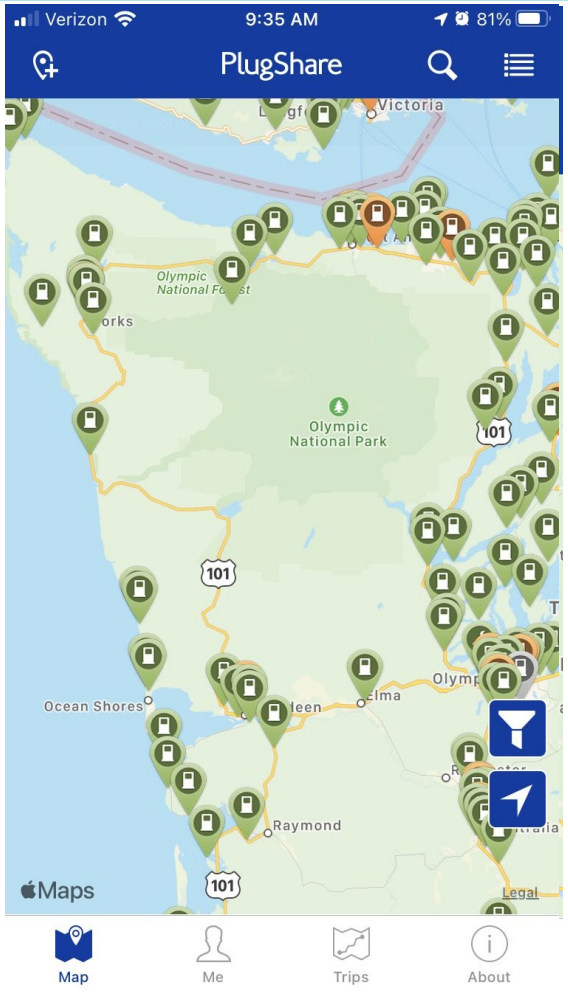


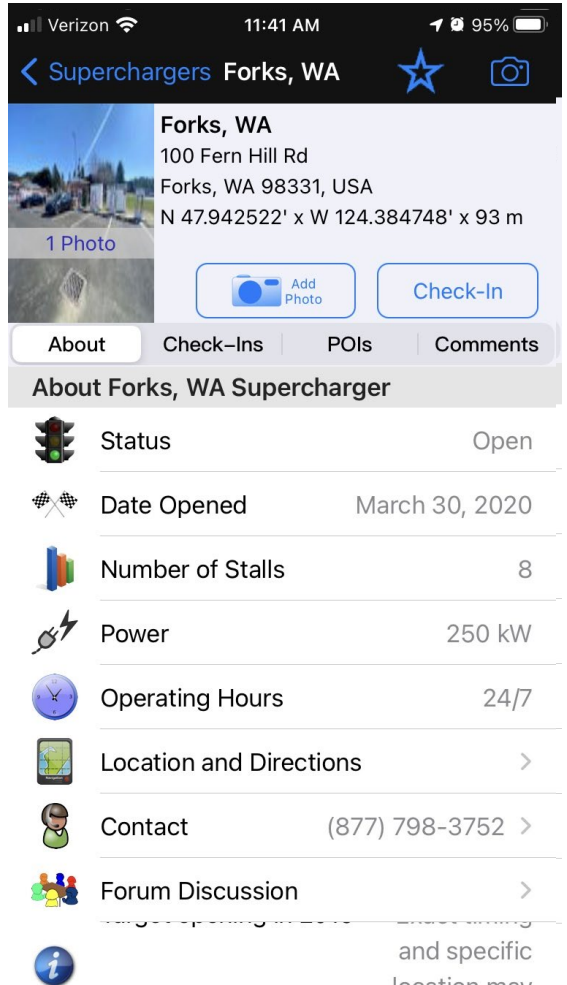


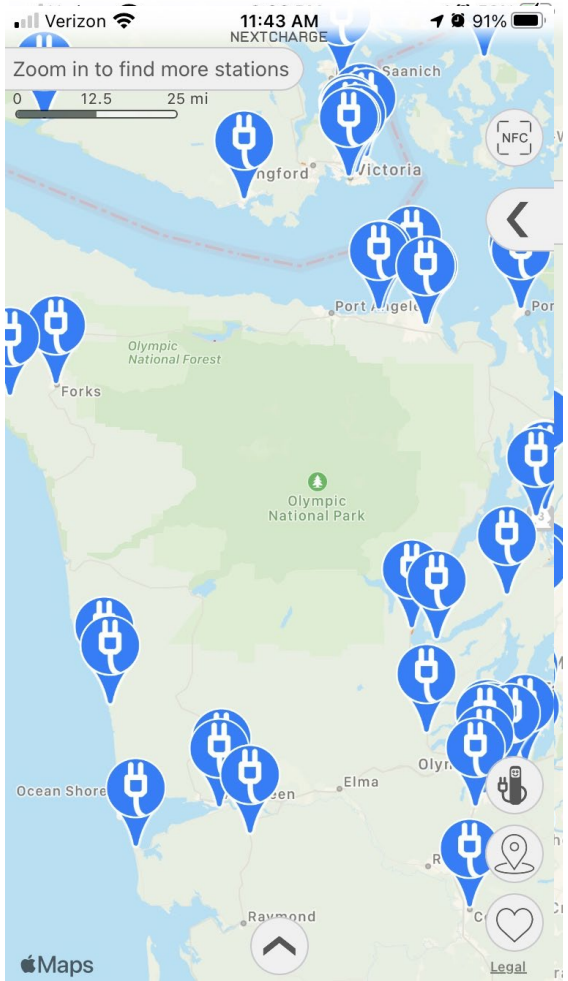


Electromobility 101: EV Charging Apps







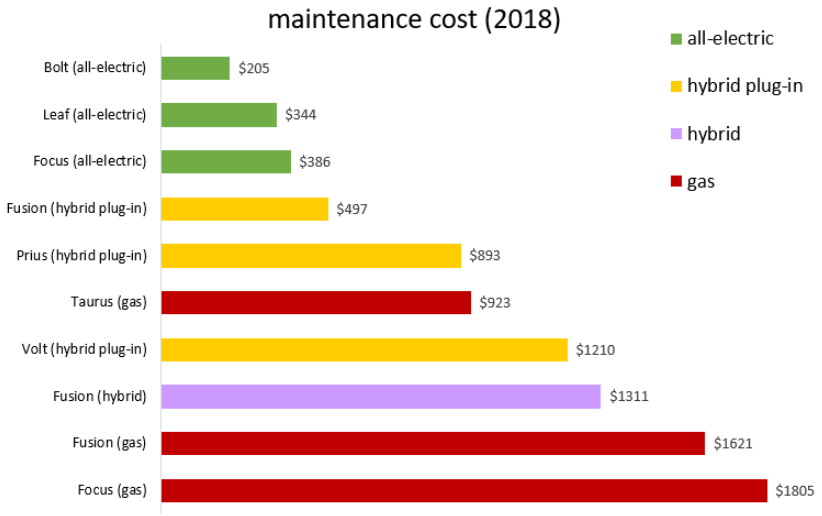


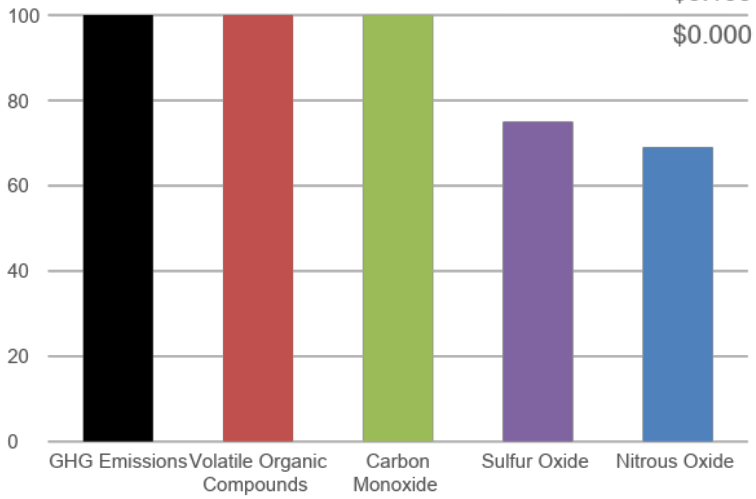
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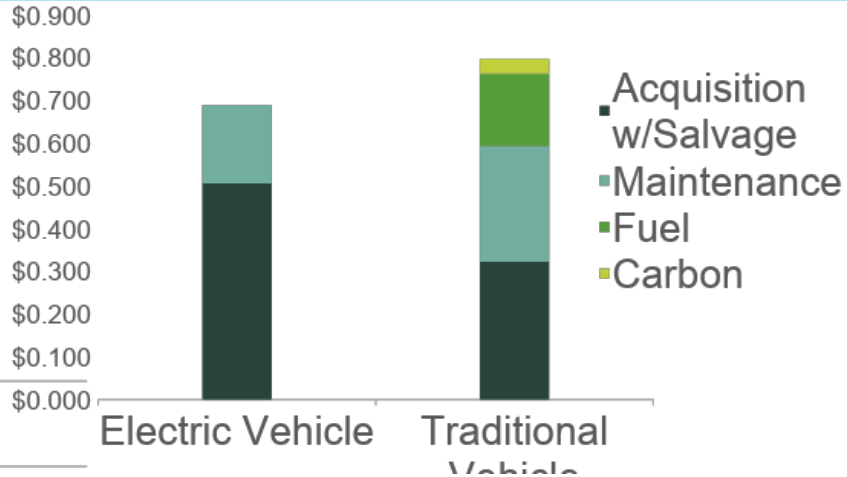
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Benefits of EVs

- Lower Emissions
- Reduced Fuel & Maintenance costs
- Superior performance





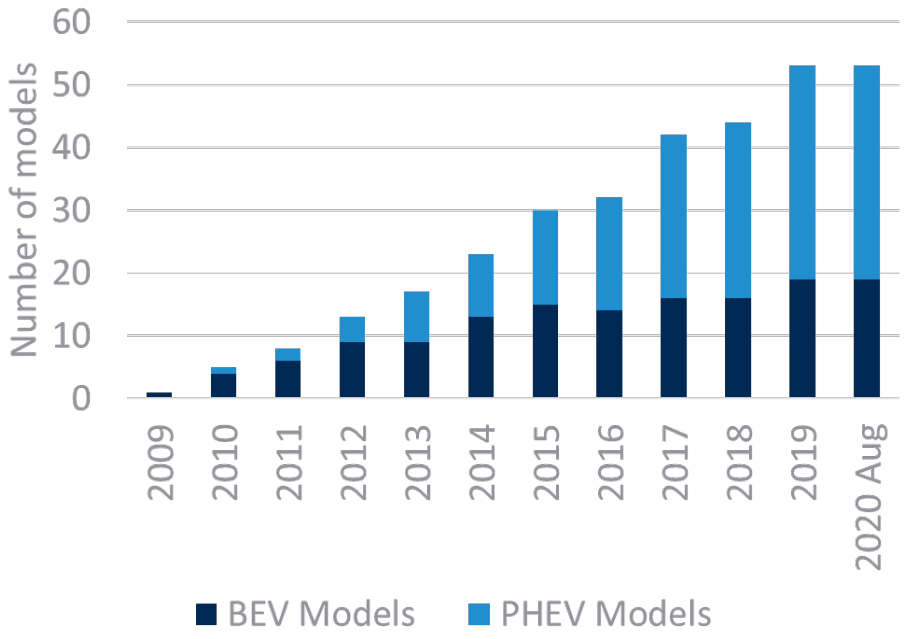


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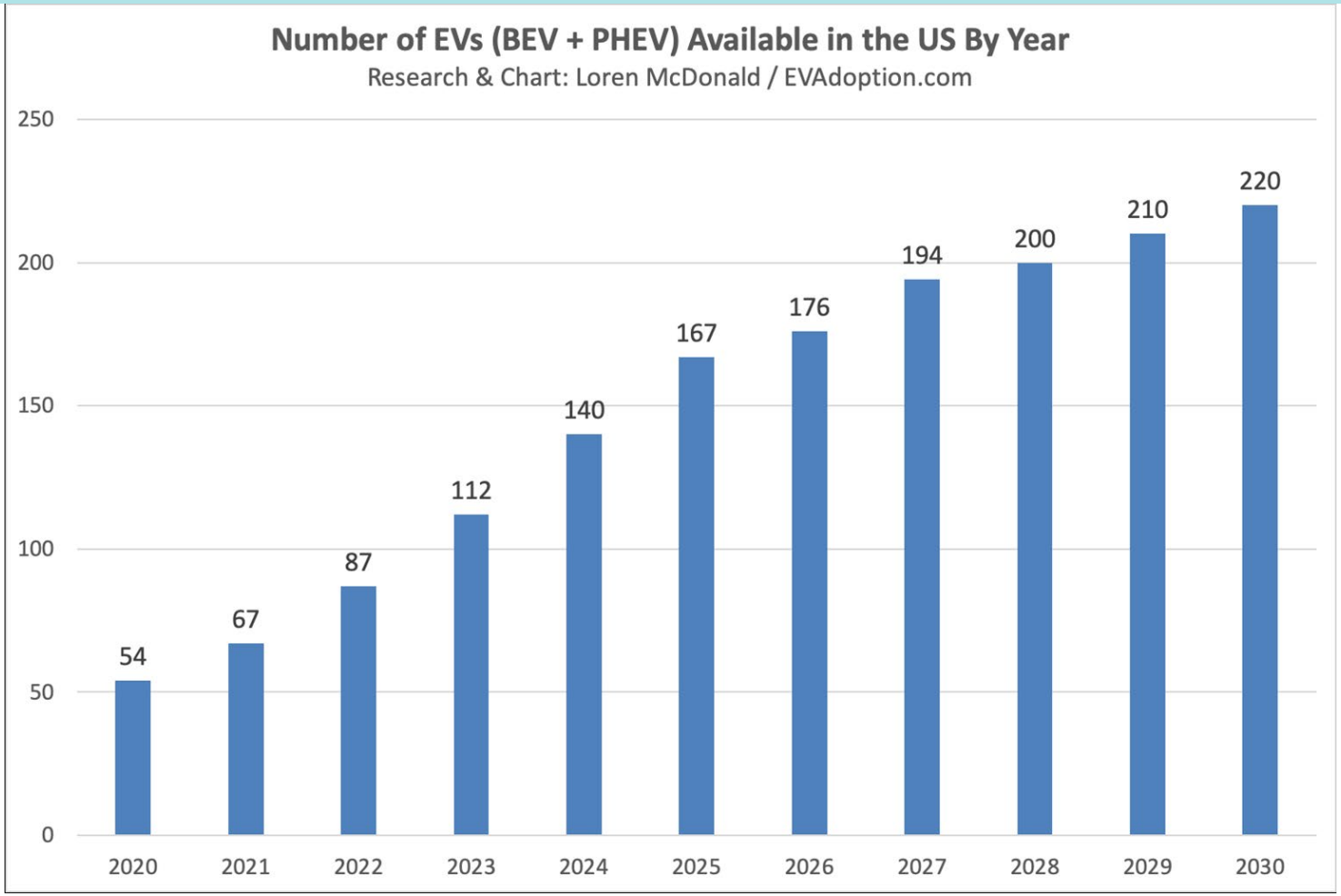
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5. Project Needs

EV Adoption Forecasts: Increased EV choice

1. Recent sales data
2. Future projections



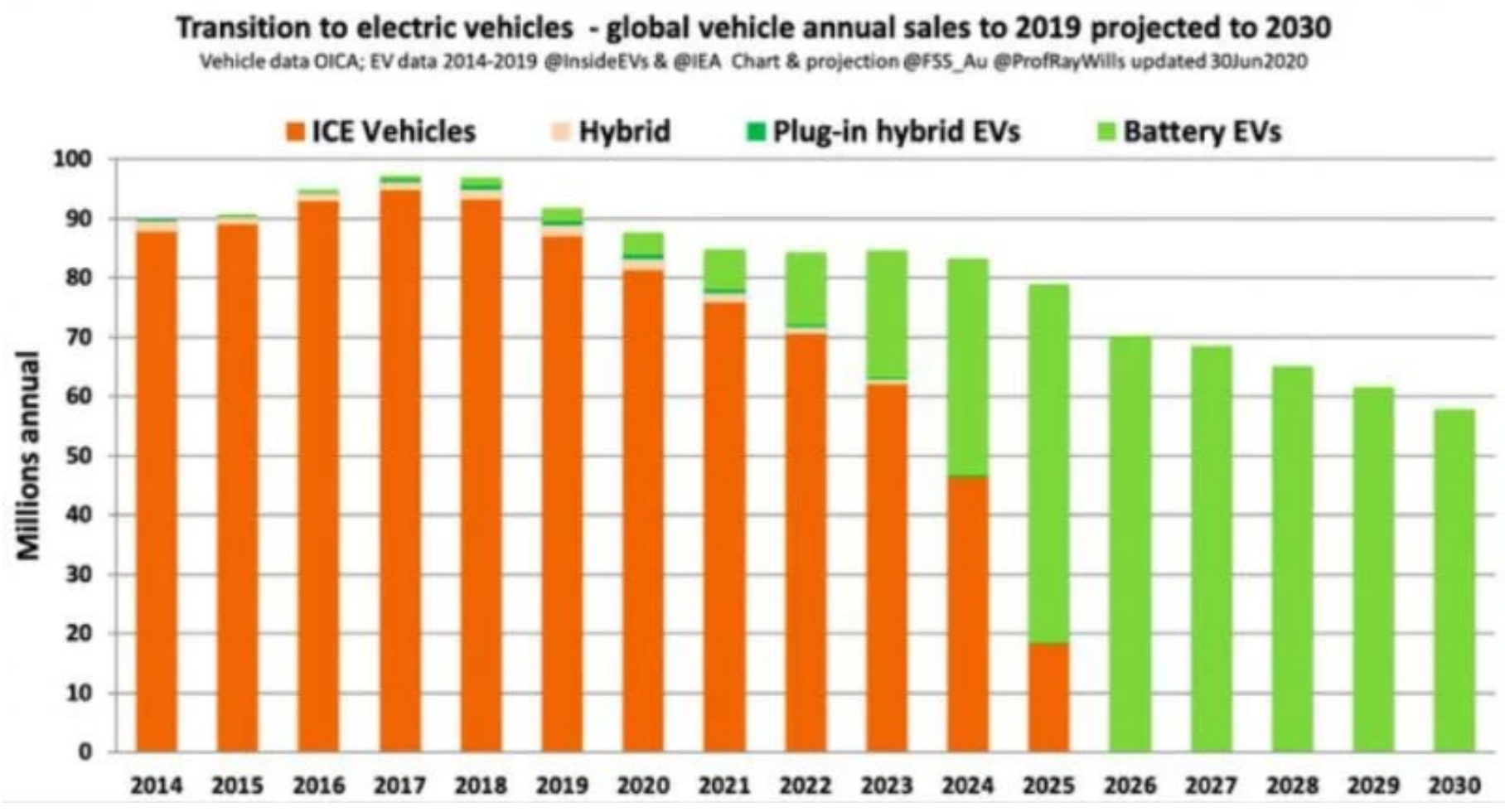
Source: ITS Davis



EV Adoption Forecasts: ICE Displacement

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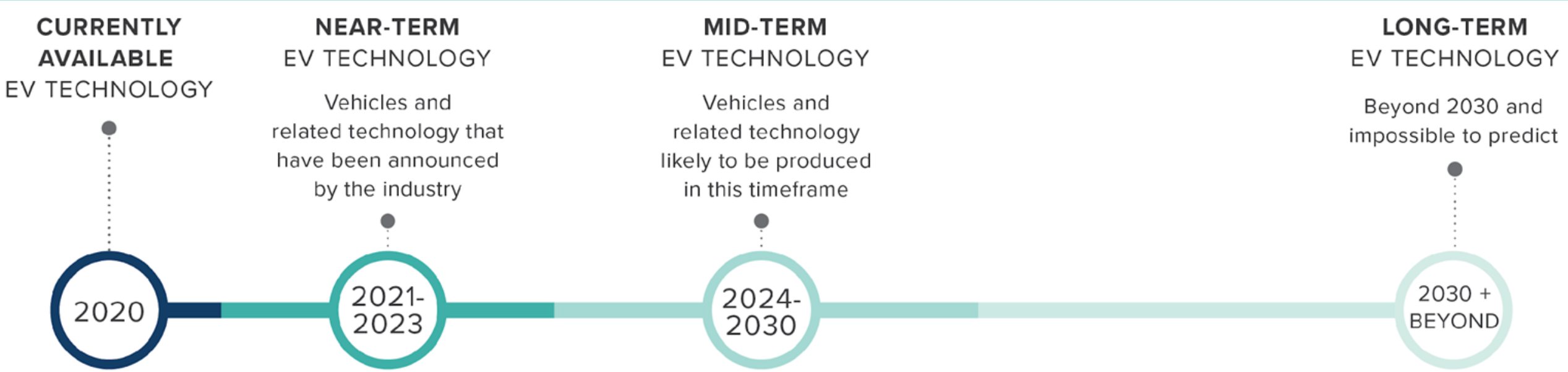
Future sales projections by vehicle type



Presentation Overview

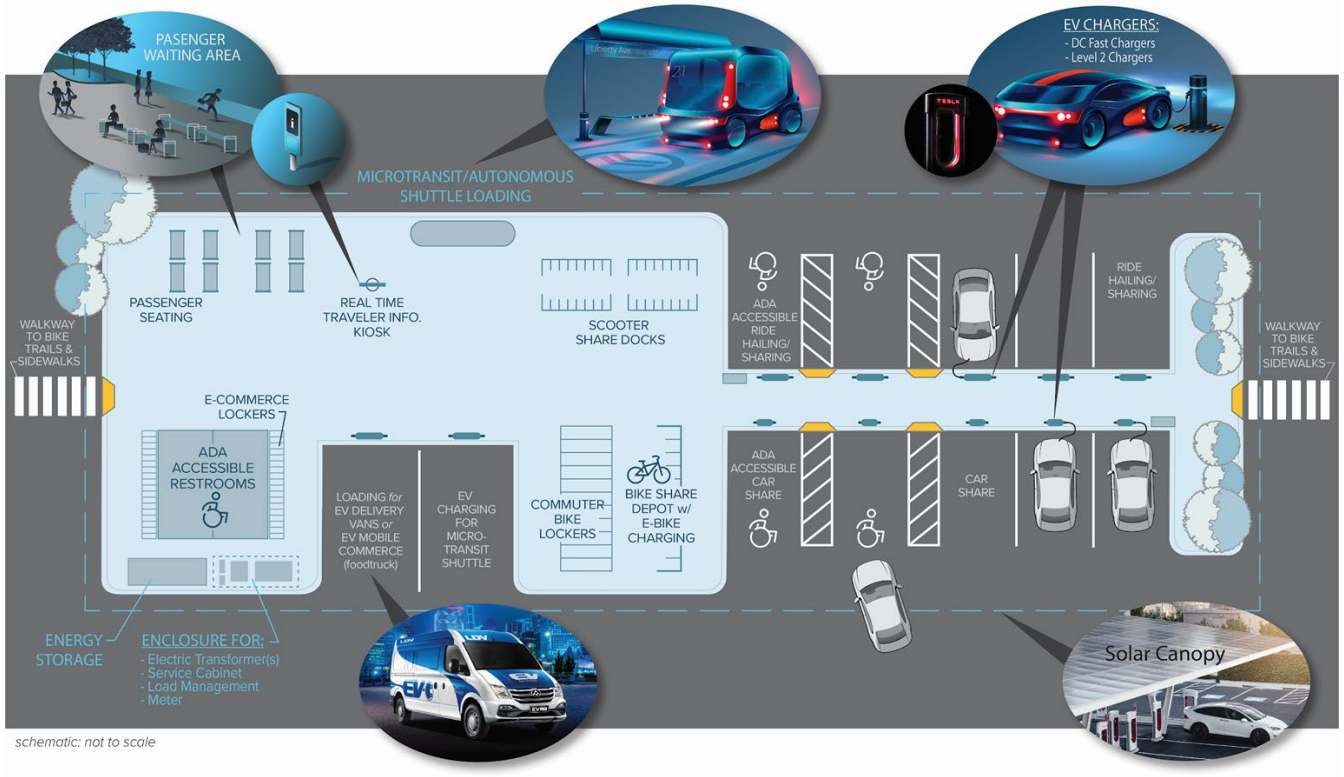
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The Future:
What do we know?



Emerging Trends in Electromobility

Mobility Revolution





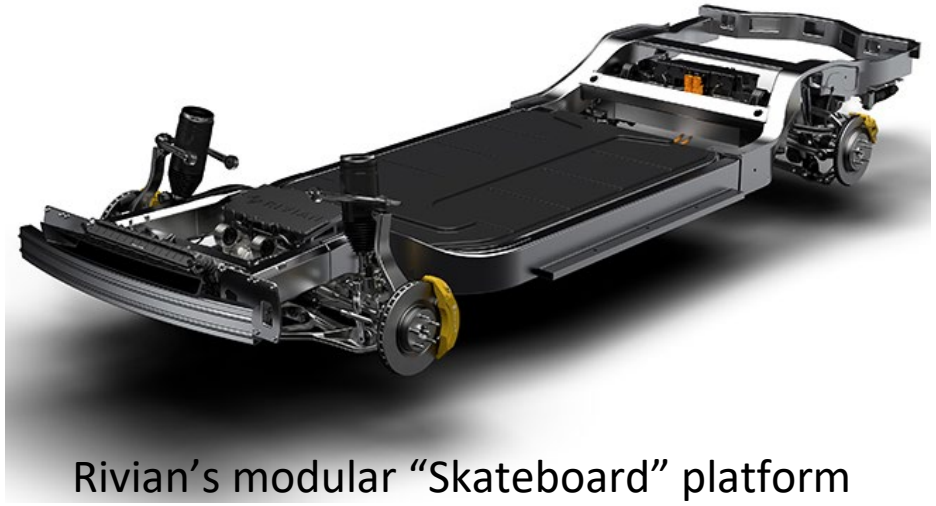




Emerging Trends in Electromobility

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Expansion of electric vehicle choice



Rivian's modular "Skateboard" platform





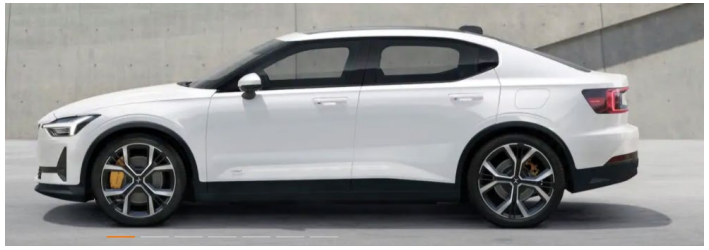
Volkswagen group's MEB platform



Emerging Trends in Electromobility

Expansion of electric vehicle choice







Cars:

Lucid,
Polestar,
Tesla



SUVs:

Ford,
VW,
Nissan





Pickup Trucks:

Tesla, Workhorse, Ford







Emerging Trends in Electromobility

Expansion of electric vehicle choice

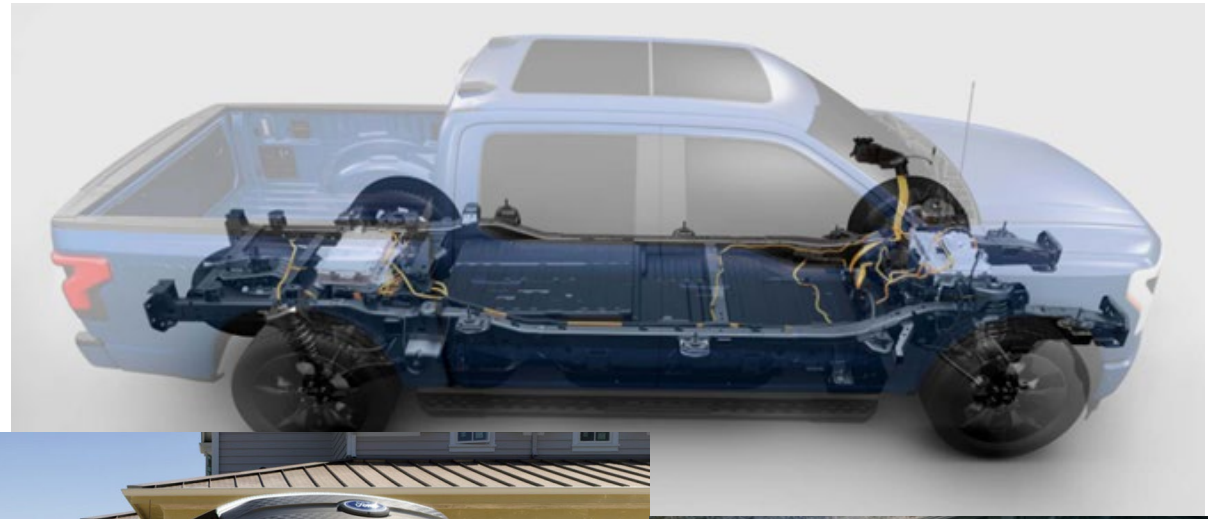
Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
	Envirotech Urban Truck 		GreenPower EV Star CarGOVan 	 BYD 6D Step Van	Kenworth K370E 	 Freightliner eCascadia116/ 126
Ford	EVT	Lightning Systems	GreenPower MOTOR COMPANY	BYD	KENWORTH	FREIGHTLINER

Emerging Trends in Electromobility

Expansion of electric vehicle choice

Ford F-150 Lightning

- Cost competitive
- More torque
- New features
  - Mobile power
  - Secure frunk
  - On-board 19.2 kW charger
  - Bidirectional charging
- Available in 2022



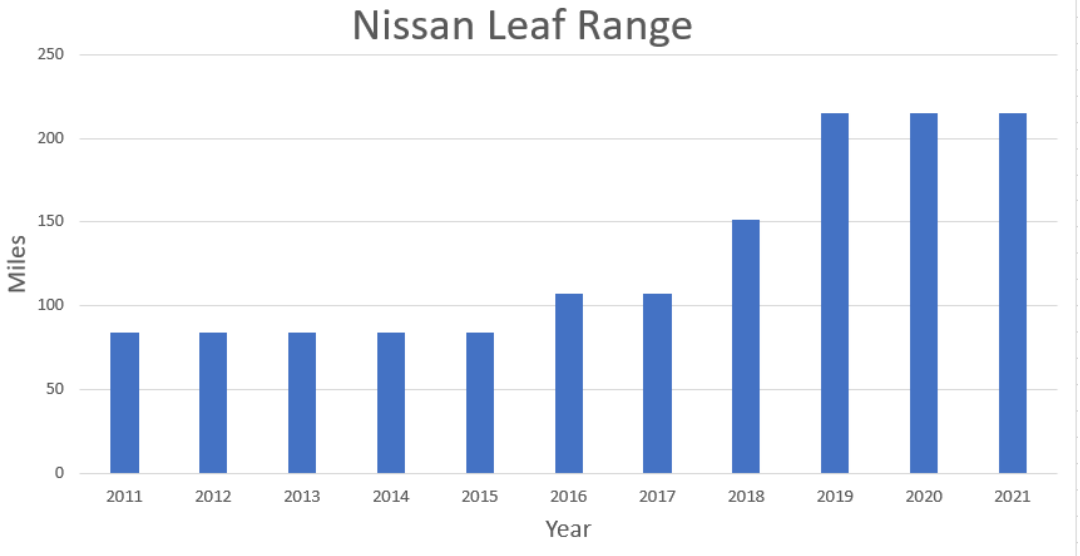


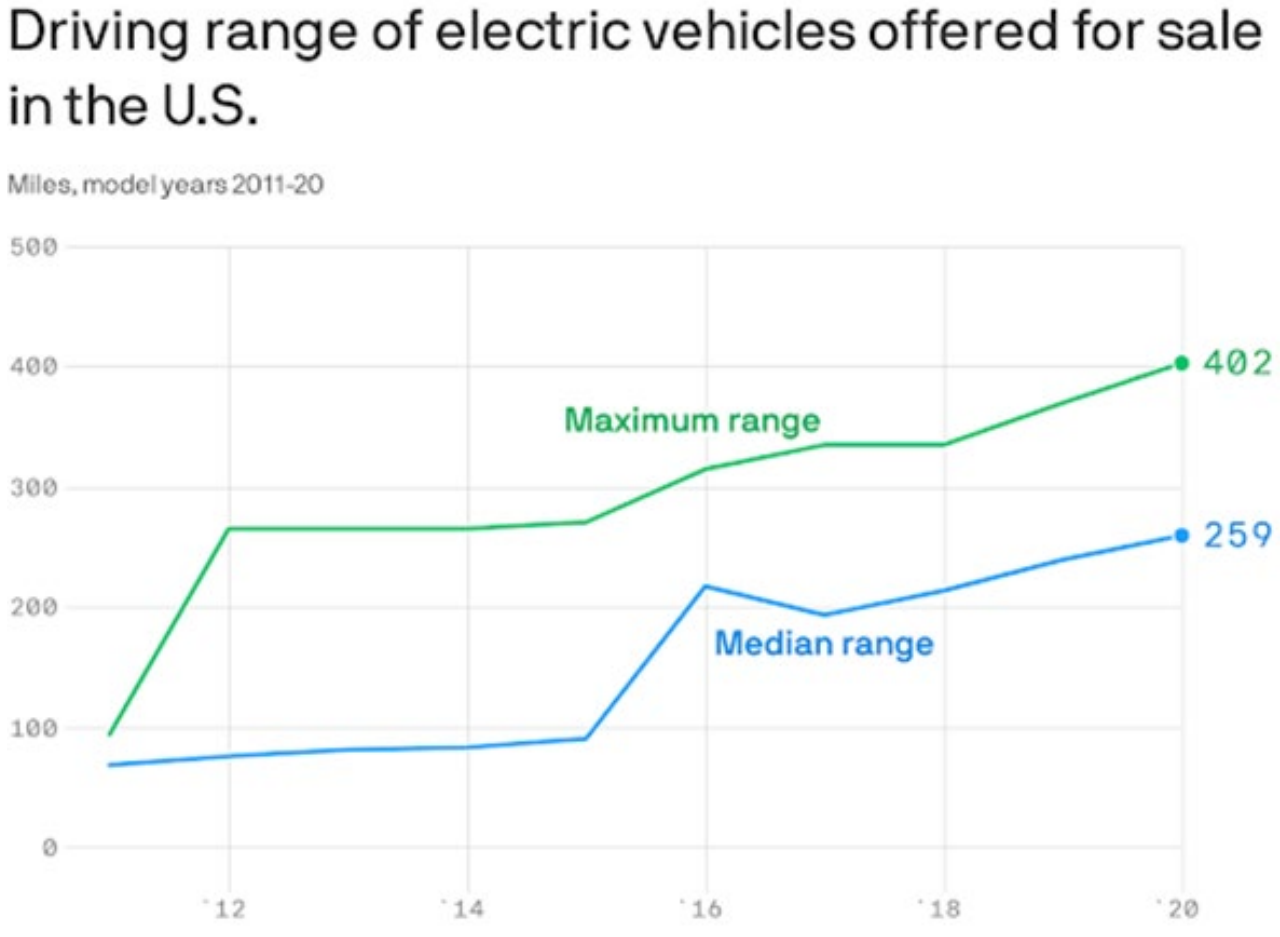


Lower Cost Energy Storage

Lower cost batteries = Longer range batteries

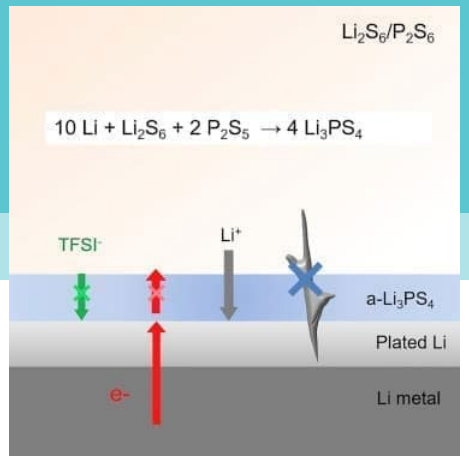






Battery Breakthroughs

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JON LESAGE

Jon LeSage is a California-based journalist covering clean vehicles, alternative energy, and economic and regulatory trends shaping the automotive, transportation, and mobility sectors.

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PREMIUM CONTENT

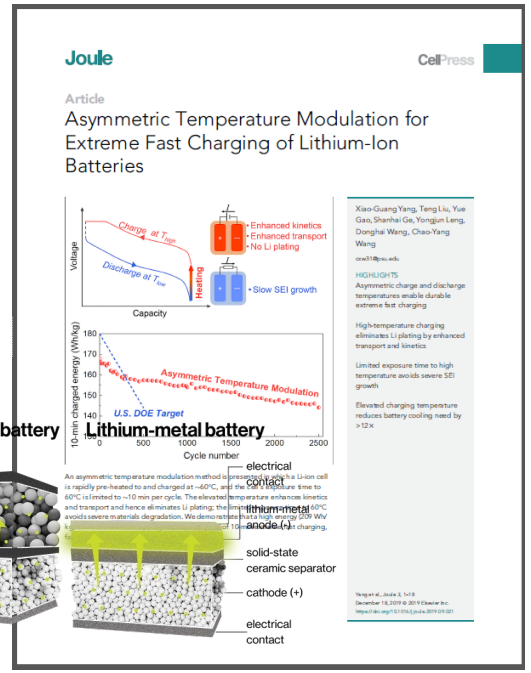
Solid State Batteries: The Next Big Thing In Electric Cars

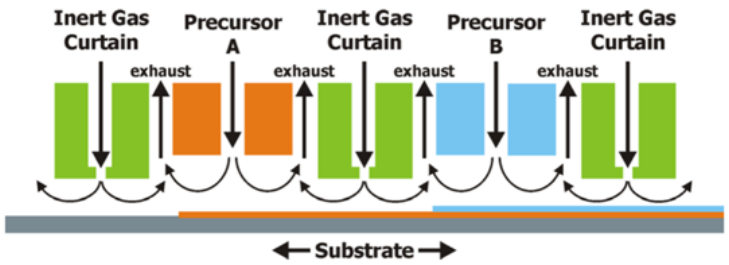
By Jon LeSage - Jun 26, 2019, 12:00 PM CDT

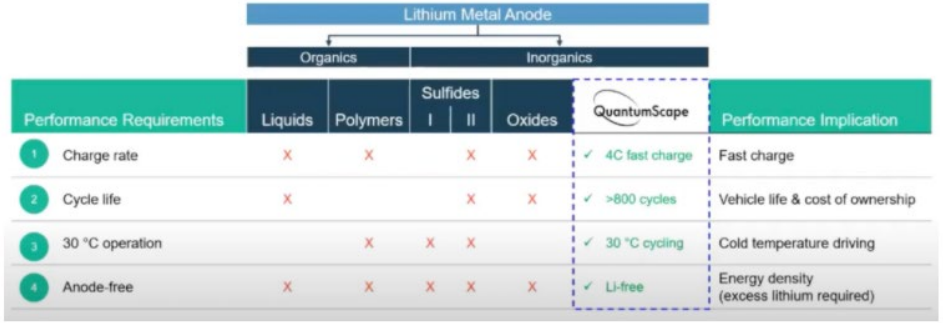


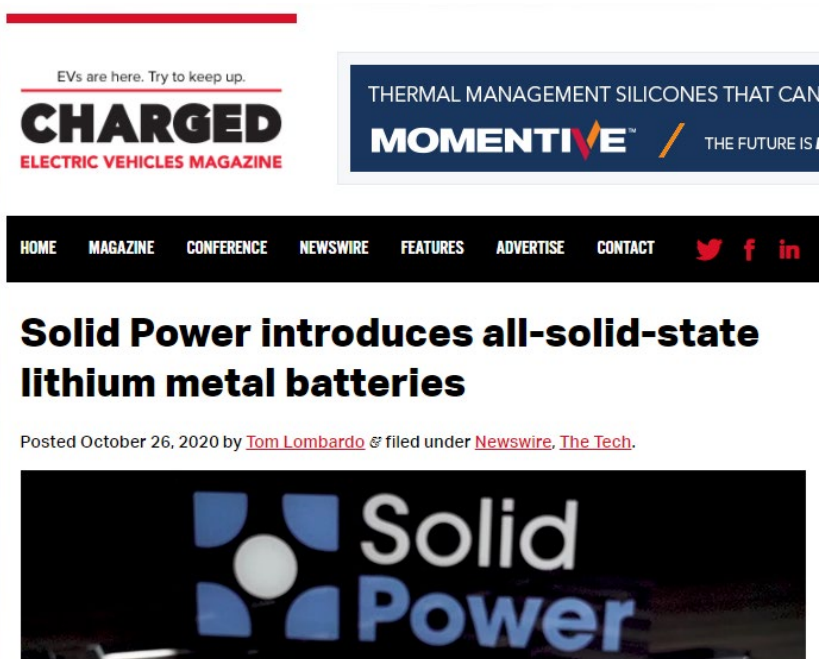
Plug-in vehicle sales have been seeing sizable growth in recent years, with Tesla grabbing most of the attention. Now the race is on with Toyota and several other global automakers taking steps forward in being truly Tesla-competitive for the first time.

At 2.1 million sold worldwide last year, sales of battery-electric and plug-in hybrid electric vehicles only saw a peak moment of 3.8 percent of new vehicle sales in December — and only 2.2 percent of sales for the year. For that number to reach 10 percent or higher, they'll need to go 400 or more miles per charge and able to be recharged in about 10 minutes. That's still a long ways off, but Toyota, Jaguar, Audi, Volkswagen, and Porsche are









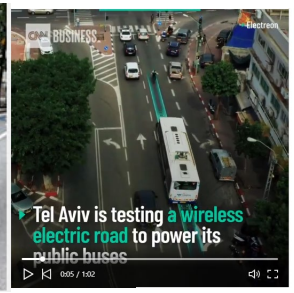
Automated Charging

Inductive (Wireless) Charging

WAVE

ELECTREON
CHARGING THE WAY FORWARD





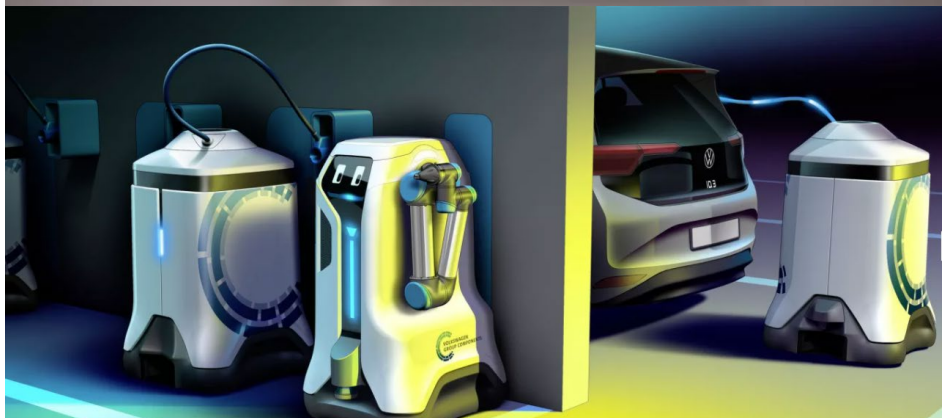
WiTricity





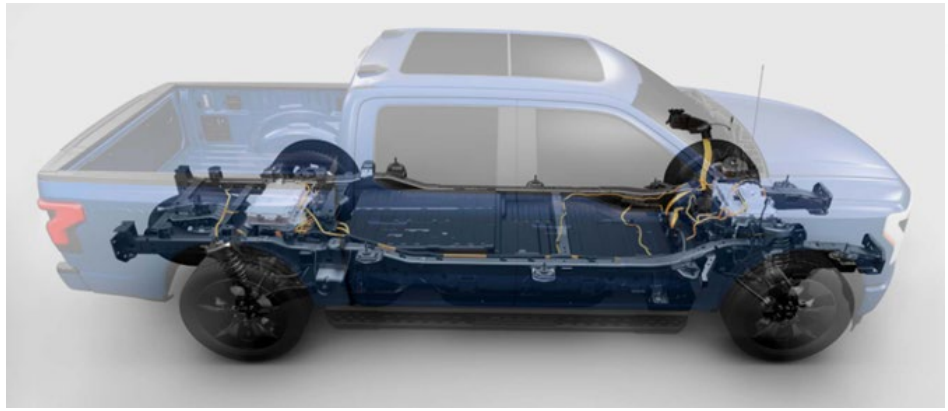
Robotic Charging





Bidirectional Power





Ford F-150 Lightning will have bidirectional charging

Vehicle to grid (V2G) energy sales

Source: Stillwater Associates & fleetcarma

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EV Charger Funding Opportunity

Washington State Department of Transportation

Zero Emission Vehicle Infrastructure Partnerships

What is it?

Grants to support turn-key projects that finance, build, operate, and maintain DCFC at new locations in 50-mile increments along a highway including U.S. Route 101.



U.S. Route 101 corridor

EV Charger Funding Opportunity

Washington State Department of Transportation

WEST COAST ELECTRIC HIGHWAY

Zero Emission Vehicle Infrastructure Partnerships
What's WSDOT's Goal?

Leverage $8 million statewide to encourage private sector investment through matching funds of 50% or higher.

Potential host site requirements:

• Sufficient 3-phase power	• Within ½ mile of highway interchange
• Retail, food, and other amenities	• At least 4 parking stalls
• Available potable water	• Public restrooms





Existing public chargers (Source: westcoastgreenhighway.com)

EV Charger Funding Opportunity

Washington State Department of Transportation

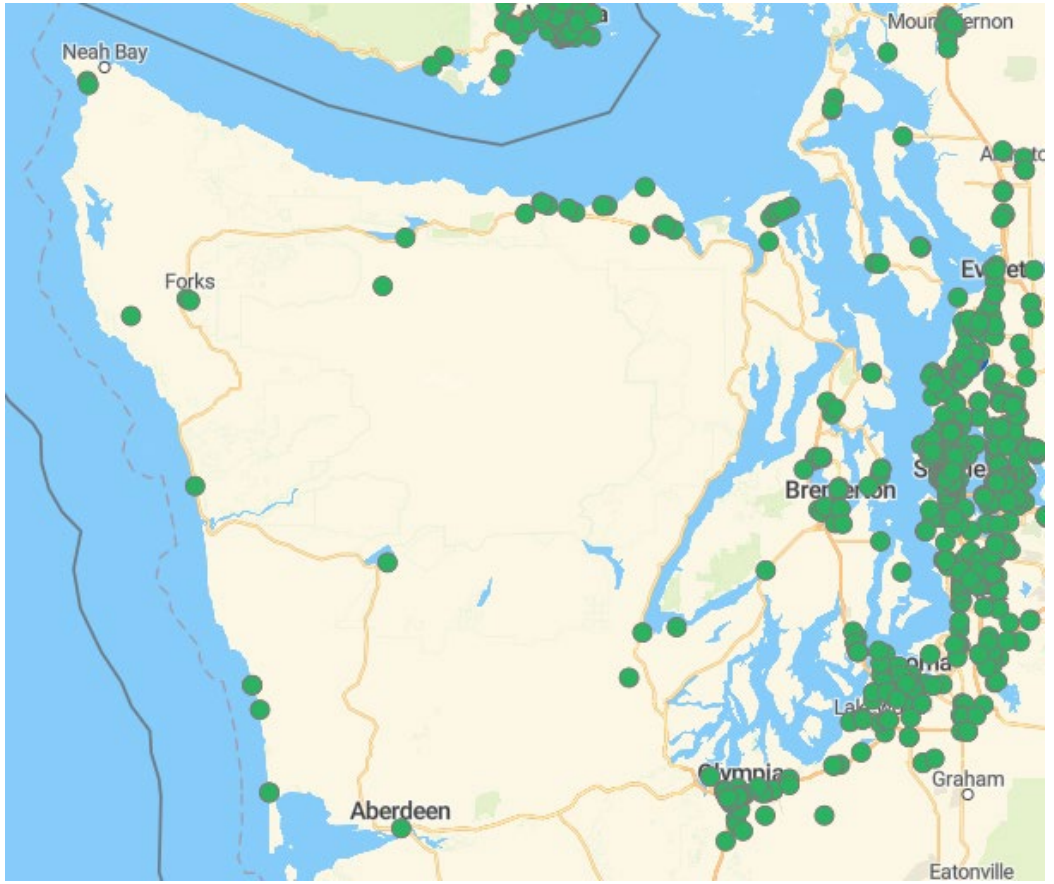
Zero Emission Vehicle Infrastructure Partnerships

Who's Eligible?

Non-profit organizations and local government agencies such as cities, towns, counties, transit agencies and tribes.

When will this happen?

Grant Applications begin this summer.



Existing public chargers (Source: AFDC)

EV Charger Funding Opportunity

Zero Emission Vehicle Infrastructure Partnerships

Washington State Department of Transportation

Where can we get more information?

- https://wsdot.wa.gov/business/innovative-partnerships/zero-emission-vehicle-infrastructure-partnerships
- Send an email to: partnerships@wsdot.wa.gov
- Attend ZEVIP Grant Work Session for Peninsula Region, Wednesday, June 23, 10:00am – 12:00pm