

Driving Electric Vehicles: The Benefits and Basics for Pennsylvania Residents

11:00AM – Noon

Wednesday, September 30, 2020

Hosted by: Drive Electric PA Coalition



WELCOME

Tips for participating:

- To ask questions, click on the Chat icon in the lower-right of your screen.
- Set your chat to “All Panelists.”
- Questions welcome! Type your questions and comments into the box any time.
- Note: Webinar is being recorded and will be posted online afterward.



Ngani Ndimbie
Policy Office
PennDOT



Colton Brown
Energy Programs Office
DEP

DRIVE ELECTRIC PA COALITION

100+ partners:

- State and local governments, industry, utilities, and academic and community organizations

Goal:

- Increase awareness and use of electric vehicles in Pennsylvania

Pennsylvania Electric Vehicle Roadmap:

- 13 recommended actions to increase electric vehicle use



<https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/State-Energy-Plan/Pages/Drive-Electric-PA-Coalition.aspx>

WHAT WE'LL COVER

Electric Vehicle Growth

Commitments to Electrification

Electric Vehicle Benefits

Electric Vehicle Basics and Charging

Incentives

Q&A



SECRETARY OPENING REMARKS

Pennsylvania is hitting the accelerator on electric transportation:

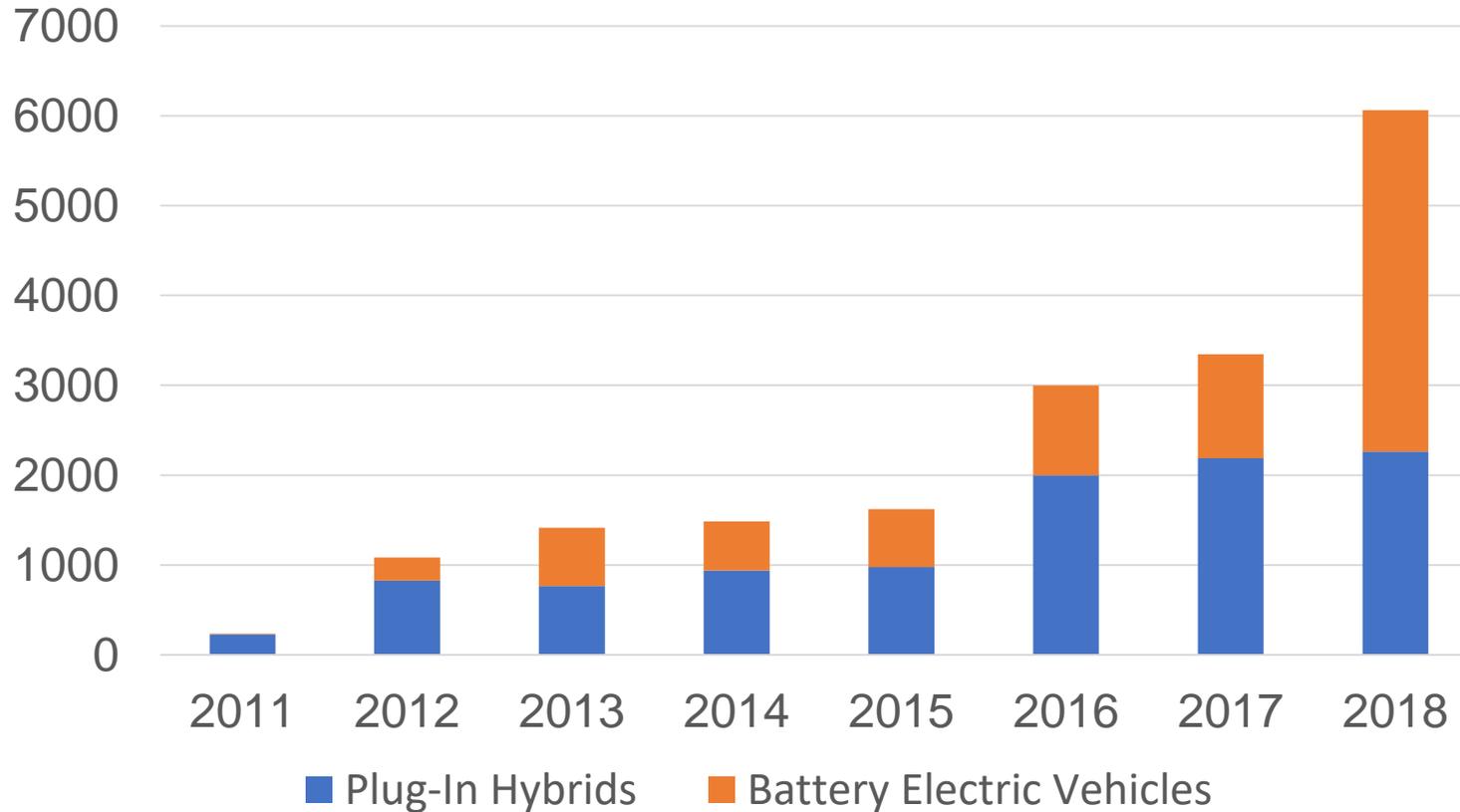
- New funding to help governments, businesses, and organizations install charging stations and pursue electric vehicle options.
- Working to develop charging corridors along highways around the state.
- Installing chargers in state parks.
- Phasing electric vehicles into state fleet.
- Partnering on Drive Electric PA Coalition initiatives.
- Partnering with other states to increase sales of electric trucks.



Secretary Patrick McDonnell
Pennsylvania Department of
Environmental Protection

ELECTRIC VEHICLE GROWTH

Annual Electric Vehicle Sales in Pennsylvania



Tom Bonner
PECO

Source: Auto Alliance Vehicle Sales Dashboard

CHARGING EQUIPMENT EXPANSION



Tom Bonner
PECO

- **Over 1,700 public charging plugs**
- *Number doubled from 2018 to 2020*

● Charging station

AUTOMAKER ELECTRIC VEHICLE COMMITMENTS

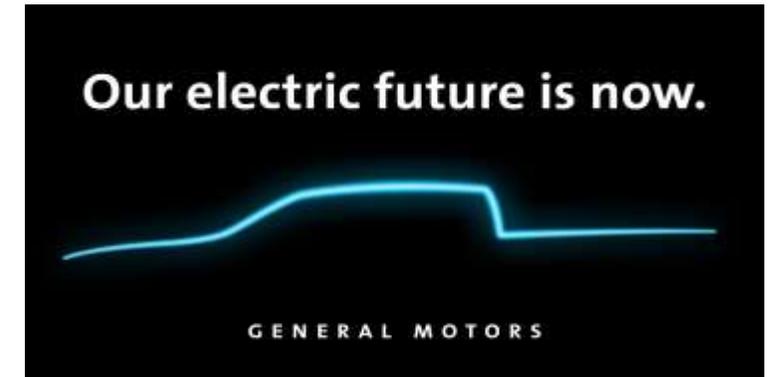


Investing in electric vehicles:

- General Motors
- Toyota
- Hyundai
- Ford
- Volkswagen



Alissa Burger
Electrification Coalition



ELECTRIC VEHICLE MODEL GROWTH

Cumulative Upcoming EV Models Over Time

● BEV ● PHEV



Alissa Burger
Electrification Coalition

- **55 electric and plug-in models currently available in Pennsylvania**
- More models every year

Source: AtlasEVHub.com

STATE ELECTRIC VEHICLE COMMITMENTS

Executive Order: 2019-01 – Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance

January 08, 2019



- **Sets statewide goal to reduce greenhouse gas emissions:**

- 26 percent by 2025
- 80 percent by 2050

- **Leading by example:**

- Replace 25 percent of state passenger cars with electric cars by 2025



Ngani Ndimbie
PennDOT

STATE ELECTRIC VEHICLE COMMITMENTS



Colton Brown
PA Department of
Environmental Protection

MULTI-STATE MEDIUM- AND HEAVY-DUTY ZERO EMISSION VEHICLE

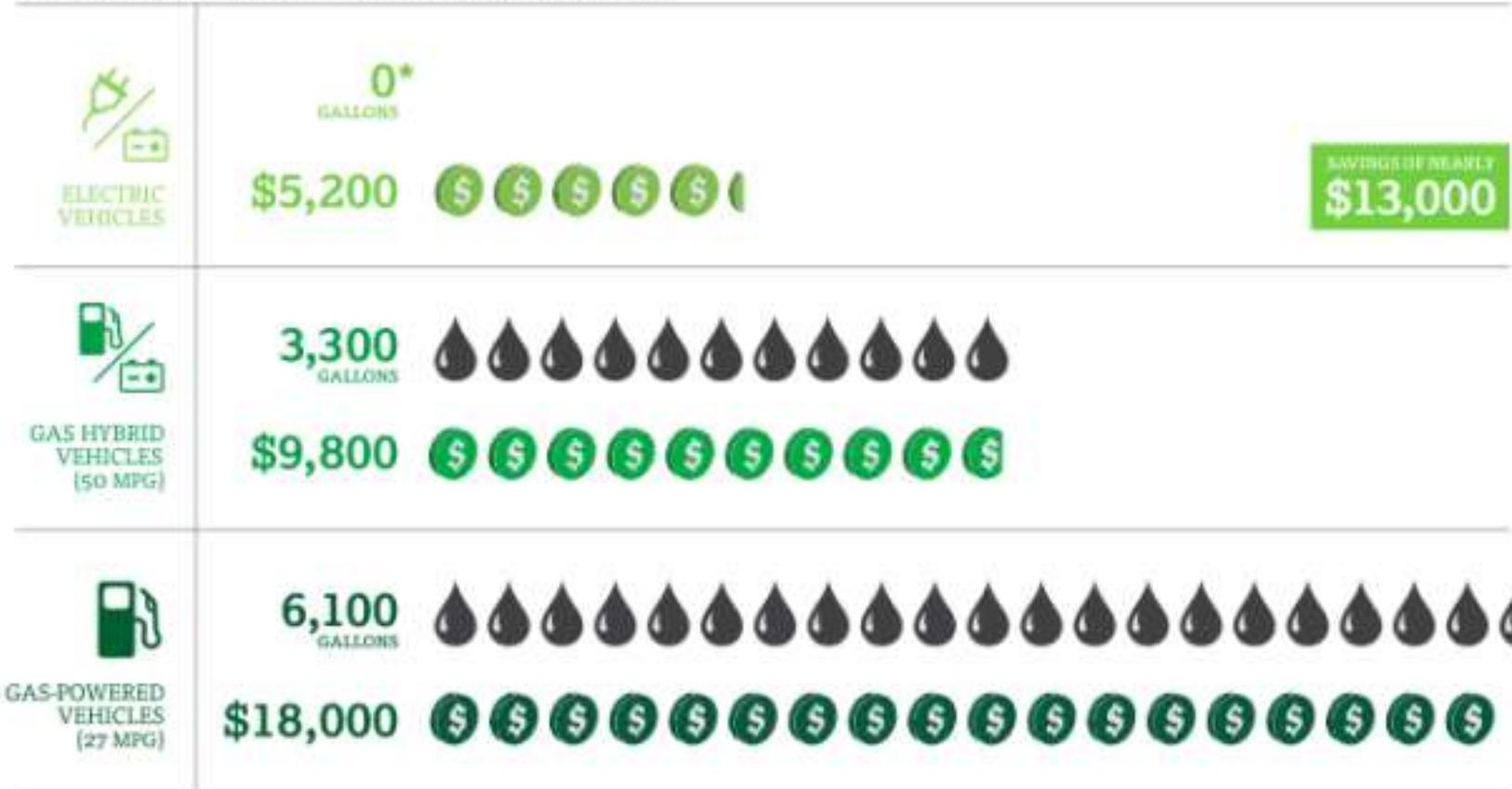
MEMORANDUM OF UNDERSTANDING

- 15 states and Washington D.C. signed
- 30% of new medium and heavy-duty vehicles zero emission by 2030
- 100% of new medium and heavy-duty vehicles zero emission by 2050

ELECTRIC VEHICLE BENEFITS

Electric vehicles **slash** oil consumption and cost thousands of dollars **less** to fuel compared with gasoline vehicles.

Lifetime gasoline consumption and fuel costs



Sarah Oleksak
Duquesne Light Company

electric vehicle
operating costs



50%-70% less than
gasoline-powered vehicles

ELECTRIC VEHICLE BENEFITS

Annual vehicle emissions by fuel type (12,000 miles)

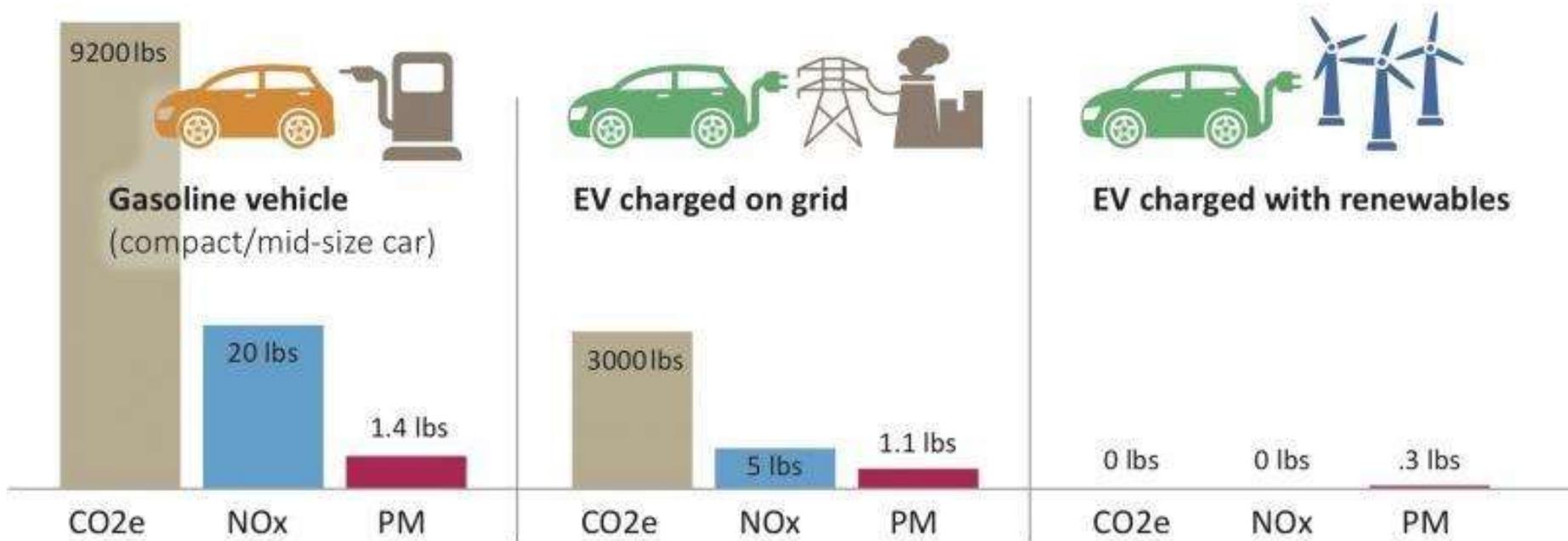


Image source: pca.state.mn.us

Fewer Emissions → Cleaner Air → Better Health



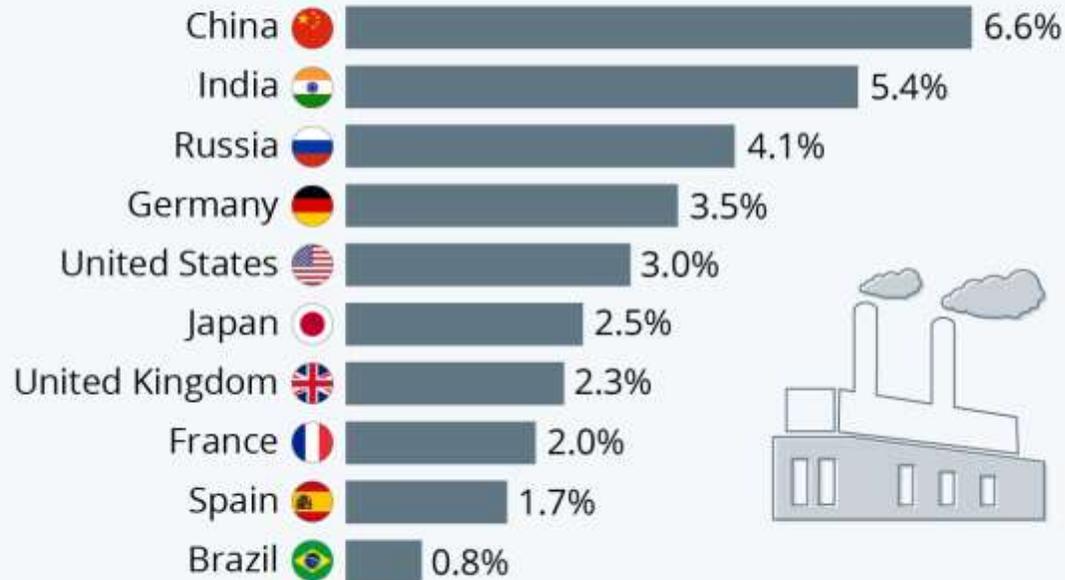
Sarah Oleksak
Duquesne Light Company

ELECTRIC VEHICLE BENEFITS

Fewer Emissions
Improve the
Economy

The Economic Burden Of Air Pollution

Economic costs of air pollution from fossil fuels
as a share of GDP in 2018



Sources: Greenpeace, Center for Research on Energy and Clean Air



statista



Rick Price
Pittsburgh Region
Clean Cities

ELECTRIC VEHICLE BENEFITS

- PA will receive net job increases from electric transportation

ELECTRIC TRANSPORTATION SUPPLY CHAIN IN PENNSYLVANIA

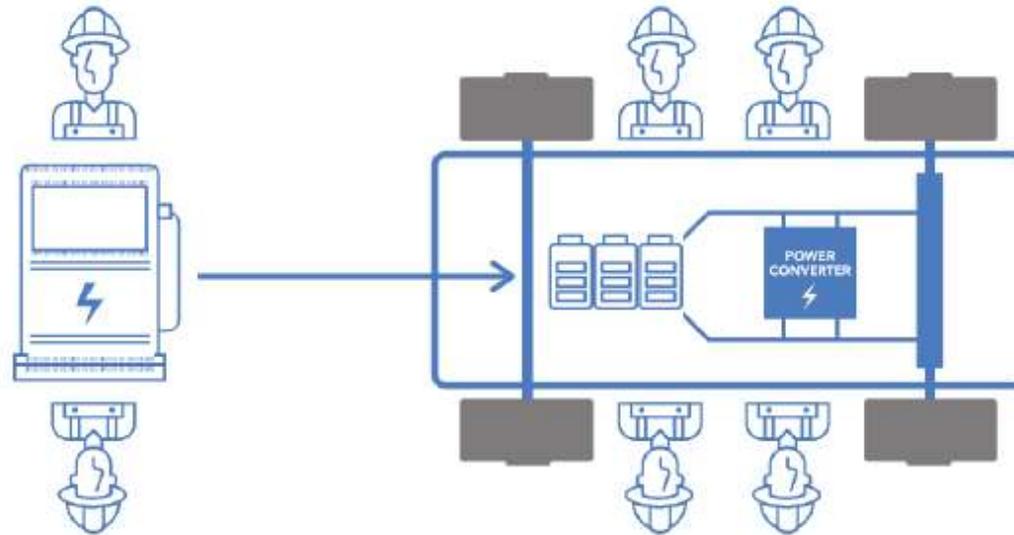
COMPANIES, JOBS, GROWTH RATES, AND OPPORTUNITIES AS ELECTRIFICATION ACCELERATES



Rick Price
Pittsburgh Region
Clean Cities



Image source: SierraClub.com



VEHICLE TYPES - GAS



CONVENTIONAL GAS

POWERED BY	Gas engine
BATTERY TRAVEL	None
FUEL SOURCE	Gas



CONVENTIONAL HYBRID

POWERED BY	Gas engine & electric motor
BATTERY TRAVEL	Short distances
FUEL SOURCE	Gas

- Gas:
 - Internal combustion engine, transmission



Tony Bandiero
Eastern Pennsylvania
Alliance for Clean
Transportation

- Hybrid:
 - Adds battery, electric motor, and battery
 - Improved efficiency
 - Brake re-generation

Image source: nyserda.ny.gov

VEHICLE TYPES - ELECTRIC



PLUG-IN HYBRID

POWERED BY

Electric motor &
gas engine

BATTERY TRAVEL

Medium distances

FUEL SOURCE

Electricity & Gas

- Plug-In Hybrid
 - Larger battery than regular hybrid
 - Plugs in for electric mode
 - Long range



Tony Bandiero
Eastern Pennsylvania
Alliance for Clean
Transportation



BATTERY-POWERED

POWERED BY

Electric motor

BATTERY TRAVEL

Long distances

FUEL SOURCE

Electricity

- Electric
 - Largest batteries
 - No gas engine
 - No tailpipe
 - High torque

Image source: nyserda.ny.gov

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

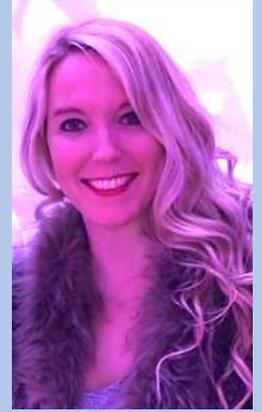
<125 Amps (Typ. 60 Amps)

CHARGING LOADS

<90 kW (Typ. 50 kW)

CHARGE TIME FOR VEHICLE

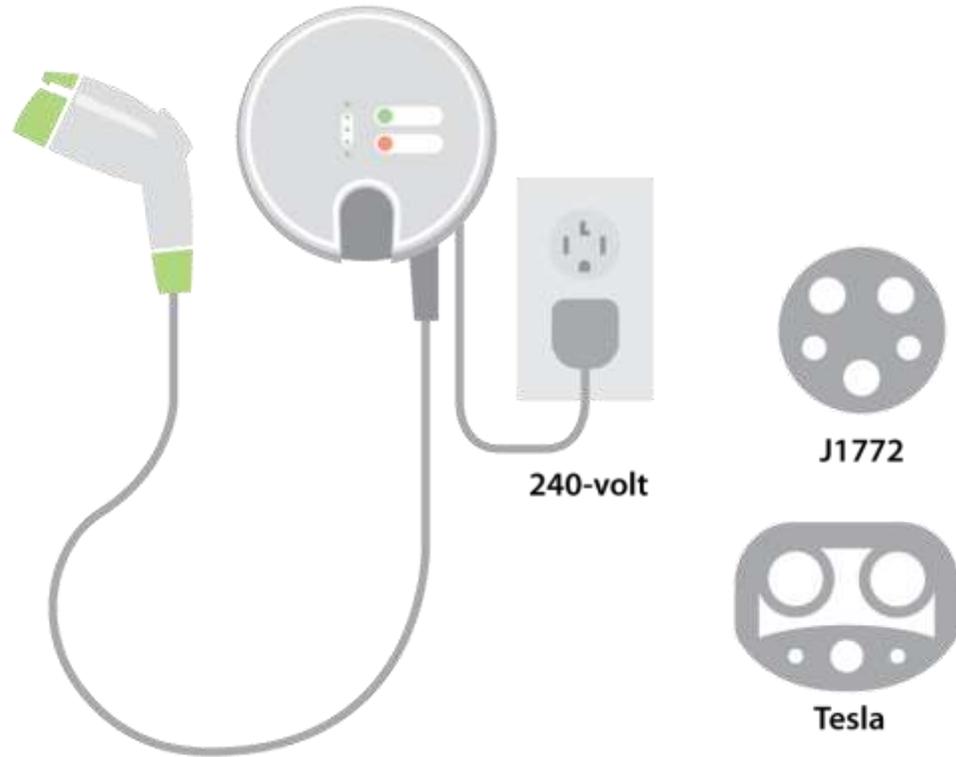
80% Charge in 20–30 Minutes



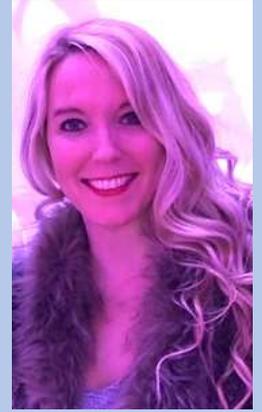
Lindsay Hertzog
ChargePoint

CHARGING PLUGS

Level 1 and 2 AC Charging



- All electric vehicles can use a regular outlet for level 1 charging
- All electric vehicles can use level 2 J1772 plugs (Tesla requires an adapter)
- Only Tesla can use Tesla plugs

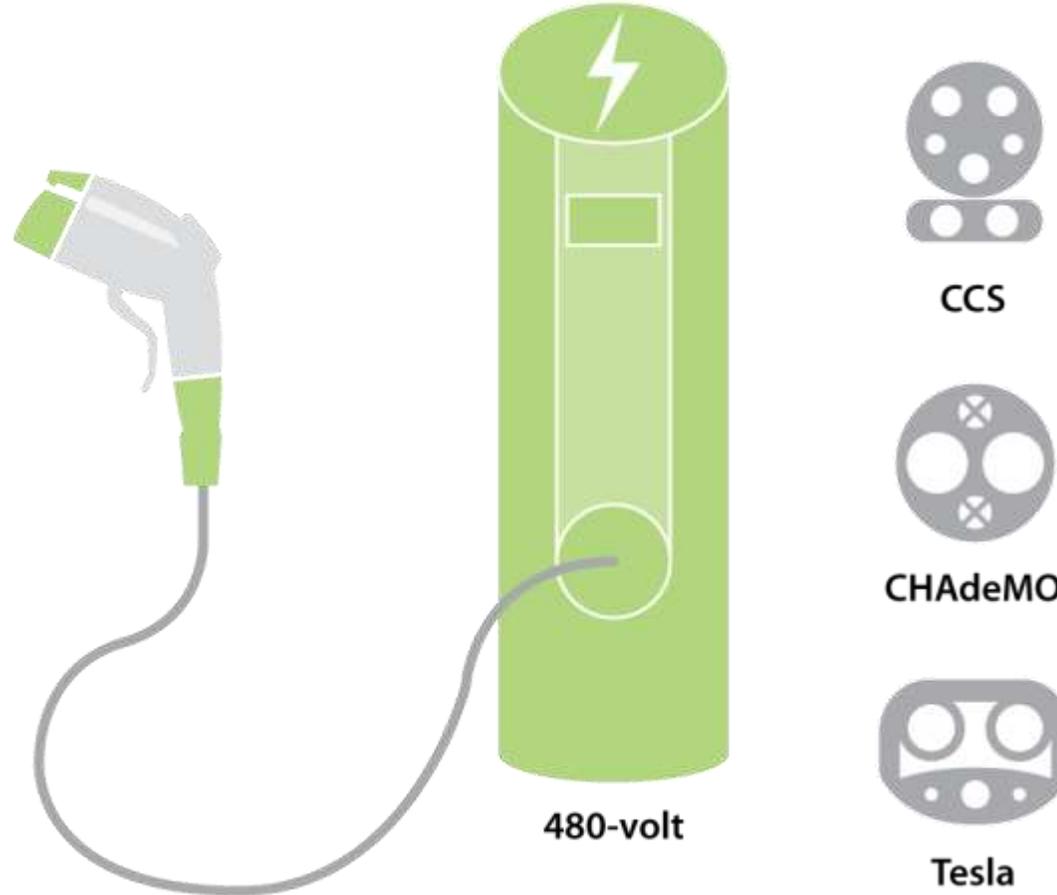


Lindsay Hertzog
ChargePoint

CHARGING PLUGS

DC Fast Charging

- Many DC fast charging stations have CCS and CHAdeMO plugs
- All electric vehicles can use one of these plugs (Tesla uses an adapter for CHAdeMO)
- Only Tesla can use Tesla plugs



Pam Frank
ChargEVC

Image source: CleanVehicleRebate.org

HOW TO FIND CHARGING STATIONS



- Websites
- Apps
- Trip Planners
- Resources:
 - AFDC
 - PlugShare
 - ChargeHub
 - In-car support



Pam Frank
ChargEVC



ALTERNATIVE FUEL CORRIDORS



Ngani Ndimbie
PennDOT

ALTERNATIVE FUELS TAX

- Paid by the kilowatt hour (kWh) to the Department of Revenue
- Funds go towards the Motor License Fund for the maintenance of roads and bridges
- The average BEV driving 13,500 miles per year would pay \$68 in alternative fuels tax
- Visit: <https://www.revenue.pa.gov/GeneralTaxInformation/Tax%20Types%20and%20Information/MAFT/AltFuelsTax/Pages/default.aspx>



Ngani Ndimbie
PennDOT

OVERCOMING RANGE ANXIETY

- Range anxiety is the most common concern of potential electric vehicle owners
- The cure for range anxiety? Owning an electric vehicle!
- 77% of electric vehicle owners report their range anxiety decreased or went away after their purchase (AAA survey, 2020)



Rob Graff
Delaware Valley Regional
Planning Commission



FEDERAL INCENTIVES

- Up to \$7,500 [federal income tax credit](#) for purchase of new electric vehicle
 - Not available for GM or Tesla
- Up to 30% or \$1,000 to [install home charging equipment](#)
 - Install by 12/31/20



Rob Graff
Delaware Valley Regional
Planning Commission



STATE INCENTIVES

AFIG Rebate for Individuals:

- \$750 for new electric vehicle
- \$500 for new/used plug-in hybrid or used electric vehicle
- Additional \$1,000 for applicants with low income



Colton Brown
PA Department of
Environmental Protection

Pennsylvania has provided funding for over 1,000 charging plugs!

Grants for businesses, local governments, and organizations: Learn about these in our other "Amped" webinars this week!

Alternative Fuels Incentive Grant Program



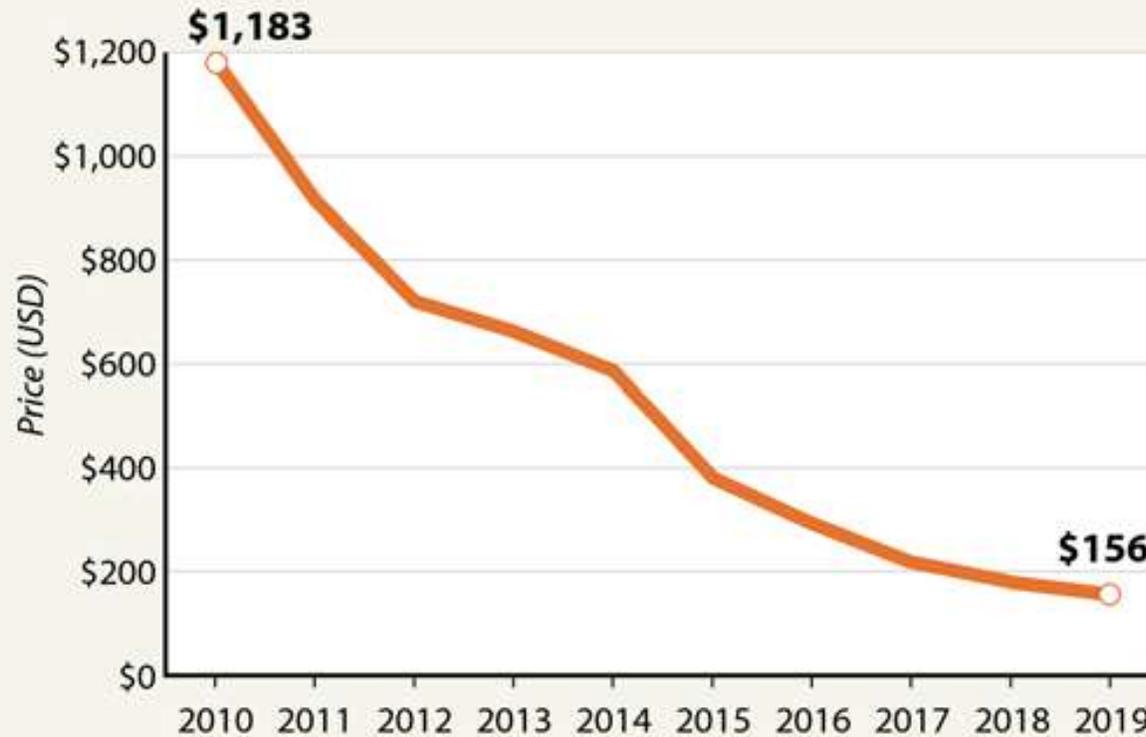
NEAR FUTURE OF ELECTRIC VEHICLES

Falling Battery Prices

The global average price of lithium-ion batteries has plummeted, making electric cars much more affordable.

LITHIUM-ION BATTERY PRICES

U.S. dollars per kilowatt-hour, 2010-2019



SOURCE: BloombergNEF

PAUL HORN / InsideClimate News



Travis Eckert
Charge Forward LLC

- Lower electric vehicle prices
- Cost-competitive when batteries reach \$100/kWh

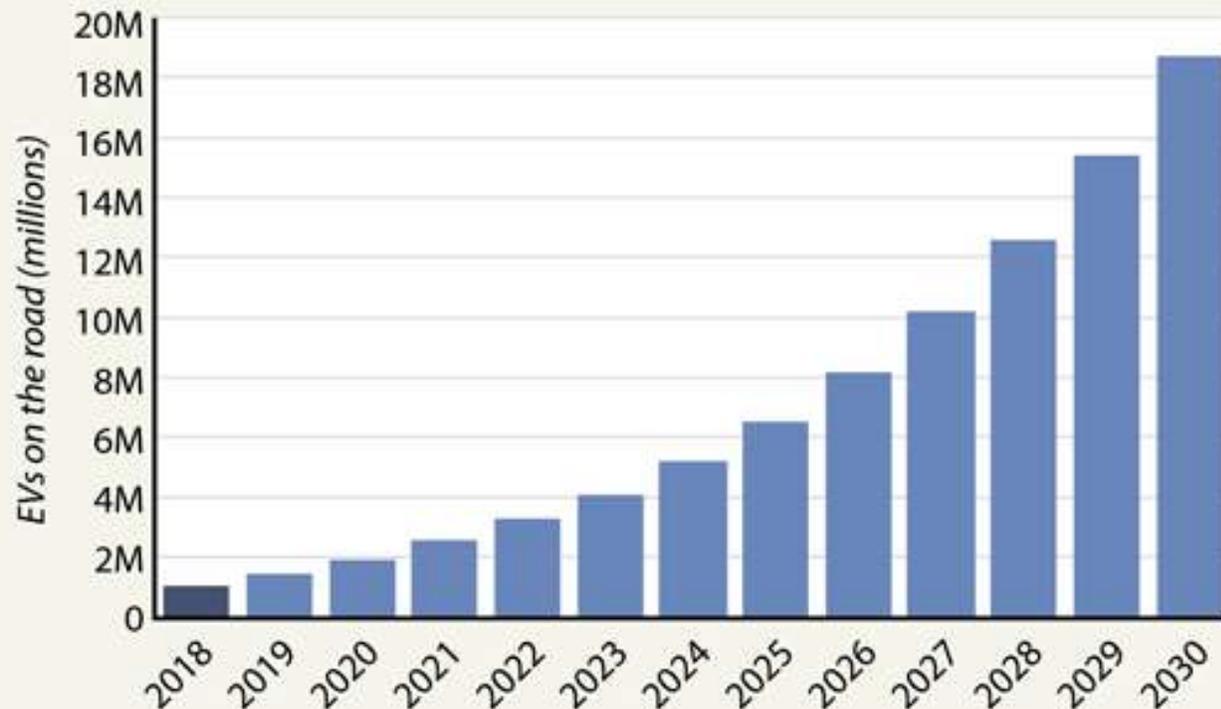
NEAR FUTURE OF ELECTRIC VEHICLES

EVs on the U.S. Roads

Edison Electric Institute, which represents U.S. power utilities, projects a significant increase in the number of electric vehicles on the road over the next 12 years. Other analysts expect an even faster rise.

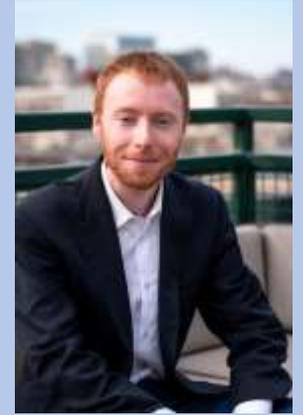
ELECTRIC VEHICLES FORECAST FOR U.S.

2018 projected to 2030



SOURCE: Edison Electric Institute

PAUL HORN / InsideClimate News



Travis Eckert
Charge Forward LLC

- Sales increasing
- More models becoming available
- More charging stations being installed

QUESTIONS?

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