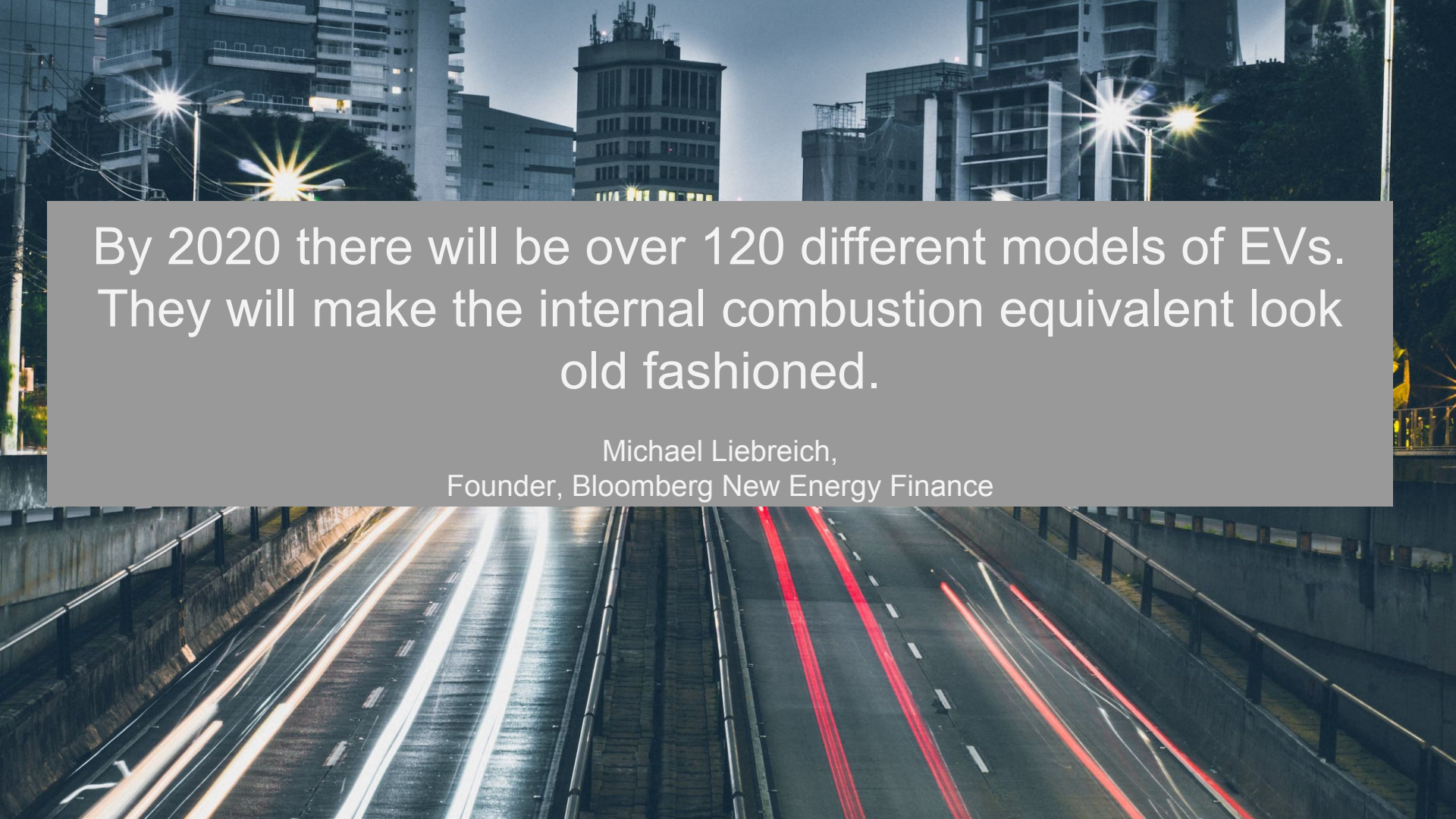


EV Charging

Strategies and Best Practices

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By 2020 there will be over 120 different models of EVs.
They will make the internal combustion equivalent look
old fashioned.

Michael Liebreich,
Founder, Bloomberg New Energy Finance

Electric for Dog Lovers.



Electric for Cat Lovers.



Electric FOR ALL

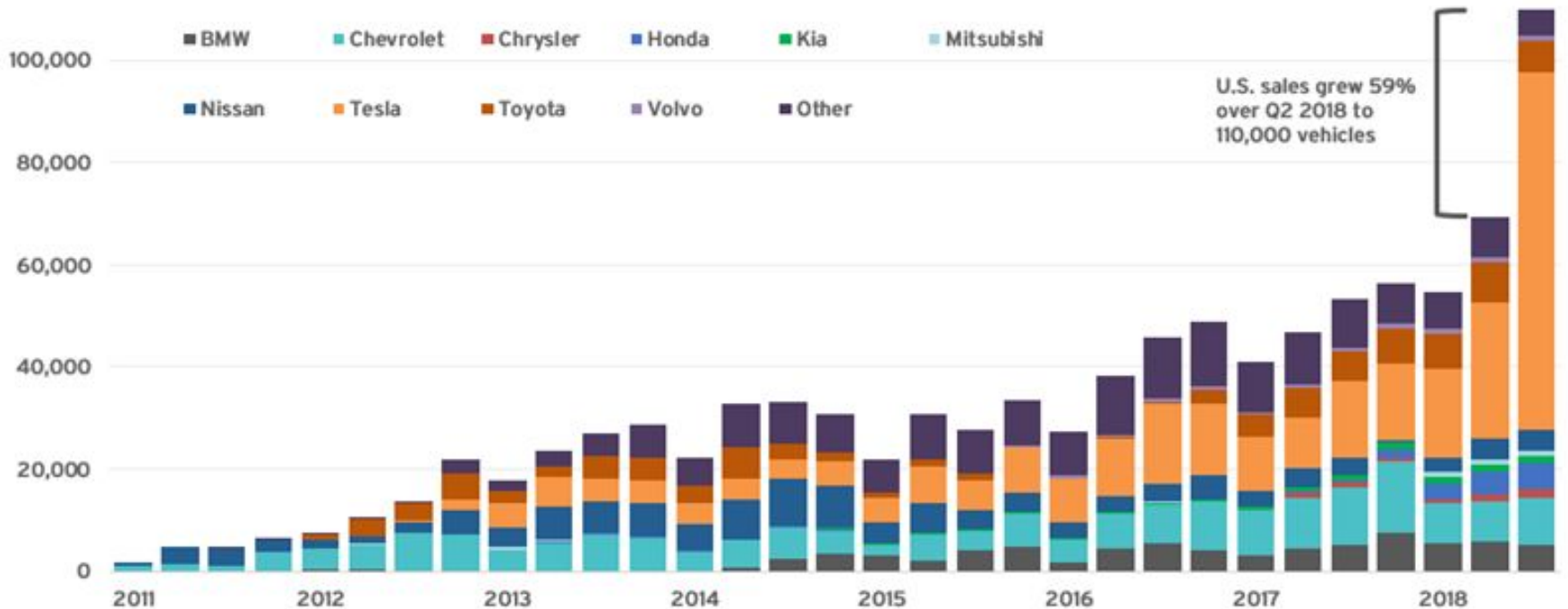
Brought to you by VELOZ

Plug-in car sales were up 66% in the first half of 2018 vs. to first half of 2017.

Q3 2018 U.S. EV Sales Smash All Records



120,000 Vehicles Sold



Source: SAFE analysis based on data from InsideEVs and Hybridcars.com.

Top 15 Cars in USA — September Sales



Non-Tesla sales = September sales. Tesla Model 3 sales = delivery estimate for September.

Automaker	Number of Electrified Vehicles*	Number of BEVs	Year
Audi	20	10	2025
BMW	25	12	2025
Fiat Chrysler	One-half of entire vehicle lineup		2022
Ford	40	16	2022
General Motors	20		2023
Honda	Two-thirds of entire vehicle lineup		2030
Jaguar Land Rover	One-half of entire vehicle lineup		2020
Mercedes-Benz	Electrified equivalent of all new vehicles		2022
Nissan/Mitsubishi/Renault	Electrified equivalent of all new vehicles		2022
Porsche	One-half of global sales will be plug-in vehicles		2025
Toyota/Lexus	Electrified equivalent of all new vehicles		2025
Volkswagen Group	All models	15	2025
Volvo	Electrified equivalent of all new vehicles		2019

*The term, "electrified" may mean conventional hybrid, not plug-in electric. Expanded use of electric drive systems help reduce costs and build the broader market for electric vehicles. Source: EPRI, 2018 EV Consumer Guide

EV Charging Basics



Public EV charging is not a barrier to early market acceptance.
It is an enabler of mainstream acceptance.

Charging Locations

- 80-90% of charging happens at home.
- Workplace charging is a great benefit for employees & usually inspires faster EV adoption among employees.
- Public charging allows people to drive EVs on longer distance trips.



EV Charging: One size does not fit all locations

	Voltage	Charging Time	Equipment Cost
Level 1 (slow)	120V	2 to 5 miles of range per hour	\$0 - \$1,500
Level 2 (medium)	240V	10 to 20 miles of range/hour	\$400 - \$12,000
DC Fast (fast)	480V	60 to 80 miles of range 20 <u>minutes</u>	\$25,000 - \$150,000

Key Factors in Siting EV Charging

- Cars are parked 95% of the time. Put charging where cars are parked.
- Match the charger to the natural dwell time of a location.
- Prioritize destination locations with regional draws.
- Place chargers near electrical panels or transformers to reduce installation cost.
- Maximize accessibility - make sure it cannot be easily blocked.



Key Factors in Siting DC Fast Charging

- Locate within ONE mile of highway corridor.
- Adequate power supply - talk to your utility early in the planning process.
- Access to bathrooms, lighting, shopping, restaurants, amenities. Make sure to provide a good user experience.




Train your employees & Mark the spaces



Pay the bills
and maintain
the station



 **CITY OF** [Redacted]

Your utilities have been shut off for non-payment, in accordance with City Ordinance C2018-1

65575-26602

Balance Past Due \$1 [Redacted]

Administrative Processing Fee \$120

Misc. Charges _____

Total Amount Due \$1 [Redacted] \$1

To restore services, pay your Total Amount Due in full at Customer Care, located in City Hall at 110 W [Redacted]

ONLY CASH, CREDIT CARDS OR MONEY ORDERS WILL BE ACCEPTED FOR PAYMENT ON SHUT-OFF ACCOUNTS.

CHECKS WILL NOT BE ACCEPTED.

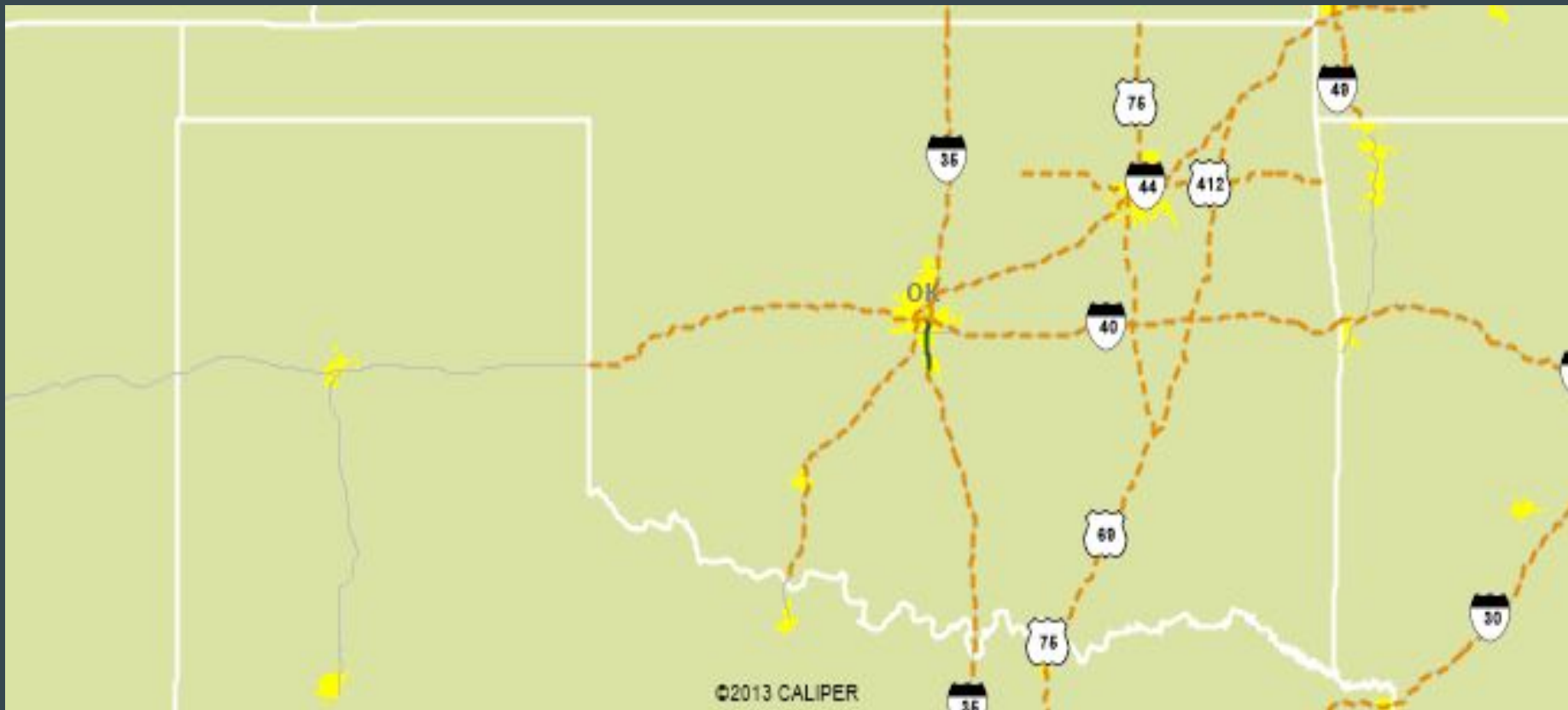
Payment of entire delinquent amount

Eric Pollard
epollard@acogok.org
Clean Cities Coordinator
ACOG

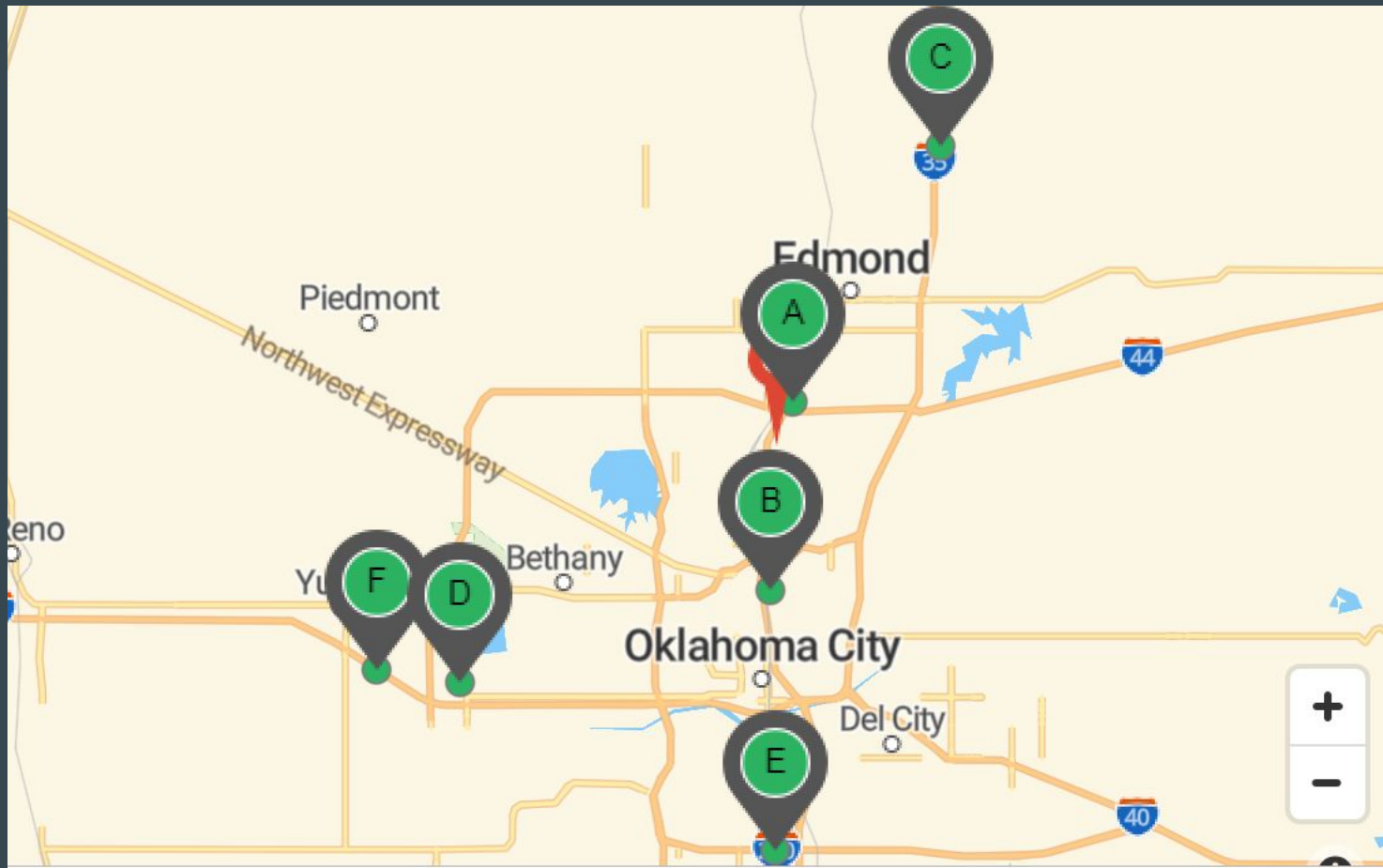
Helpful Maps & Resources for EV Project Planning



Federal Highway Administration Designated EV Corridors

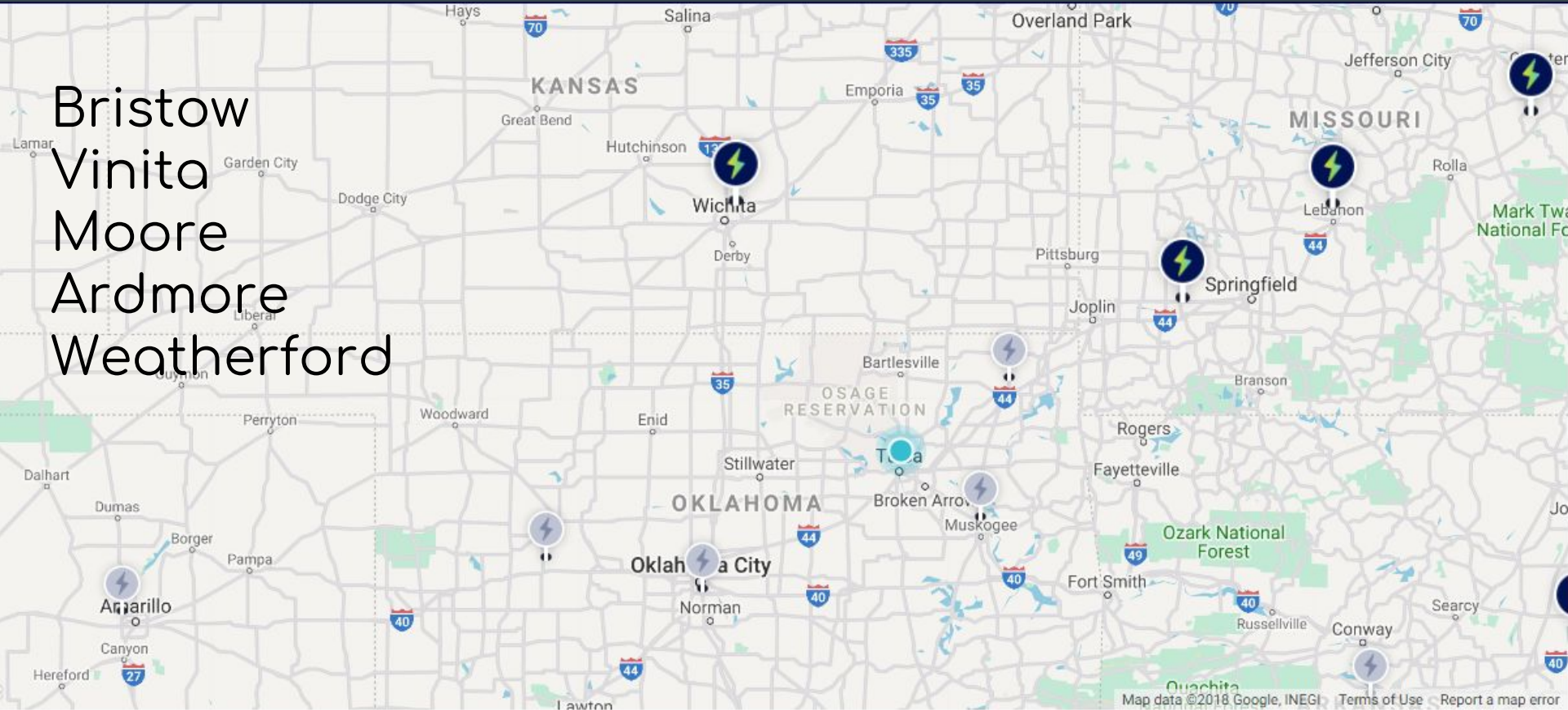


Current DC Fast Charging in OK



Planned Electrify America Stations in OK

Bristow
Vinita
Moore
Ardmore
Weatherford



Alternative Fuels Data Center

Search the AFDC

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FUELLOCATE
STATIONSLAWS &
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Tools

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Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite

This tool provides a simple way to estimate how much electric vehicle charging you might need at a city- and state-level.

How Much Electric Vehicle Charging Do I Need in My Area?



Estimate for a State



Estimate for a
City/Urban Area



Resources

INCOG and ACOG

Oklahoma EV Coalition

EVs and Chargers on State Purchasing Contract

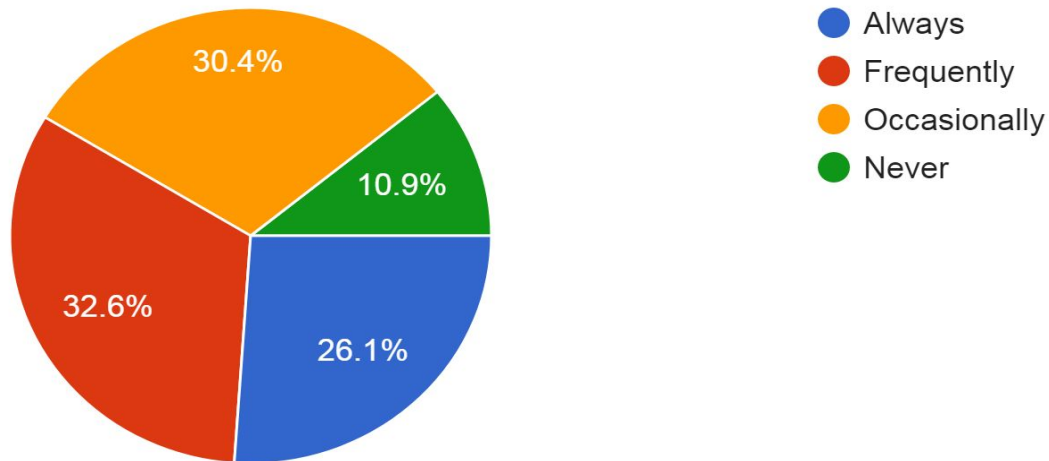
Some utilities developing EV and charging incentives - call yours and ask

State tax credit through 2019 - 75% of costs of EV charging installations may be eligible for state tax credits

Results of Oklahoma EV Driver Survey 2018

Do you choose to visit local dining, shopping, or other destinations with EV chargers over locations that do not offer EV charging?

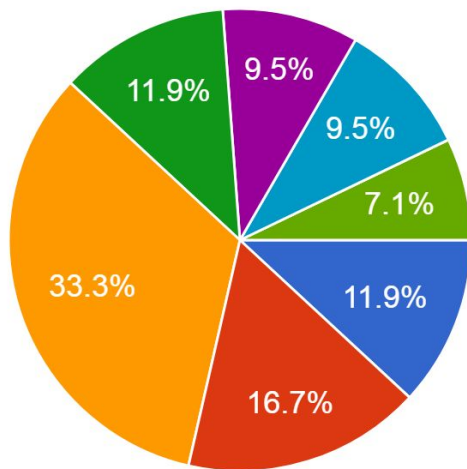
46 responses



Results of Oklahoma EV Driver Survey 2018

If you do purchase goods or services while you are charging, how much do you spend, on average, per charging session?

42 responses

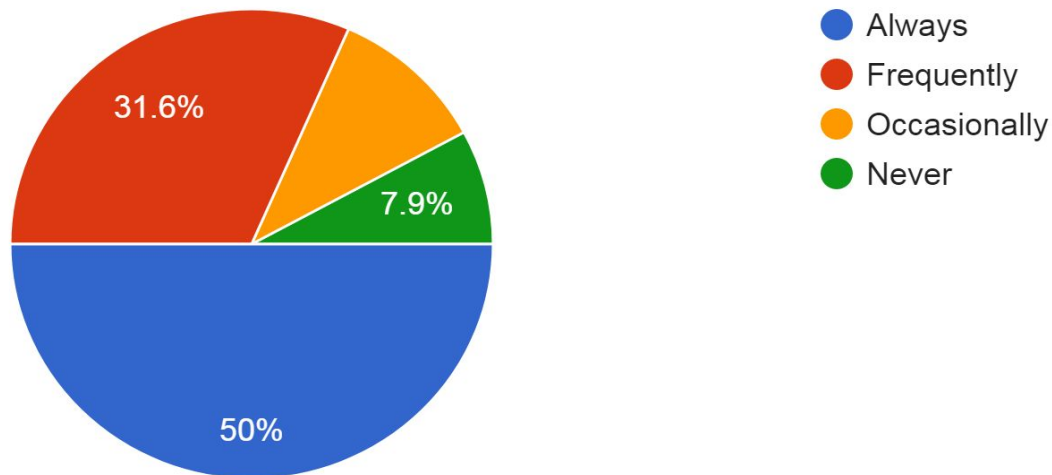


- I typically do not purchase anything while I am charging in my town.
- Less than \$10
- \$10-\$20
- \$20-\$30
- \$30-\$40
- \$40-\$50
- \$50-\$60
- More than \$60

Results of Oklahoma EV Driver Survey 2018

When traveling with your EV, do you choose accommodations, dining, shopping, or other destinations with EV...cations that do not offer EV charging?

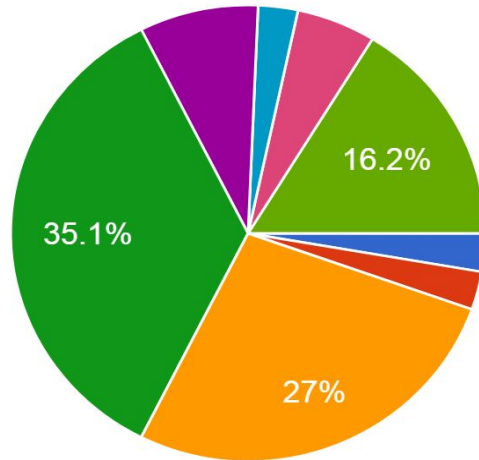
38 responses



Results of Oklahoma EV Driver Survey 2018

If you do purchase goods or services while you are charging out of town, how much do you spend, on average, per charging session?

37 responses



- I typically do not purchase anything from the charging station host when traveling.
- Less than \$10
- \$10-\$20
- \$20-\$30
- \$30-\$40
- \$40-\$50
- \$50-\$60
- More than \$60

Oklahoma EV Drivers Comments on Charging in 2018

- I always look for hotels and restaurants with chargers and give preference to them.
- Chargers should be near restrooms and dining
- Small Town, no public charging available.
- Would love to frequent more businesses and other locations who add public charging.
- Destination charging is a great boost to the local economy.
- More level 3 chargers will increase tourism. Especially needed on interstate highways.
- It's common for ICE vehicles to block EV charging spots. Sometimes because they're closer or out of spite. The EV spots should be clearly marked and enforced.
- Convenient, accessible, safe and attractive locations
- Choose places where time is spent already; shopping, dining.
- As drivers charge their vehicle they will shop and get meals. EV drivers are loyal to the businesses that provide this service.
- Prompt station repairs and communication are vital for EV drivers. We count on having a place to charge when we make our plans. It's not like when a car wash is out of service. We rely on your best service. When a charger needs repair it must be reported so we can utilize other options for our charge.

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Thank you.