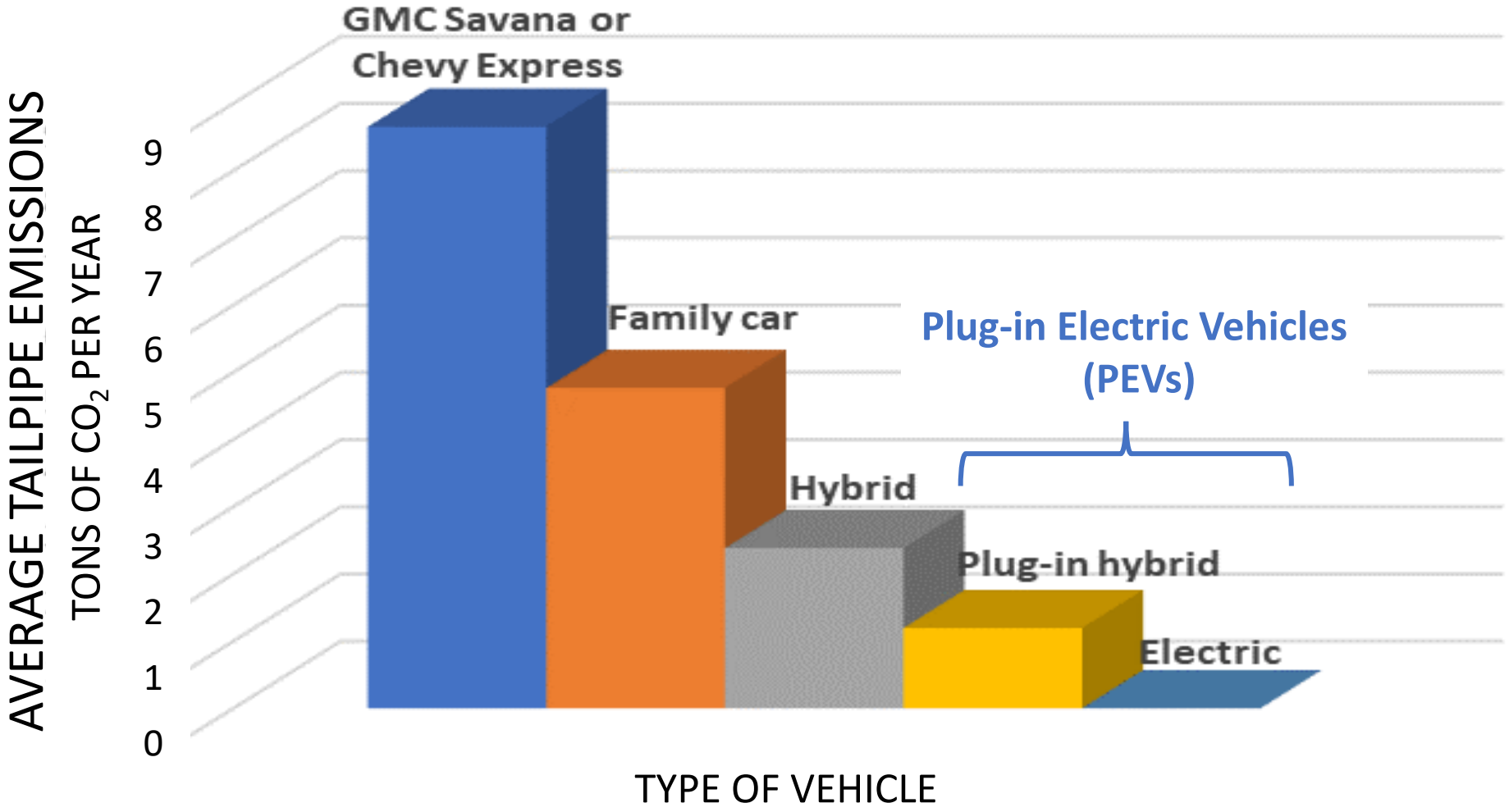
The Ins and Outs of Electric Vehicles

an Owner's Perspective

Tom and Celeste Theis

March 3, 2021 @ 7:00 pm – 8:00 pm
Online Virtual Event

Purchasing an EV is one of several important choices you can make to reduce your personal carbon footprint.



Going electric is also…

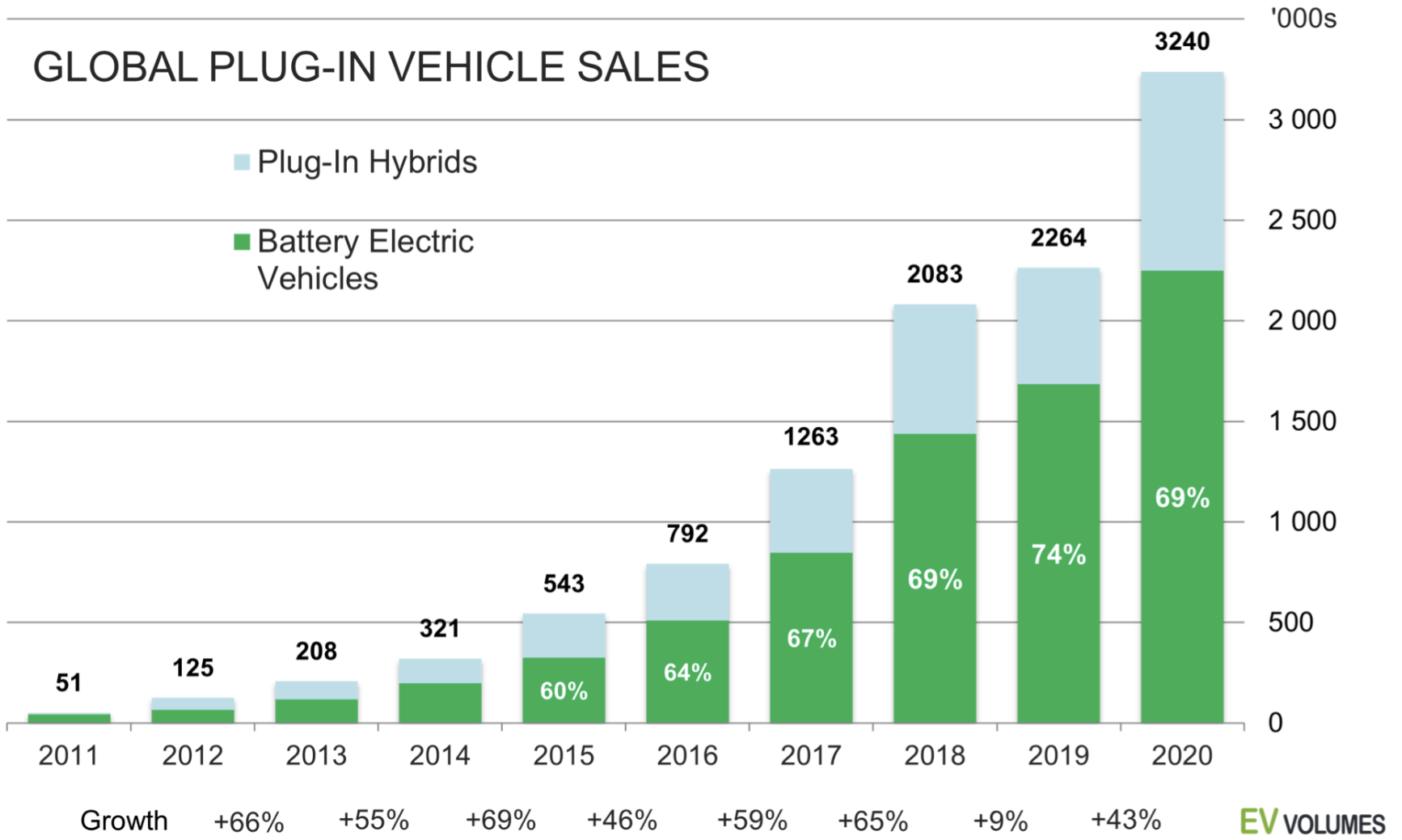
Fun

Convenient

Comfortable

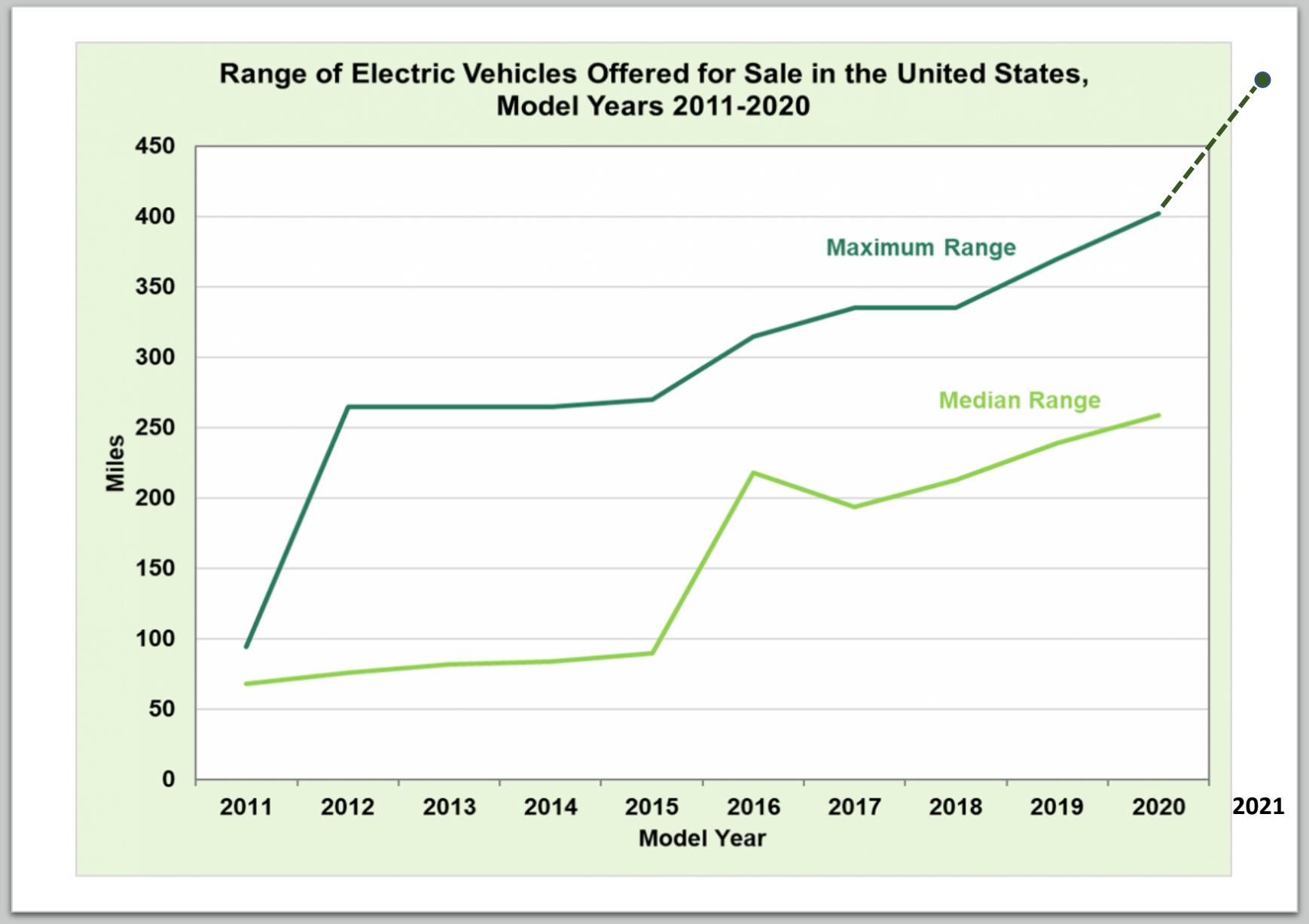
Affordable

Electric vehicle (EV) sales are growing very rapidly.

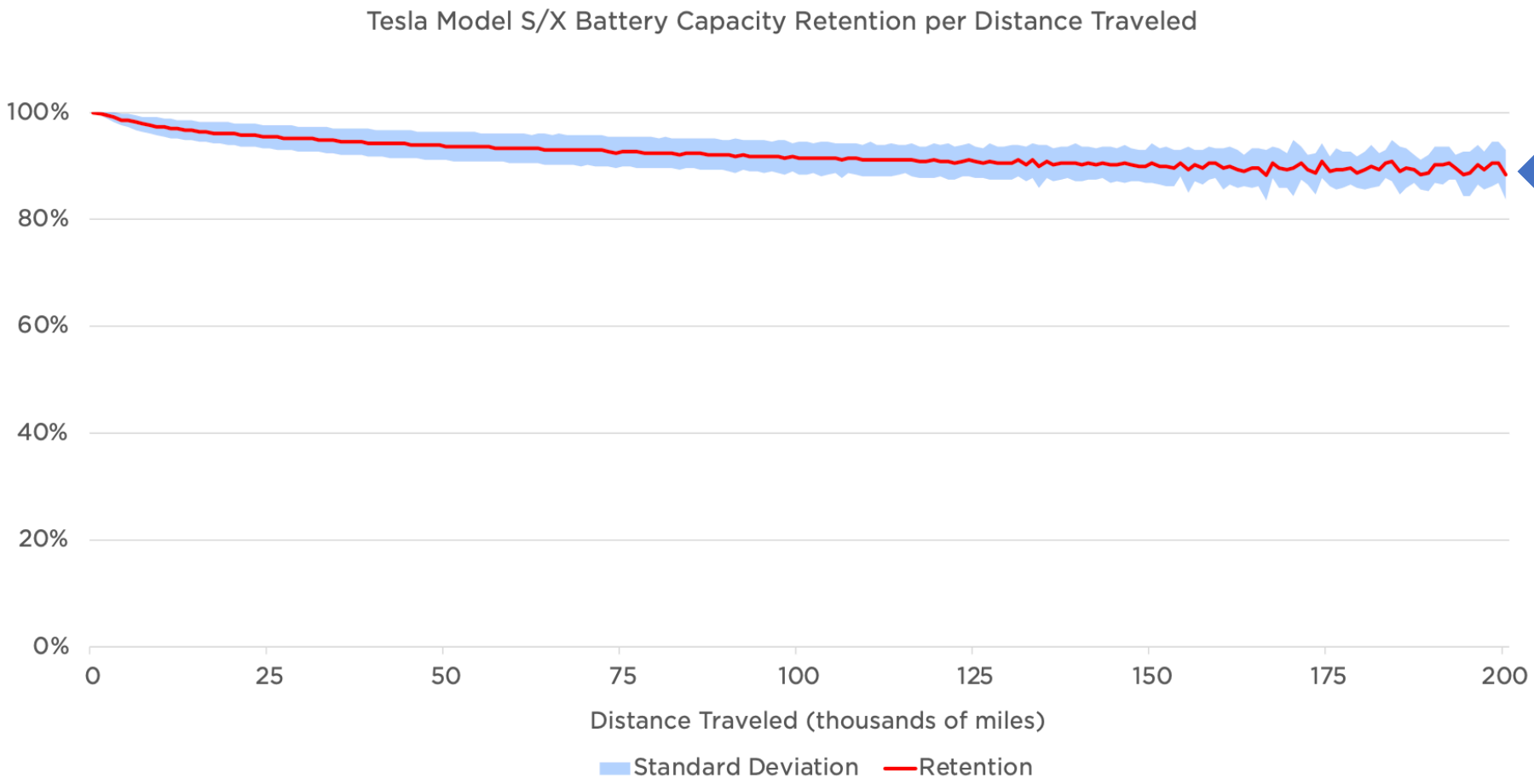


http://www.ev-volumes.com

Driving range on a full charge is steadily increasing.



Batteries degrade slowly and gracefully, and last a long time.



~ 10% range loss at 200,000 miles

Source: [Tesla 2019 Impact Report]

Total cost of ownership is less than that of an equivalent gasoline vehicle.

CR Consumer Reports

Ownership Costs for Celeste's Tesla Model 3

Maintenance: $158/year

($316 for 2 years and 30,000 miles includes yearly tire rotation, wiper blade replacement and fluid check done at Tesla Service Center in Mt. Kisco, NY)

Tire Replacement at 30,000 miles: ~$800

New all-season tires installed by a local garage.
(With AWD, we've found no need for winter tires in our Westchester Co. climate.)

Insurance: **$1632/year**

Charging: $447/year

20,000 miles in 2019 (pre-COVID)
$872/year for home charging + $75/year for fast charging - $500/year Smart Charge NY rebate

Comparable fuel cost = $1200/year (Toyota Prius at 50 mpg) or $2400/year (Toyota RAV-4 at 25 mpg, assuming gasoline at $3.00/gal.

Choice, quality, and price are rapidly improving.

(Examples: Compact SUVs with EPA Range greater than 250 miles)

Kia Niro; from **$39,090** MSRP

Similar: Hyundai Kona Electric, from **$37,390** MSRP

Tesla Model Y; from **$48,990**

Sedan: Tesla Model 3; from **$36,990**

VW ID.4; from **$39,995** MSRP

Ford Mustang Mach-E; from **$43,995** MSRP

… and More SUVs

Chevy Bolt EUV (new), from **$33,995** MSRP, avail. Summer 2021

Similar: Bolt EV (refreshed), from **$31,995,** avail. Summer 2021

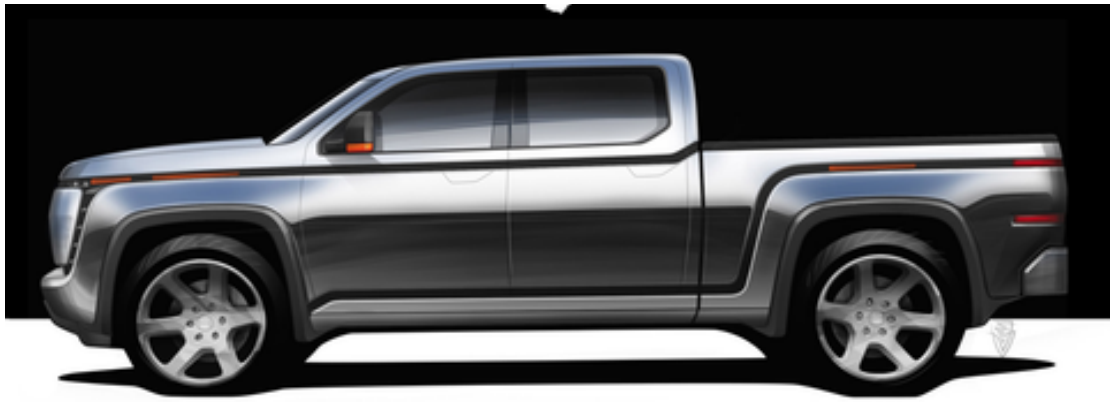
Nissan Arriya, **price not announced**, avail. “late 2021”

Volvo XC40 Recharge, from **$53,990 MSRP**

Similar: C40 Recharge, **price not announced**, avail. Fall 2021

Hyundai Ioniq 5, from **$30,000 est.,** avail. 2nd Half 2021

Coming Soon: Pickup Trucks



Lordstown Endurance; from **$52,500**, avail. Sept. 2021

Rivian R1T Explore; from **$67,500**, avail. Jan. 2022

R1S Explore (large SUV); from **$70,500**, avail. Jan. 2022

Bollinger B2; **$125,000**, “avail. 2021”

Tesla Cybertruck; from **$49,900,** avail. “late 2021”

… and More Pickup Trucks

GMC Hummer EV; from **$67,500**, avail. 2022
(The first edition sold out immediately at $112,000.)

Ford F150 Electric; **price not announced**, avail. 2023?

Customer Satisfaction with EVs is very high.
Owners are not going back to gasoline.

J.D. POWER

Press Release

Majority of Electric Vehicle Owners Are Intent on Purchasing Another One in the Future, J.D. Power Finds

Tesla Model S Ranks Highest Overall; Kia Niro EV Ranks Highest among Mass Market Brands

In sum, electric vehicles provide a superior ownership experience.

So…

If you are in the market for a new or used car, consider an EV.

Don’t wait for a lower price or a longer driving range.

Enjoy the performance, convenience, comfort, and savings *now!*

Have fun!

Thanks for listening!

Questions?

Question from Jim Smaltz

Q: I'd like to know how MPGe is calculated. Is there a default ratio used for city vs. hwy miles? It seems like these are based on a typical suburban dweller running errands, all on the battery, with occasional long trips. (We have the exact opposite situation. Most of our miles are highway.)

A: The battery of an EV with 300 miles of range stores about 75 kWh of electrical energy (measured at the wall outlet). That's the energy in just 2.2 gallons of gasoline.

$$\frac{EPA\ estimated\ range}{battery\ energy\ meassured\ in\ gallons\ of\ gasoline} = \frac{300\ miles}{2.2\ gallons} = 135\ MPGe$$

(The high MPGe value of an electric vehicle reflects the very high efficiency of its battery electric drive train. In contrast, a gasoline engine wastes most of its fuel energy in the form of heat.)

EPA range is based on a rigorously-defined driving cycle that includes both highway and stop-and-go driving conditions. Your range may vary! Celeste and I have found that EPA range is a conservative indicator of actual highway range at 65 miles an hour in mild weather.

FAQs

Q: How many miles can your car go before you have to charge it? What do you do on long trips?

A: Our cars each have a range of about 300 miles. Starting on a long trip from home with a full charge, we typically drive about 200 to 250 miles before stopping at a fast-charging station with 50 to 100 miles of range still available. (By then it's time to take a break anyway!) We usually stop just long enough to add the range we need to comfortably finish the trip. For example, driving from our home in Westchester Co., NY to Nantucket, MA, we typically stop at a Tesla charging station just off I-95 in Rhode Island. We can walk our dogs and get a bagel and hot beverage in the 15 to 20 minutes it takes to add another 100 miles of range. We drive off the ferry onto the island of Nantucket with about 125 miles of range left.

In general, Tesla highway charging locations, called Superchargers, are pleasantly situated in proximity to food and restrooms, and there are lots of them.
For other EVs, the coverage is far less complete. The situation is improving, but for now, the Tesla Supercharger network makes a Tesla the best choice among battery electric vehicles for long-distance interstate travel.

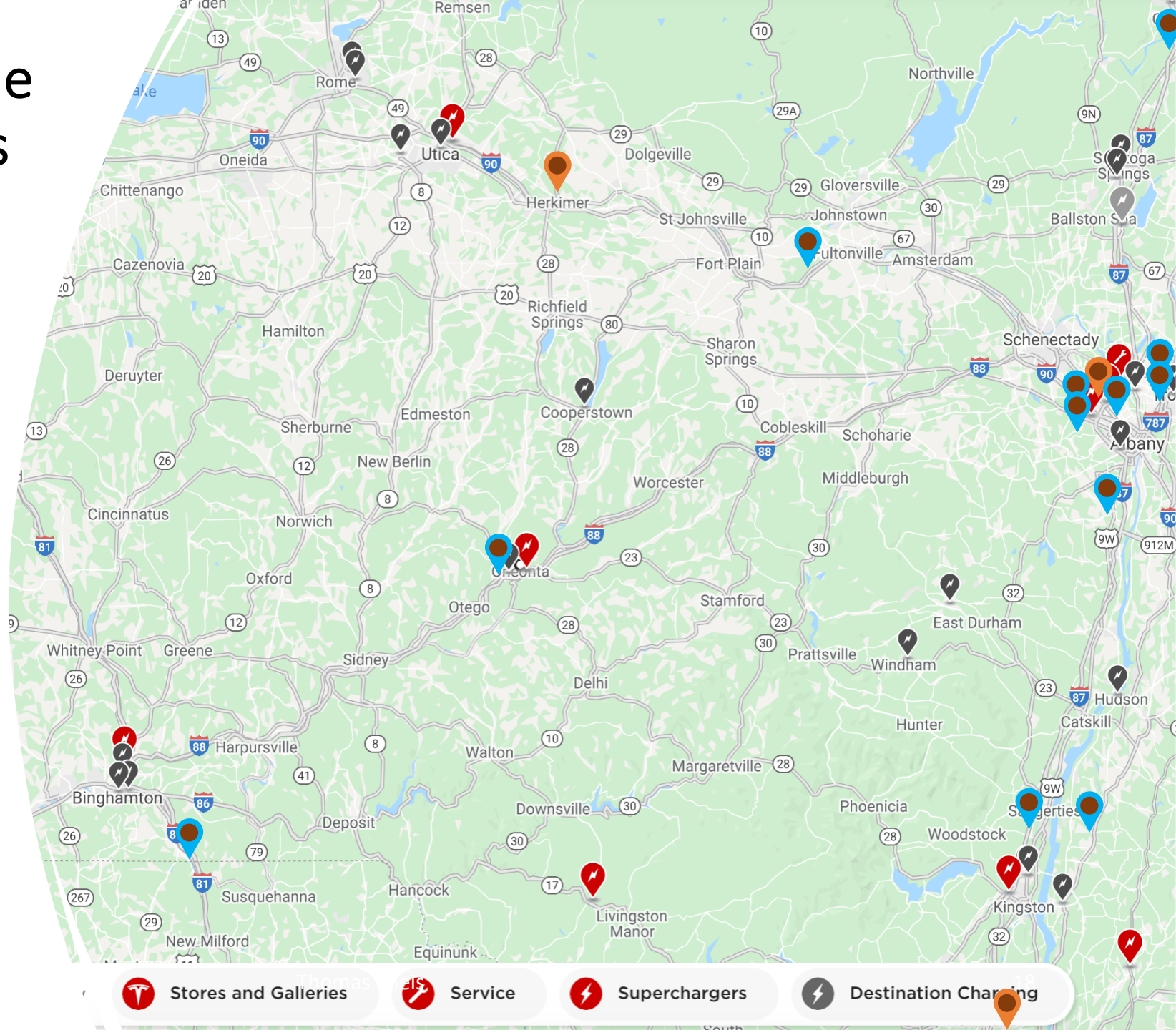
Availability of Roadside Fast-Charging Stations in Central NYS

The Tesla Supercharger network is unrivaled in coverage and convenience, but so far, it is only available to Tesla owners.

Other networks provide provide equivalently fast (150 – 350 kW) charging, but so far, coverage is less complete.

There *are* many additional non-Tesla stations with slower (50 kW) charging.

9/20/20



FAQs continued

Q: How much does it cost to charge your car?

A: It has cost us far less than than it would have cost to fuel a gasoline-powered car to drive the same distance. See the charging cost summary on Slide 9 of this presentation.

Q: What happens to the battery in cold weather?

A: The car just goes!

Cold won’t stop the battery from working, but if the battery is very cold, the rate at which the battery can supply or absorb power will be reduced. To avoid this, keep the car plugged in overnight during very cold weather. The newer electric vehicles can then use a small amount of wall plug power to keep the battery warm enough to avoid any loss of acceleration or regenerative braking capability as you begin your morning drive.

FAQs continued

Q: How long will the battery last? Will it wear out in a few years like the battery in my phone?

A: In all likelihood, the battery will last longer than you will own the car. (See slide 7 of this presentation.)

The battery is warranted to retain at least 75% of new battery capacity at 125,000 miles, but very few batteries are replaced under warranty. Note that frequent highway fast-charging will accelerate battery degradation, as will frequent charging to 100%. To battery capacity (and thus the resale value of your vehicle), save fast charging for long road trips and limit home charging to 80% or 90% of full charge.

At home, we typically keep the battery charge between 40% and 80%. We therefore plug in once or twice a week, depending on how much we drive. Plugging in takes about 7 seconds. The car then begins charging at the time (say, 2:00 AM) and charges to the limit (say 80% of full) that we have preset. Charging takes a few hours while we sleep. We wake to a vehicle with a nearly full "tank" without ever going to a gas station.

Q: What about maintenance costs? Insurance?

A: Maintenance costs are far lower than those for a gasoline vehicle. Insurance is about the same as for an equivalent gasoline vehicle.

FAQs continued

Q: Will my auto dealer provide options and recommendations on what I need to purchase or install for home charging?

A: Yes. If your dealer is not knowledgeable and responsive to such questions, try another dealer.

Q: The EV marketplace is changing very quickly. What are the best questions to ask at the dealership?

A: The traditional auto dealers (Ford, GM, VW, etc.) have been reluctant to sell and service EVs. That is changing, partly because the auto manufacturers are forcing dealers to change. Still, we recommend doing much of your research online before contacting a dealer. For information about specific vehicles, start with the manufacturer's web pages. Then read independent reviews of the vehicle(s) you are interested in. Elektrek https://electrek.co/ is an EV-focused website with relatively unbiased, highly-knowledgeable reviewers. (Just type the manufacturer and model into the search box to find all the articles on that topic.) Finally, phone or visit dealerships to see if they can answer your knowledgeable questions and schedule a test drive.

FAQs continued

Q: Are there any financial incentives for EV purchase that I should be aware of?

A: A **federal income tax credit** worth up to $7500 is available to purchasers of eligible Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). The credit amount depends on the size of the vehicle battery: https://www.fueleconomy.gov/feg/taxevb.shtml

Note: Vehicles manufactured by Tesla and GM are no longer eligible because those manufacturers have sold more than the 500,000 vehicles. This cap may be removed for new purchases going forward if legislation currently before Congress is passed.

There is also a **NYS state rebate** program worth up to $2000 for which all BEVs and PHEVs are eligible: https://www.nyserda.ny.gov/all-programs/programs/drive-clean-rebate