

ELECTRIC VEHICLES EDUCATION SESSION

September 2024



SEVEN STATES POWER

Overview

- ❑ Non-profit Generation & Transmission Membership Cooperative Corporation
 - Established 2007 in the State of Tennessee
 - Serving 153 local power companies (LPCs), their consumers, and TVA
 - 104 municipalities and 49 cooperatives, representing over 5,000,000 meters
 - Covering all of TN, and parts of MS, AL, KY, GA, NC, VA, rural and urban communities

- ❑ Solving technology challenges incrementally with each LPC, and at scale for the Valley

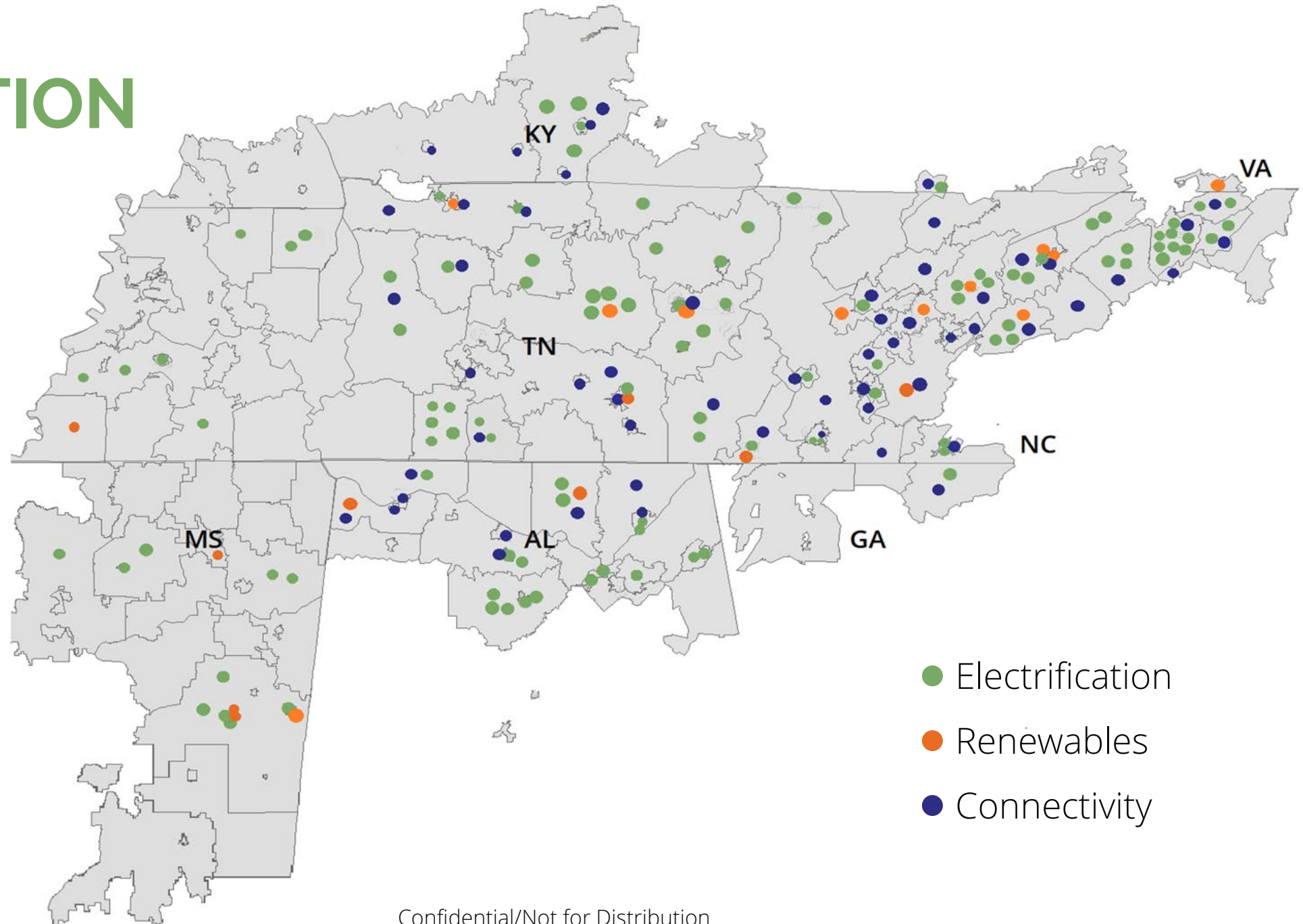
- ❑ Building the grid of the future supporting grid resiliency, economic development and decarbonization

Vision: Leverage innovative technology to design, develop, and deploy solutions for the Valley

Mission: Empower utilities to meet demand for technology and energy in an evolving marketplace

Values: Integrity, Innovation, Service, Sustainability, Partnership

VALLEY INNOVATION



ELECTRIFICATION

Student-led EV Research

Knoxville, TN



RENEWABLES

Solar Canopy, EV Chargers, and Battery Storage *Huntsville, AL*

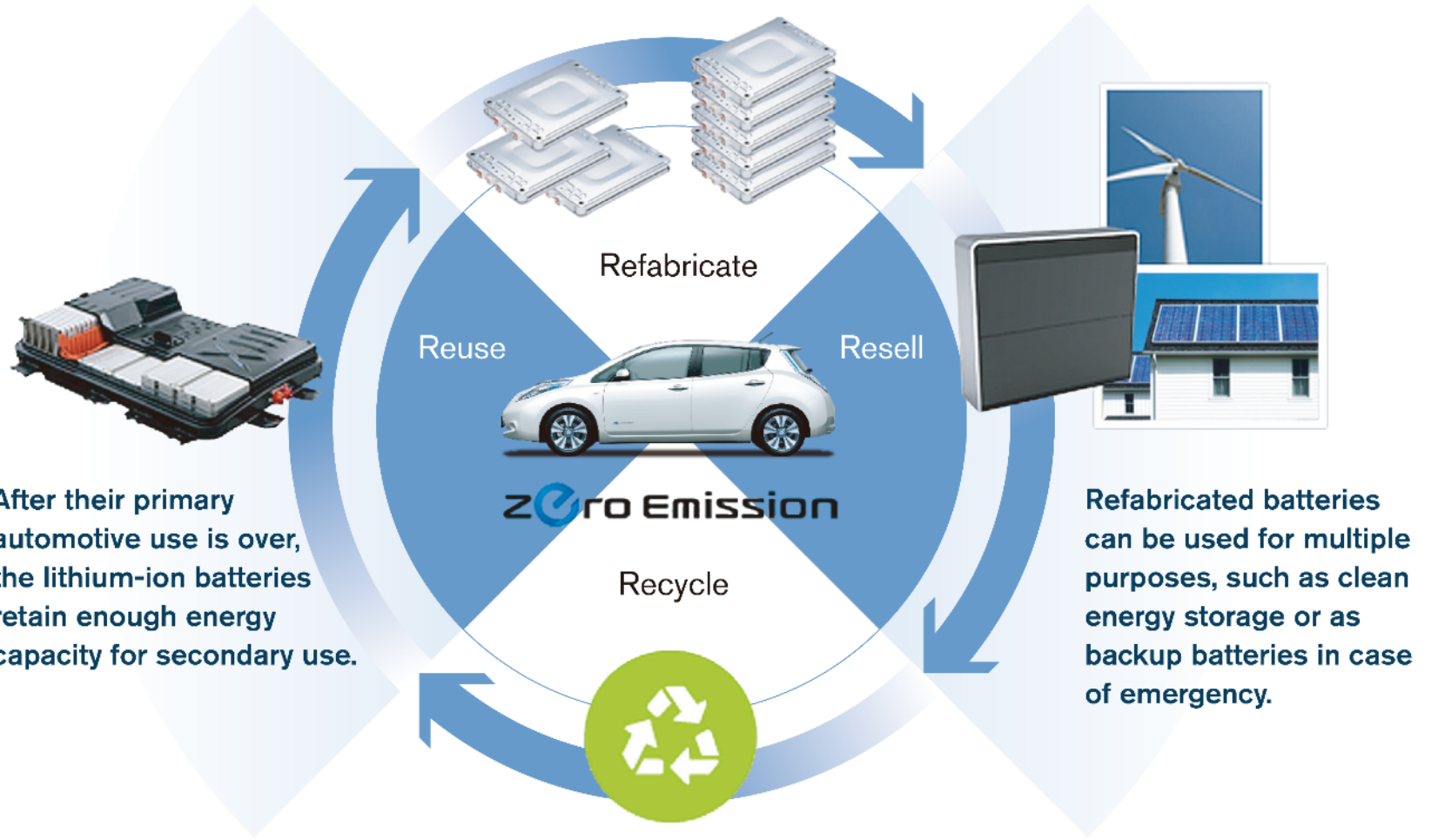
HUNTSVILLE UTILITIES
ELECTRICITY • NATURAL GAS • WATER



RENEWABLES

Battery Storage

Battery module structure will be redesigned to create new packages that satisfy the varying voltage or capacity needs of customers.



After their primary automotive use is over, the lithium-ion batteries retain enough energy capacity for secondary use.

Refabricated batteries can be used for multiple purposes, such as clean energy storage or as backup batteries in case of emergency.

Used batteries can be recycled to recover useful resources.





EV'S IN THE SOUTH?

Just 'Rich Men North of Richmond'?

Why are EV sales slowing?

May 21, 2024 Share

Tesla Model Y overtakes Toyota Corolla as world's best-selling car

07:00 19 June 2024

No one wants to buy used EVs and they're piling up in weed-infested graveyards

BY MONICA RAYMUNT AND BLOOMBERG
December 22, 2023 at 6:06 AM EST



NEWS / NEWS BY BRAND / TESLA NEWS

Actually, EV Sales Aren't Struggling—Just Tesla's

Are US EV sales a disaster or a booming segment? The answer may be both

29 February 2024

Share

Why Americans don't want electric vehicles

BY JASON ISAAC, OPINION CONTRIBUTOR - 02/02/24 7:00 AM ET

SHARE POST

Electric Vehicle Sales in US Hit the Accelerator Pedal

September 22, 2023 | 9:43 am

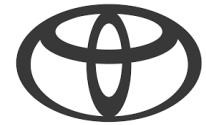
\$1.2T INVESTMENT BY AUTOMAKERS

New auto-factory investment up 4x from 2017

\$37B

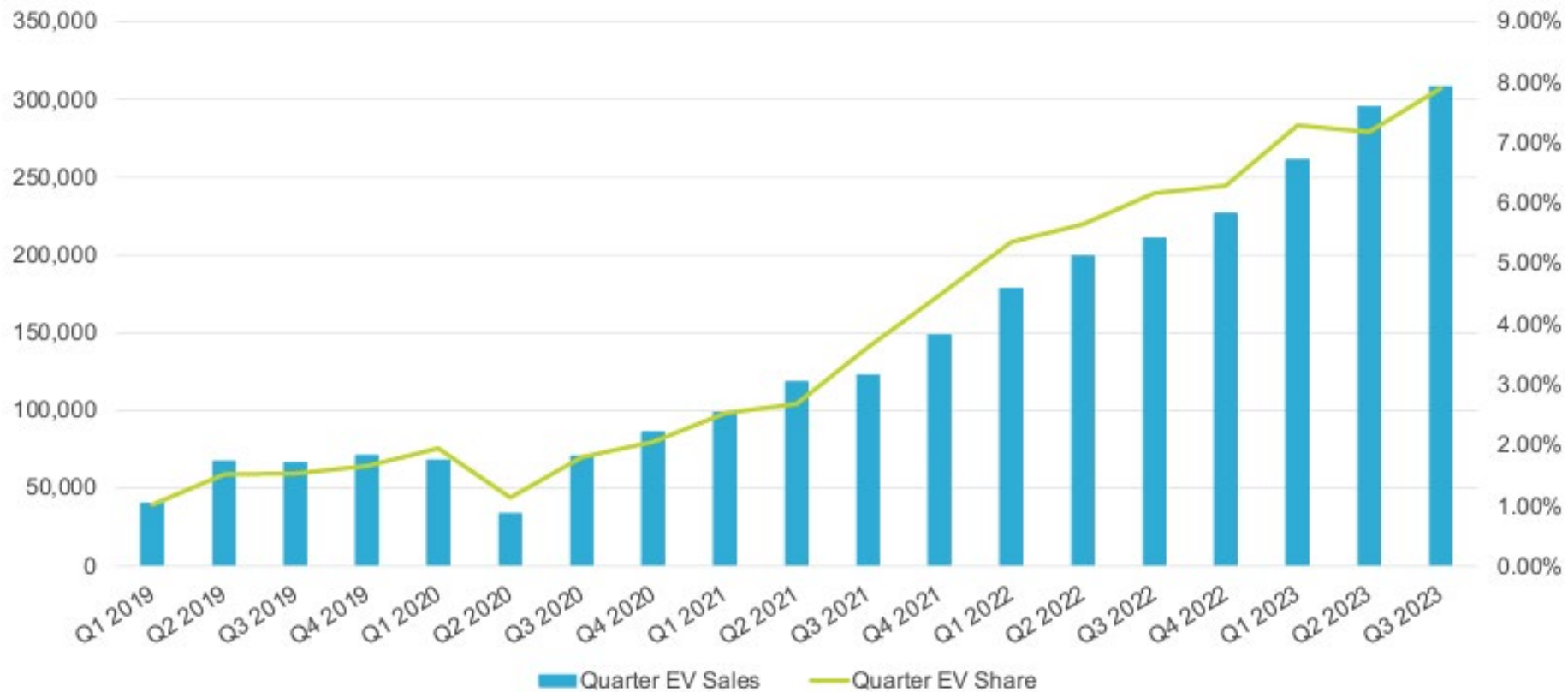


\$9B



SALES CONTINUE TO CLIMB

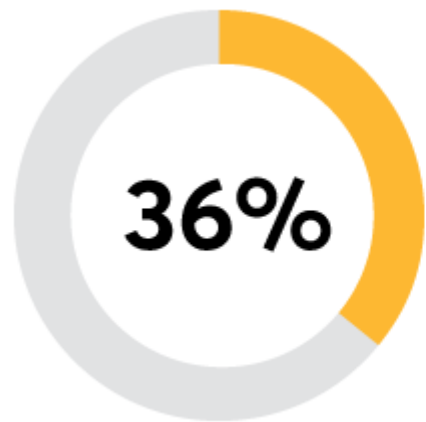
“The report of my death was greatly exaggerated”



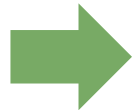
**Over 5M Evs
on US Roads
(51% YoY)**

PAST THE TIPPING POINT

The virtuous cycle for younger drivers



of Americans plan to buy or lease an electric-only vehicle, or are seriously considering doing so.



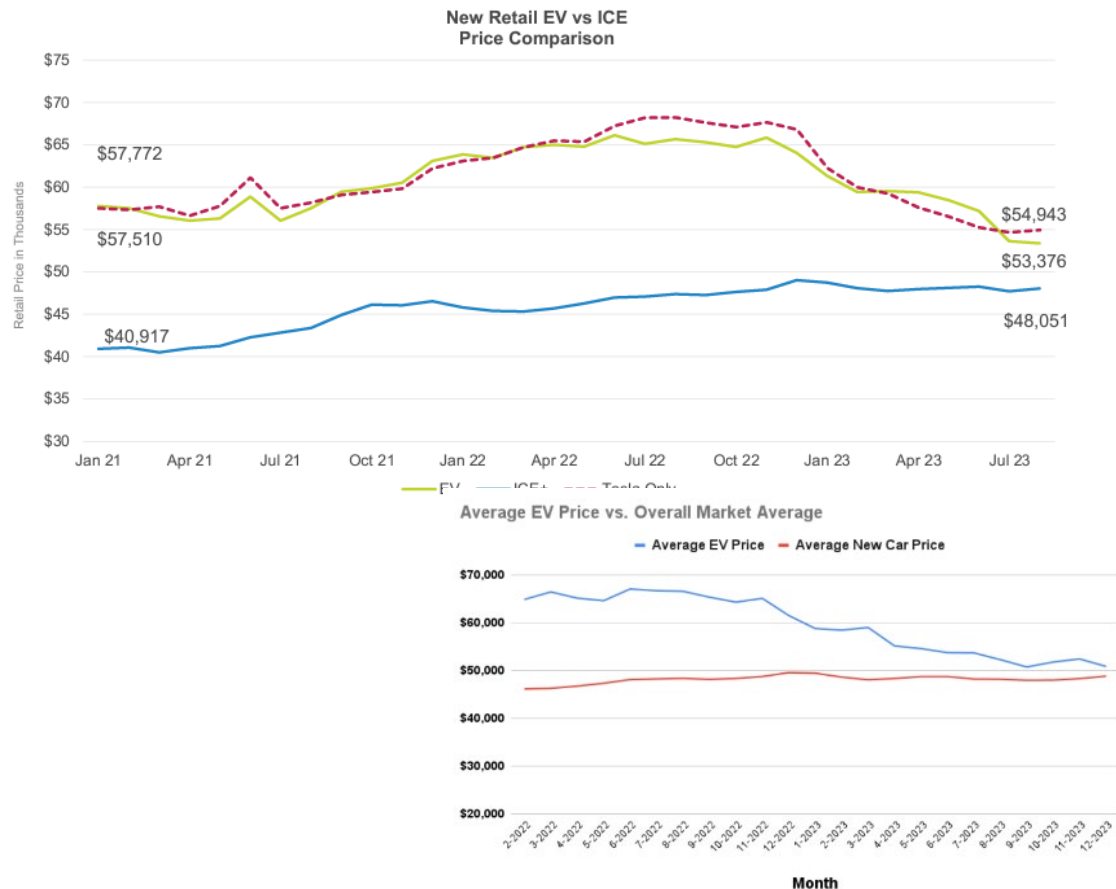
87%

Barriers

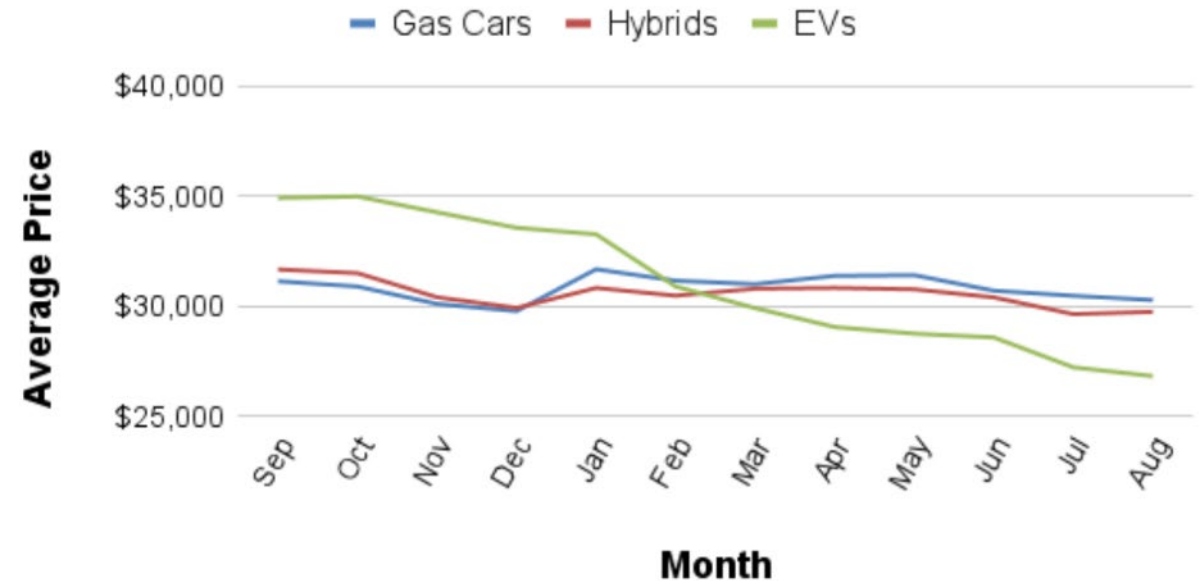


EV PRICES CONTINUE TO FALL

Approaching parity without incentives



Average Prices of 1- to 5-Year-Old Gas Cars, EVs, and Hybrids, Sep. 2023 - Aug. 2024 - iSeeCars Study

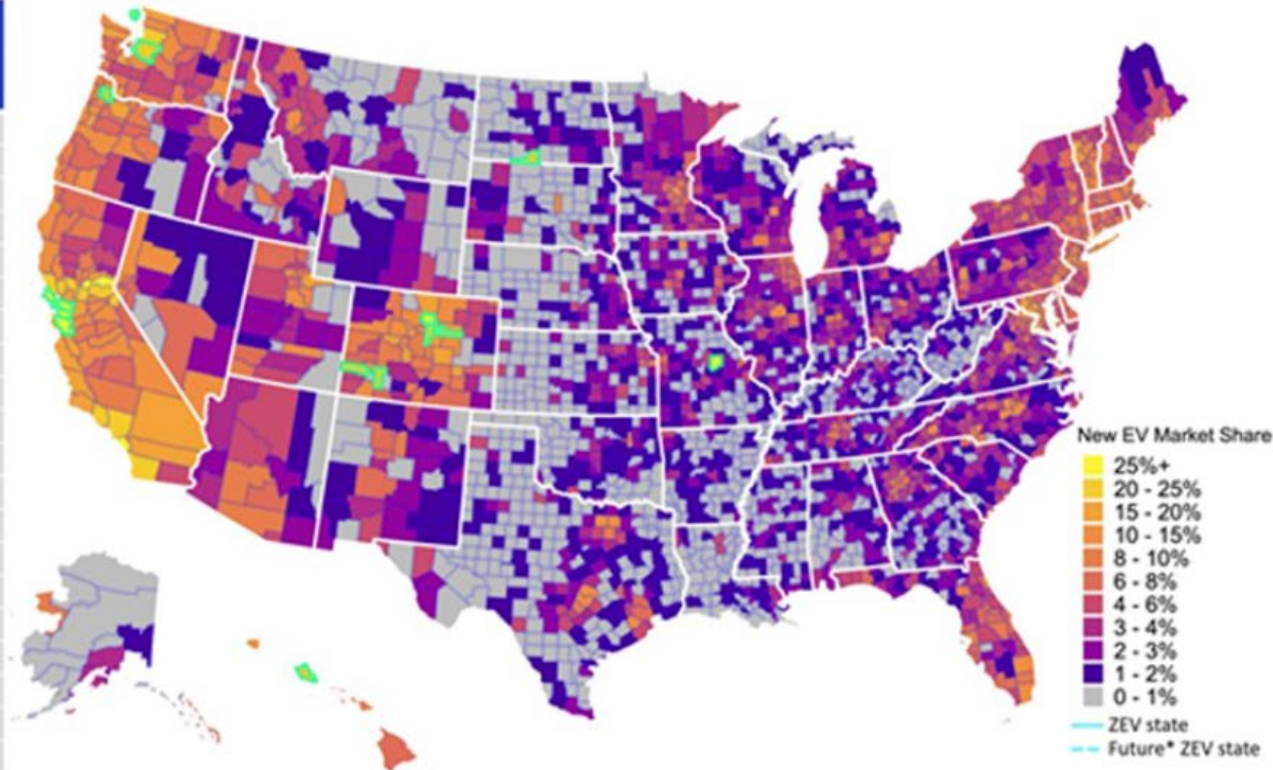


SHARE OF NEW VEHICLE SALES HITS 9.3%

But not equal in each region, ZEV states dominate

Jan 1 through April 30, 2024

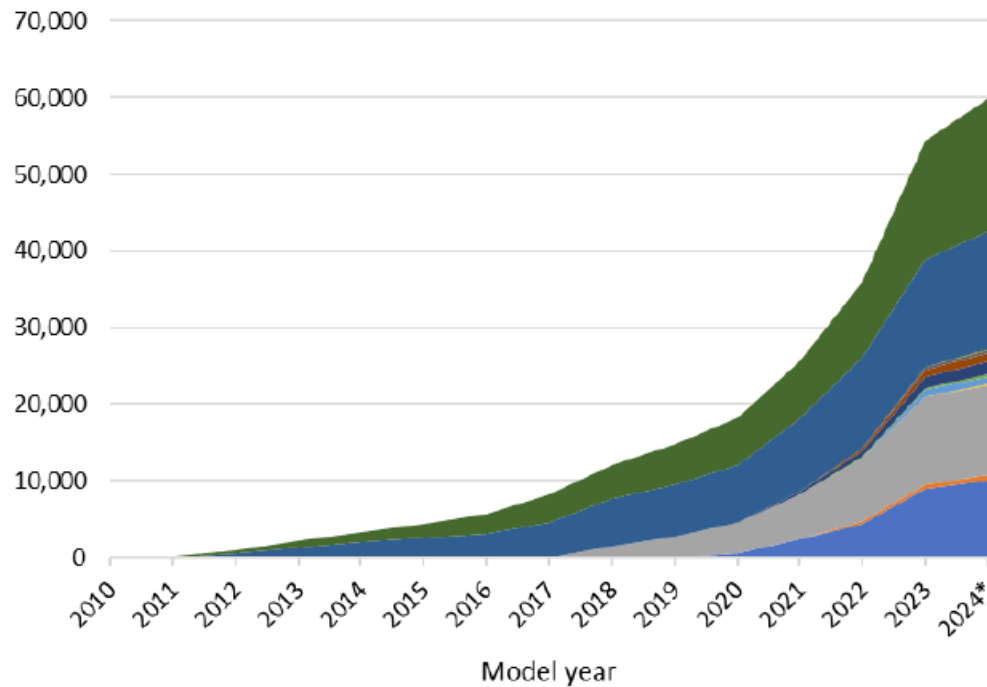
Top 5 counties in CA & Top 15 counties outside CA	New EV market share
Santa Clara, CA	40.0%
Marin, CA	38.0%
Alameda, CA	35.9%
San Francisco, CA	33.3%
Contra Costa, CA	30.4%
Callaway, MO	35.3%
Boulder, CO	31.8%
San Juan, WA	26.9%
Bristol Bay, AK	25.0%
Hinsdale, CO	25.0%
Sioux, ND	25.0%
San Miguel, CO	24.8%
Broomfield, CO	24.0%
King, WA	23.5%
Denver, CO	23.0%
Jefferson, CO	20.7%
District of Columbia	20.6%
Arapahoe, CO	20.4%
Honolulu, HI	20.4%
Washington, OR	20.3%



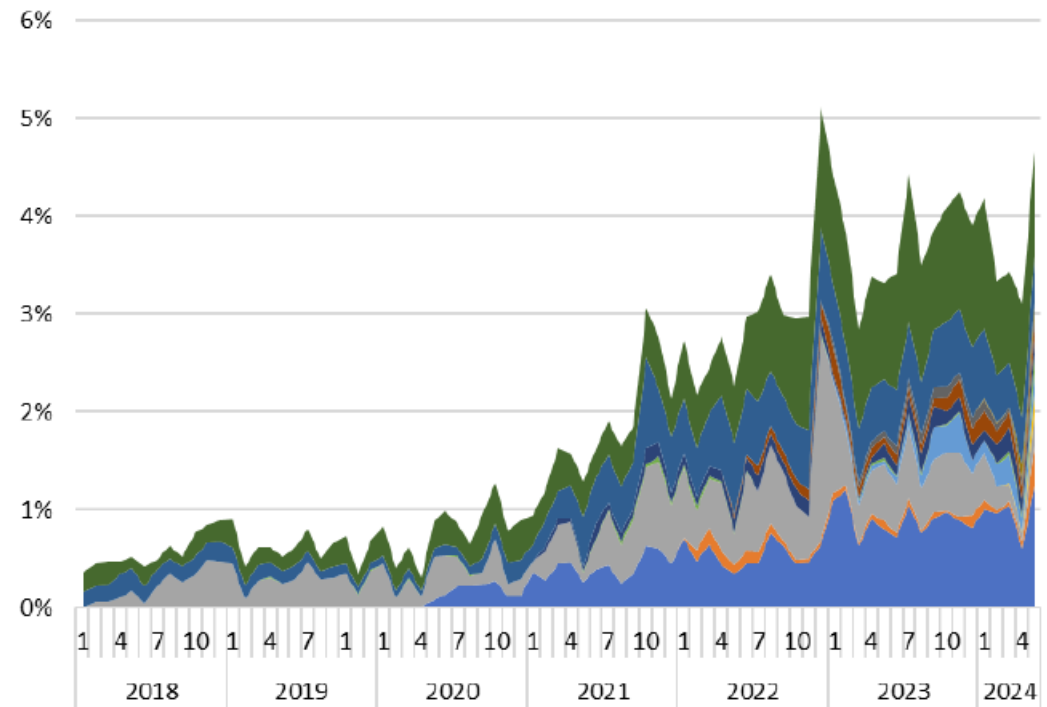
IN THE VALLEY: 60,000 BEV'S

~4% Market Share (43% YoY)

Vehicles on the Road

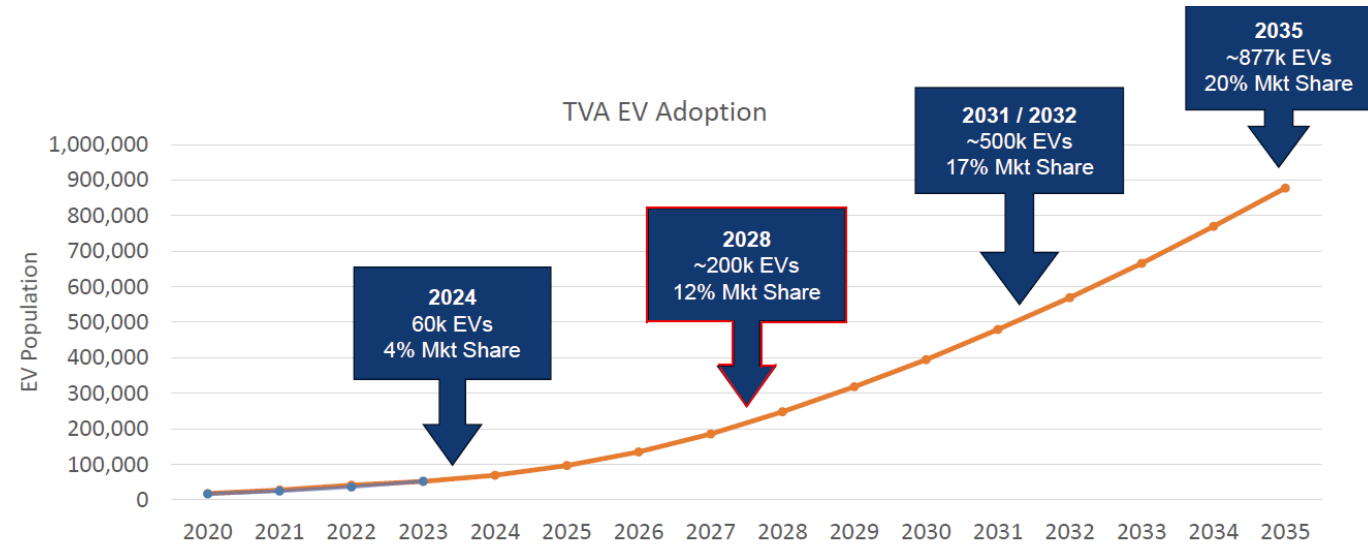
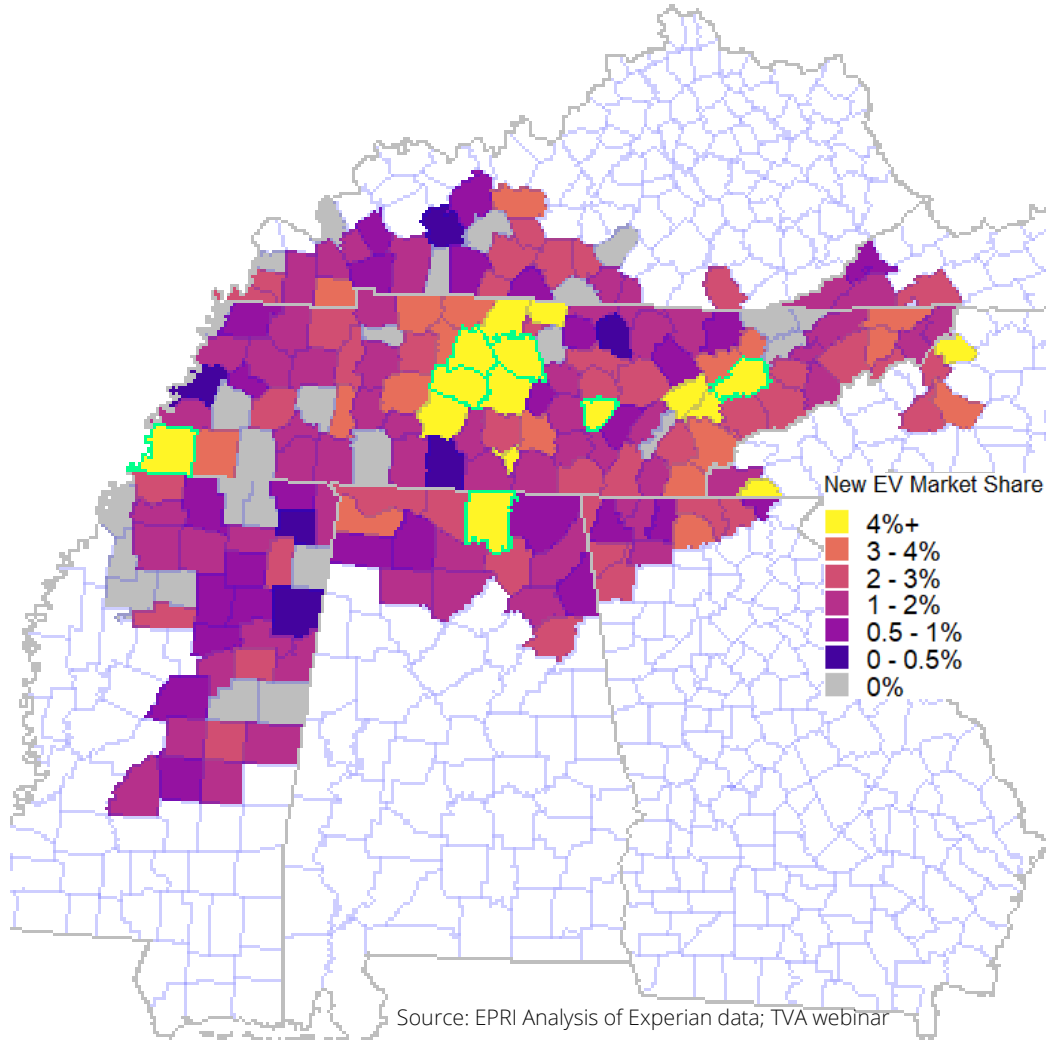


New Registration Share



ONE COUNTY EXCEEDS NATIONAL AVERAGE

TVA Planning for 20% by 2035



EV'S TAKE TOP RANK

Tesla Model Y is best selling vehicle in the world

Top Pick-Up	YTD	YTD Change
Ford F-Series	514,716	22%
Chevrolet Silverado	356,949	6%
Ram Pickup	295,768	-9%

Top SUV	YTD	YTD Change
Tesla Model Y	270,464	58%
Toyota RAV4	264,733	-2%
Honda CR-V	227,785	46%

Top Passenger Car	YTD	YTD Change
Toyota Camry	192,490	3%
Tesla Model 3	151,261	10%
Honda Accord	135,379	36%

AVAILABILITY, CHOICE, AFFORDABILITY

Drivers of EV Adoption

Longer ranges (300+ miles)


- MY 2023: 19 Models with >300 miles
- MY 2023: Top range 516 miles, median range 270 miles

Lower prices: (with tax credits)

- Volkswagen ID4 (Chattanooga) is less expensive than a Toyota Camry or Corolla
 - Multiple EVs with lease ~\$200/mo
- MY2025 Chevrolet Equinox EV sub \$35k MSRP (pre-tax credit)
- 3-4 old EV's in the \$20k range (pre-tax credit)

Larger and More Models for sale:

- Ford F150, Chevy Silverado, GMC Sierra, Rivian R1T, Tesla Cybertruck
- Rivian R1S, KIA EV9, Volvo EX90, Lucid Gravity (soon), Cadillac Escalade (soon)



2021 Tesla Model 3 Standard Range Plus RWD

\$18,500 | 21,000 miles | 6 saves

VIN: 5YJ3E1EA5MF988597

NO PRICE ANALYSIS

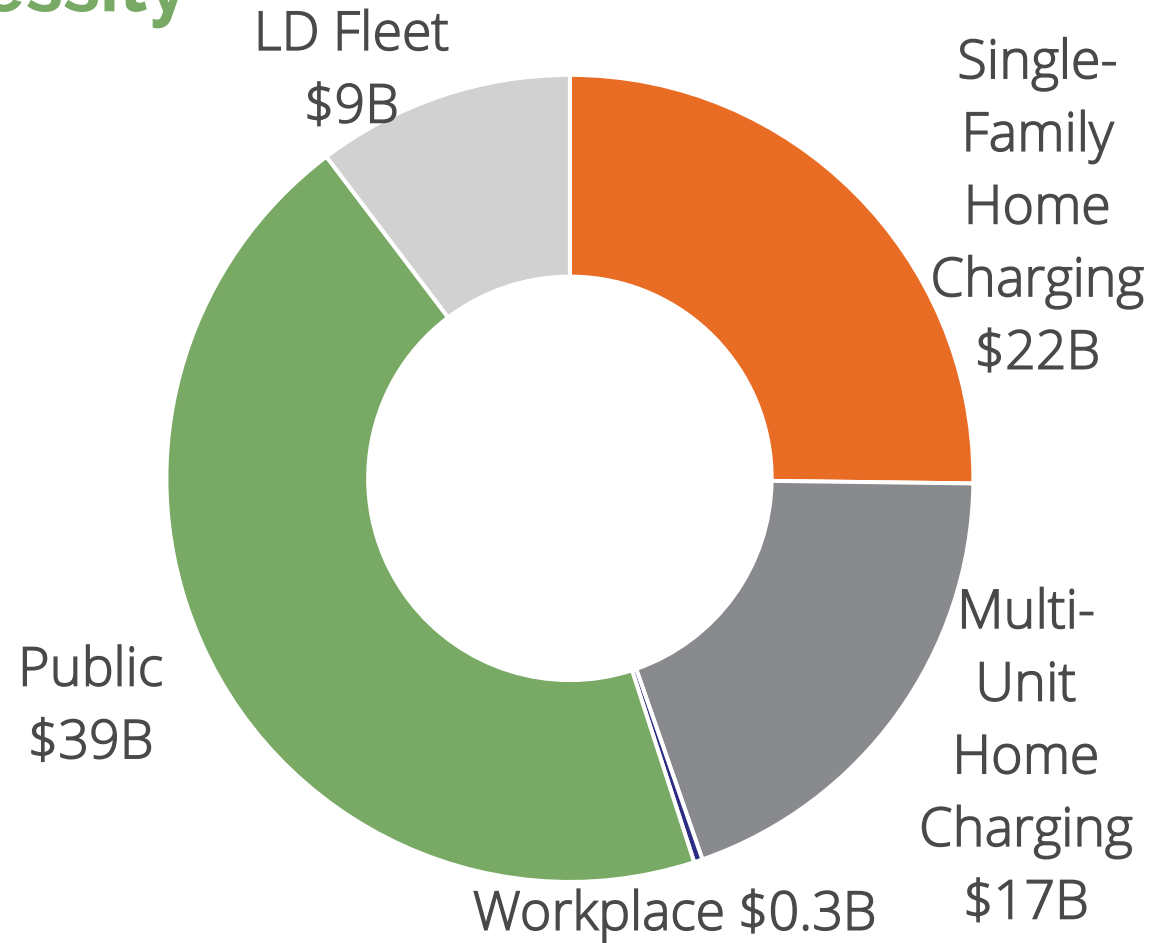
Birmingham, AL

Contact the dealer to check availability and more.

[Check availability](#) [Call](#) [Text](#)

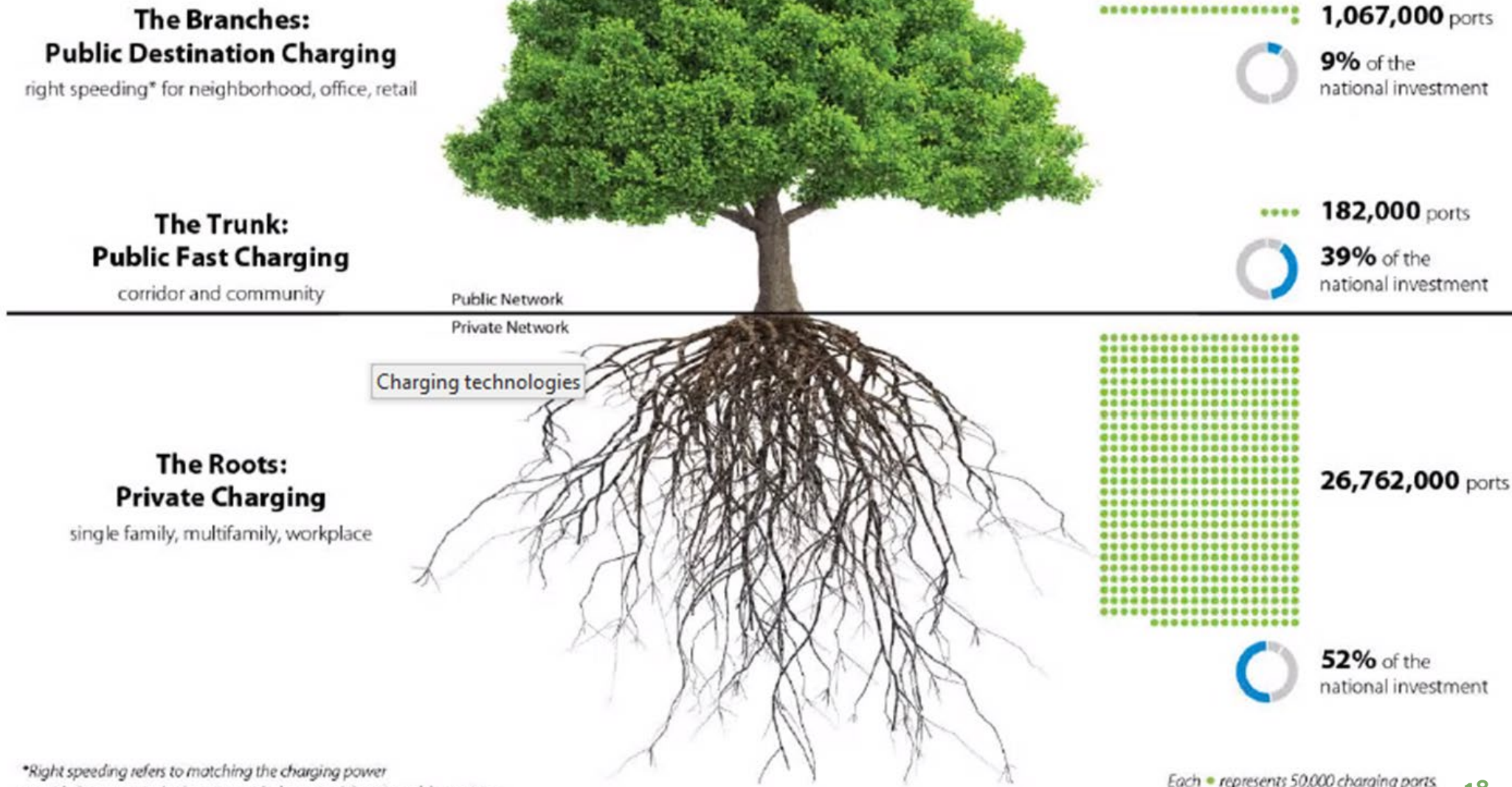
\$87B INVESTMENT IN 10 YEARS*

Innovation is a necessity



ANALOGY

**National Charging Network Supporting
33 Million Light-Duty PEVs by 2030**






*Right speeding refers to matching the charging power provided at a particular location with the typical duration of the activity.

Each • represents 50,000 charging ports

CHARGING TECHNOLOGIES

Existing EVSE Types and Use Cases

EVSE Type	Supply Voltage	Charger Examples	Power Level	Charge Rate (miles / hr)	Install Cost	Charging Use Cases	KEY POINTS
Level 1	120V (Toaster)	 J1772 Connector	1 - 1.8 kW	3 - 7	\$	Home / Overnight	↓ Obsolete for commercial purposes
Level 2	208-240V (Clothes Dryer)	 J1772 Connector	3.3 - 19.2 kW 7.7 kW typical	10 - 60 26	\$\$	Home-work / Destination / Community	Currently dominant for commercial purposes
DCFC	480V (Small office building)	 CHAdeMO / SAE Combo (CCS) / NACS	50 kW 150 kW 350 kW	175 500 1,200	\$\$\$	Travel along State Highways	Most applicable for long-range travel and evacuations

44,848
DC Fast Ports



27,390 DC Ports



4,389 DC Ports



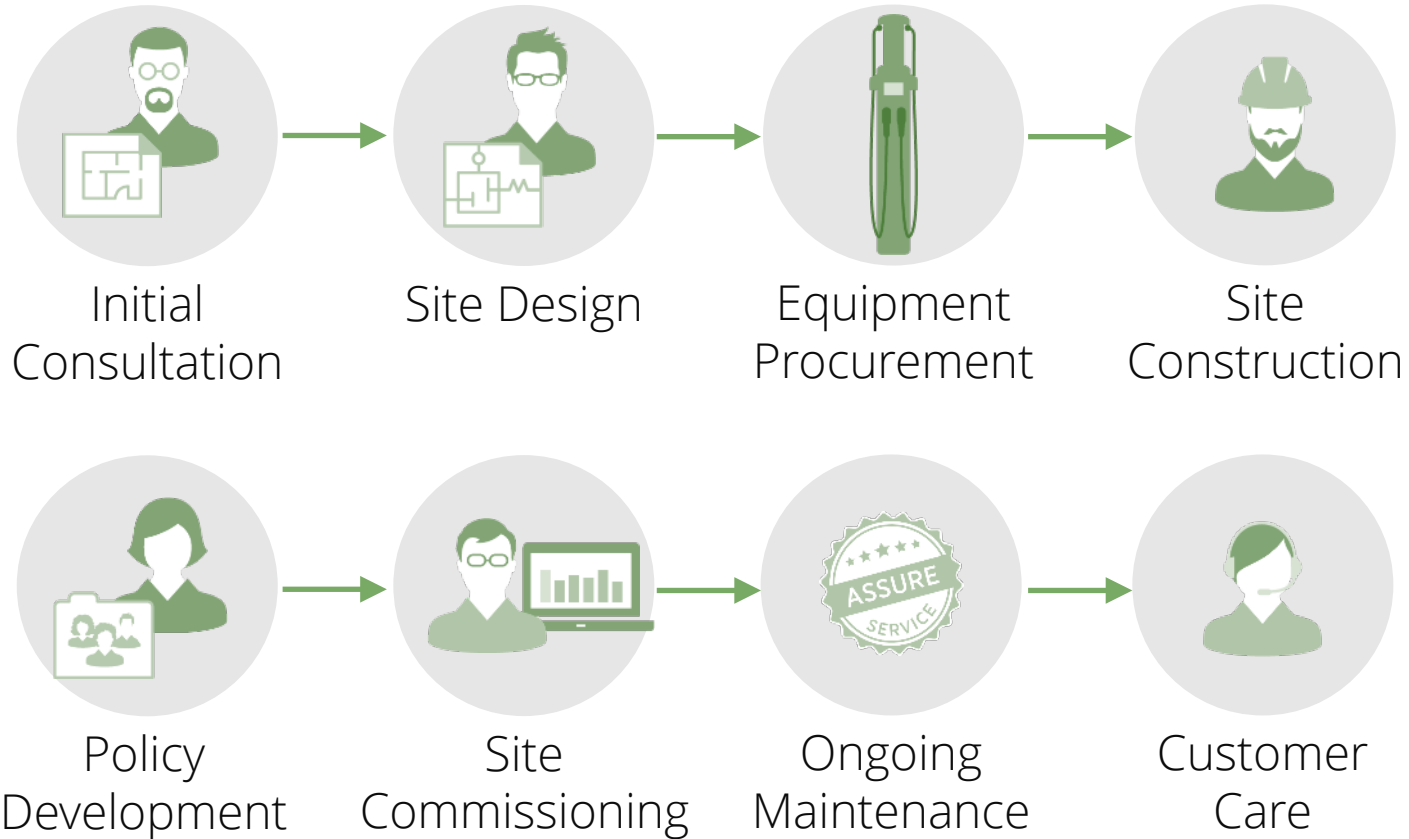
3,265 DC Ports



3,186 DC Ports

COMPLICATED PROJECTS

Even without grant administration overheads



COSTS

Costs vary widely | Lease options available

Per Port Installation	Level 1 AC	Level 2 AC	DC
Equipment	\$90 - \$900	\$750 - \$4,500	\$50,000 - \$150,000
Installation	\$200 - \$1,200	\$2,000 - \$10,000	\$20,000 - \$100,000
Total	\$290 - \$2,100+	\$2,750 - \$14,500+	\$70,000 - \$250,000+

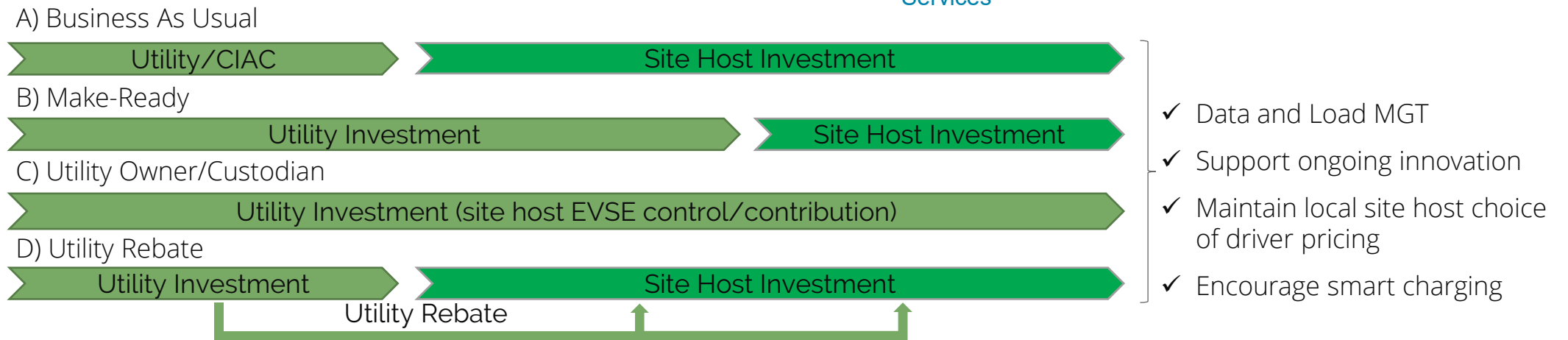
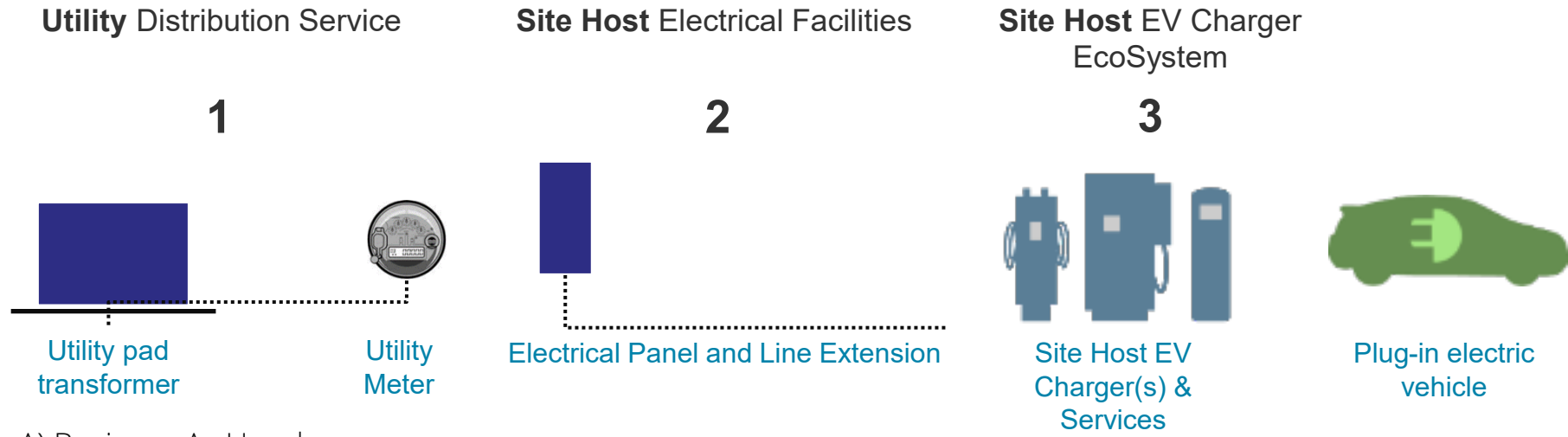
Per Port Annual Operating	Level 1 AC	Level 2 AC	DC
Energy	\$200 - \$800	\$1,000 - \$2,500	\$6,000 - \$20,000
Network Services	\$0 - \$120	\$0 - \$300	\$300 - \$700
Extended Warranties	\$0	\$0 - \$300	\$300 - \$3,500
Insurance	Varies	Varies	Varies
Total	\$200 - \$920+	\$1,000 - \$3,100+	\$6,600 - \$24,200+



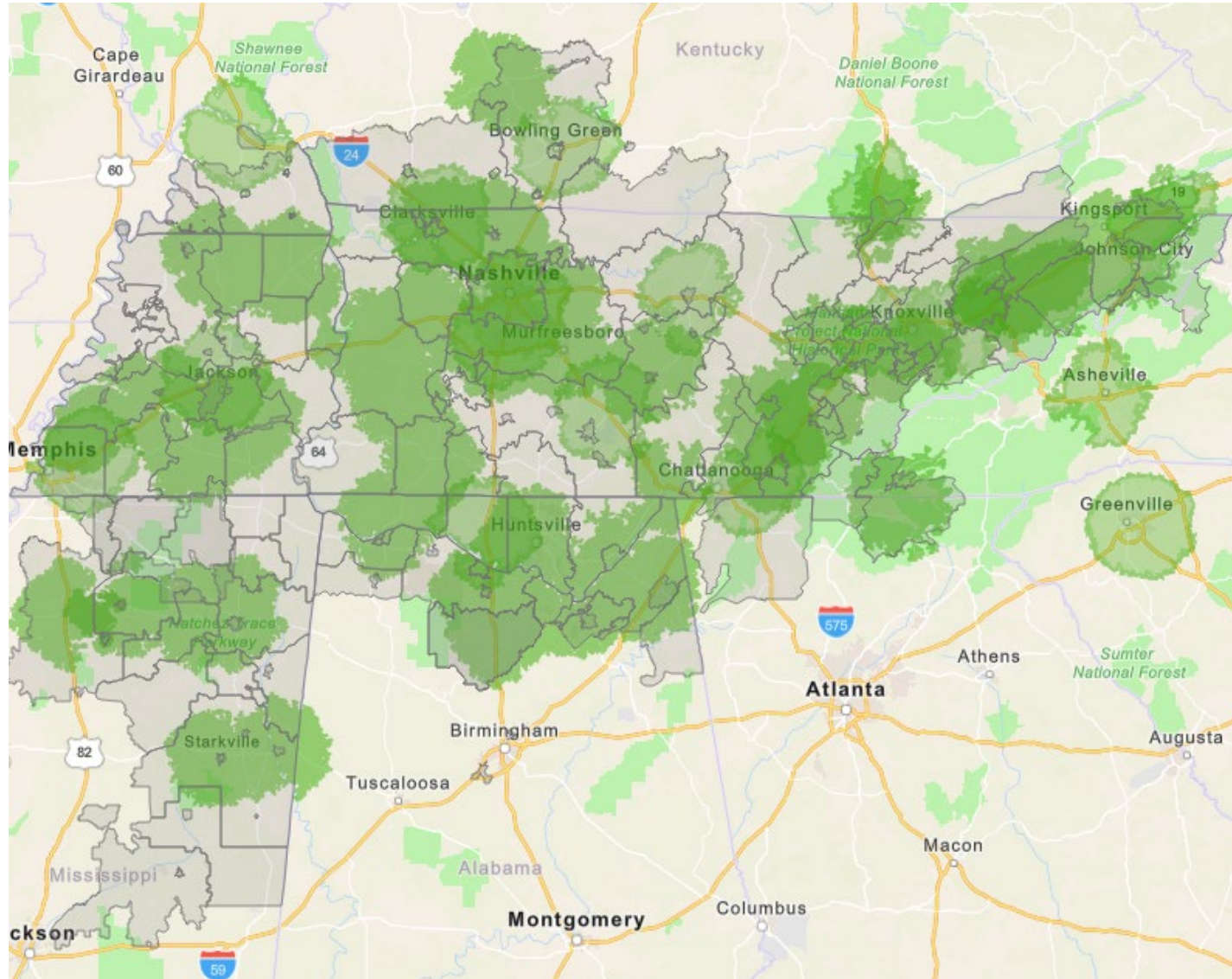
USEFUL LIFE

Depends on use

- ▶ Public stations can be depreciated over 10 years
- ▶ DC Fast Chargers rarely last over 5-7 years in the field (to date)
- ▶ Warranties vary from 1 to 5 years

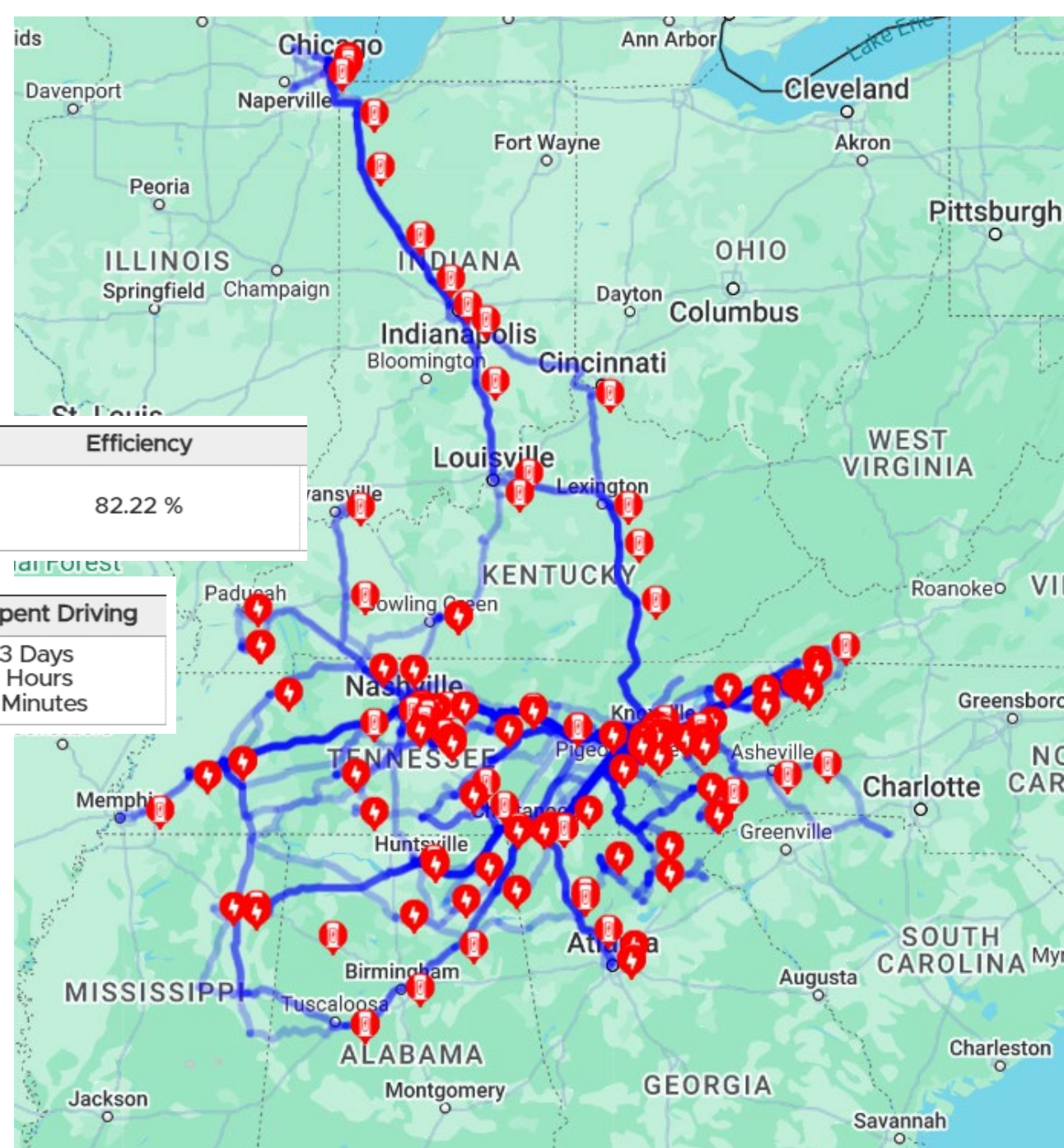


GAPS REMAIN



MY EXPERIENCE

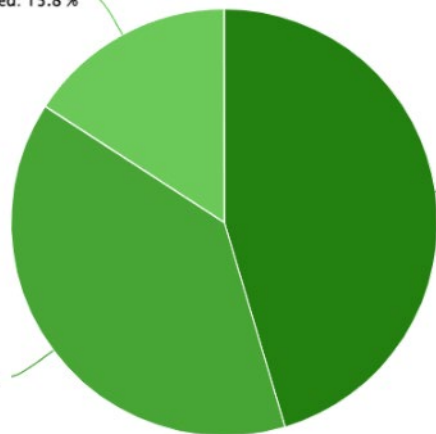
\$0.041 / mile → \$0.94/gal



Drives	Miles Driven	Rated Miles Used	Wh/Mile	Efficiency
3,663	57,829	70,338	275 Wh/Mile	82.22 %

kWh Used	Avg Speed	Avg Temp	Total Cost	Time Spent Driving
15,900 kWh	45.1 mph	67.57 F	\$ 2,385	53 Days 9 Hours 14 Minutes

CCS-Chademo Charges kWh Added: 15.8 %



Supercharging kWh Added: 45.4 %

Total AC Charges kWh Added: 38.7 %

RESOURCES

Grant Funding / Competitive Analysis / Market Analysis

- ▶ Seven States Power Corporation
 - ▶ Free Portfolio Analysis
 - ▶ Turnkey development
- ▶ Alternative Fuels Data Center (afdc.energy.gov)
- ▶ TVA / TVA Fast Charge Network (tva.gov)
- ▶ Atlas EV Hub (atlasevhub.com)
- ▶ Plugshare (plugshare.com)



FUTURE CONSIDERATIONS

- ▶ NACS (J3400) conversion!
- ▶ School Bus / MD Fleets
- ▶ V2X
- ▶ Wireless Charging (fixed and mobile)
- ▶ New battery chemistries
- ▶ Cybersecurity
- ▶ Megawatt Charging Standard (MCS)



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