THE FINAL REPORT OF THE JOINT STUDY COMMITTEE ON THE ELECTRIFICATION OF TRANSPORTATION

COMMITTEE MEMBERS

Senator Steve Gooch – Committee Co-Chairman
District 51
Representative Rick Jasperse - Committee Co-Chairman
District 11

Senator Bill Cowsert
District 46

Senator Frank Ginn
District 47

Senator Larry Walker, III
District 20

Senator David Lucas *(Ex Officio)*
District 26

Senator Randy Robertson *(Ex Officio)*
District 29

Representative Don Parson
District 44

Representative Alan Powell
District 32

Representative John Corbett
District 174

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Mr. Pat Wilson
Georgia Department of Economic Development

Mrs. Tricia Pridemore
Georgia Public Service Commission

Prepared by the Senate Research Office
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SECTION I -

STUDY COMMITTEE FOCUS, CREATION, AND DUTIES

The Joint Study Committee on the Electrification of Transportation (the "Study Committee") was created with the adoption of Senate Resolution 463 (the "resolution") during the 2022 legislative session.[1] The resolution was sponsored by Senator Gooch of the 51st, Senator Cowsert of the 46th, Senator Kennedy of the 18th, Senator Ginn of the 47th, Senator Miller of the 49th and others.

The resolution establishes that the market for electric vehicles ("EVs") is poised for significant growth in the near future and such growth will expand the need for a robust public charging network. Further, the resolution provides that implementation of statewide public charging infrastructure for EVs is vital for the state to remain economically competitive and that the State of Georgia needs to establish a comprehensive, strategic plan that sets policy objectives for infrastructure, economic preparedness, transportation funding, innovation, and the development of a successful EV market. Lastly, the resolution proclaims that it would be beneficial to examine how to accelerate economic growth and directly engage stakeholders in the development and implementation of initiatives that best position and prepare the state and its citizens for transportation electrification. Therefore, as stated in the resolution, the Study Committee was charged with undertaking a study of the conditions, needs, issues, and problems associated with the aforementioned circumstances; and recommending action or legislation which the Study Committee deems necessary or appropriate.

The following individuals were appointed by the President of the Senate, Lieutenant Governor Geoff Duncan, to serve as members of the Study Committee:

- Senator Steve Gooch of the 51st;
- Senator Bill Cowsert of the 46th;
- Senator Frank Ginn of the 47th;
- Senator Larry Walker, III of the 20th;
- Senator David Lucas of the 26th (ex-officio); and
- Senator Randy Robertson of the 29th (ex-officio).

The following individuals were appointed by the Speaker of the House, Representative David Ralston, to serve as members of the Study Committee:

- Representative Rick Jaspers of the 11th;
- Representative Don Parson of the 44th;
- Representative Alan Powell of the 32nd; and
- Representative John Corbett of the 174th.[2]

[1] 2022 Senate Resolution 463 available online at : https://www.legis.ga.gov/search?ch=2&d=2&ln=463&s=1029&p=1

[2] Additionally, Representatives Brad Thomas of the 21st and Representative Spencer Frye of the 118th participated by attending meetings and contributing to valuable discussions.

The following individuals were named in the resolution to serve as members of the Study Committee:

- Commissioner of the Georgia Department of Transportation, Russell McMurry, or a designee;
- Commissioner of the Georgia Department of Economic Development, Pat Wilson, or a designee[3]; and
- Commissioner of the Georgia Public Service Commission, Tricia Pridemore, or her designee.

The following staff members were assigned to the Study Committee: Katherine Russell, Senate Research Office; Abby Day, House Budget and Research Office; Andrew Allison, Senate Press Office; Jenna Dolde, Legislative Counsel; and Erin Alford, Legislative Assistant to Senator Gooch.

The study committee held six meetings: August 24 in the Coverdell Legislative Office Building at the Capitol; September 7 at Brasstown Valley Resort in Young Harris, Georgia; October 3 at the Kia Training Facility in WestPoint, Georgia; October 25 at Ft. Valley State University in Ft. Valley, Georgia; and November 2 at the Georgia Department of Transportation Headquarters in Atlanta, Georgia. The Final Report and Recommendations were discussed and adopted at the final meeting on November 22, 2022, held at the Capitol in Atlanta.

The study committee heard testimony from the following individuals:

Shannon Peloquin, McKinsey Capital Projects
Pat Wilson, Commissioner, Georgia Department of Economic Development
Janine Miller, Director of Planning, Georgia Department of Transportation
Tricia Pridemore, Georgia Public Service Commission
Michael Dwyer; U.S. Energy Information Administration
Angela Holland; Georgia Association of Convenience Stores
Jay Smith; Charge Ahead Partnership
Dean Bushey; Travel Centers USA
Allie Kelly; The ASPIRE Center
Stephanie Gossman and Jeff Grub; Georgia Power
Beau Whiteman; Rivian
Jeff Pratt; Georgia EMC
Daryl Ingram; Electric Cities of Georgia
Anne Blair; The Electrification Coalition
Nick Steingart, Alliance for Automotive Innovation
Jim Alvis; KIA Motors
Ben Jordan; Georgia Automobile Dealers Association
Mike Demenicone, Classic Cadillac of Atlanta and Classic Subaru of Atlanta
Timothy Redding, Jr, Dublin Ford Lincoln
Jimmy Ellis, Jim Ellis Automotive Group
Stuart Countess and Steve Daniel; KIA
John Orr and Mike Alexander; Atlanta Regional Commission
Allie Kelly and Brad Skinner; The Ray
Ben Kessler; Chargepoint

[3] On two occasions, Josh Stephens attended and participated as Commissioner Pat Wilson's designee.

Nick Steingart and Dan Bowerson; Alliance for Automotive Innovation
Blake Snyder and Jeff Hutchins, EOS Linkx
Scott Ennis; Enterprise
Andy Moore; Blue Bird
Dr. David Gattie; Center for International Trade and Security University of Georgia
Erin and Stephanie Luque; Envirospark;
Kathleen Bowen; ACCG
Carolyn Kramer Simons; ARTBA
Tracy Styf; Town Center CID
Ann Hanlon; Perimeter CID
Brandon Haddock; Textron Industries
Dr. Trish Hendren; The Eastern Transportation Coalition
Carolyn Simmons; ATRBA
Kary Witt; HNTB
Brad Christie & Taylor Ann Calvin; Sysco
Michael Maten; General Motors
Frank Morris; Clean Cities Georgia
Stan Cross; Southern Alliance for Clean Energy
Austin Hackney; Home Builders Association of Georgia
Daniel Witt; Lucid Motors
AJ Siccardi; RaceTrac
Representative Alan Powell
Seth Blocker; Georgia Power

SECTION II -

BACKGROUND

I. Legislative History

During the 2022 Legislative Session, Representative Alan Powell introduced HB 1322. This bill was favorably reported out of the House Committee on Energy, Utilities, and Telecommunications. It did not, however, move any further. Anecdotal commentary suggested that both chambers of the Georgia General Assembly decided no legislation regarding EV charging stations would be considered for passage until a study committee gathered more information on the issue. Senate Resolution 463, creating this Study Committee, was passed the same legislative year.

HB 1322 required electric suppliers who own, operate, and maintain EV charging equipment directly to the public to do so through a separate, unregulated entity with the same rates, terms, and conditions offered to private providers of EV charging equipment. Representative Powell provided testimony concerning this bill, as did Angela Holland from the Convenience Store Association.

II. Federal Legislation and Programs

As the Study Committee heard testimony from its many speakers, references were commonly made to federal legislation and incentive programs. A brief, localized summary of the programs mentioned is provided below.

A. Infrastructure Investment and Jobs Act/ National Electric Vehicle Infrastructure Program.

The Infrastructure Investment and Jobs Act ("IIJA")[4], also known as the Bipartisan Infrastructure Law, provided a panoply of funding for federal incentive programs, including the National Electric Vehicle Infrastructure ("NEVI") Program. The NEVI Program[5] will provide funding to states to strategically deploy EV charging stations. That funding is available for up to 80 percent of eligible project costs, including: (1.) the acquisition, installation, and network connection of EV charging stations to facilitate data collection, access, and reliability; (2.) proper operation and maintenance of EV charging stations; and (3.) long-term EV charging station data sharing.

The program requires that EV charging stations be non-proprietary, allow for open-access payment methods, be publicly available or available to authorized commercial motor vehicle operators from more than one company, and be located along designated Federal Highway Administration's ("FHWA") Alternative Fuel Corridors ("AFC"s). If a state[6] and the United States Department of Transportation ("USDOT") determine that all AFCs in the state have been fully developed, then the state can propose alternative public locations and roads for EV charging

[4] U.S. Department of Transportation, *Bipartisan Infrastructure Law (BIL) Overview of Highway Provisions*, https://www.fhwa.dot.gov/bipartisan-infrastructure-law/docs/BIL_overview_update_2022-11-8b.pdf

[5] U.S. Department of Energy, *National Electric Vehicle Infrastructure (NEVI) Formula Program*, https://afdc.energy.gov/laws/12744#:~:text=Funding%20is%20available%20for%20up,EV%20charging%20station%20data%20sharing.

[6] See testimony in Meeting #1 from GDOT for details and a link to access Georgia's plan.

station installation. To receive funding, states must have submitted plans to the USDOT and United States Department of Energy joint office for review and public posting before August 1, 2022. The submitted plans must describe how the state intends to distribute NEVI funds.

Separate, additional, funding is available through a USDOT grant program for states and localities requiring additional assistance to strategically deploy EV charging stations under this program.

B. Inflation Reduction Act

According to the Congressional Research Service[7], the Inflation Reduction Act of 2022 ("IRA") [8], modified tax credits for EVs and fuel cell vehicles, and enacted new tax credits for used and commercial clean vehicles. The bill included a collection of inflation reducing provisions including several tax credits for cars purchased in 2022. A concise summary of tax incentives available in the future are listed below:

Clean Vehicle Tax Credit Modifications:

Critical Mineral and Battery Component Requirements

Beginning in 2023, EVs qualify for the clean vehicle tax credits only if the battery meets certain conditions. The maximum potential tax credit, up to $7,500, is the sum of two amounts: the critical mineral amount and the battery component amount.

- *Critical Minerals*: EV owners may receive up to $3,750, for vehicles purchased in 2023, if at least 40 percent of the value of the battery's applicable critical minerals have been extracted or processed in the United States or in a country with which the United States has a free trade agreement, or recycled in North America. The 40 percent requirement increases to 50 percent in 2024, 60 percent in 2025, 70 percent in 2026, and 80 percent in 2027.
- *Battery Components*: EV owners may receive up to $3,750, for vehicles purchased in 2023, if at least 50 percent of the value of the battery's components must have been manufactured or assembled in North America. The 50 percent requirement increases to 60 percent in 2024 and 2025, 70 percent in 2026, 80 percent in 2027, 90 percent in 2028, and 100 percent in 2029.

Manufacturing and Assembling by Foreign Entities of Concern

Additional restrictions apply to vehicle batteries starting in 2024 and 2025. For example, starting in 2024, an EV will not qualify if any of the vehicle's battery components were manufactured or assembled by a foreign entity of concern. Starting in 2025, an EV will not qualify if the vehicle's battery contains critical minerals that were extracted, processed, or recycled by a foreign entity of concern.

New Income Limits

Other changes to the credit also take effect in 2023. These include the credit's new income limits, limits based on the vehicle's price, and new reporting requirements (including both taxpayer and

[7] Congressional Research Service, *Clean Vehicle Tax Credits in the Inflation Reduction Act of 2022,* August 24, 2022 : https://crsreports.congress.gov/product/pdf/IN/IN11996

[8]Inflation Reduction Act of 2022, H.R. 5376, 117th Cong. (2022) (as passed version). https://www.congress.gov/search?q=%7b%22source%22:%22legislation%22,%22search%22:%22cite:PL117-169%22%7d

seller vehicle identification number [VIN] reporting). Starting in 2024, taxpayers will be able to elect to transfer credits to dealers, effectively allowing the credit to be a point of sale rebate.

New Tax Credits: Previously Owned Clean Vehicle Tax Credit; Commercial Clean Vehicle Tax Credit

The IRA enacted two new tax credits for clean vehicles. The first is a new credit for previously owned clean vehicles.[9] This tax credit is 30 percent of a used EVs' sales price, up to $4,000. Taxpayers must have an income of less than $150,000 for joint filers or $75,000 for single filers, and the purchase price of the vehicle must be $25,000 or less.

The second new tax credit[10] is for commercial clean vehicles. This tax credit is 15 percent of a qualifying vehicle's cost, or 30% if the vehicle also does not have a gas- or diesel-powered ICE, with limitations. The credit for light-duty vehicles is limited to $7,500 and up to $40,000 for heavy-duty vehicles. It is expected that this credit will help support the deployment of electric or hydrogen trucks and busses.

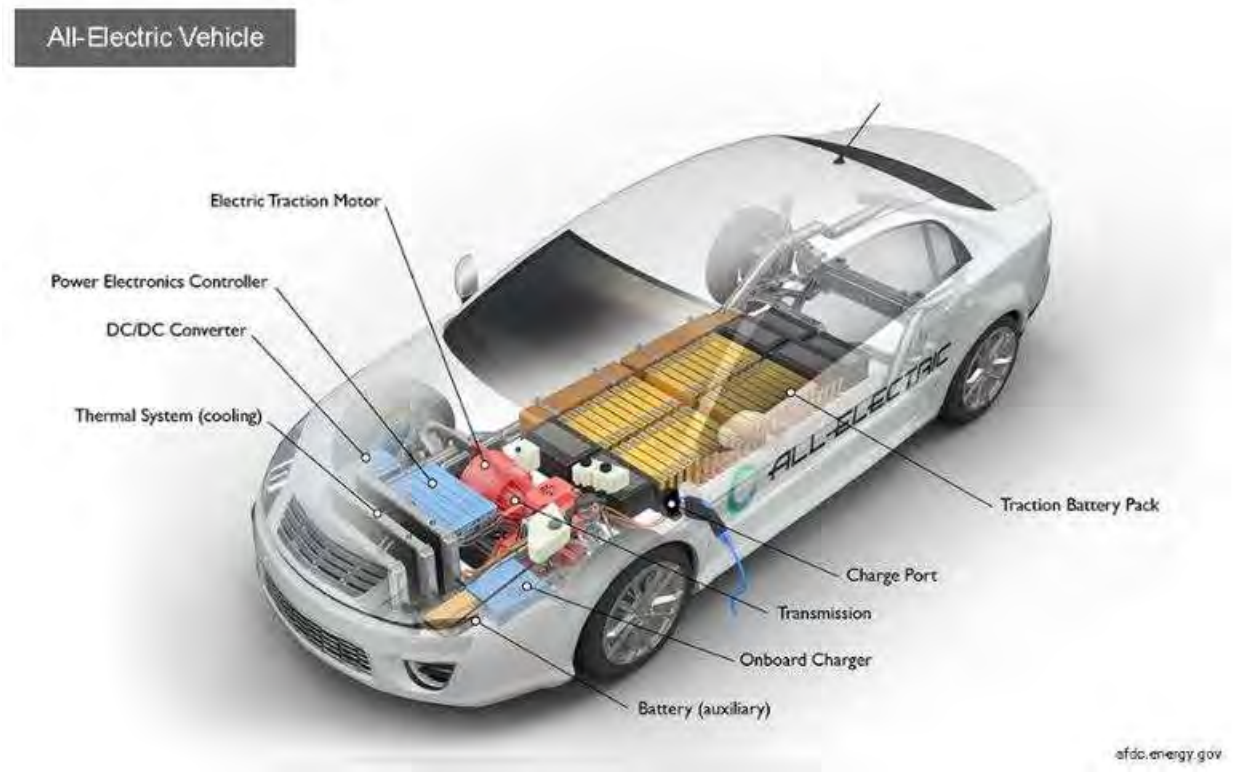
[9] IRC Section 25E.
[10] IRC Section 45W.

III. Emerging Vehicular Technology

In the course of hearing testimony from experts about emerging alternate fuel technology, the Study Committee was introduced to concepts and data for more than just electric vehicles. Below is a short primer on similar and tangential technologies gathered from the United States Department of Energy[11]. This includes electric vehicles, hybrid vehicles, plug-in hybrid vehicles, and hydrogen fuel cell powered vehicles.

A. All-Electric Vehicles

The United States Department of Energy describes all-electric vehicles as vehicles that use a battery pack to store the electrical energy that powers the motor. These batteries are charged by plugging the vehicle in to an electric power source. All-electric vehicles have a shorter range than comparable internal combustion engine vehicles. The efficiency and range of an all-electric vehicle is largely based on driving conditions; therefore, extreme temperatures reduce range. This is because more energy is required to heat and cool the cabin. In general, all-electric vehicles are more efficient under city driving conditions than highway driving conditions. Because city driving conditions have more frequent stops, vehicles maximize the benefits of regenerative braking. Alternatively, highway travel typically requires more energy to overcome the increased drag at higher speeds.



[11] https://www.energy.gov/

Key Components of an All-Electric Car

High-res image

Battery (all-electric auxiliary): In an electric drive vehicle, the auxiliary battery provides electricity to power vehicle accessories.

Charge port: The charge port allows the vehicle to connect to an external power supply in order to charge the traction battery pack.

DC/DC converter: This device converts higher-voltage DC power from the traction battery pack to the lower-voltage DC power needed to run vehicle accessories and recharge the auxiliary battery.

Electric traction motor: Using power from the traction battery pack, this motor drives the vehicle's wheels. Some vehicles use motor generators that perform both the drive and regeneration functions.

Onboard charger: Takes the incoming AC electricity supplied via the charge port and converts it to DC power for charging the traction battery. It also communicates with the charging equipment and monitors battery characteristics such as voltage, current, temperature, and state of charge while charging the pack.

Power electronics controller: This unit manages the flow of electrical energy delivered by the traction battery, controlling the speed of the electric traction motor and the torque it produces.

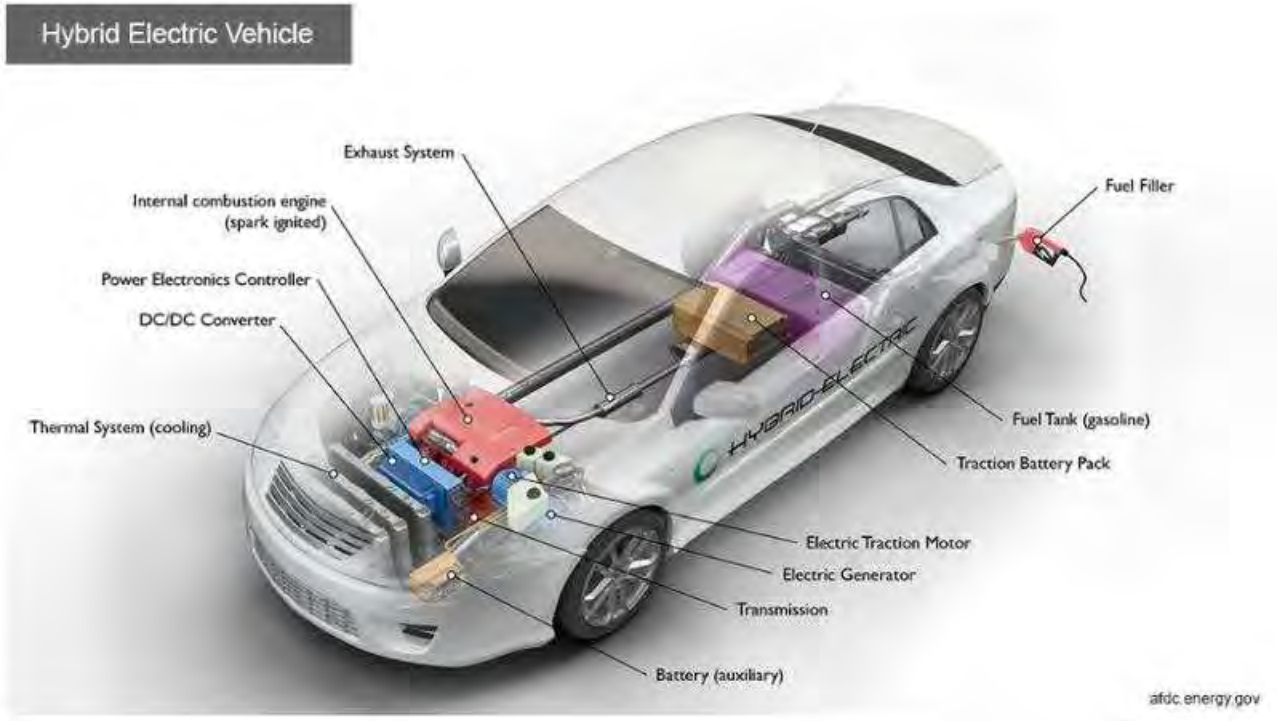
Thermal system (cooling): This system maintains a proper operating temperature range of the engine, electric motor, power electronics, and other components.

Traction battery pack: Stores electricity for use by the electric traction motor.

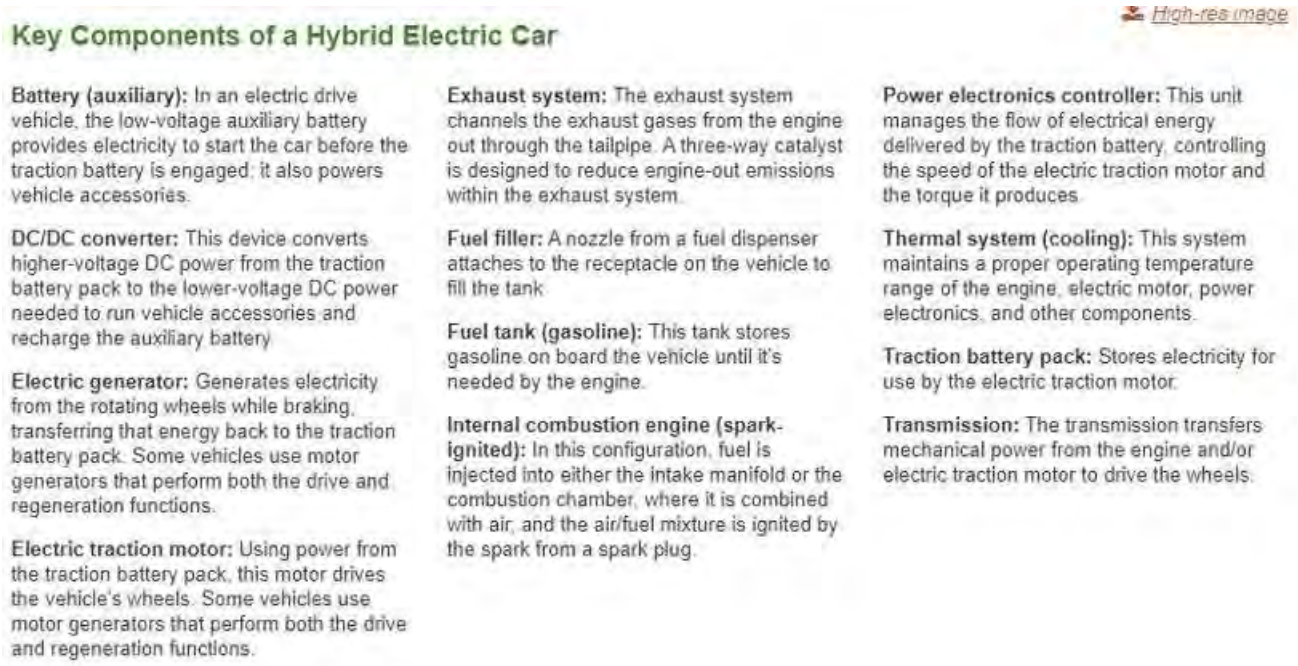
Transmission (electric): The transmission transfers mechanical power from the electric traction motor to drive the wheels.

B. Hybrid Electric Vehicles

The United States Department of Energy describes Hybrid Electric Vehicles[12] as vehicles powered by an internal combustion engine in combination with one or more electric motors that use energy stored in batteries. Hybrid electric vehicles combine the benefits of high fuel economy and low tailpipe emissions with the power and range of conventional vehicles. Hybrid vehicles do not plug in to off-board sources of electricity to charge the batteries; instead, they use regenerative braking and the internal combustion engine to charge the batteries on board the vehicle.



[12] https://afdc.energy.gov/vehicles/electric_basics_hev.html



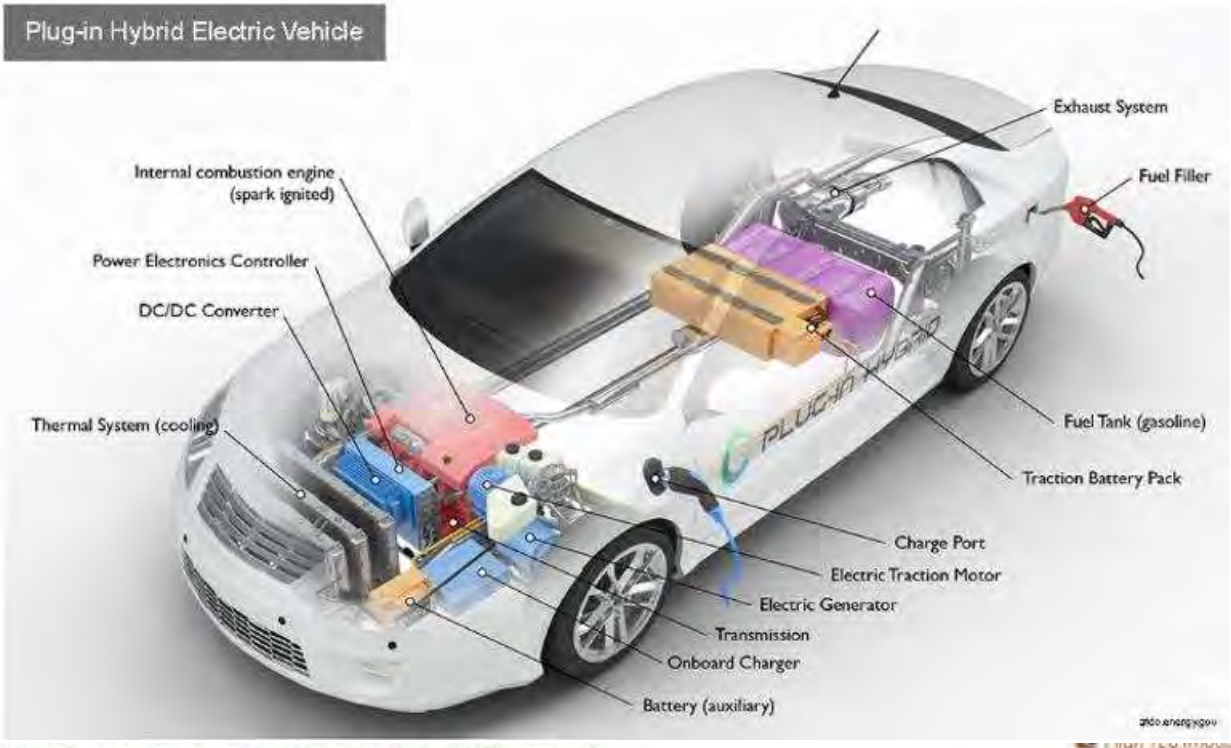
C. Plug-In Hybrids

Plug-In hybrids vehicles are described by the United States Department of Energy[13] as vehicles that "use batteries to power an electric motor, as well as another fuel, such as gasoline or diesel, to power an internal combustion engine or other propulsion source."

Plug-in hybrids have larger battery packs than hybrid EVs and can drive moderate distances using just electricity. This is often referred to as "electric range" and can be between 15 and 60 miles.

Plug-in hybrid batteries can be charged by outside electric power sources, by the internal combustion engine on board, or through regenerative braking. During braking, the electric motor acts as a generator, using the energy to charge the battery. This allows the vehicle to recapture energy that would otherwise be lost.

[13] https://afdc.energy.gov/vehicles/electric_basics_phev.html



Key Components of a Plug-In Hybrid Electric Car

Battery (auxiliary): In an electric drive vehicle, the low-voltage auxiliary battery provides electricity to start the car before the traction battery is engaged; it also powers vehicle accessories.

Charge port: The charge port allows the vehicle to connect to an external power supply in order to charge the traction battery pack.

DC/DC converter: This device converts higher-voltage DC power from the traction battery pack to the lower-voltage DC power needed to run vehicle accessories and recharge the auxiliary battery.

Electric generator: Generates electricity from the rotating wheels while braking, transferring that energy back to the traction battery pack. Some vehicles use motor generators that perform both the drive and regeneration functions.

Electric traction motor: Using power from the traction battery pack, this motor drives the vehicle's wheels. Some vehicles use motor generators that perform both the drive and regeneration functions.

Exhaust system: The exhaust system channels the exhaust gases from the engine out through the tailpipe. A three-way catalyst is designed to reduce engine-out emissions within the exhaust system.

Fuel filler: A nozzle from a fuel dispenser attaches to the receptacle on the vehicle to fill the tank.

Fuel tank (gasoline): This tank stores gasoline on board the vehicle until it's needed by the engine.

Internal combustion engine (spark-ignited): In this configuration, fuel is injected into either the intake manifold or the combustion chamber, where it is combined with air, and the air/fuel mixture is ignited by the spark from a spark plug.

Onboard charger: Takes the incoming AC electricity supplied via the charge port and converts it to DC power for charging the traction battery. It also communicates with the charging equipment and monitors battery characteristics such as voltage, current, temperature, and state of charge while charging the pack.

Power electronics controller: This unit manages the flow of electrical energy delivered by the traction battery, controlling the speed of the electric traction motor and the torque it produces.

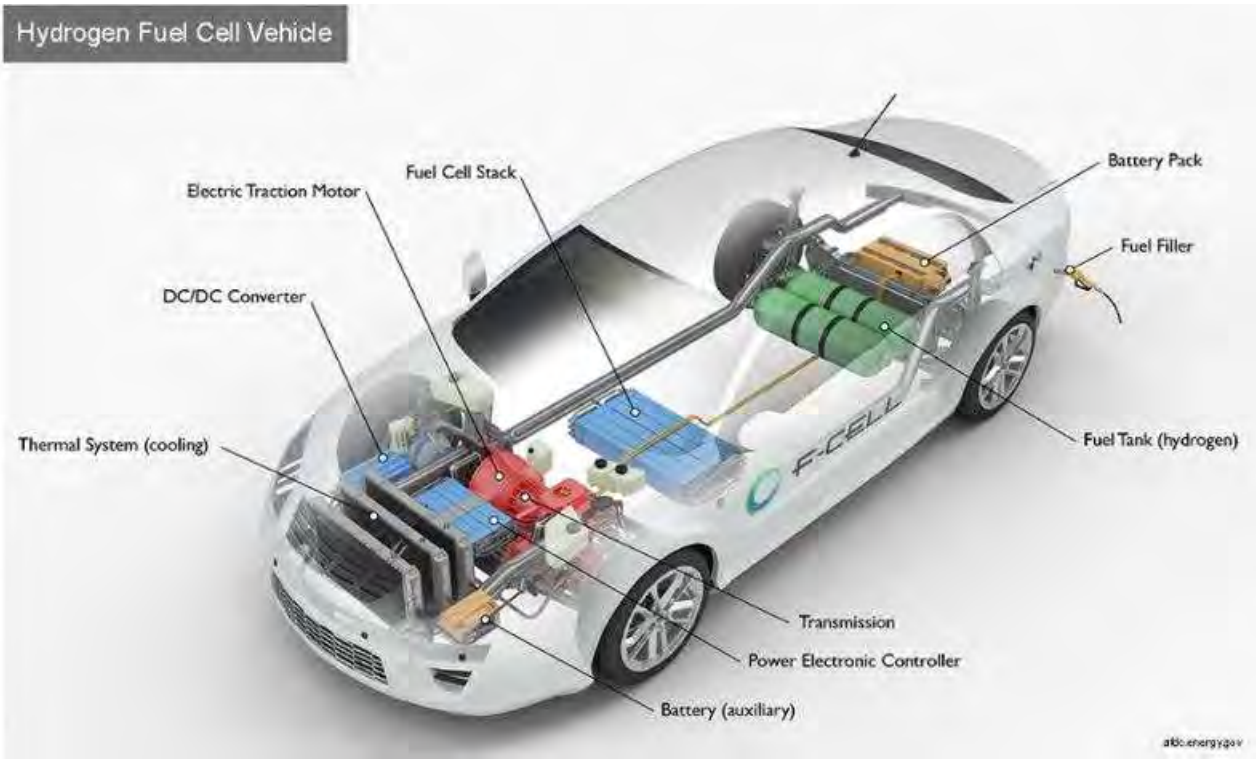
Thermal system (cooling): This system maintains a proper operating temperature range of the engine, electric motor, power electronics, and other components.

Traction battery pack: Stores electricity for use by the electric traction motor.

Transmission: The transmission transfers mechanical power from the engine and/or electric traction motor to drive the wheels.

D. Hydrogen Fuel Cell Vehicle

Another emerging technology is the Hydrogen Fuel Cell. According to the United Stated Department of Energy[14], vehicles using these systems function similarly to EVs in that they use electricity to power an electric motor. However, they produce electricity using a fuel cell powered by hydrogen rather than drawing electricity from a battery.



Key Components of a Hydrogen Fuel Cell Electric Car

Battery (auxiliary): In an electric drive vehicle, the low-voltage auxiliary battery provides electricity to start the car before the traction battery is engaged; it also powers vehicle accessories.

Battery pack: This high-voltage battery stores energy generated from regenerative braking and provides supplemental power to the electric traction motor.

DC/DC converter: This device converts higher-voltage DC power from the traction battery pack to the lower-voltage DC power needed to run vehicle accessories and recharge the auxiliary battery.

Electric traction motor (FCEV): Using power from the fuel cell and the traction battery pack, this motor drives the vehicle's wheels. Some vehicles use motor generators that perform both the drive and regeneration functions.

Fuel cell stack: An assembly of individual membrane electrodes that use hydrogen and oxygen to produce electricity.

Fuel filler: A nozzle from a fuel dispenser attaches to the receptacle on the vehicle to fill the tank.

Fuel tank (hydrogen): Stores hydrogen gas onboard the vehicle until it's needed by the fuel cell.

Power electronics controller (FCEV): This unit manages the flow of electrical energy delivered by the fuel cell and the traction battery, controlling the speed of the electric traction motor and the torque it produces.

Thermal system (cooling) - (FCEV): This system maintains a proper operating temperature range of the fuel cell, electric motor, power electronics, and other components.

Transmission (electric): The transmission transfers mechanical power from the electric traction motor to drive the wheels.

[14] https://afdc.energy.gov/vehicles/how-do-fuel-cell-electric-cars-work

SECTION III -

EXECUTIVE SUMMARY

The Study Committee heard testimony from 54 speakers and stakeholders with expertise ranging across many topics. Several recurring themes were noted by Study Committee members, including:

1. Projected Growth of EV Sector and its Economic Impact

Numerous speakers provided testimony to the Study Committee projecting an exponential increase in EV adoption across the country and in Georgia. The projections varied slightly, but almost all speakers anticipate a sharp increase in EV sales within the next 10 years. Several speakers expressed that about 30 percent of consumers are considering purchasing an EV for their next vehicle.

Further, the Study Committee heard testimony avowing the electrification of vehicles to be the next big technological movement, and supporting industries, such as manufacturing, will likewise be the next arena of economic growth for Georgia.

2. Gas Tax Revenue Recovery

Multiple speakers recognized an emerging concern for transportation funding. Currently, motorists purchasing gasoline fuel pay a tax when they purchase gas for their vehicle. Most motorists are not fully aware that the tax exists, how much it is, or what it funds. However, with newer technology causing ICEs to be more fuel efficient, a shortfall of tax revenue is imminent. Furthering the shortfall, drivers of EVs do not pay an equivalent tax to the motor fuel tax. Several speakers provided data supporting these concerns and a few introduced ideas adopted in other states to address the shortfalls.

Several popular ideas included charging motorists a tax based on the miles they travel a year. These plans are called Mileage Based User Fees ("MBUF"), Road Usage Charges ("RUC"), Vehicle Miles Traveled ("VMT") fees, and Pay Per Mile ("PPM") fees.[15] How the state would record this data without violating the privacy of its citizens was a recurring question. Examples of high-tech and low-tech tracking systems emerged without a clear consensus as to the best solution for Georgia. Challenges to this approach include the lack of a state-wide system to gather the information, highlighting to consumers that they are paying a tax that most do not currently recognize, and consumer resistance to being tracked by the government.

Another approach to recouping the loss in revenue involved taxing EVs by the kWh consumed at charging stations. A drawback to this approach is the inability to capture those EVs charged in homes not using a separate metering system. Currently, their EV charging is included in the household usage and indiscernible from power used to support a refrigerator. This approach, however, would help to capture taxes from those motorists who drive through the state and use Georgia roads.

[15] See testimony in this report from the November 2, 2022 meeting for greater details.

3. Utility Grid Readiness

A major area of discussion amongst Study Committee members was the readiness of the electric grid to support EV charging. Two major scenarios surfaced: (1) the increased demand by DC fast chargers in public spaces; and (2) increased demand by home chargers.

Utility providers gave testimony explaining the processes by which they estimate future power need and consumption, and gave reassurances that they would be able to provide whatever level of power the public necessitates[16].

Testimony from another speaker[17] indicated that if the Vogtle nuclear power plant's units three and four do not come online as expected, there could be a shortfall in available electricity.

4. Utility Sale of Electricity

a. Retail Sales Measured by the Kilowatt Hour versus Time

Testimony was provided for the Study Committee explaining that currently EV charging providers are selling electricity in measurements of time or by a subscription service. This is because many believe the sale of electricity sold by the kWh from EV charging providers to motorist to be forbidden by Georgia law.

b. Sales to Public Charging Providers (Convenience Stores, Hotels, Retail Districts)

There was significant conversation around the competition of utility owned EV chargers against privately owned public chargers. Georgia Power explained how their Community Choice program was deployed and approved by the Public Service Commission in their testimony on September 7 and October 25, 2022. While their chargers make up only 3 percent of the EV chargers available to the public, as was noted by Commissioner Pridemore on several occasions, there were still members of the committee and public who believe the practice is not good policy.

5. Direct Sales of Electric Vehicles

Study Committee members were presented with testimony from automobile dealers and electric vehicle OEMs about the current and future availability of direct sales to consumers.

Currently, there is a provision in law[18] allowing Tesla to sell electric vehicles directly to consumers and bypass the otherwise mandated dealership structure. A bill allowing for the same treatment of electric vehicle manufacturer, Rivian, was presented in the 2022 legislature[19] but did not become law.

Representatives from the affected industry provided testimony to the Study Committee. Traditional manufacturers and dealers argued for the continued existence of the dealership model

[16] See testimony from the September 7, 2022 meeting later in this report.
[17] See testimony from the October 25, 2022 meeting later in this report.
[18] O.C.G.A. § 10-1-664.1.
[19] H.B. 460; https://www.legis.ga.gov/legislation/59687

in Georgia to the exclusion of EV direct sales. Representatives from Rivian and Lucid Motors petitioned for the continued and expanded ability to sell EVs directly to consumers.

SECTION IV -

STUDY COMMITTEE MEETING TESTIMONY

Meeting # 1: August 24, 2022

The first study committee meeting was held in the Coverdell Legislative Office Building in Atlanta, Georgia. The meeting provided introductions to such topics as anticipated electric vehicle adoption rates, National Electric Vehicle Infrastructure ("NEVI") compliant plans submitted by the Georgia Department of Transportation, and the anticipated economic impact of the adoption of EVs on Georgia.

Chairmen Gooch and Jasperse welcomed everyone to the Study Committee meeting by outlining objectives and discussions that they plan for the committee to address. One question they hope to address is how the state will continue to fund the Georgia Department of Transportation projects that rely heavily on the motor fuel tax. That tax provides about $2 billion a year to maintain 100,000 miles of roads and bridges. Another topic the chairmen planned to address is the factory direct sale of electric cars and trucks to the customer. Currently, there is a carve out in the Georgia franchise laws for car dealers that allows Tesla to sell directly to customers. The chairmen plan on hearing testimony about this topic. A third topic the chairmen wanted to address is efficient, reliable charging by motorists traveling long distances. Included in this topic were questions about infrastructure planning, such as who will provide charging stations; who will maintain those stations; and who will collect fees from the customers charging their vehicles.

Testimony was provided by the following individuals:

Shannon Peloquin; McKinsey Capital Projects
Pat Wilson; Commissioner, Georgia Department of Economic Development
Janine Miller; Director of Planning, Georgia Department of Transportation
Tricia Pridemore; Georgia Public Service Commission

McKinsey Capital Projects

Shannon Peloquin, a Partner with McKinsey Capital Projects, provided testimony based on independent studies conducted by McKinsey and Co. She focused her presentation around four main questions:

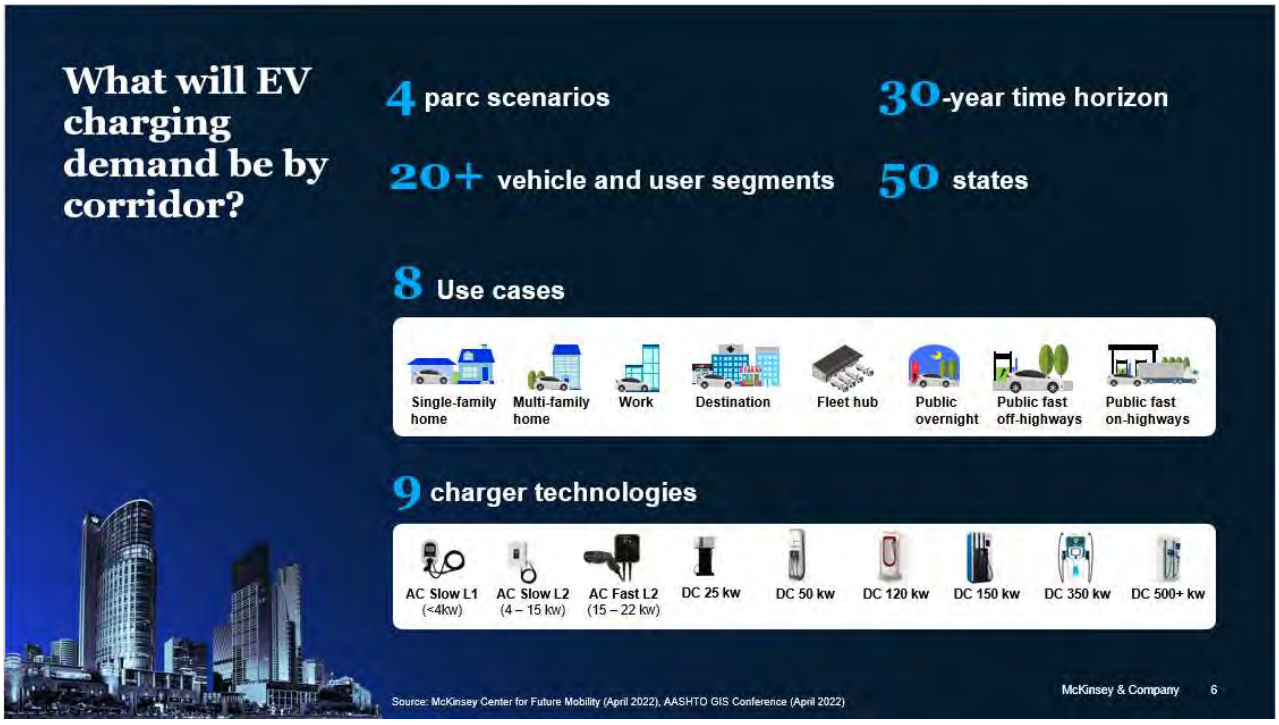
(1) How to think about EVs and EV chargers;
(2) Where chargers should be located;
(3) How to think about EV and EVCI investments; how they can be funded and financed-considering rural versus urban environments and equity to purchase EVs; and
(4) What role do states play in supporting the electrification transition?

Mrs. Peloquin provided general estimates and projections about the adoption of EV technology. McKinsey's research showed that there were about 3 million EVs on the road in 2021. Projections indicate that there will be 16 million by 2025 and 48 million by 2030. This indicates a growth from about 1percent to about 15 percent by 2030.

Mrs. Peloquin noted that automotive original equipment manufacturers ("OEMs") are investing significantly in the transition of production lines to electric vehicles. The largest area of growth for OEM sales is expected to be in the medium and large vehicle categories. These are considered to be personal passenger vehicles or family vehicles.

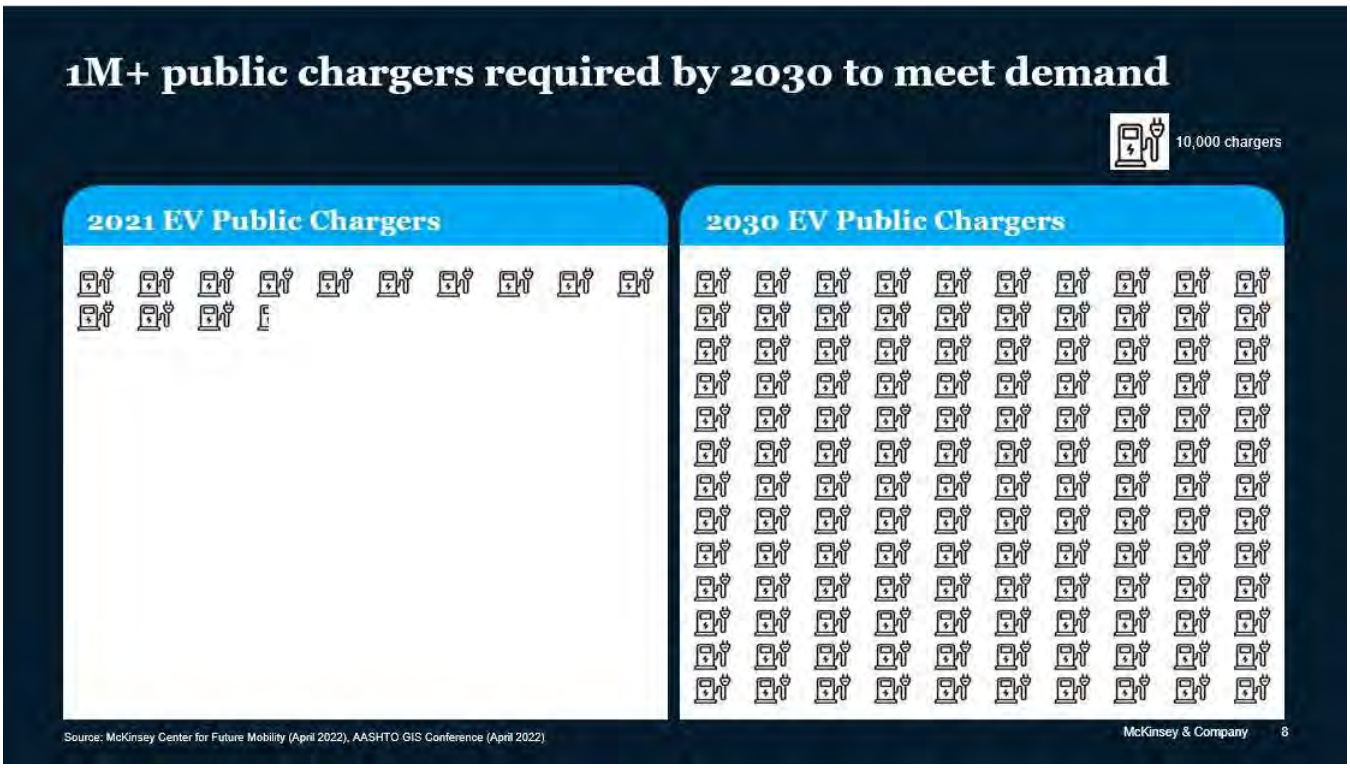
Research indicated that one-third of Americans are considering an EV purchase for their next vehicle which indicates a significant uptick in consumer interest. Questions from the committee revealed that the data was based on a large swath of survey participants and that the numbers included EVs and hybrid vehicles.

1. How to think about EVs and EV chargers. Mrs. Peloquin explained that as her team analyses EV adoption rates and plans, they frame the case analysis on two major questions: How fast consumers will purchase EVs and what those consumers will be using the EVs for. This includes behaviors such as how far they drive, where they are likely to charge, what type of chargers they will use, and how much they will be willing to pay. She provided the following slide to show how many variables a use case can employ.



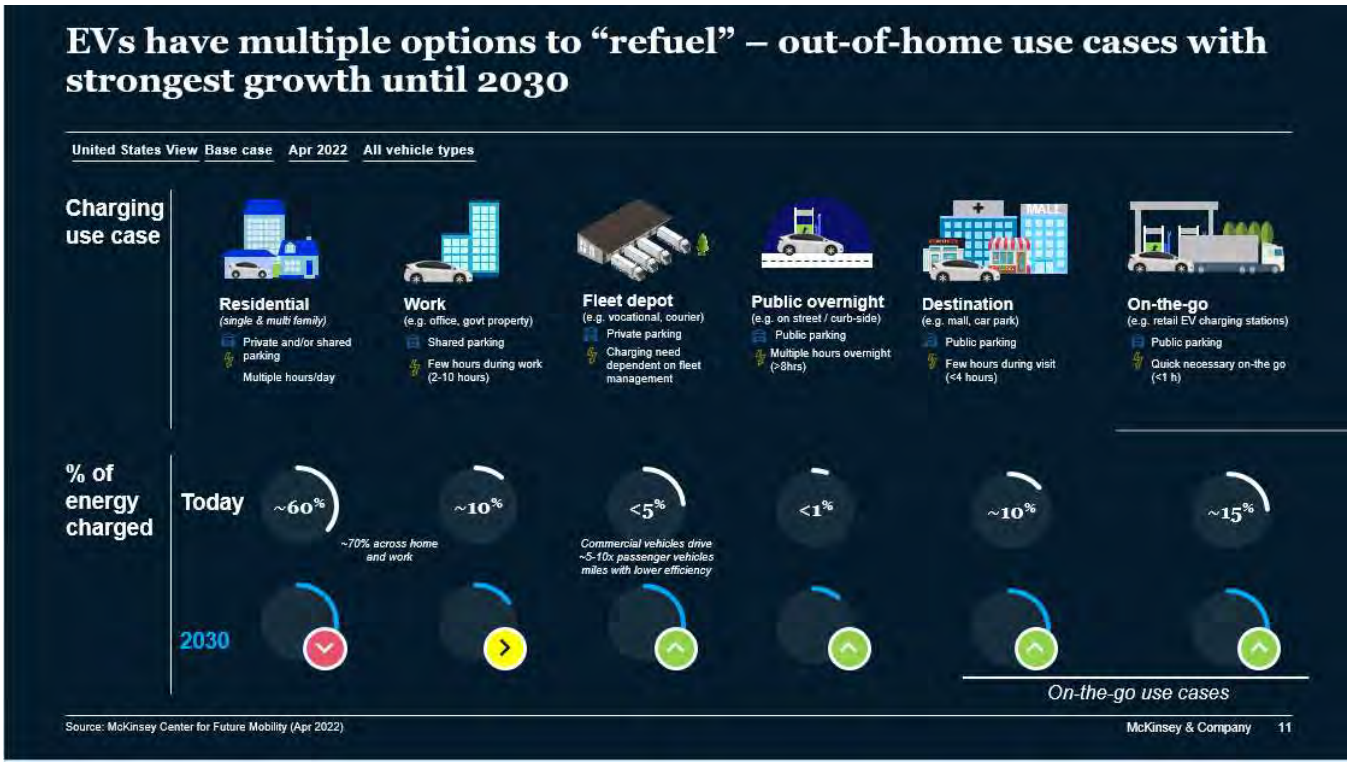
2. Where should chargers be located? Mrs. Peloquin provided a visual representation of the existing EV public chargers available in 2021 and the federal government's aspirations as outlined in the bipartisan infrastructure law[20], which is about 500,000 EV chargers by 2030.

[20] Also known as the Infrastructure Investment and Jobs Act ("IIJA").



Since 2016, there has been significant growth in the number of publicly accessible EV charger outlets, this increase has measured about 20 percent annually. In Georgia, there are currently about 3,800 charging stations. Mrs. Peloquin went on to explain that predictions of energy consumption in the future indicate that about 20 percent of the electricity consumed by EVs would need to be delivered by public chargers. She further noted that a significant amount of charging occurs around fleet depots, work places, destination and retail outlets, and amongst the public on the go. She predicted that these areas will continue to grow while residential charging will decrease.

The accompanying slide shows McKinsey's predictions for energy use in the above mentioned sectors. She noted that residential charging will primarily decrease and that charging for a few hours with a public charger is roughly five to ten times more expensive than charging at home.



Location of chargers was another factor Mrs. Peloquin addressed. She noted that most chargers exist in high-income urban areas. She further noted that when analyzing the likely profitability of a charging station, utilization is a big indicator of profitability, especially among those consumers that are less price sensitive and tend to be early adopters. Questions from the Study Committee indicated that equity considerations for publicly available chargers is one intent of the National Electric Vehicle Infrastructure ("NEVI") plan. This includes placing chargers in rural areas, lower income areas, multifamily housing complexes, or other households who may not have access to a garage.

Mrs. Peloquin provided a sample rubric explaining how potential charger sites might be evaluated. This included such factors as car traffic, and what would be required to actually build the site (including electricity grid access).

Another series of questions from Study Committee members revealed that most home charging is done on a level one charger, which takes about 20 to 40 hours to fully charge a battery. This equates to charging about four miles an hour, which works for most Americans, considering that they travel about 30 miles a day. However, she noted that this may not work for rural Americans who have to drive further distances. Those consumers would likely need to install level two chargers. Senator Ginn noted that once an area starts to install level two chargers, the risk of overloading transformer banks increases. Mrs. Peloquin further added that management programs becomes very valuable once level two chargers are introduced to the grid.

In response to questions from Study Committee members concerning peak load limits and utility preparedness, Mrs. Peloquin indicated that software for demand management is being developed.

3. How to think about EV and EVCI investments. Mrs. Peloquin indicated that more than $30,000,000,000 worth of investment will be made into charging stations for the public on the go. The infrastructure law funding provides $7,500,000,000. However, McKinsey projections state that about 95 to 100 million dollars will be necessary across all use cases (residential, workplace, public on the go, etc.)

Mrs. Peloquin noted that there are a number of incentives provided across multiple federal programs that aimed at creating an opportunity for equity among EV consumers. Questions from members revealed a level of skepticism concerning those programs. She provided informative slides identifying factors that investors will likely consider before committing to the EV market and also considered ways that private investment can be leveraged.

4. What role do states play in supporting the electrification transition? Mrs. Peloquin highlighted six considerations for policy makers to use as they approach EV adoption and buildout. She recommended that they (1) use data-driven baselines and decision making for site and partner selections; (2) ensure a holistic long-term vision and use iterative planning for additional chargers and facilities as needed; (3) take a lifecycle budgeting approach and seek private sector engagement; (4) be intentional around drivers stakeholder engagement, preparing for barriers and adapting to them; (5) promote continuous program improvement opportunities; and (6) consider equity as a priority across location selection and workforce development goals.

Georgia Department of Economic Development
Pat Wilson, Commissioner of the Georgia Department of Economic Development, explained that he believes all industries are moving toward electrification and that it is the future of manufacturing. He noted that over the last ten years, manufacturing has made an exponential move toward electrification.

He provided Kia, as an example. The company is what he described as a "backbone employer" providing about 3,000 jobs, but he further noted that the plant affects about 15,000 jobs in the area. He explained that 55,000 jobs in Georgia are attached to the automotive industry and internal combustion engine ("ICE") technology.

He provided plans for introducing new EVs by such companies as Cadillac and Kia. He provided details of challenges he faced when sampling an EV, including range anxiety and redundant app installation to access chargers.

One deficit in preparedness the Commissioner noted is our country's inadequate battery production. However, he also mentioned that Georgia has secured SK, a battery manufacturer, and thirteen other suppliers to support EVs. He explained that SK provides about 1,800 jobs in Commerce and that manufacturing jobs are the kind of jobs that invest in rural communities and allow people to continue to live there.

Commissioner Wilson complimented the Technical College System of Georgia and explained that he believes it to be the best system in the country. Students are being trained there to work in facilities like SK, where they don't have regular manufacturing jobs. Many of them are computer programmers and have other technical skills. He also noted that he recently returned from South Korea where he was recruiting suppliers because Hyundai would like forty or more suppliers to locate in Georgia near their facility.

Commissioner Wilson said that since 2020 over 13 billion dollars of investment in the production of EVs has been announced in the state, adding over 8,000 jobs, which he believes will not fill the need. Further, he mentioned that the Department is continuing to recruit companies.

Commissioner Wilson further highlighted the importance of recycling minerals and materials from spent batteries. He explained that China has cornered the market on the raw materials used to produce batteries. Currently, 77 percent of our lithium ion batteries are coming from China. Additionally, long-term investments in our country's processing and mining have waned. He explained that the real crux is in the processing of batteries, which the United States does not do well. There are large mineral reserves in the United States, but currently we do not mine or process lithium. Further, mining requires high initial investments and low profit margins.

The committee inquired about criticisms that batteries cannot be recycled. In response, the Commissioner explained that minerals do not diminish in functioning capacity, so they theoretically could be used many times over, creating a continuous recycling loop. He further explained that companies do it in different ways. Aurubis, a copper recycling company in Augusta and Denkai, a Japanese company located in Georgia, will recycle copper into copper foil that will supply the battery industry here in Georgia.

He reminded Study Committee members that batteries have multiple layers of minerals and through a heavy smelting process, about 95 to 98 percent of the minerals can be extracted and returned to the value stream.

Upon prompting, Commissioner Wilson explained that Georgia has an entire value chain in the state and will be the fastest growing EV manufacturing state in the country. The Commissioner also highlighted the Governor's interest and support in the adoption of electrification.

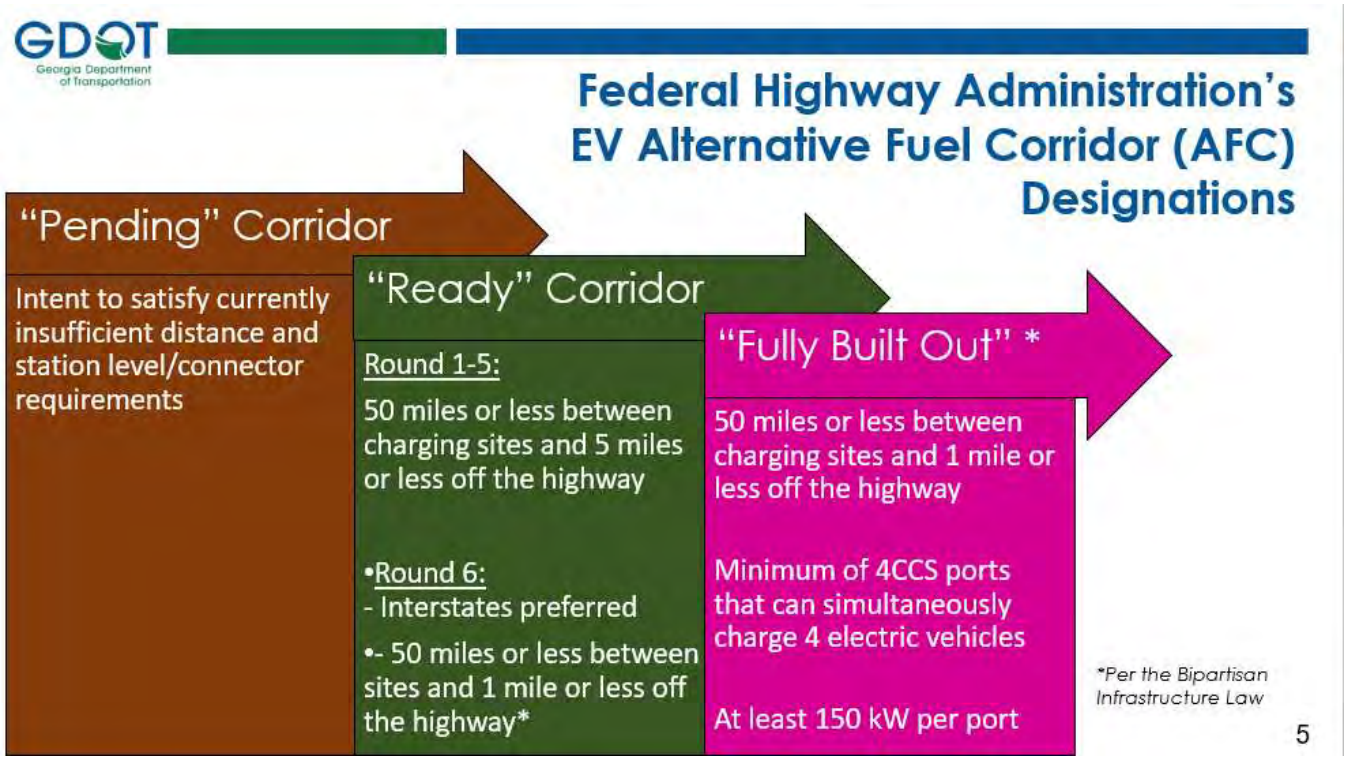
Chairman Jasperse inquired if the Georgia General Assembly should consider something similar to the recycled tire fee and apply it to batteries to keep them in the supply chain. Commissioner Wilson believes that the private sector is going to almost require that those minerals stay in circulation because demand is so high.

Georgia Department of Transportation

Janine Miller, the Director of Planning at the Georgia Department of Transportation ("GDOT"), began her presentation by giving an overview of recent state activity, specifically the activities of the Georgia Electric Mobility and Innovation Alliance ("GEMIA"), and providing an overview of vehicle manufacturing in the state.

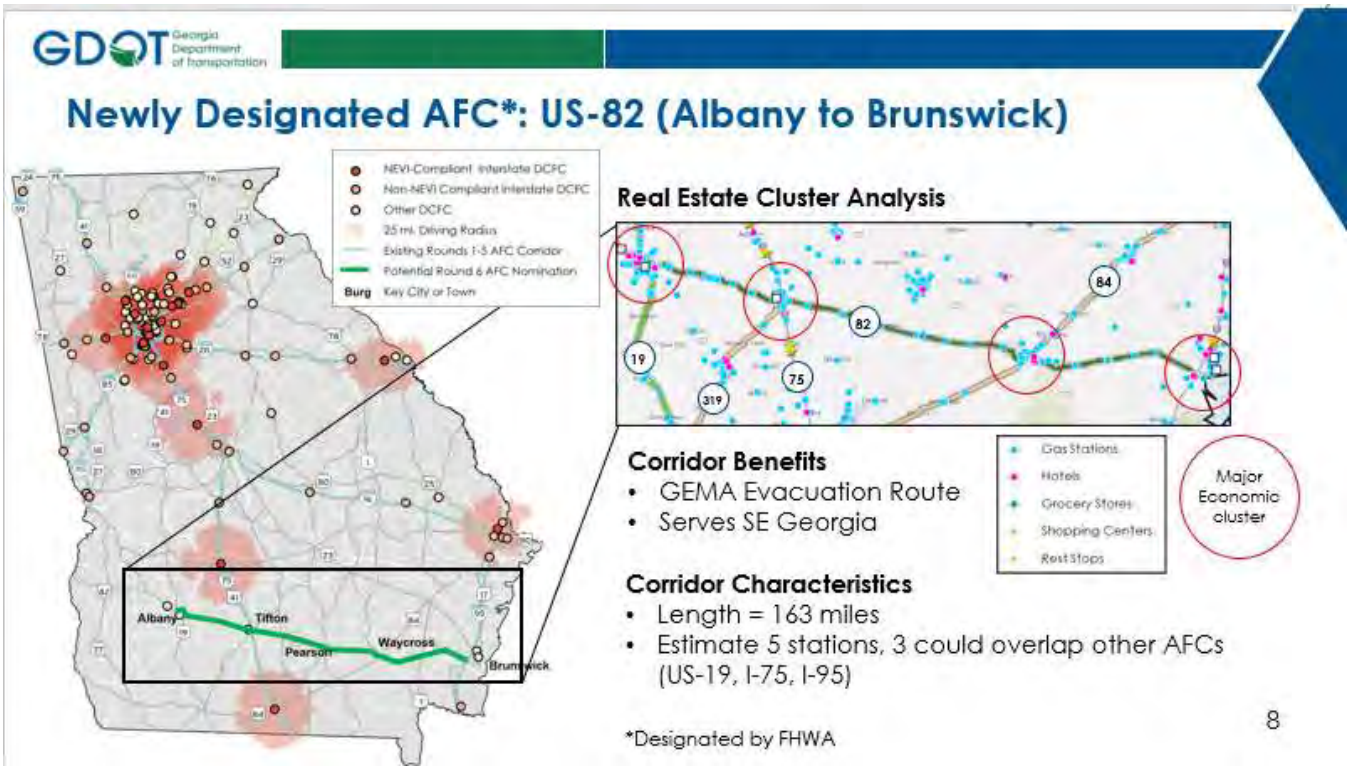
Charging Corridor Requirements

Director Miller explained that the driving force behind GDOT's interest lies within the corridors and availability of EV charging on those routes. Alternative fuel corridors are designated by the federal government in one of three categories. Before the Bipartisan Infrastructure Law was passed, there were only "pending" and "ready" corridors. Five rounds of funding supported those standards, but the most recent round of funding, round six, required that the charging sites be located only one mile or less from highway corridors, whereas they could previously be five miles or less from the highway. This also created a new designation "fully built out" corridors, meaning that chargers are located every 50 miles or less, within one mile from the highway, and have a minimum of 4CCS ports which can simultaneously charge four EVs at 150kW per port.

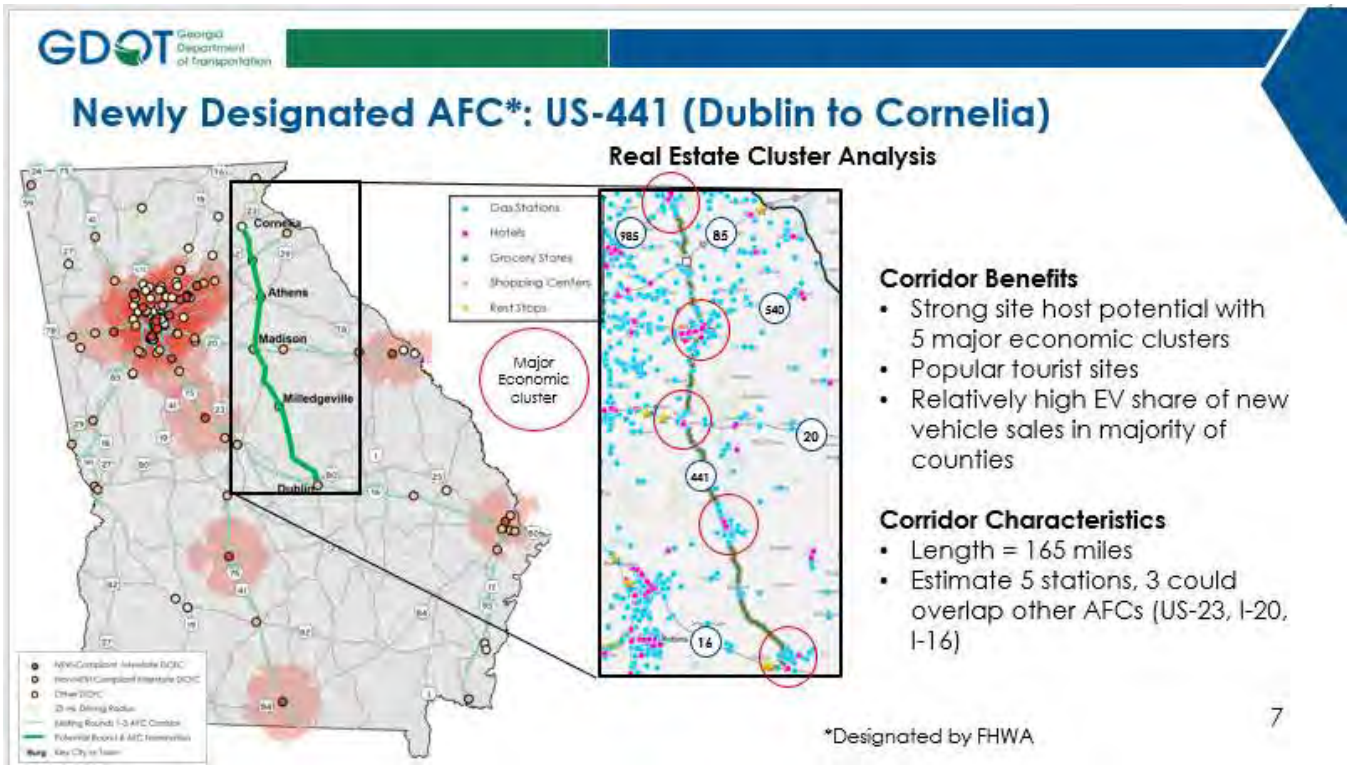


Newly Designated AFCs

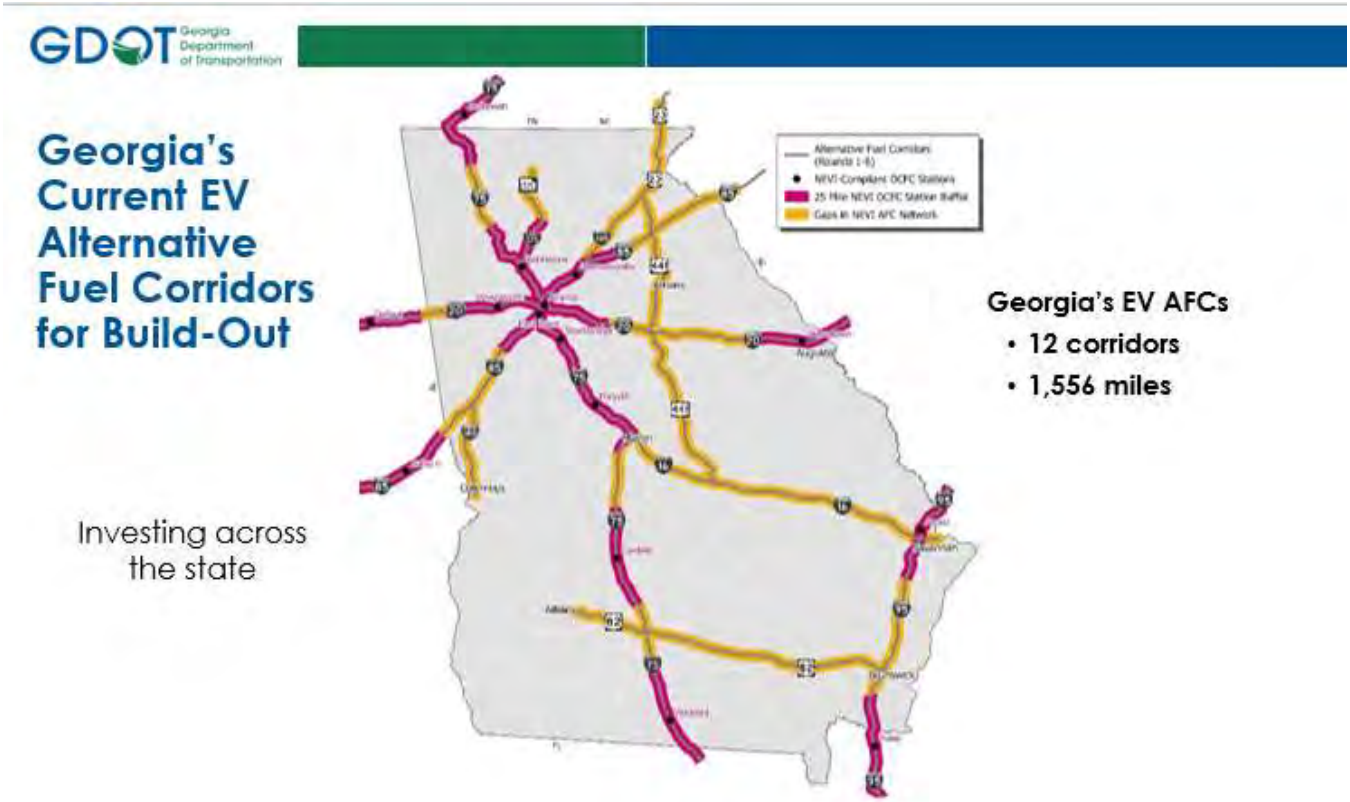
Director Miller provided the factors that GDOT used to evaluated corridors eligible to be added to the network, including: available real estate, if the route supported tourism, and if the corridor is an evacuation route. US route 82 emerged as an important route for evacuees. The addition of this corridor from Albany to Brunswick adds 163 miles to the transportation system offering alternative fueling options.



U.S. route 441 between Dublin, Athens, and Cornelia is also an important corridor. It hosts five major economic clusters and popular tourist sites. The addition of this corridor will add 165 miles to the states AFC system.



Director Miller noted that, in total, the new plan for Georgia includes 12 EV alternative fuel corridors covering 1,556 miles, which adds about 27 percent or 330 miles to our corridors.[21]



Director Miller pointed out that GDOT is inexperienced in this undertaking; she noted that she knows of no state DOT that has ever installed gas stations or other fueling options for motorists. However, she explained that GDOT is starting slowly and plans to expand its reach as necessary to create additional corridors. She also noted that GDOT will develop a state freight plan where they are interacting with the Department of Defense and military installations. The Commissioner of Transportation added that Georgia is ahead of the curve in the southeast for alternative fuel corridors. Director Miller added that Georgia has over 3,800 public charging ports among 1,500 stations, but only 12 of those are NEVI compliant.

Director Miller explained that the Federal Highway Administration's ("FHWA") National Electric Vehicle Infrastructure ("NEVI") Program was funded by the bipartisan infrastructure law, which provided for $7.5 billion dollars to be allocated nationwide through 2026. $4.2 billion is earmarked for state DOTs for strategic deployment of EV charging infrastructure. Additionally, $500 million in grants is available to fill in gaps and $2.5 billion will be available as discretionary grants. These additional programs will be awarded by the joint program office.

[21] Director Miller noted that Tesla chargers are not included in NEVI plans.

Director Miller reiterated Mrs. Peloquin's testimony, providing that the purpose of the NEVI program is to deploy 500,000 EV charging ports by 2030. These ports are to be a convenient, reliable, affordable, and equitable charging experience for all users. Further goals include accelerating the equitable adoption of EVs (including for those who cannot reliably charge at home); and positioning U.S. industries to lead global transportation electrification efforts.

She believes that Georgia will receive upwards of $135 million through fiscal year 2026. Director Miller explained how GDOT created and submitted Georgia's NEVI plan[22], pointing out the key elements that were required. Some of these elements included: a 97 percent "uptime" (or time the port is adequately functioning), 24/7 accessibility by the general public, and cybersecurity.

She clarified that GDOT is only aiming to satisfy consumers on very long trips, considered 250 miles or more, which will require predominantly level 2 chargers.

A series of questions from Study Committee members explained that level one and level two chargers are primarily used at home and around town, while DC fast chargers are more likely to be used for interstate travel. Other members mentioned concerns that building out an EV infrastructure with a significant amount of uncertainty may not be a prudent use of tax payer money.

Georgia Public Service Commission

Tricia Pridemore, Chairman of the Georgia Public Service Commission ("PSC"), provided testimony to the Study Committee. She began by explaining the role of the PSC, which is made up of five commissioners. The PSC regulates rates, territory, and oversees the IRP[23] for Georgia Power and the 2.7 million Georgians they serve. Additionally, the PSC regulates territory for municipal electric providers and Electric Membership Corporations ("EMCs"). Further, it regulates financing for EMCs, and hears and adjudicates Territorial Act cases.

Commissioner Pridemore provided a summary of the 1973 Territorial Act[24] by explaining that the purpose of the act is to (1) assure the efficient provision of retail electric service; (2) inhibit the duplication of power lines; (3) foster the extension of power lines so as to preserve the environment; and (4) protect power lines lawfully constructed. She further explained that the Act implements a plan whereby every area in the state is either assigned to an electric supplier or is declared to be unassigned. It subjects all electric suppliers in Georgia to the requirements of the Act and grants the PSC the power to regulate and enforce the Act.

She explained three key concepts under the Territorial Act. The first was an exception to territorial service rights which applies when a new customer with a load of 900 kW or greater begins service. They can choose their electric provider at the onset of construction. This customer choice component supports Georgia's nationally competitive economic development structure. Second, she mentioned a grandfather clause that allows electric suppliers to continue serving premises they previously served, regardless of their location. Lastly, she mentioned a prohibition of discriminatory rates and tying arrangements.

[22] The plan is available at: https://nevi-gdot.hub.arcgis.com/ .
[23] Integrated resource planning, which is a 20 year strategic plan analyzed every three years.
[24] O.C.G.A. § 46-3-1 through § 46-3-15.

She further stated that the Territorial Act defines an electric supplier as any electric light and power company that generates, transmits, and distributes energy. She added that some might argue that the exclusive rights conferred by the Territorial Act extend only against other electric suppliers, but that no court or commission has issued a decision supporting such a limited construction.

Next, Commissioner Pridemore explained the application of the Territorial Act on EV charging services. She stated that the Act specifically addresses the provision of retail electric service to premises, which she said is defined as a building structure or facility to which the electricity is furnished. She surmised that a motor vehicle is inherently mobile and is not, therefore, a premise. She further explained that the because EV charging service is not provided to a premise, but instead a transient motor vehicle, such service does not constitute the provision of retail electric service.

She explained that Georgia Power has provided retail electric service to EV charging service providers, such as Tesla and Electrify America, for many years and have not claimed that their provision of EV charging services has violated the Territorial Act. She further elaborated that this perspective was reinforced by the PSC in a recent case, docket # 39844. Senator Walker posed a question which clarified that the Territorial Act applies to providing power to the charging stations but does not apply when charging stations are providing power to the EVs. Also, the anticipated NEVI ports would only require 600 kW for four ports, placing them below the 900kW threshold. However, Senator Ginn proffered a hypothetical scenario where 10 350kW chargers were collected in a charging bank, which Commissioner Pridemore stated would qualify as a customer choice load.

Upon prompting from Study Committee members, Commissioner Pridemore further elaborated that the charging station is not a retail electric supplier. Rather, they are purchasing retail electric service from one of the electric companies. Charging companies sell or bill charging based on time and not kW.

Representative Powell asked if a convenience store or other charging facility who had invested in a charging station, could resell power by the kW. Commissioner Pridemore explained that charging by the kW would likely make them fall under the definition of a retail electric provider. He then provided an example where Tesla owners can buy a subscription and avoid buying power by the kW. He state that he believes private investments would likely not occur until retailers can sell power by something other than by metrics of time or subscription. Chairman Parsons noted that the Territorial Act can be changed by the legislature if becomes necessary.

Commissioner Pridemore explained the benefits of the Territorial Act as being threefold; It provides lower rates, increases reliability, and supports economic development. She stated that Georgia has electricity rates 15 percent below the national average and the prohibition against duplication of services in the Territorial Act is a big reason why. She provided examples of unregulated states and the pitfalls of those models. She stated that the stability of Georgia's electricity supply is due to the diverse energy sources in use. She also explained that utilities need to have base load to encourage renewable sources, which are usually the traditional sources of energy. She explained that Georgia has not retired all of the coal plants in an effort to ensure a reliable baseload and that plant Vogtle units 3 and 4 will be coming online providing 500 megawatts each starting the first quarter of 2023 and then in 2024.

Commissioner Pridemore mentioned the rate cases from 2016 and 2019 where the planning of EV generation and transmission first started. She explained that Georgia Power provided 69 chargers for electric vehicles and that now there are 187 prepared to come online. She continued, that only about three percent of the state's charging stations are owned by a utility.

Representative Powell asked if Georgia would be facing the possibility of brownouts with the sudden increase in electricity consumption. The Commissioner reassured him that it will not be a problem as long as she is a commissioner. She recognized that the trend across the country is to electrify everything, but also noted that it is her job to ensure that the winter and summer reserve margins are met. She elaborated that with the recent IRP, the PSC approved the purchase of six new gas power purchasing agreements. She explained that purchasing natural gas plants or provisioning natural gas plants provides stability to our system, in much the same way that keeping Plant Bowen[25] units one and two do.

[25] Plant Bowen is a coal fired power station.

Meeting #2: September 7, 2022

The second meeting was held at Brasstown Valley Resort in Young Harris, Georgia. Topics covered during the meeting include energy use trends; expected adoption of EVs; the future of retail sale of electricity for charging; utility grid projections and planning; smart road wireless charging; and direct versus dealership sales of EVs.

The following individuals provided testimony:

Michael Dwyer; U.S. Energy Information Administration
Angela Holland; Georgia Association of Convenience Stores
Jay Smith; Charge Ahead Partnership
Dean Bushey; Travel Centers USA
Allie Kelly; The ASPIRE Center
Stephanie Gossman and Jeff Grub; Georgia Power
Beau Whiteman; Rivian
Jeff Pratt; Georgia EMC
Daryl Ingram; Electric Cities of Georgia
Anne Blair; The Electrification Coalition
Nick Steingart, Alliance for Automotive Innovation
Jim Alvis; KIA Motors
Ben Jordan; Georgia Automobile Dealers Association
Mike Demenicone, Classic Cadillac of Atlanta and Classic Subaru of Atlanta
Timothy Redding, Jr, Dublin Ford Lincoln
Jimmy Ellis, Jim Ellis Automotive Group

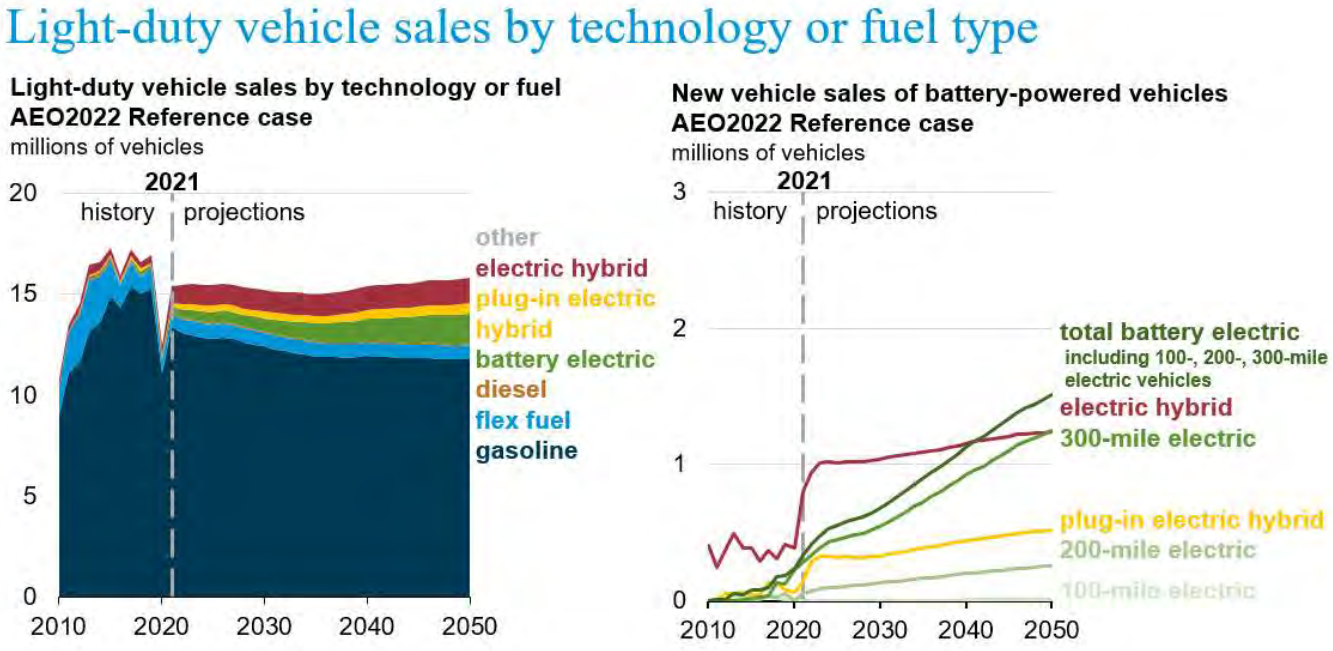
U.S. Energy Information Administration

Mr. Dwyer, with the Transportation Demand Team at the U.S. Energy Information Administration, joined the meeting by Zoom. He presented modeling results from the Annual Energy Outlook ("AEO") and provided some of the assumptions which were incorporated into the models. His presentation, titled "Projecting Light-Duty Electric Vehicle Sales in the National Energy Modeling Systems ("NEMS")" explained that the AEO is developed using NEMS[26].

Some of the projections shared with the Study Committee focused on light duty vehicles, not freight duty fleets. The modeling suggests that if 100 percent of cars sold from now on are EVs, it will be 25 years before the entire fleet of light duty vehicles on the road are EVs. It is further estimated that it will be about 15 years before half of the light duty vehicles on the road are EVs.

He explained that sales across different powertrains (including fuel economy, vehicle price, acceleration, range, luggage space, etc) are projected based on previous consumer purchasing data. Mr. Dwyer explained that vehicles with an internal combustion engine (gasoline, diesel, flexfuel, etc), whose share of the market was 92 percent in 2021 is expected to drop to 79 percent in 2050. The sales of battery electric vehicles with a 200 mile range is expected to grow five-fold from about one-third of a million to around one and a half million by 2050. Sales of plug-in hybrid electric vehicles ("PHEV") are expected to triple from 144,000 to 520,050 by 2050.

[26] NEMS incorporates current laws and policies and does not anticipate disruptive technologies or revolutionary practices. He explained that transportation is only one piece of the broader framework of the NEMS model. The modeling conditions for AEO 2022 were based on conditions in November 2021 and did not incorporate many recent policy changes to support the adoption of electric vehicles.



Mr. Dwyer explained that the model considered four conditions affecting vehicle sales in projecting EV adoption. Policy, price of batteries and materials, price of vehicles to consumers, and cost to drive. However, it is worth noting that as battery costs are expected to diminish by half for both EVs and PHEVs by 2050.

Mr .Dwyer explained that currently, most EVs are priced as luxury vehicles and primarily participate in the luxury vehicle market. The luxury vehicle market accounts for about 20 percent of the total market and 15 of that 20 percent is for EVs. Outside of the luxury market, EV sales account for about half a percent. Widespread adoption would likely require a decrease in price for consumers.

Projections show an estimated 50 percent decrease in the cost to drive an EV compared to a traditional vehicle. This assumes home charging prices, which may not necessarily be available for multi-family dwellings and apartments.

Georgia Association of Convenience Stores
Angela Holland, President of the Georgia Association of Convenience Stores, began her remarks by explaining that she represents chain and independent convenience stores in rural and urban areas. After a brief explanation of the services her members provide across the state, Mrs. Holland opened her substantive comment by referencing to a bill[27] that Representative Powell sponsored in the 2022 legislative session. She claimed that this bill (1) allowed the resale of power per kilowatt in a way that did not violate the Territorial Act, (2) asked for the major utility company in Georgia to provide an electric vehicle charging rate, and (3) required the major utility company to provide charging stations to the motoring public on a level and competitive platform with other companies in the business. Further, she stated that the bill would have denied electric suppliers

[27] Mrs. Holland did not provide a bill number, but she may have been referring to HB 1322, which was authored by Representative Alan Powell and addressed the deployment of electric vehicle charging stations.

the ability to recover the costs of providing, owning, operating, and maintaining EV charging equipment from ratepayers. She provided more details on this bill.

Mrs. Holland also provided commentary as to the convenience stores' fitness to provide EV charging to the motoring public in the future. She expressed that convenience stores provide about 150,000 gas pumps in Georgia. It is the job of convenience stores to provide fuel to the public. She asserted that they sell all types of fuels and are "fuel agnostic." As an example, she explained that convenience stores sell gasoline, diesel, ethanol, and biodiesel. She further explained that they are the only industry that is priced at the pump and advertises as such to create a competitive market.

She claims that the law discourages investment in EV charging stations because retailers cannot resell power and therefore cannot compete with a monopoly. Further, she exerted that retailers cannot resell a product if they don't know the cost that they pay to purchase that product. Once changes are made, she believes retailers will enter the EV charging market.

Mrs. Holland explained what requirements make a charging station NEVI compliant, and explained how the convenience store retailers would be able to accommodate some of those requirements.

She referenced several articles supporting her claim that a lack of EV charging infrastructure exists and provided the Study Committee with those articles. She highlighted that many EV charging stations are located in parking lots and do not have an attendant or representative to assist stranded motorists if a charging apparatus is nonfunctioning.

She pointed out that one of the challenges facing the state, would be collecting tax for refueling. She highlighted that prior to 2008, convenience stores collected gas retail sales tax and remitted that tax back to the state. Senator Gooch and Mrs. Holland discussed how those taxes could be collected and remitted. Mrs. Holland pointed out that it would likely be easiest for the state to collect them from the power companies because they are fewer in number. Therefore the convenience stores would purchase prepaid kilowatt hours. They also discussed different structures for metering systems.

Charge Ahead Partnership

Jay Smith is the Executive Director of the Charge Ahead Consortium, which is a group of organizations advocating for rapid adoption of electric vehicle infrastructure. He hopes that charging an EV will become as easy for consumers as accessing gas today. He provided a number of reasons that retailers have been hesitant to jump into the EV charging business, even though they already have real estate for providing charging, the amenities that drivers have come to expect, and a system of transparent pricing. There are two major barriers that prevent companies from getting into the EV charging business. (1) They cannot compete with power companies who are able to subsidize their costs using money from ratepayers; and (2) The rate structure for EV charging is not workable for businesses to recoup; this is partially due to the demand charges which are not passed on to the drivers who charge from power companies. He expressed concern that the model for charging in Georgia would be built on a monopoly utility instead of on private investment. He further explained the pitfalls of allowing power companies to compete with other retailers in an unequal playing field.

Mr. Smith believes in removing obstacles in the way of retailer investment in the infrastructure of EV. He believes this is not an anti-utility position, but a pro consumer/pro driver position.

Recommendations from Mr. Smith include: (1) third-party power provider should be allowed without being deemed a utility company. A simple change, consistent with other states, would allow retailers to charge by the kilowatt hour rather than by the minute; (2) prohibiting utility monopolies from "rate basing" for EV charger ownership and operation; (3) a transparent, common-sense rate structure.

Mr. Smith recommended that power companies who provide EV charging operate as separate non-regulated subsidiaries. He noted that this currently takes place in the both the telecom and natural gas markets.

He noted that Georgia's NEVI plan is one of the best submitted and further stressed that the purpose of the NEVI act is to support private investment.

Commissioner Pridemore added to the Mr. Smith's comments that the 2022 rate case is filed under the guidance of the PSC by Georgia Power. The rate case is only for "make ready" and "desert charging". She explained that less than 3 percent of the chargers on the market in Georgia qualify for the rate case distribution. She further claimed that there is no rate recovery that is set up in the rate case to specifically help the electric utilities. She further explained that there are three EV tariffs that the PSC has set and only one of those tariffs has a demand charge. She later clarified that there are only 69 Georgia Power charging station. They all in desert charging sectors and they have been rate based.

Representative Jasperse inquired if other state utility providers are operating with subsidiaries that provide EV charging. Mr. Smith explained to him that most states are operating the way utilities are in Georgia and that subsidiaries are not appearing except in states that require it.

Travel Centers USA

Dr. Dean Bushey, Senior Vice President of Sustainability Travel Centers USA, provided a case study of his company. His company provides rest stops along major highways. As they begin to incorporate electric vehicle charging, they plan to cater to drivers that are driving more than 80 to 100 miles on a charge. Travel Centers USA rest stops average about 20 to 25 acres per site. Here they offer an abundance of amenities that drivers might want to use while charging, including full service restaurants and clean bathrooms with showers.

Mr. Bushey expects that his customers will want very quick charging stations and he is considering chargers of varying charging capacity, from 150 kilowatt to one megawatt charger. He anticipates that these chargers will put tremendous stress on the grid. He echoed sentiments voiced by previous speakers about the industry hesitancy of investing in charging stations without market and regulation certainty. He also returned to the concept of fuel charge transparency and allowing the consumer to see what they are paying in taxes versus what they are paying to the utility.

Dr. Bushey explained the factors that Travel Centers USA considers when deciding if they will place chargers in a location. They consider (1) if the area is rural; (2) the adoption or utilization rate in the area; (3) the cost to install; (4) the utility rate for electricity; and (5) if they are spreading out into all states.

The ASPIRE Center

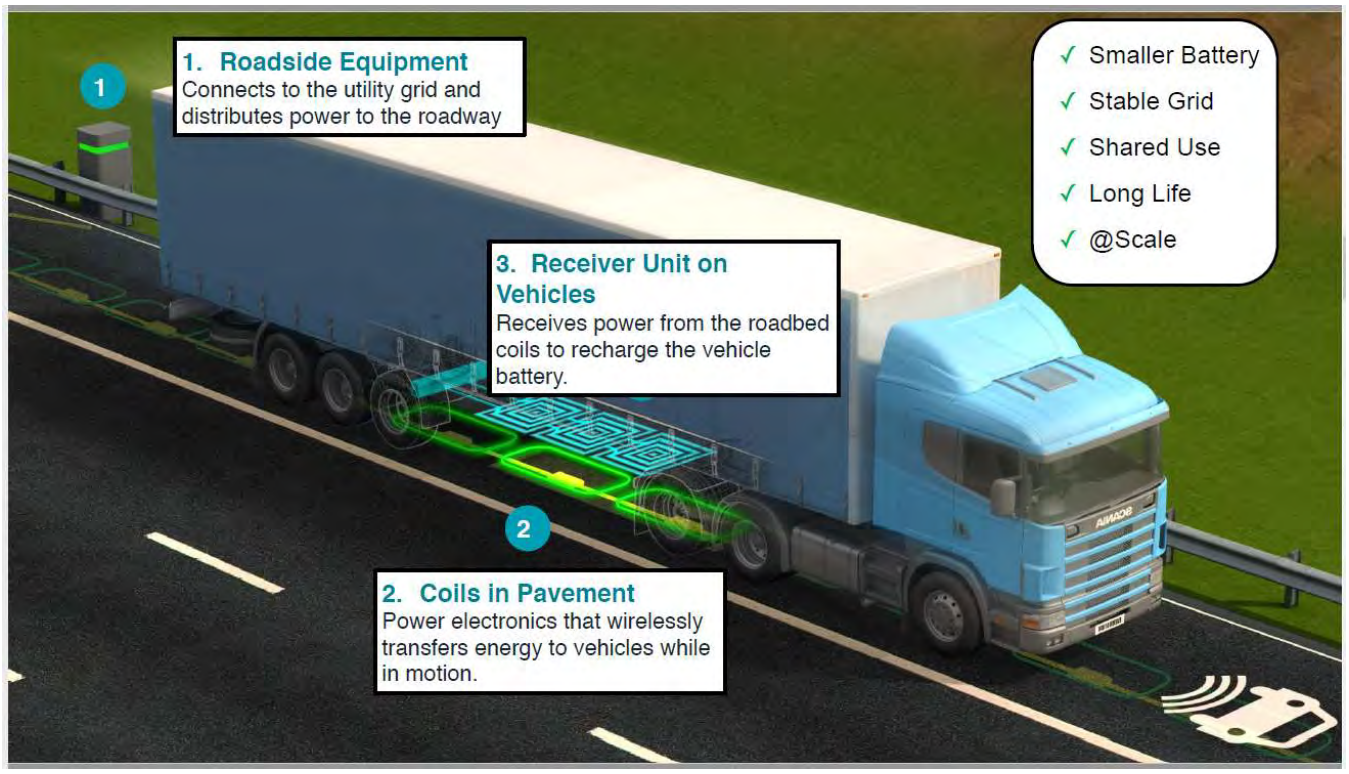
Allie Kelly provided information on both the ASPIRE Center and The Ray. Mrs. Kelly is the Executive Director of The Ray, which she described as a non-profit based in Atlanta. The Ray works on an 18 mile stretch of Interstate 85 where they have developed a test bed for advanced technologies in transportation. The organization is named after Ray Anderson, who pioneered net zero and circularity concepts and practices in heavy industry.

She explained that The Ray is committed to deploying projects for scale across the country and that 26 states are partnering with The Ray currently. She highlighted that the first project was a solar powered 50 kw charging station developed in partnership with Kia Georgia. At the time, 50 kw was a very fast charging speed.

Mrs. Kelly then began to explain the ASPIRE Center, which is a national science foundation engineering research center. The Ray has been an innovation partner to ASPIRE since 2018.

She provided a scenario where a heavy-duty vehicle would be equipped with a battery providing a 500 mile range, costing $150,000, and weighing 15,000 pounds. This scenario is based on current industry projections. However, Mrs. Kelly also provided a scenario where heavy-duty trucks have smaller batteries that cost less, weigh less, and have a smaller range. These batteries could be used on heavy-duty vehicles that use other methods of charging. She explained a smart road system that has inductive loops sunk into the roadbed. These loops receive energy from power sources located on the roadsides and right-of-ways, such as solar panels. The inductive loops in the charging lane create a magnetic field where alternating current can be shared and distributed over the air. The magnetic field can be turned on and off so that it is a "just-in-time" delivery. Vehicles charging on the smart roadway system must have a receiver on the undercarriage of the vehicle.

She further explained that the inductive loops are sunk about two inches into the roadbed and transmit between 50 to 100 kw. A test track affiliated with ASPIRE in Utah has proven 50kw to 100kw transmission at interstate speeds with efficiencies of 87 to 94. She mentioned that this is on par with wired charging.



Mrs. Kelly explained this technology has been particularly useful on the west coast and gave the Los Angeles port as an example. Because the workers at the Port of LA are unionized, and the unions are opposed to handling cables that provide for large amounts of power, they have installed wireless charging. Trucks that are queuing to pick up loads receive charge wirelessly from the road bed, while moving at a crawl. Similarly, the port of Portland has a wireless megawatt charging station. Mrs. Kelly provided examples of similar wireless charging facilities across the country that are associated with the ASPIRE Center.

She noted that the wireless technology is not NEVI compliant, but also pointed out that the federal government has stated that wireless dynamic charging lanes are as important as the transportation use for the right of way. Indicating that the federal government believes that incorporating infrastructure like this is a priority.

Georgia Power
Stephanie Gossman the Electric Transportation Manager for Georgia Power Company and Jeff Grub, Georgia Power's Director of Resource and Policy Planning presented as a panel.

Mrs. Gossman leads a team that is responsible for the development, implementation, and administration of Georgia Power's electric transportation offerings. She expressed that a major concern of her office is providing customers with reliable and affordable electric service, which includes the infrastructure needed to support Georgia's growing electric transportation sector. She explained that private charging service companies presently own about 97 percent of the public charging infrastructure in Georgia. In addition to supporting the state's public charging infrastructure, she explained that Georgia Power also acts as a charging service provider of last resort by installing a limited number of publicly available DC fast charging sites throughout the state. The areas where these chargers were installed were deemed unlikely to see private

investment for many years to come. These charging stations are provided on a limited basis through a program called Community Charging, which was approved by the Georgia Public Service Commission in the 2019 rate case filing. In the 2022 rate case filing, Georgia Power requested an increased level of funding for the Community Charging program based on inflation and desire to accommodate increasing technology capabilities. She expressed that it is not Georgia Power's intent to deploy vast numbers of utility-owned public DC fast chargers.

She expressed two areas of concern for customers who wish to provide EV charging to EV drivers.

1. Charging by the Kilowatt/hour instead of by unit of time. Mrs. Gossman expressed that Georgia Power does not believe that anything in the Territorial Act prohibits charging companies from billing by the kilowatt hour for charging services; they recognized that additional clarity is needed.
2. Demand Charges for EV Charging Providers. Mrs. Gossman explained that Georgia Power has filed a rate rider in the 2022 rate case to specifically address the concern of demand charges and to mitigate them for customers.

Jeff Grubb, Georgia Power's Director of Resource and Policy Planning, discussed the grid planning process and how Georgia Power is preparing to meet customer needs. He explained that while Mrs. Gossman discussed the company's plans to provide infrastructure, he would address how Georgia Power will be providing energy to those chargers through generation resources, transmission, and distribution wires. His role at Georgia Power is to developing long-term generation planning for the company and the integrated resource plans that are filed with the PSC.

Mr. Grubb explained that the company has a very robust load forecasting process and an entire group that is dedicated to looking into economic trends. Currently, this group is already incorporating residential charging and commercial charging in their forecasts. They are estimating about 250,000 EVs by 2030 and then about 600,000 by 2040. They are estimating about 70,000 cars a year in EV growth. For Georgia Power, charging these vehicles only represents about one percent of the total peak demand and they expect it to grow to around three percent by 2040. He explained how regularly the transmission line loads are measured and expressed confidence that Georgia Power will be able to project and respond accordingly to increased demand. He also expressed that in situations where a fleet conversion occurs and there is a significant increase in charging vehicles in an area, the customers are usually in communication with Georgia Power, allowing them to plan accordingly. He explained further practices for forecasting.

Senator Gooch asked how Georgia is insulated from the problems that California has faced with insufficient power supple. Mr. Grubb explained that while he is not an expert on California utilities, he understands that their PSC does not allow them some of the flexibility that we have in Georgia. Specifically, there is less incentive to adopt some of the practices Georgia Power uses to provide reliability, because their utility companies can only charge ratepayers when they are generating power. In Georgia, the PSC allows utilities to recover costs for taking steps to secure power, such as purchasing a surplus of fuel sources.

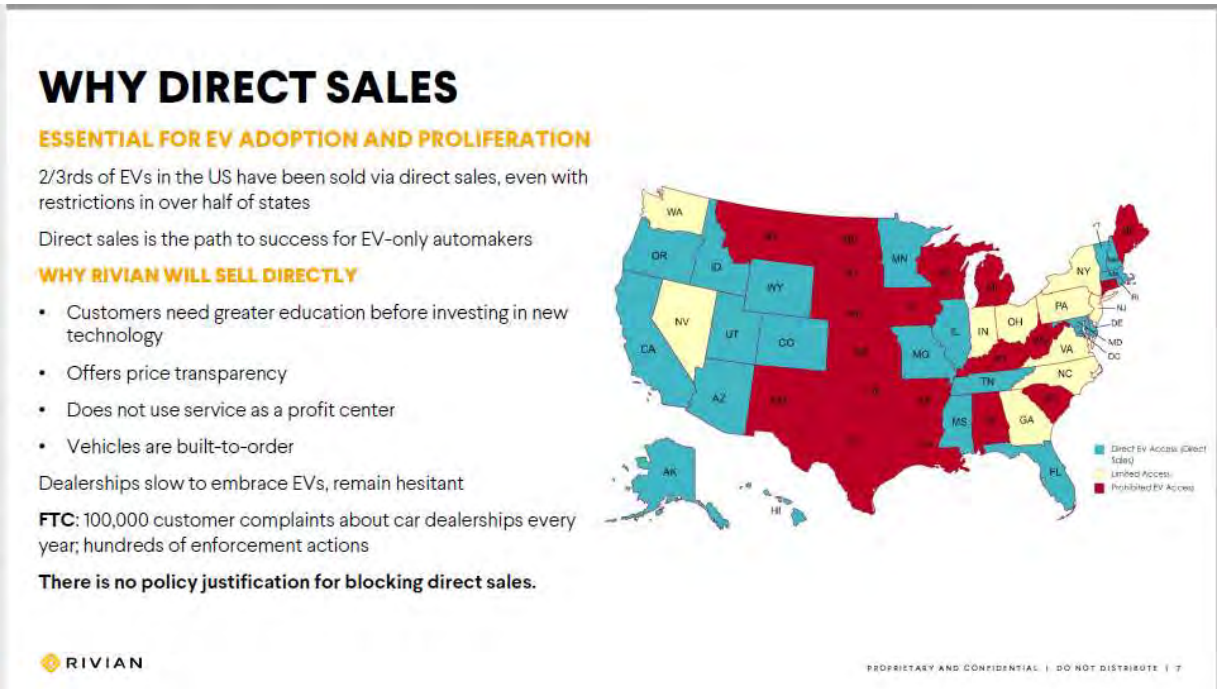
Representative Alan Powell expressed his concern that ratepayers are subsidizing the cost of EV chargers and infrastructure to support EV drivers. It is his belief that business and homeowner rates should not be subsidizing someone else's EV charging. He believes that the EV chargers should be taking care of themselves. He asked how much money has been directed to the Community Charging program. Mrs. Gossman explained that the PSC approved Georgia Power to spend six million dollars over three years.

Rivian Automotive Group
Jim Chad, Vice President of Public Policy and Chief Regulatory Council; Chris Evans, the Senior Direct of Public Policy; and Leslie Hayward, the Policy Communications Manager for Rivian Automotive Group joined the Study Committee over zoom.

Mr. Chad explained that Rivian is an independent U.S. manufacturer of electric vehicles that was founded in 2009. They developed the first electric pick up truck available in United States. It was designed, iterated, and is currently being built in the United States because Rivian is devoted to domestic production. Rivian is currently producing three vehicles: the R1S, R1T, and the EDV (which is an amazon electric delivery van). This rollout was the first time that any Original Equipment Manufacturer ("OEM") was able to certify and release three vehicles into the market at the same time.

Rivian plans to open its second manufacturing facility in Georgia and is making a $5 billion investment. It will establish about 7,500 jobs with salaries averaging about $65,000 a year. Rivian is working with Walton, Newton, Monroe, and Jasper counties to develop electric vehicle career pathways.

Mr. Chad explained that despite the great relationship between Georgia and Rivian, he anticipates challenges in the future. He explained that in 2015, the Georgia legislature changed state laws to block new EV-only manufacturers from selling directly in the state. There is, however, an exception for Tesla. He explained that Rivian is a direct to consumer sales company and they would like to be licensed as their own dealer. Current law prevents vehicles that are being built in Georgia from being sold in Georgia. He expressed that the purpose of allowing Rivian the same carve out as Tesla would not be to push out local dealers, but would be about consumer choice. Two thirds of EVs sold in the U.S. have been sold by direct sales, even with restrictions in half the states.



Rivian feels it needs to sell directly to consumers because most consumers are familiar with incumbent technology of internal combustion vehicles. However, EVs generate a much greater number of questions and more education to the consumer is necessary. The average Rivian purchaser spends several hours over the course of a half dozen conversations. Additionally, EVs do not require the same maintenance of an ICE; there is significantly less service required. Rivian vehicles are built to order. Mr. Chad went on to bolster his unease concerning the prohibition of direct sales by providing critical quotes from various sources and making references to communist China and totalitarian Russia.

Georgia EMC
Jeff Pratt is the President of Green Power EMC which is a utility that is owned by the cooperatives (Georgia EMCs) and its purpose is to source renewable energy and other emerging technologies for the EMCs in the state. Mr. Pratt is also the Vice President of Oglethorpe Power. He explained that a major goal of the EMCs is to educate the consumer on energy consumption. They have also tried to educate consumers on EV technology. Several EMCs have purchased EVs and had them available for customers to test drive. He believes that the largest question about adoption of EV technology is if the grid is ready. He reiterated previous speakers' projections for EV adoption. He believes that adoption will happen quickly but does not believe there is a crisis today. He did caution the Study Committee to carefully consider policies before consumer behavior is better understood. He explained that currently, they believe customers will mostly be charging at home, but are uncertain. He also expressed the uncertainty of how quickly technology will evolve and how long expensive chargers installed today will be useful. He reiterated some of the challenges with EV drivers having different charging equipment requirements depending on the make of the car.

Mr. Pratt stated multiple times that the Georgia EMCs are not interested in competing with their co-op members in the EV charging arena.

Electric Cities of Georgia
Daryl Ingram is the Chief External Officer with the Electric Cities of Georgia ("ECG"). The organization is a public power entity created by 52 municipalities in Georgia that are in the electric business. Mr. Ingram explained that the ECG has been working with the DOT to provide electric services to the planned charging stations in rural Georgia. The stations will be level three chargers with about 600 kw capacity.

Currently, electric cities are metering retail sites and are billing the retailer at the city's commercial utility rate. He explained several trends that the electric cities are observing: that EV drivers will drive 10-15 miles out of their way to access a level three charger; and that residential builders are pre-wiring garages with 240 kw outlets. They are anticipating greater residential demand for time of use rates. As a result, the electric cities are looking for ways to motivate consumer with time of use pricing that allows a lower rate for off-peak charging.

The Electrification Coalition
Anne Blair is the Director of Policy at the Electrification Coalition and the President of the EV Club of the South. The Electrification Coalition is a national non-profit nonpartisan organization that is committed to the deployment of electric vehicles on a mass scale. She explained that the group is really driven by the national security concerns of our dependence on oil and support the electrification of vehicles which provides an opportunity to diversify power sources. The group also supports consumer freedom to purchase vehicles through direct sales and is frustrated that

Georgia does not allow citizens to freely purchase their preferred vehicles without having to go out state.

Alliance for Automotive Innovation
Nick Steingart handles state affairs at the Alliance for Automotive Innovation. The organization is a made up of car and light duty truck manufactures, battery manufactures, and technology companies. He focused his presentation on direct sales and whether the laws should be expanded beyond the existing framework. He explained that all of his manufacturers are committed to the existing franchise distribution model. He noted that current market participants have invested millions of dollars to comply with the existing laws and believes in equal treatment of all market participants. He believes that "carve-outs" are patently unfair and that they undermine the spirit of franchise law. He expressed that Tesla has a carve out in existing law, which he believes made sense because at the time, they were one of the only electric car providers. However, today there are 79 EVs available on the market and that number is projected to increase. Lastly, he expressed that having a nationwide dealership network to fulfill recalls and where motorists can get routine services performed is an effective and reliable tool for auto makers and motorist alike.

KIA Motors
Jim Alvis, the Senior Manager for Government Affairs for the KIA Corporation, gave a presentation of Kia's plans for electrification and provided some policy recommendations. He began by explaining the support that Kia Corporate provides for its dealer network through new forms of training. This includes training in high voltage safety, diagnosis, and repair. It is available online and in the hands-on workshops. Kia Corporate operates a training center in Lawrenceville where dealers have attended over 324 courses. One of the newer courses, intended to support the EV6, was a blended learning workshop including a one-day hands-on workshop. This training is critical to providing ongoing support to the customers and to the dealer base. Mr. Alvis echoed earlier sentiments opposing the direct sales of electric vehicles to customers in Georgia.

Mr. Alvis mentioned the new investment that Hyundai Motor Group[28] plans to make in an EV and battery manufacturing plant outside of Savannah. The plant will be a $5.5 billion investment. It is expected that this plant will produce about 300,000 units annually.

He continued to provide insight into the charging practices of consumers and echoed sentiments about multi-family housing complexes having unique challenges for providing charging space.

Upon being questioned, Mr. Alvis expressed that Kia does not currently have technology that would report vehicle miles traveled for taxing purposes. However, he did say that it is something the research and development offices at Kia are looking at.

Georgia Automobile Dealers Association
Ben Jordan, the Senior Director of Government Relations with Georgia Automobile Dealers Association, presented a panel including himself; Leah Kirschner, President and Chief Executive Officer of the Georgia Automobile Dealers Association; Bill Murry, President Emeritus of the Georgia Automobile Dealers Association; Emily Patook Director of Government Relations, Public Relations and Communications with the Georgia Automobile Dealers Association; Mike

[28] Kia is an affiliate of the Hyundai Motor Group.

Demenicone, Classic Cadillac of Atlanta and Classic Subaru of Atlanta; Timothy Redding, Jr, Dublin Ford Lincoln; and Jimmy Ellis, Jim Ellis Automotive Group.

He explained that the Georgia Automobile Dealers Association represents 500 franchise new car and truck dealers in Georgia that employ over 35,000 Georgians. He considers franchise dealers to be job creators, who are constantly investing and reinvesting in their dealerships and personnel.

He emphatically stated that Georgia does not need factory direct sales of electric vehicles. He gave examples of companies selling electric vehicles in Georgia without changing the franchise laws and expressed that it can be accomplished by all market participants. He projected that 150 new models of EVs will be available for sale by the middle of this decade. He explained that dealerships are having to make large investments to prepare to sell and service EVs. He also expressed that the Tesla carve out demonstrated that direct sales are not as good for consumers because the factory controls all aspects of the car. As a result, there is no competitions for service, replacement parts, warranties, or recall services. He cited such customer complaints as long wait times, inconvenient locations, expensive repairs, and difficulty with collision repairs.

Mike Domenico, Timothy Redding, and Jimmy Ellis provided testimony of their dealership experiences. They explained that they consider their companies integral parts of their communities by serving their customers, providing jobs, and giving by back to their communities through charitable donations.

Meeting #3: October 3, 2022

The third meeting was held in West Point, Georgia at the Kia Motor Company Training Facility. The third meeting of the Jt. Study Committee on the Electrification of Vehicles was held at the KIA training facility in West Point, GA. Some of the topics discussed included the adoption of electric manufacturing, electrification of heavy-duty freight, incorporation of charging stations in communities, EV sales and services, fees and taxes associated with EVs, and EV charging infrastructure and batteries.

The following individuals provided testimony:

Stuart Countess and Steve Daniel; KIA
John Orr and Mike Alexander; Atlanta Regional Commission
Allie Kelly and Brad Skinner; The Ray
Ben Kessler; Chargepoint
Nick Steingart and Dan Bowerson; Alliance for Automotive Innovation
Blake Snyder and Jeff Hutchins, EOS Linkx

KIA

Kia Georgia President, Stuart Countess, welcomed the Study Committee to the KIA training center and manufacturing plant. Executive Director of Quick Start with KIA, Steve Daniel, explained that the facility was established in 2008. All speakers expressed how proud they are of KIA Georgia and to be part of the legacy of KIA in the state of Georgia.

Following the welcome, Stuart Countess provided testimony on EV readiness from KIA's perspective as a manufacturer and employer. He began by introducing some futuristic vehicles KIA makes and plans to make ready for consumers, such as the upcoming EV9 and the EV6, which is currently on the market.

He explained that KIA is embracing what it calls Plan S, which is a $25 billion shift to manufacturing electric vehicles, including hybrids and plug-in hybrids. KIA plans to focus on vehicles with a longer range ability, as they know range anxiety is a major concern for their consumers.

He provided details about the performance aspects of electric technology; including that some of the vehicles can go from 0 to 60 mph in 3.4 seconds (because the vehicle does not have the normal delay of an internal combustion system). He also mentioned advances such as dual-drive motor systems, etc.

Mr. Countess provided more information about the expected growth of EV sales. Looking forward, he also noted the workforce for developing and building the EVs will need to be specialized to work with high-voltage electricity and new design standards. After addressing other manufacturing skill transitions, he moved on to mention some logistical and managerial concerns, including the training needed by emergency services to assist people when EVs with high-voltage energy are involved. Lastly, Mr. Countess mentioned environmental concerns, noting that the batteries have a useful life for energy storage after their use in EVs. He also referenced the Inflation Reduction Act, and the mineral requirements existing therein, that are creating difficult circumstances for OEMs.

During questions from the Study Committee members, Mr. Countess talked about hydrogen passenger cars as a growing field, however, they anticipate having the same infrastructure problems with hydrogen vehicles as with electric vehicles. Another question about national design standards for charging ports revealed there has been discussion about how to centralize charging points with adapters and other devices. OEMs have tried to show officials in Washington, DC the need for more centralized charging points. Another question touched on the number of KIA dealerships in Georgia and if those dealerships would be able to service KIA EVs. There are 65 dealerships in Georgia; KIA has a dealer network system that will come into a dealership and provide upgrades for the technical training and services required to maintain KIA EVs.

Atlanta Regional Commission

John Orr, Transportation Planning Department Manager, and Mike Alexander, Chief Operating Officer with the Atlanta Regional Commission, presented on Electrification Planning in the Atlanta Region. Mr. Orr began by highlighting funding for the deployment of electric vehicle infrastructure made available in the Infrastructure Investment and Jobs Act ("IIJA") passed by Congress. He specifically mentioned approximately $18 billion earmarked for charging electric school buses and the like. The presentation slides provided that about $5 billion is allotted for a nationwide network of 500,000 EV charging stations, about $2.5 billion for publicly accessible alternative fuel infrastructure, and about $10.9 billion to transition school buses, transit buses, and passenger ferries to low- and/or zero-emissions alternatives.

Mr. Alexander focused on some Tax policies that will likely increase the future rates of EV adoption, specifically the Inflation Reduction Act ("IRA"). The most important change he noted was the removal of the cap on EV tax credits. However, additional requirements limit the tax credit availability, such as income limits. The ARC estimated that 90 percent of Georgia tax filers would be eligible for the tax credit if they drove an eligible vehicle.

In considering Georgia's emergence as an EV manufacturing center, Mr. Alexander noted the IRA requires a significant commitment to domestic manufacturing. Some of the aggressive strategies require battery components must be manufactured or assembled in North America by 2029. By 2025, no critical battery minerals can be sourced from "Foreign Entities of Concern." Questions about the origin of these minerals and how these goals can be achieved surfaced from Study Committee members, but no conclusive answers were reached. The supposition that alternative materials will have to be found arose. Mr. Alexander clarified that these requirements do not stop the manufacture of batteries, but will limit what tax credits are available.

Mr. Orr went on to discuss some of the solar tax credits associated with the IRA, explaining the widespread adoption of solar panels on homes will further complicate some of the electric grid planning. While the adoption of home solar technology has the potential to ease consumer concerns about the ability to charge EVs at home in the event of major power outages. The IRA provides a 30 percent tax credit on installing solar generation on your home, without any expense limit or income limit. The tax credit will be available for 10 years.

Mr. Orr presented state figures for 2021 light-duty vehicle registration. He deduced that 0.4 percent of vehicles in Georgia are EVs. The national average is about 0.5 percent. However, he expects a drastic increase moving forward. He further explained that within the Atlanta region about 0.8 percent of vehicles are electric now. There are only a few counties where it gets closer to one percent (Cobb, DeKalb, Fulton, and Forsyth).

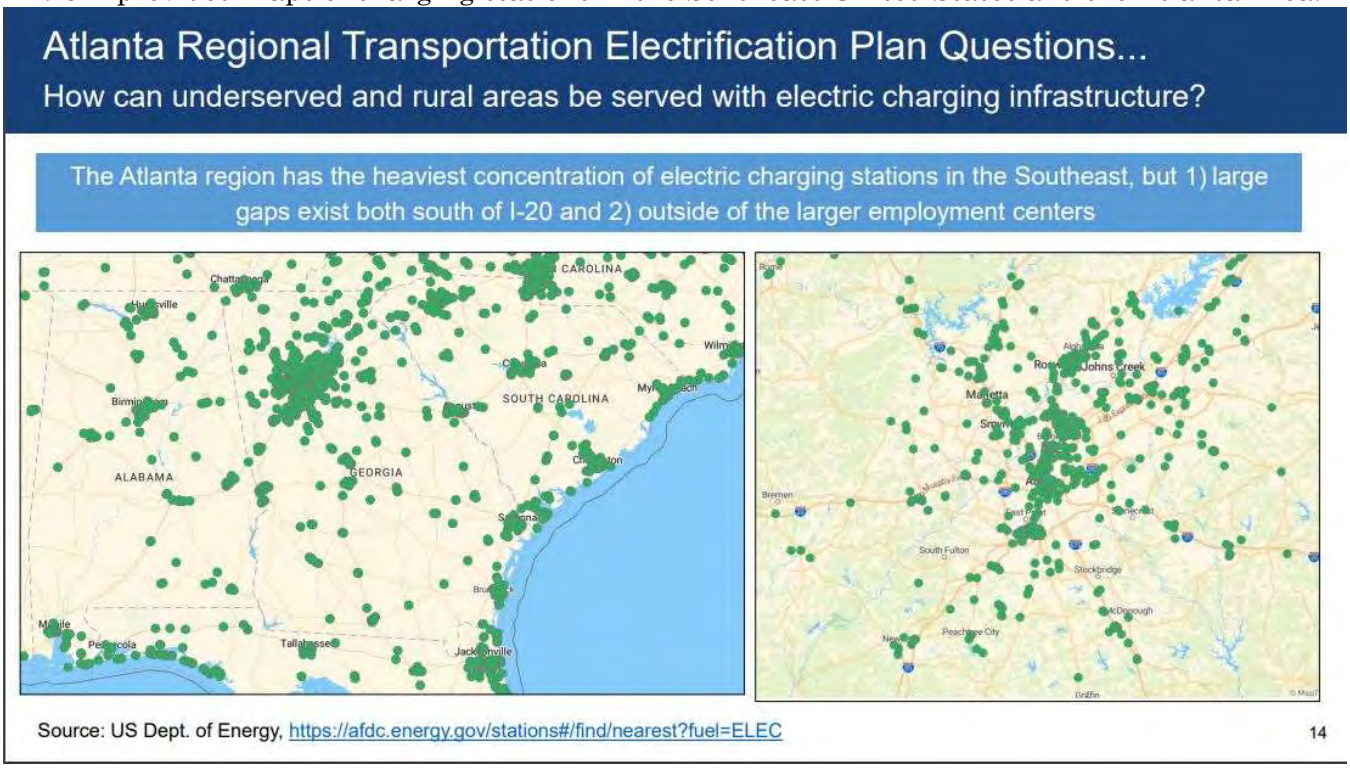
Mr. Orr provided projections for the adoption of EVs through 2035. Discussions about the variability of estimates and factors followed.

Mr. Alexander then turned to charging station availability problems. He provided a slide explaining that federal IIJA funds provide funding for 400,000 EV chargers, but an additional 600,000 public chargers will be needed by 2026. It was estimated that 60 percent of EV drivers charge at home; with most early adopters having a level 2 charger at home.

The discussion continued toward concerns of on-peak versus off-peak charging. Mr. Alexander explained the ARC will soon release an RFP (request for proposal) for the Atlanta Regional Transportation Electrification Plan and that the ARC would be interested in including the topic in their study.

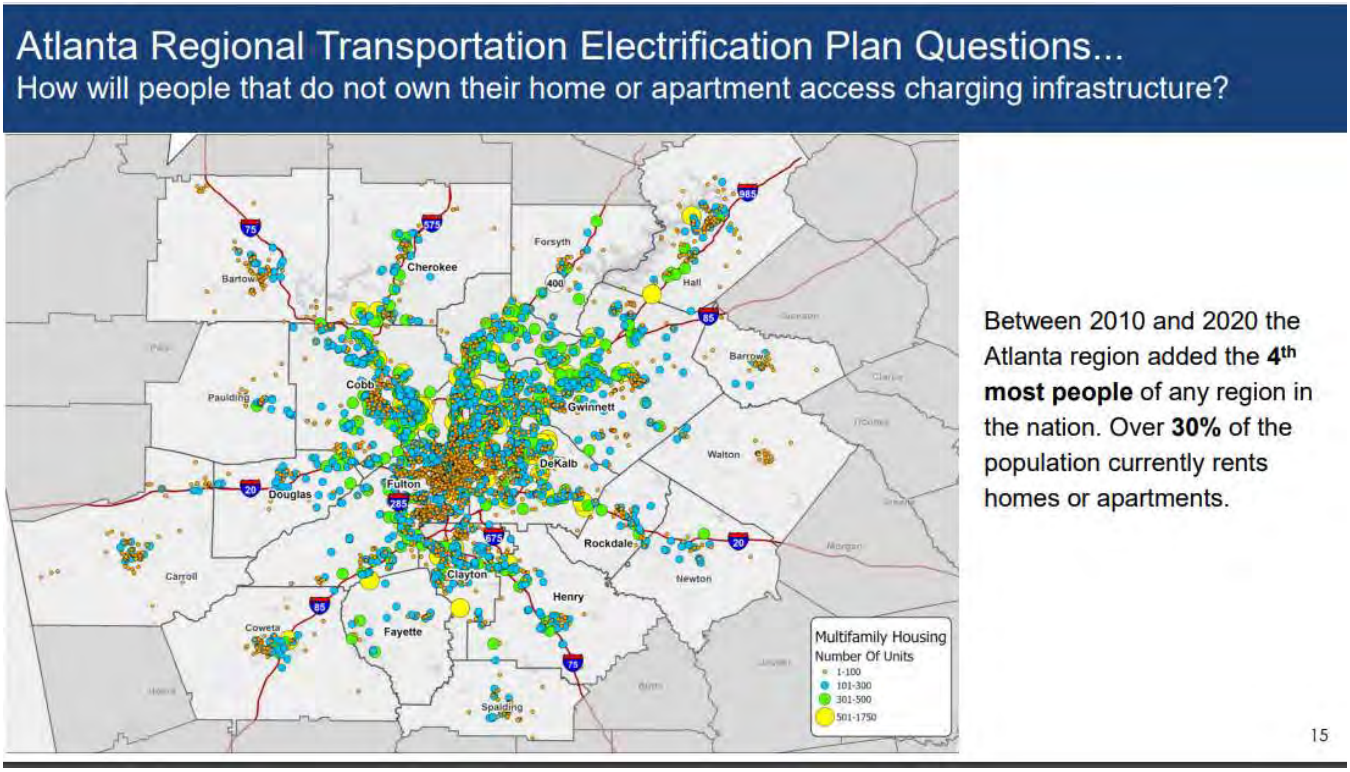
As a relevant side note, Commissioner Pridemore advised the committee that Georgia no longer operates off a summer reserve margin. Therefore, the peak is no longer based only on the maximum amount of energy consumed on a summer day. Now, there is also a winter reserve margin to account for the amount of solar that Georgians put into the system. Georgians put a lot of energy back on the grid using solar energy, but this does not correspond with vehicle charging, as most consumers charge their EVs at night. The state still has to have base load generation no matter how much the federal government incentives solar energy.

Mr. Orr provided maps of charging stations in the Southeast United States and the Atlanta Area.



He expressed that there exists a relatively strong network within the metro area. However, without the airport area, the south side of town has major gaps.

Another concern that will be closely examined by the ARC is charging availability in multifamily housing and for renters. Mr. Orr explained that in the Atlanta region over 30 percent of people rent.



Another area of Mr. Orr's focus considered the long-term impacts on gas stations and small businesses that currently provide muffler repair or oil changes. These small businesses are not needed by consumers who drive EVs, so the widespread adoption of EVs may have far-reaching impacts on the economy.

Mr. Orr presented data on the Atlanta Regional Freight Plan, which includes an analysis of the impacts of electrification on freight clusters and Industrial areas. He mentioned the Atlanta region's industrial development is growing rapidly and the region was the national leader in space absorption rates in the second quarter of 2022. Additionally, major concerns include inadequate truck parking and an anticipated need for truck charging.

The Ray

Allie Kelly and Brad Skinner, from The Ray, expressed how impressed they are that Georgia is the best state to do business for the 9th year in a row and how much they respect leaders in Georgia for their vision and support.

Mr. Skinner began his remarks by explaining his belief that recent announcements, programs, and incentives surrounding electric innovation are important to Georgians because green jobs are the future. Further, he argued modern factories are both the present and future, providing good salaries and work opportunities in rural areas. He believes not only is green manufacturing a good goal, but it will also stimulate the companion industry of green transportation. According to statistics from FreightWaves, the American Transportation Research Institute, and the Georgia

Motor Trucking Association, there are over 32,000 trucking companies and 275,000 trucking industry jobs in Georgia today.

Mr. Skinner additionally pointed out freight drivers are moving to electric heavy haul truck options, and companies such as Volvo and Freightliner are taking orders for electric semi-trucks. Automated freight options are on the horizon to actively pilot test autonomous vehicles throughout the United States.

Mr. Skinner reported that new technology is not restricted to freight trucking, but also extends to electric locomotives. He highlighted battery technology being adapted to run locomotives and pointed out that heavy haul industries are already gravitating toward electric industries. Encouragingly, he noted Georgia has already begun and can continue to lead in this arena by building the best electric transportation system in the US. He believes electrified manufacturing will breathe new life into rural Georgia.

Representative Powell expressed concern over the logistics of electrification of heavy-duty freight. Specifically, he was concerned the 15,000 pound batteries required for freight trucks would prove less economical than switching their fuel source to hydrogen.

Mrs. Kelly reported her belief that the infrastructure, not the technology itself is the limiting factor in the adoption of new technologies. She explained electric freight charging is not supported by NEVI. However, she also mentioned the federal government has launched an $8 billion hydrogen hub challenge. The southeastern region has submitted a proposal for a hydrogen hub and the Department of Energy will make a decision in the next 12 months about where the money will be allocated. The southeastern states could receive between one and two billion dollars to establish a hub of hydrogen infrastructure.

Mr. Skinner closed by offering six issues he believes need to be thought out or acted upon in Georgia's plans for the future:

1. Replacing gas tax structures with other usage charges for automobiles, trucks, and transit;
2. Making the cost of an electric truck equal to the cost of a diesel unit;
3. Improving the battery life and distance ranges of vehicles as new technology and strategically placed charging facilities allow;
4. Improving electric infrastructure grid as demand increases;
5. Supporting innovations which The Ray, Panasonic, and GDOT are initiating, which will have a profound impact on freight and passenger movement; and
6. Organizing and facilitating statewide initiatives to teach and upgrade skills required for jobs of the future.

Chargepoint

Ben Kessler, the Public Policy Manager of the Southeast for Chargepoint, began his presentation by echoing previous speakers' comments, such as highlighting federal incentive announcements. He explained that Chargepoint believes the future of mobility is electric and their role is to "make electric easy for you."

He explained their business model. Chargepoint sells equipment to site hosts, who then own and operate that equipment at their facility. The site hosts set the rates and determine who gets to charge at the location while Chargepoint provides support with software and hardware. Mr. Kessler noted Chargepoint's large network reach in the United States, Europe, Asia, and India.

In the Georgia market, Chargepoint has about 5,000 ports. Mr. Kessler noted that Chargepoint's ports may have more than one charging station per port and, therefore, more than one vehicle may charge at a port at a time. Of the 5,000 ports in Georgia, about 2,100 are commercial ports. He explained commercial ports are installed at an establishment to generate revenue.

Mr. Kessler made a side reference to address a previously asked question concerning mining in the United States. He explained that lithium mining is taking place in Kings Mountain, North Carolina and he believes they will have a production capacity of about 500,000 EVs. He further explained that there is a graphite mine in Alabama and copper recycling in Georgia.

When Chargepoint considers partnering with a site host, they consider where the sitting charging stations are located. Particularly, they look at security issues such as adequate lighting; consider what amenities are located nearby such as restrooms; consider if there are points of interest or traffic corridors nearby. As an example, Mr. Kessler provided that Chargepoint is partnering with Starbucks out west. Other ideal locations include Main street districts, parks, and other mixed-use developments where there are accessible sidewalks and shopping nearby.

Mr. Kessler explained that site hosts establish costs based on the kilowatt/hour (or time) and Chargepoint is not interested in competing with utility companies or electric co-ops, but would like to see charging based upon volumetric consumption similar to how gas is sold. (i.e. kilowatts of energy). He provided a comparison between two vehicles, a Chevy Bolt and a Polestar 2, charging at different energy rates for the same amount of time. Because the EV with the faster charger spent less time to reach a full charge, the cost to the driver would be less than if he had used the slower charger.

Model	Max Charge Rate (kW)	EVSE Power Capacity (kW)	Time to Charge 0-80%	Cost at $.25min
Chevy Bolt	55kW	150kW	70min	$17.5
Polestar 2	155kW	150kW	32min	$8

Mr. Kessler then shifted his discussion to medium and heavy-duty fleet charging, noting the trend of trucks charging "behind the gate" such as when they are unloading at docks or during shift changes at facilities. However, what he termed opportunity charging, is taking place on the road and he believes shows the need for more powerful chargers.

Members of the Study Committee asked a series of questions. Senator Gooch asked if there are any permitting requirements for establishing a sitting charging station. Mr. Kessler explained that it varies and some states have processes. For example, California has a very detailed process requiring the counties and companies to follow a regimented protocol. However, most states are not as uniform and can vary widely at the local level.

Senator Gooch followed up with concerns over how large apartment complexes may provide charging for occupants at night. Mr. Kessler pointed out that 95 percent of people drive less than

45 miles a day and most vehicle ranges are about 200 miles per charge. This means vehicles do not have to charge every day.

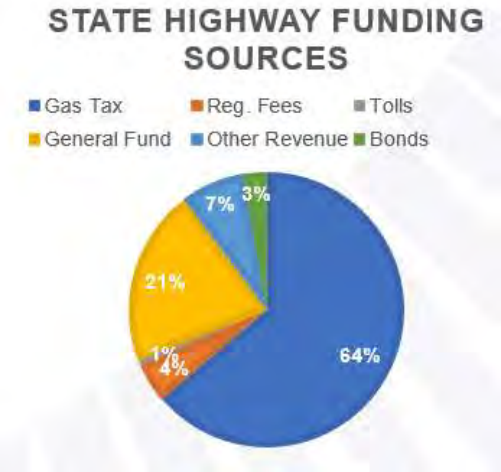
Senator Gooch then asked questions surrounding the change in charging by the kilowatt/hour versus the kilowatt. He inquired what incentive an individual would have to unplug and move if they are not being charged based on time. Mr. Kessler explained that charging companies will charge idle fees. Chargepoint offers a 10-minute grace period but after that period, fees will begin to accumulate.

A member of the panel asked how long it took Mr. Kessler to drive down from South Carolina to West Point, Georgia, which is just beyond the typical car range. He responded by stating charging the vehicle added a little over 30 minutes to his travel time.

Commissioner Pridemore continued the conversation by explaining electric utilities are tasked with creating the necessary generation to support systems and was curious to know what Mr. Kessler believes the incentive to be for utilities to resource plan. Mr. Kessler expressed he didn't believe there would be much change in resources planning and the two agreed to discuss further during a break.

Alliance for Automotive Innovation
Nick Steingart, the Director of State Affairs at the Alliance for Automotive Innovation, presented on behalf of OEM members. He provided information about the current number of EVs on the road and projections for EV adoption in the future.

Mr. Steingart began by focusing on the loss in gas tax revenue, providing explanations for that decline. He explained that in Georgia, 65.6 percent of state highway funding is derived from gas taxes, according to Consumer Reports and he provided a pie chart showing the following:

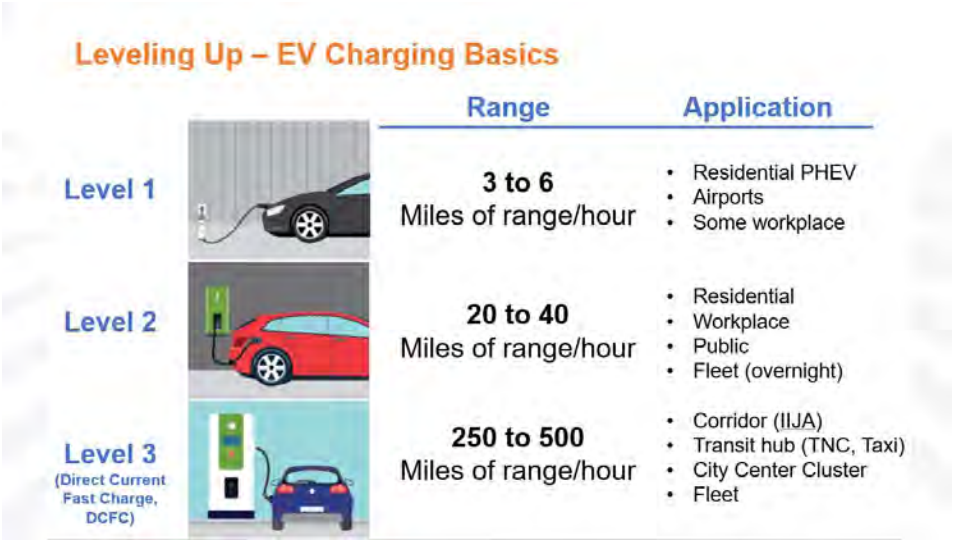


He expressed that manufacturers believe electric vehicles should be equal contributors to funding highways and drew a comparison between the national average EV fee and average gas tax paid by drivers of traditional internal combustion engines ("ICE"s). He noted that currently, EVs pay an annual fee of $121, but the average gas tax paid by residents with an ICE vehicle is $134. The gap between EV owners' fees and ICE owners' fees is only projected to grow in the coming years. However, he believes high EV fees are a barrier to adoption and claims such fees do not raise significant revenue.

Mr. Steingart explained the Alliance for Automotive Recycling plans to support legislation that would update building codes because 80-90 percent of charging occurs at home and lack of access to home charging is a major barrier for people living in multifamily residential buildings. He also noted requiring charging stations in new construction only costs the consumer about $2,000, but a retrofit where a charger is added later costs consumers about $15,000.

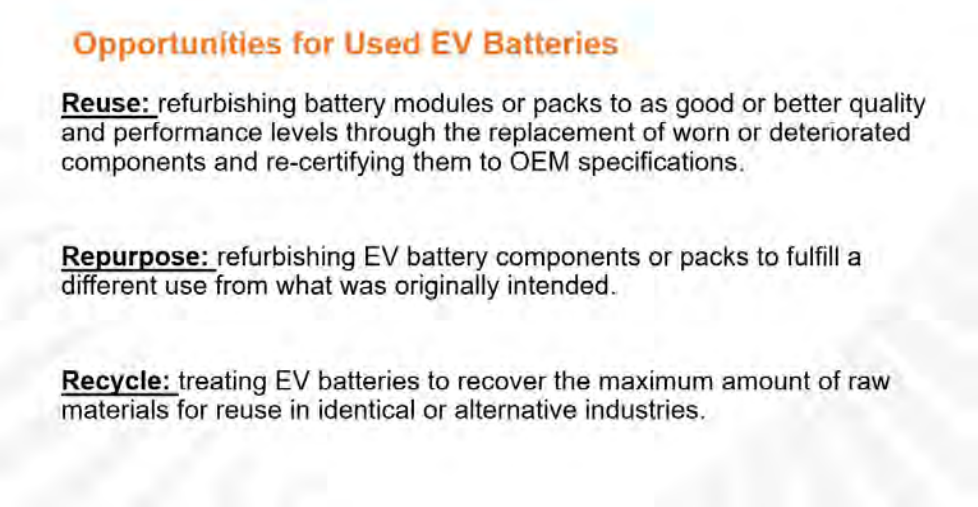
During his presentation, Mr. Steingart stated that he believes the collection of vehicle mileage data should be obtained through a voluntary good faith reporting system by the vehicle owner. After an inquiry from Senator Ginn, Mr. Steingart explained that such a reporting system is currently being tested in an Oregon pilot program where drivers take and submit a picture of their odometer to report their vehicle's miles traveled. Senator Gooch noted he believes the technology for a car to remotely report miles being driven to a manufacturer exists currently. Commissioner McMurry noted the IIJA contains provisions and funding supporting a national pilot program on mileage-based fees.

Dan Bowerson, the Senior Director of Energy and Environment with the Alliance for Automotive, provided the Study Committee with a presentation focused on recycling, batteries, and charging. He began by sharing a slide categorizing and explaining the three levels of chargers that currently exist. He compared the three levels by explaining the level one chargers provide a "trickle" type charge, requiring many hours of charging to reach a full battery charge; whereas the level three/DC fast chargers are the fastest currently available. The level two chargers fall somewhere in between and that is what most consumers have in their homes.



Mr. Bowerson answered a question that was posed earlier in the meeting by explaining the NEVI plan supports SAE connection types, which is a non-proprietary standardized connection.

Mr. Bowerson then focused on how to deal with a battery at the end of its usefulness. He proposed a simple three-pronged approach including reusing, repurposing, and recycling.



He believes the United States needs to ensure we have a domestic circular economy for batteries locally so resources are not being shipped overseas to be processed, only to be repurchased and shipped back to the US.

EOS Linx

Blake Snyder, Chief Executive Officer of EOS Linx, and Jeff Hutchins, the President and Chief Technology Officer of EOS Linx, a company that deploys, owns, and operates chargers, gave the committee's final presentation. They explained that EOS Linx is in the business of deploying smart technology vehicle chargers.

His comments echoed those of previous speakers, estimating the quick adoption of EVs and noting the availability of federal infrastructure funding. He expressed that EOS Linx invested about $5 million in Georgia in 2022.

One of the speakers focused on the technology EOS Linx uses, including solar power cells to support charging stations. Some other components mentioned included edge data center screens and security components.

Much of the discussion between members and speakers revolved around security issues. The EOS security component includes a weapon detection function. This camera is equipped with an advanced artificial intelligence system that has a database of objects it will recognize as weapons and it also collects thermal tracking data. Senator Robertson explained this software is commonly used in other public spaces.

Meeting #4: October 25, 2022

The fourth meeting was held at Ft. Valley State University in Ft. Valley, Georgia. Presentations were given on a variety of topics including: rental EV charging and usage; electric school buses and funding; energy grid security; EV charging site procurement, development, and permitting; community improvement district adoption of EV charging; and non-highway EVs.

The following individuals provided testimony:

Scott Ennis; Enterprise
Andy Moore; Blue Bird
Dr. David Gattie; Center for International Trade and Security University of Georgia
Erin and Stephanie Luque; Envirospark;
Kathleen Bowen; ACCG
Carolyn Kramer Simons; ARTBA
Tracy Styf; Town Center CID
Ann Hanlon; Perimeter CID
Brandon Haddock; Textron Industries

Enterprise

Scott Ennis is the Vice President of Finance for Enterprise, which is one of the largest mobility providers and fleet operators. He explained that Enterprise's business strategies include evolving with the broader car markets, for example the acquisition of Polestars. He expressed that there has been a strong demand for EVs in his market and noted that many customers use rentals as an extended test drive. In fact, half of his consumers intend to rent vehicles before committing to purchase one. Their research has revealed that drivers are hesitant to purchase EVs because they have range anxiety and believe charging takes too long.

He explained that Enterprise has several thousand EVs in their fleet, but that they present unique opportunities and challenges. Specifically, their research has shown that if an EV breaks down, they are very hard to get repaired and require significant down time compared to a normal vehicle. His Polestars, for example, have to be shipped to Charlotte, NC. He mentioned hearing about battery and connectivity issues being common problems. Mr. Ennis further testified that Enterprise plans to have charging stations on their car lots.

Blue Bird

Andy Moore is the Electrification Director for the Blue Bird Corporation. He welcomed everyone to Ft. Valley and explained that every Blue Bird bus is manufactured local to that area, which is about 11,000 buses a year. He provided a little background on the company and then focused on the new electric bus program. He explained that consumers fair better financially with an electric bus than with a diesel fueled bus. He specifically noted that with an E-bus there is no need for oil changes and that brakes don't have to be replaced as often.

Since 2018, Blue Bird has received over 1,200 orders and they have provided over 600 electric school buses in 31 states. Their buses get about 120 miles of range per charge. This adequately serves school bus duties because 80 percent of bus routes are 70 miles or less per day.

He discussed the upcoming EPA announcements, which will name the recipients for the Clean School Bus Program. He explained that Blue Bird helped 35 schools in Georgia apply for the program and he anticipates funding for around 300 buses in the state.

Blue Bird is launching a program called Blue Bird Energy Services, which is designed to provide comprehensive support for E-bus customers. The service will include assessments and plans taking into account vehicle range, charging equipment requirements, infrastructure challenges, and other approaches to streamline the process for customers. Mr. Moore further explained that school buses have the ideal usage cycle for electrification. Currently, the range for an E-bus is about 100-120 miles per charge but he expects that to increase to 150-170 miles per charge with adoption of new battery technology.

Mr. Moore advocated for the adoption of E-buses by explaining that the cost of owning and operating E-buses is less than a diesel bus. While the initial cost of an E-bus is about three to four times as much as a diesel, Mr. Moore expects production costs to diminish as supplies become more readily available. Further, Mr. Moore explained that EV adoption is driven by grant funding. Those federal funds are designed to help customers purchase EVs, not for research and development.

Questions from the Study Committee revealed that school buses would likely have to be charged every day, returning to a lot each night. That charging lot would likely be a large investment.

Center for International Trade and Security University of Georgia
Dr. David Gattie is a Senior Fellow with the Center for International Trade and Security at the University of Georgia, focusing on battery life cycles and grid security. He explained that he is part of a research group that looks at energy policy and energy security.

He anticipates that Georgia will experience some energy grid challenges, supply chain challenges, and some challenges associated with federal climate policies. However, he believes that the state is blessed to have pragmatic, realistic policy makers that are looking at EV adoption as an economic opportunity.

He provided charts demonstrating that since 1990 the state increased its resource diversity and technology diversity every time a new resource became available. He discussed the introduction of Vogtle units three and four and the use of natural gas to compensate for the restricted use of coal as more coal plants are retired. He further provided capacity factors of different types of energy sources and trends in other state markets, noting that our current policies have resulted in affordable, reliable energy for Georgians.

One such trend is the growing reliance on natural gas to backfill demand after coal plants are retired. He pointed out some of the restrictions of depending on natural gas, which is a "flow" fuel. He highlighted that the resource has to travel to the source and cannot be stored on site. Supply chain problems can disrupt the availability of fuel if a state is dependent on natural gas. He added that many states will be facing these potential challenges in the future.

Dr. Gattie emphasized that Georgia has a wide resource base which creates reliable energy and low prices. He further elaborated that Georgia is the only state in the country offsetting baseload coal with dispatchable natural gas, baseload nuclear, and renewables while also reducing carbon emissions.

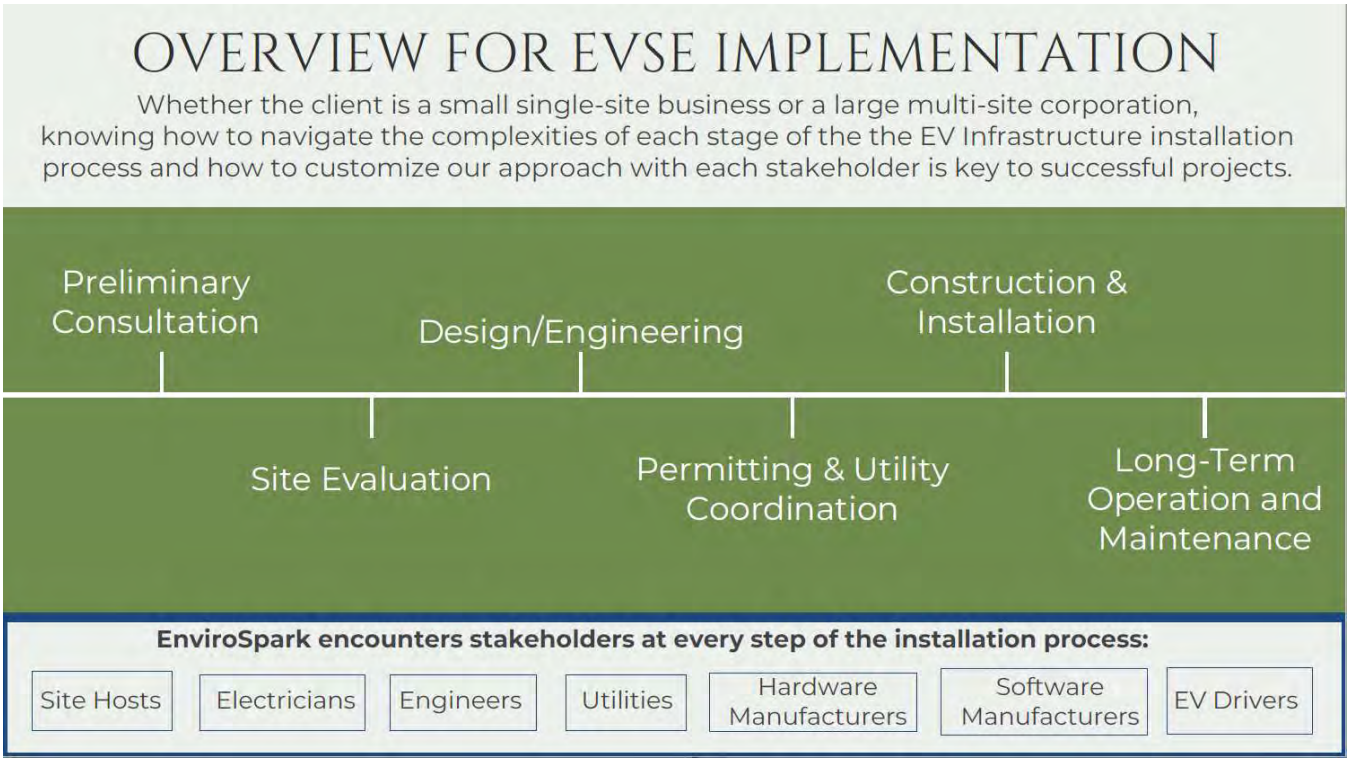
When asked about a potential demand spike resulting from rapid EV adoption, Dr. Gattie explained that demand management plans will be necessary. Without a management plan, the

grid could collapse. Other questions from Study Committee members revealed the necessity of Vogtle reactors three and four operating as part of the energy grid; and the value that small modular reactors deployed across the state could have.

Envirospark
Erin Luque and Stephanie Luque operate Enivrospark, which is a turnkey provider for charging infrastructure. They explained that with increased charging station visibility, more people are becoming comfortable with adopting EV technology. Their company partners with Chargepoint, Tesla, and the federal government. They have aided in the design, provision, and construction of over 5,800 EV installations in North America and 2,600 of nearly 6,000 in Georgia.

Mr. Luque provided an overview of general implementation objectives and explained how Environspark goes about installing chargers. He explained that a preliminary consultation is a good starting point; this gives their customer the opportunity to indicate who they intend to work with and what special considerations they may have for funding or grant requirements. After that, site evaluations are an important step to consider needs and conditions, such as proximity to power sources. The design stage is predicated on having the best information gathered by the first two steps. Next is permitting. Mr. Luque indicated that the single most important factor is the length of the permitting process. He emphasized that it is challenging to streamline a process when each jurisdiction requires different standards before being able to build a charging station. Lastly, the construction of the charging site can be challenging. For instance, many key stakeholders want to minimize disruption to the site while installing the charging stations, and it can be challenging to find someone experienced or trained in installing high level voltage.

The Luques provided that long term operation and maintenance is something they try to get their clients to consider. They said that, surprisingly, some installers have not considered and do not intend to maintain charging sites. They also noted that the NEVI plan requires each funded charger to have a five year maintenance plan.



A line of questioning from Senator Gooch suggested that Tesla may have the capacity to record and transmit odometer readings at each charging post.

Association County Commissioners of Georgia
Kathleen Bowen, the Associate Legislative Director for the Association of County Commissioners of Georgia, explained that Georgia counties have an interest in the development and deployment of EV technology. She outlined the counties' main concerns:

1. Effects on motor fuel collection, particularly the amount of local funding derived from the tax;
2. County owned EV charging stations and fleet;
3. Permitting, zoning, and inspections; and
4. Economic development affected by lack of charging.

Mrs. Bowen listed current motor fuel sales tax collections that will be affected by a change in revenue stream. These include LOST[29], SPLOST[30], ESPLOST[31], HOST[32], and MARTA[33]. She further added that most counties have about a three percent local sales tax.

[29] Local option sales tax
[30] Special purpose local option sales tax
[31] Education special purpose local option sales tax
[32] Homestead option sales tax
[33] Metro Atlanta Rapid Transit Authority;
Mrs. Bowen further noted that TSPLOST (Transportation Special Purpose Local Option Sales Tax) is not applied to motor fuel; and
Mrs. Bowen provided a reference to find local sales tax rates on motor fuel: https://dor.georgia.gov/sales-tax-rates-prepaid-local-tax-motor-fuel-highway-use

Mrs. Bowen also mentioned the Local Maintenance & Improvement Grant ("LMIG") Program. She explained that the LMIG funds are administered according to a formula established by GDOT and that these funds are associated with motor fuel excise tax collections[34]. She expressed that these funds are very important to the cities and counties as they are used to resurface roads. She further asked that when the legislature considers any replacement to the motor fuel tax, that they recognize a component of the motor fuel sales tax is allotted to local governments. In sum, she explained that less motor fuel consumption will equate to less LMIG funding for local governments.

Senator Gooch and Mrs. Bowen discussed the local sales tax collected on electricity sold to charge the cars. They calculated hypothetical examples where there could potentially be an eight percent sales tax in a county on electricity and clarified that all local sales taxes would apply to electricity where it currently is not applied to motor fuel tax.

Mrs. Bowen highlighted examples of counties adopting EV technologies before addressing zoning, permitting, and inspections concerns. She gave examples of what type of issues the counties and cities are considering: (1) how to treat private residences and multi-family and public charging stations; (2) de-commissioning abandoned charging stations; (3) electrical infrastructure capacity and equipment standards; (4) signage; (5) security and lighting; and (6) operation and maintenance. She provided a statement from ACCG explaining that they "are trying to strike a balance with the zoning standards to [be] EV friendly, while at the same time, not allowing the stations to become a nuisance should they become unsightly, unsafe, or inoperable."

Perimeter CID and Town Center CID

Tracy Styf is the Executive Director of the TownCenter Community Improvement Development ("CID") and board member of the Georgia Transportation Alliance. She explained that TownCenter CID is located in northwest Cobb County near Kennesaw State. The TownCenter CID has been active in the EV space for quite some time and the area boasts the largest number of registered EVs (besides Fulton County) with about 6,000 cars registered. Mrs. Styf provided projections for the adoption of EV in the TownCenter area.

Mrs. Styf further provided information about her local area, explaining that they have more than 30 chargers located near retail centers and in neighborhoods. The area hosts different types of charging equipment across the various locations including DC fast chargers and level 2 chargers, with major makers of charging equipment including Tesla, GE, Envirospark, Blink, Volta, EVgo, Leaf, and Electrify America.

Mrs. Styf shared that the TownCenter CID is awaiting a study which will be completed by the end of the year. The study will include a 100 day action plan and will evaluate the feasibility of EV charging down to street block and hour of day. This study will be used to create a master plan for the community supporting the deployment of EV charging. Senator Gooch asked what the result would be if a convenience store was interested in placing a charger on their property that was not on the preapproved community plan.

[34] Mrs. Bowen noted that Georgia Code specifies that funds allocated each fiscal year from LMIG shall be not less than 10% nor more than 20% of the money derived from motor fuel excise taxes received by the state in the immediately preceding fiscal year.

Another question from a Study Committee member provided that the Volta platform allows for some free charging while the customer is watching certain advertising. He explained that the charging fees are offset by the amount of advertising a consumer watches while charging.

Ann Hanlon is also on the board of the Georgia Transportation Alliance and the Executive Director of the Perimeter CID, which is the largest community improvement district by revenue. She explained that they largely serve commercial property owners because the Perimeter area is the largest concentration of class A business space in the Southeast United States. They are currently working on one of the largest transportation projects in the state, the Interstate 285/ Interstate 400 interchange improvement. She raised three points that she asked the Study Committee to consider. She plead that they think about EV in terms of:

1. Economic development;
2. Redevelopment of suburban office districts; and
3. Funding.

She explained that as people are returning to the office, employees are asking for EV chargers at work. This has become a trend in the Perimeter district. Also, Perimeter Mall has expressed interest in having chargers because the extended dwell time of charging motorists present a good customer base for mall traffic.

Textron Industries
Brandon Haddock, the Director of Communications with Textron Specialized Vehicles, offered his perspective on the electrification of vehicles operating off highway.

He first explained that the company was founded in August of 1954 as the E-Z-GO golf cart company, but now their product lines extend beyond golf carts to include such vehicles as ATVs and ground support equipment for aviation. Textron employs about 1,800 people in the Cartersville and Augusta areas. These locations house the company's headquarters and manufacturing sites.

Mr. Haddock explained that today the company makes E-Z-GO golf carts, Arctic Cats, side-by-side ATVs, snowmobiles, professional turf care equipment, commercial utility vehicles, and ground support equipment for aviation. He further explained that companies are adopting the use of EVs because they reduce the company's carbon footprint, are more affordable, and are easier to maintain. Specifically, he focused on the commercial air travel ground operations by explaining that airlines and air cargo companies are looking to streamline operations with electrification. Textron has entered into agreements with General Motors ("GM") to integrate GM's ultimum lithium technology into the TUG endurance and cargo tractor.

New air travel ground support equipment offered by Textron includes: TUG Alpha 1, which is an aircraft pushback to move airplanes to and from the gate; and the TUG 660, which is a belt loader used to unload cargo from airliners.

In addition to the air travel ground support equipment line, Textron offers other product lines including E-Z-GO ELiTE. The ELiTE line uses new lithium battery technology. They are more efficient, charge more quickly, require no maintenance, and have a much longer life span that the lead-acid batteries.

Meeting #5: November 2, 2022

The fifth meeting was held at the Georgia Department of Transportation Headquarters in Atlanta, Georgia. Presentations were given concerning tax structures to fund transportation infrastructure; registration fees and tolling programs; heavy duty fleet EV adoption; OEM adoption of electrification; direct sales of EVs to consumers; and utility suppliers providing EV charging to the public.

The following individuals provided testimony:

Dr. Trish Hendren; The Eastern Transportation Coalition
Carolyn Simmons; ATRBA
Kary Witt; HNTB
Brad Christie & Taylor Ann Calvin; Sysco
Michael Maten; General Motors
Frank Morris; Clean Cities Georgia
Stan Cross; Southern Alliance for Clean Energy
Austin Hackney; Home Builders Association of Georgia
Daniel Witt; Lucid Motors
Ben Jordan; Georgia Automobile Dealers Association
AJ Siccardi; RaceTrac
Jay Smith; Charge Ahead Partnership
Angela Holland; Georgia Association of Convenience Stores
Representative Alan Powell
Stephanie Gossman and Seth Blocker; Georgia Power
Jeff Pratt; Green Power EMC

The Eastern Transportation Coalition

Trish Hendren is the Executive Director at The Eastern Transportation Coalition, which is a multi-state, multi-modal organization dedicated to improving transportation from Maine to Florida. The organization is comprised of 17 state members and Washington DC. She explained that they are not a funding organization for transportation; instead they gear their work toward organizing states and sharing information. She further gave an explanation of how grant funds are used to support the organization and what kind of work they do.

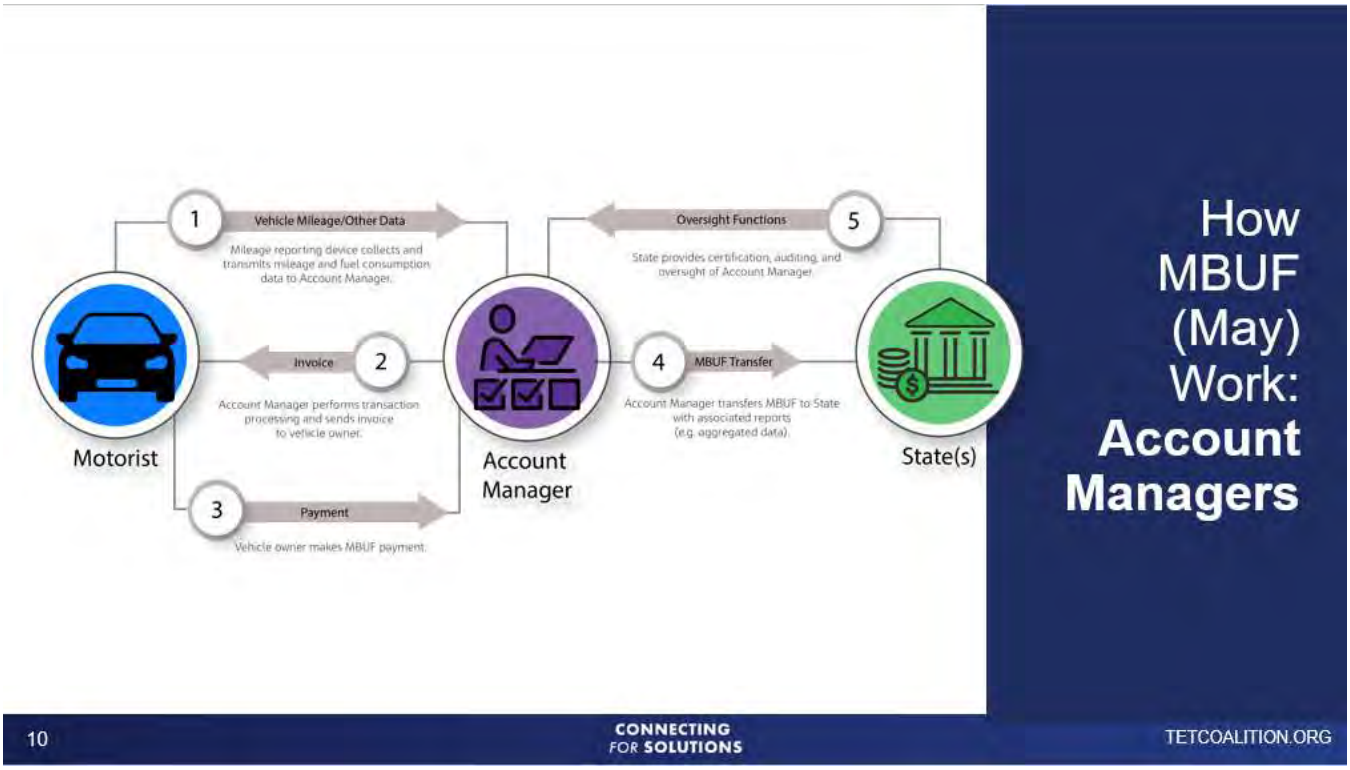
<u>The transportation fleet is changing.</u>

Dr. Hendren focused her presentation on mileage-based user fees as a solution to transportation funding shortfalls. She began by explaining that the current road transportation system is reliant on motor fuel tax revenues, but the amount of fuel tax that is being collected for the miles driven by motorists is declining. While fuel efficiency of motor vehicles is better for the individual driver, it is not best for supporting transportation needs. Further, there are some motorists using the transportation system who use no fuel at all.

She provided Virginia as an example. A study from KPMG showed that in 2019 the number of miles driven by residents increased but the fuel tax collected decreased for the first time. Further projections estimated that fuel tax revenues are expected to decline by 31 percent in 2040. This is primarily due to increased efficiency of the motor vehicles, not necessarily the adoption of EVs. Only 3 percent in the decline is projected to be the result of EV adoption.

There is a gap in public understanding.
Another important statistic Dr. Hendren provided, considered public awareness of transportation funding. A survey from Pennsylvania found that 61 percent of Pennsylvanians thought their state highway quality was good or excellent; 68 percent believed the funding is increasing or staying the same; but 92 percent did not know how much they pay in fuel tax. She summarized that most people don't know how transportation is funded.

What is an MBUF?
A mileage based user fee ("MBUF")[35] is a system that most states are considering to replace their gas tax. This system is a different approach to taxing people that are using the roads by shifting from collecting the fee based on how much fuel a motorist purchases to how many miles they actually drive. Dr. Hendren provided an example of what a MBUF system could look like for states. It would include the motorists, the states, and an account manager in between. A motorist would open an account with a third party private sector company (account manager) who would provide a device to be installed in the vehicle or would simply collect data provided from the driver. Then the account manager would send an invoice to collect fees due and the fees would be handed over to the state. The role of the state would involve oversight of the private sector vendor/ account manager.



Dr. Hendren further provided that a state could choose between four ways to have a motorist report their mileage. Drivers could (1.) pay a flat fee; (2.) submit odometer readings; (3.) submit in-vehicle telematics; or (4.) use a plug-in device.

[35] Also known as a Vehicle Miles Traveled ("VMT") fee, Pay Per Mile ("PPM") fee, or Road Use Charge ("RUC").

Dr. Hendren further added that volunteer submission programs are growing around the country. Currently, Oregon, Utah, and Virginia have volunteer programs. In Virginia, the legislature provided an option for motorists to either pay a flat fee or a distanced based highway use fee. Oklahoma is considering a program that would establish a fee based on the kWh a motorist used to charge up. Vermont attempted to recoup lost revenue from out of state motorists, but ultimately decided the revenue recovered wasn't worth the expenditure.

Dr. Hendren provided six key points for the Study Committee to remember. :

1. Real-world pilots reduce privacy concerns among motorists. Where many initially consider MBUFs to be a "tracker tax", people who interact with a pilot program have diminished resistance to the idea.
2. For drivers, choice is key. Providing people with choices, including low-tech or no-tech options, will be important for adoption.
3. Rural drivers may fare better with MBUFs. Because many rural drivers use less fuel efficient vehicles, they may be paying a higher tax via a motor fuel tax than they would if they paid for miles driven[36].
4. EV owners often support MBUF. EV motorist are primarily motivated by decrease in fuel costs and don't consider a road use charge when they make the decision to purchase an EV.
5. Fairness resonates with people.
6. MBUF technology can handle cross-state travel.

Questions from Chairman Gooch revealed that recent legislation in Congress includes a national pilot program tracking MBUFs. They created this because there is great concern about the future of the highway trust fund.

Study Committee members voiced concerns that setting up a program which would eventually be overshadowed by a federal program could be inefficient and costly. Dr. Hendren expressed that she could see a pair of tax systems working alongside each other and that she didn't anticipate the national program to progress quickly. The main divergence between the interests of the states and the federal government would be an accounting of location for miles traveled. Dr. Hendren did not expect the federal government to be interested in any GPS technology, whereas Georgia will likely want to keep track of interstate travel.

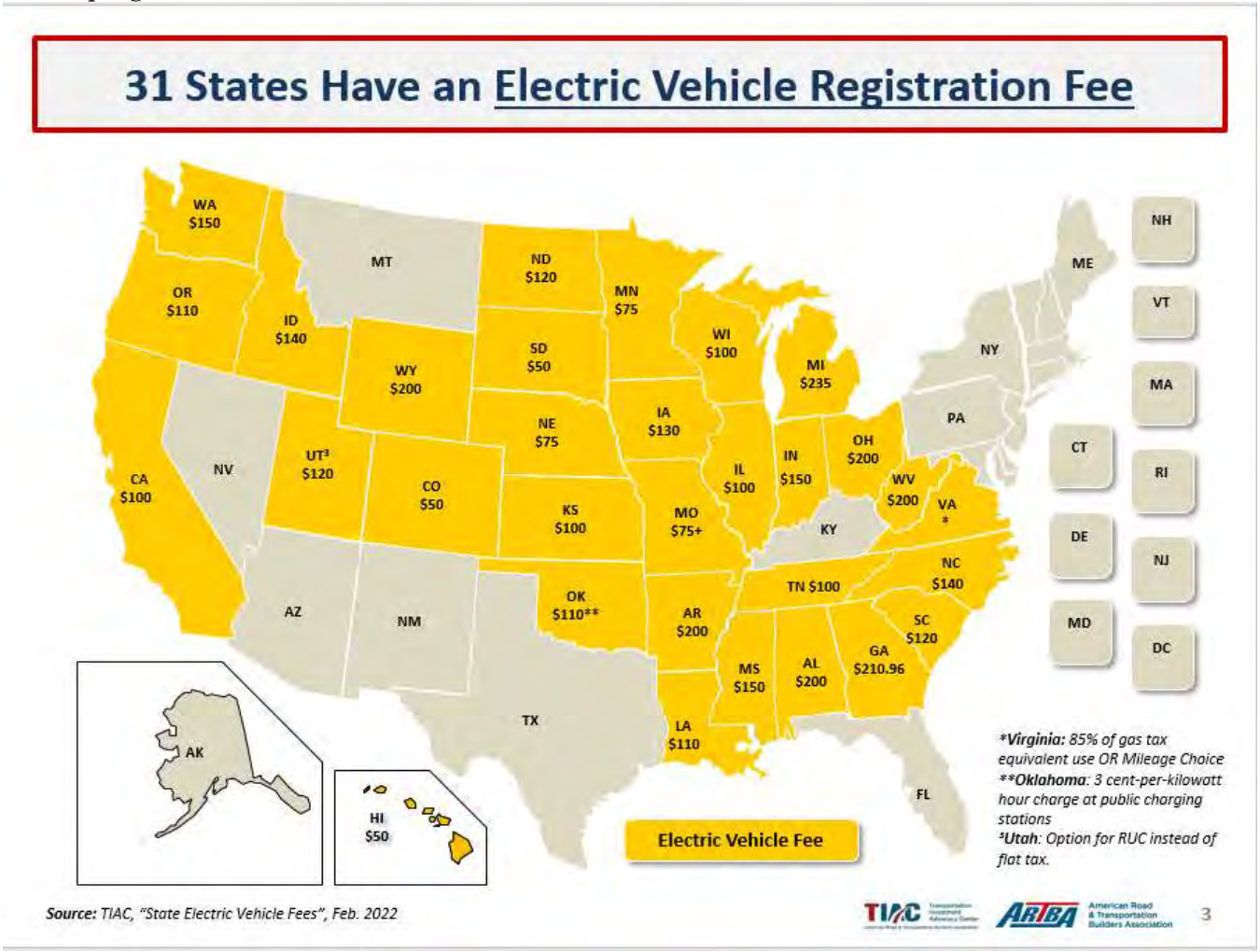
Another Study Committee member asked if the legislature should consider freight and logistics legislation that would charge a higher MBUF for heavier trucks. Dr. Hendren explained that truckers do not support the MBUFs, because they already face so many fees. The coalition has tried several approaches to establish a MBUF that the truckers could support, but have not yet found a satisfactory solution. The truckers have expressed that they would like to have existing fees removed or reduced with the introduction of a new fee.

American Road and Transportation Builders Association
Carolyn Kramer Simons the a Senior Director of State Funding Policy at the Transportation Investment Advocacy Center with in the American Road and Transportation Builders Association ("ARTBA-TIAC").

[36] The Eastern Transportation Coalition's website provides a calculator where an individual can see how much they are paying in fuel tax currently and what their MBUF would be in comparison. https://tetcoalitionmbuf.org/calculate-your-mbuf/

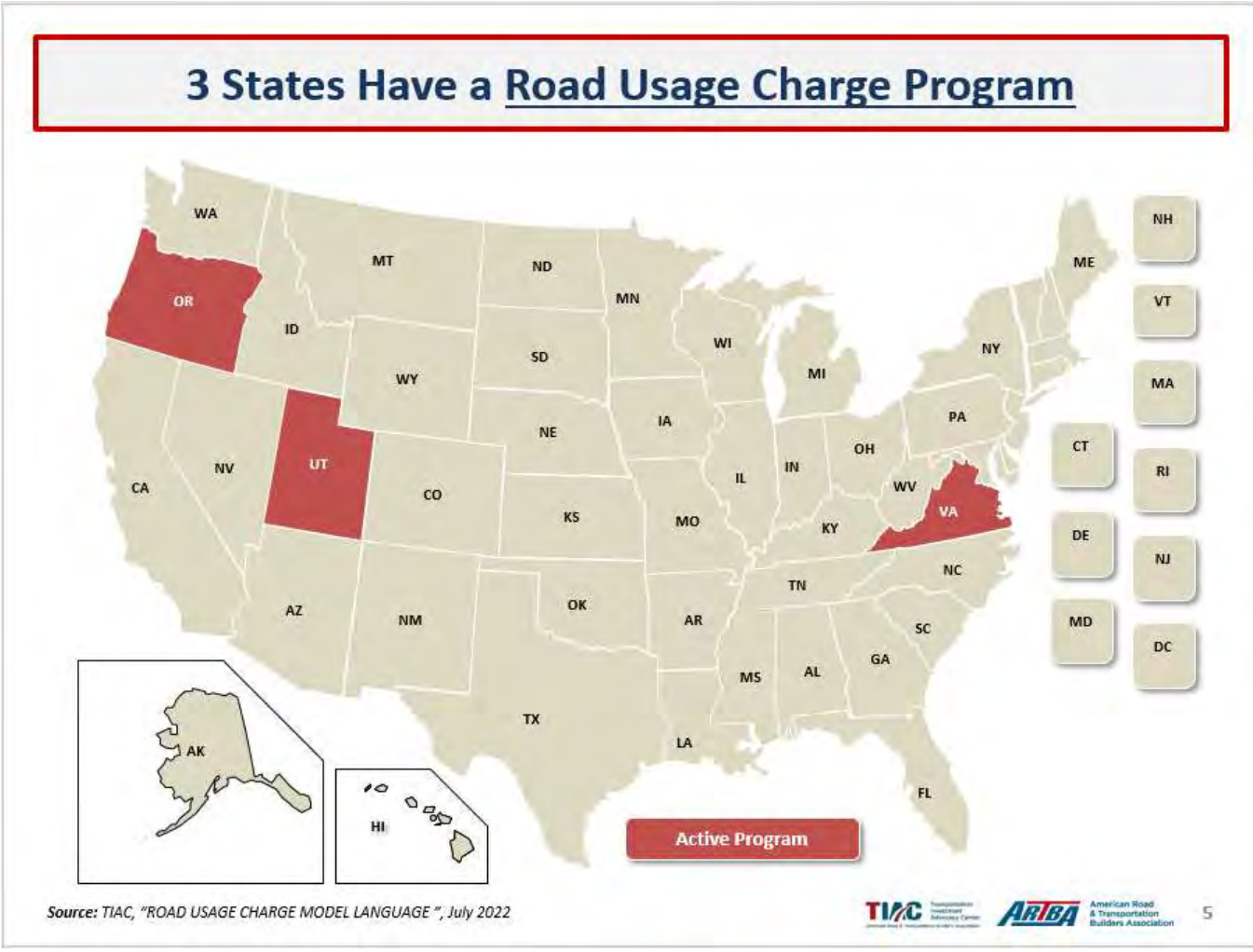
EV Registration Fees

Mrs. Simons began by explaining that currently 31 states have an EV registration fee. For most states, it is an annual registration fee that is supplemental to the registration fee that all vehicles pay. South Carolina has a biennial fee. Six states have a fee that is indexed to various factors, but still operates as a flat fee. That fee grows over time, so that the fee has the same "buying power" in the future. Still other states have a formula, such as Virginia. Virginia has a highway use fee, which is paid annually but is not a set amount. Mrs. Simons testified that the formula is set at 85 percent of what a driver would have paid in gas taxes. Alternatively, drivers may elect the mileage choice program.



Road Usage Fees

Mrs. Simons provided a map of states that implement a road usage charge program. There are currently only three states; Virginia, Utah, and Oregon.



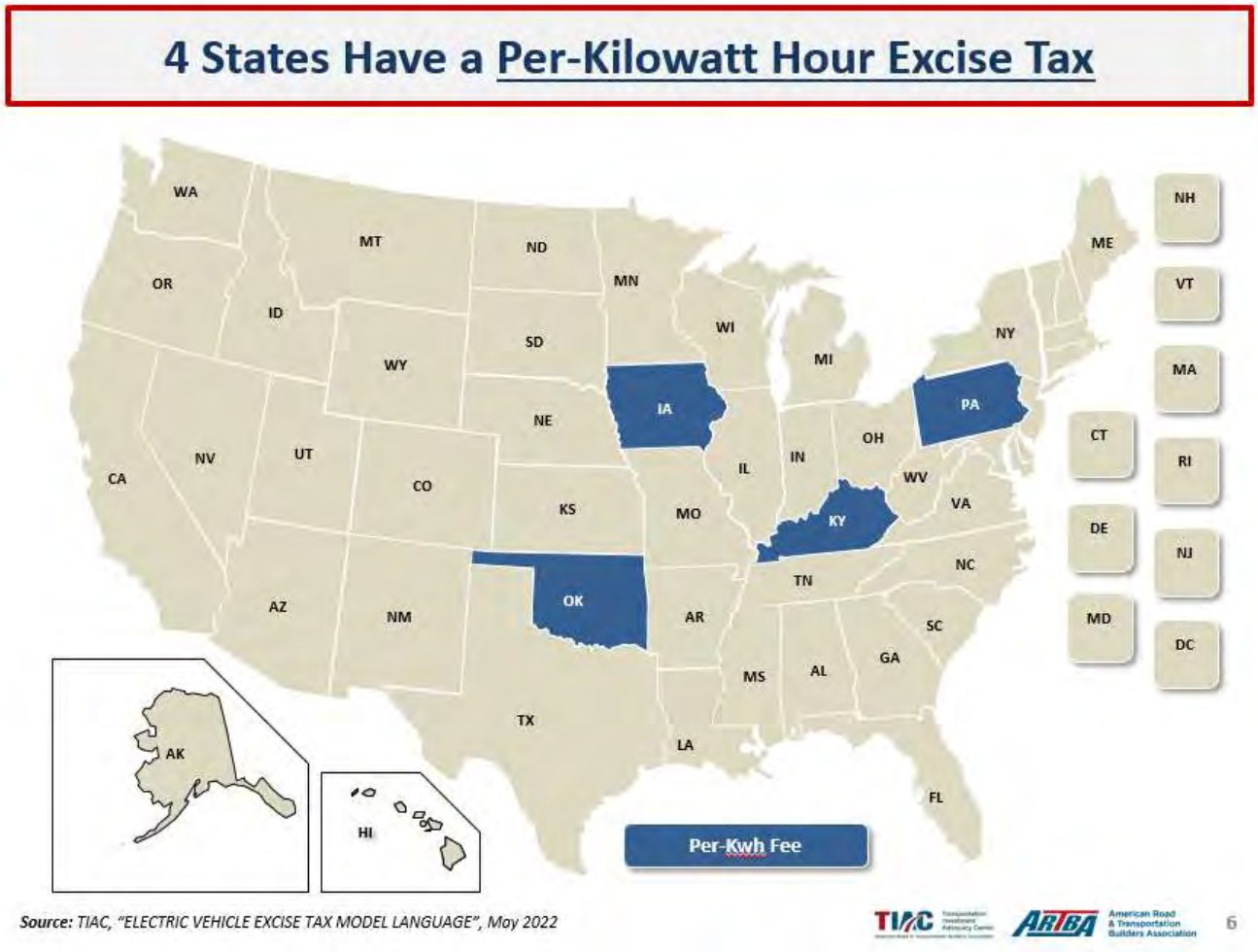
Some concerns noted with these programs include payment collection problems, privacy concerns, equity, and bond agreement complications. Because a lot of bond agreements specify certain revenue streams, the agreements weren't written with these new revenue streams in mind.

She provided details of how Oregon, Utah, and Virginia's road usage fees are established.[37] OReGO, a voluntary system out of Oregon uses three private companies to collect information from drivers. These companies provide reporting options that include GPS tracking and options that do not. Mrs. Simons agreed to provide more information to the committee members in later communication.

Per-Kilowatt Hour Excise Tax

Mrs. Simons explained that four states have legislation that places an excise tax on based on the kWh consumed for EV charging. This model helps states collect from out of state motorists when they charge at public charging stations. Critics of this model point out the individual could be double taxed. In Oklahoma, motorists can save receipts from charging out of state and file for a refund.

[37] The audio was disrupted at the 1:17 mark but can be viewed at: https://www.youtube.com/watch?v=okiVRxErXlw&t=1469s .



Oklahoma, Iowa, and Kentucky have passed legislation to implement future fees. Oklahoma will begin assessing taxes of three cents per kWh in January of 2024. Pennsylvania has had an alternative fuels tax in place since 1997. The alternative fuel tax includes anything not otherwise taxed as motor fuel and is 1.72 cents per kWh for EV charging. Kentucky will begin collecting a 3 cent per kWh fee. This rate will be adjusted annually based upon the national highway construction cost index. Iowa will begin placing a 2.6 cent per kWh excise tax on EV charging beginning in 2023.

Prompting from committee members revealed that a major challenge with the kWh excise tax model, is the inability to capture at home charging.

Committee members remarked that projections calculated for Georgia would require a six or seven cent tax per kWh. Mrs. Simons indicated that most states don't believe that they will recover the lost revenue from motor fuel taxes.

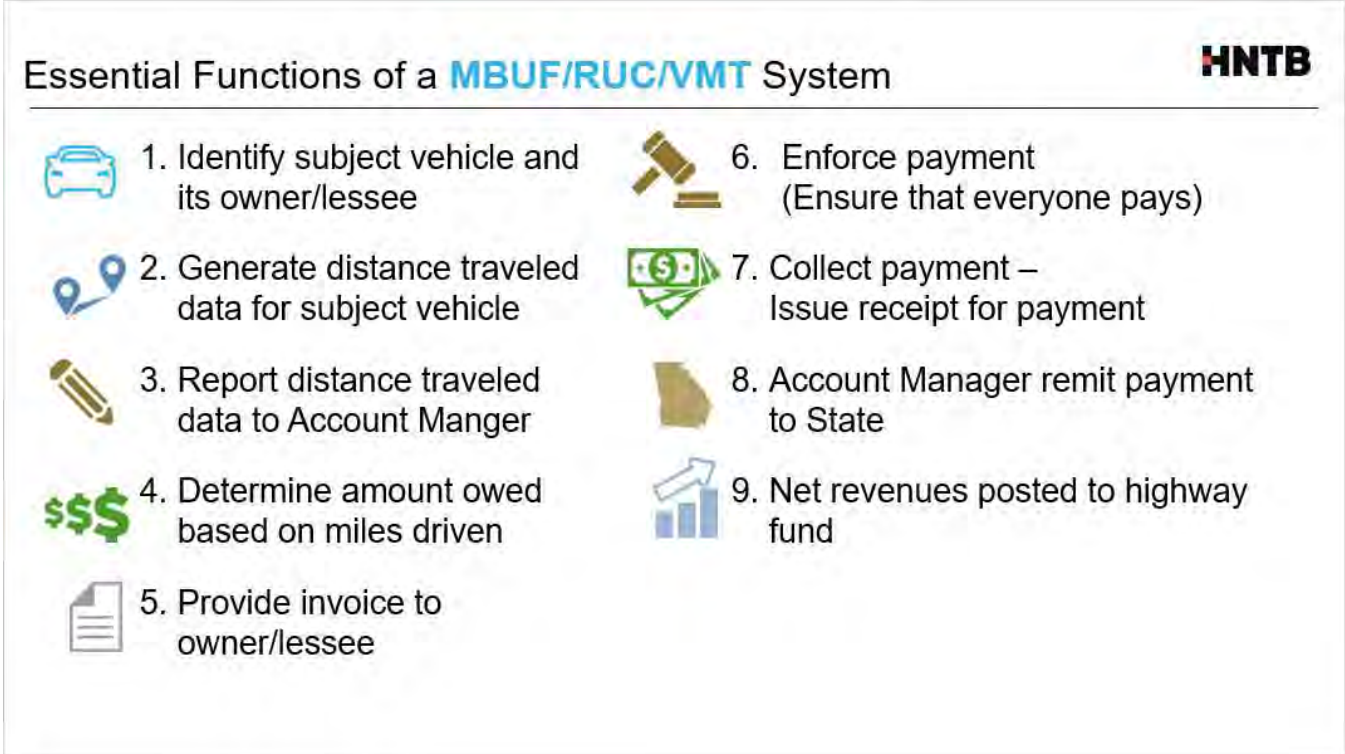
HNTB

Kary Witt is the Vice President of National Tolls and Road User Charging Practice at HNTB. He explained that he has been working with Oregon and Oklahoma. He explained that working with

Oregon is interesting because they want to integrate a tolling program into an existing road user charge program. This would result in a single invoice that a driver would receive each month. Transversely, Oklahoma has an established tolling system that are trying to expand to handle road usage charges.

Mr. Witt repeated projections shared by previous speakers indicating a continued decrease in revenue from the motor fuel tax. He thought it important to note that many states have indexed their motor fuel tax, which is proving to be inadequate, to make up for the projected loss of revenue. He believes that most states are considering Road Use Charges ("RUC"). Even if they are not visibly demonstrating any kind of action, he said the conversations are taking place. He further outlined funding in the IIJA for RUC pilot programs. There will actually be funding available for a national pilot that will look at calculated fees across state lines.

Mr. Witt then provide what he considered the nine essential functions of an RUC system, but focused on the challenge of enforcement most of all.



Then Mr. Witt proposed ideas for ways that a state might collect mileage data. (1) Pre-Paid Time. This is essentially EV fees. The fee is for a fixed period of time and the driver can drive as many miles as they like. (2) Odometer readings. Drivers could submit photographs of their odometer. Hawaii has incorporated an odometer reading as part of their mandatory annual vehicle inspection. (3.) Fuel Stations. Oregon tried a pilot program where a signal would be transmitted to the receiver on the nozzle that reported how many miles a vehicle had driven since the last time they fueled. (4.) Plug-in On-Board Unit. This is how most road user charges are being done today. Units are plugged into the OBD port in a vehicle and have the capability to collect data, including where, when, and how far a car was driven. (5.) Mobile Apps. Major challenges or inconveniences with using mobile apps include the necessity of having the phone in the car, powered up, with the application open. (6.) In-Vehicle Telematics. Mr. Witt expressed a great deal of confidence in using

in-vehicle telematics. He explained that every car manufactured today is already collecting the data needed to implement RUCs.

Mr. Witt explained that RUCs can be calculated considering many factors. The simplest approach is a flat fee. However, a state could introduce a different flat fee for different classes of vehicle, different fuel sources, or fuel efficiency. With the collection of more data points, a more variable fee could be calculated, one that accumulates varying amounts dependent on location, type of roads, time of day, and traffic congestion.

Study Committee members expressed concerns about how data collected is being used and who actually owns that data. Mr. Witt expressed that the question of ownership is unresolved at this time. But his research did reveal that drivers are more willing to share personal information with a private company than with the government.

Mr. Witt expressed that RUCs are a good solution because they are stable, viewed as fair by users, simple, and still flexible. However, concerns of adopting an RUC program include privacy, cost to collect, social equity, and enforcement.

He expressed some of the key lessons people in the industry have learned so far.

- He believes that this is not a technology challenge; it is a policy challenge. The technology works and is readily available.
- Educating the public on what fees they are already paying and how the new structure will apply is very important.
- Most of the public is supportive of the user pay concept.
- Rural drivers often come out better with a RUC.
- Participation in pilots alleviates driver's concerns about privacy. In fact, many drivers in California began with manual reporting and by third month switched to automatic reporting.
- Complex rate structures don't work well because less likely to be accepted by the public.

Representative Parson noted that most emissions testing inspection in the metro area record the mileage on each car. He explained that it cost about $25 to get a vehicles emissions tested, it is done by the third party, and can be easy to get.

Sysco-
Brad Christie is the Director of Government Relation for Sysco and he leads the company's government affairs work across the international and US jurisdictions. Sysco is the global leader in selling, marketing, and distributing food and food related products to restaurants, health care and educational facilities, lodging establishments, government facilities, and other customers who prepare meals away from home.

Their fleet includes over 500 heavy-duty trucks and trailers that travel over eight million miles and consumer over 84,000 gallons of diesel fuel annually. Sysco has operated in Georgia for nearly 35 years, employing 1700 Associates and serving 7,500 customer locations sourced from 1,500 suppliers.

Sysco hopes to electrify 35 percent of their diesel fleet by 2030, which amounts to converting just under 3,000 diesel trucks to electric trucks across the county over the next eight years. Mr. Christie

explained that Sysco is a short haul distribution business and EVs provide the range necessary to meet daily customer delivery demands for the bulk of their routes.

He closed his remarks by explaining that Sysco is investing significant capital and is looking to establish public-private partnerships with states like Georgia to ensure they can expand and accelerate their deployment efforts.

Mrs. Taylor Calvin, the Government Relations Manager for the South market with Sysco, joined Mr. Christie. Mrs. Taylor expressed Sysco's plans on becoming a leader in the heavy-duty electrification space. She expressed that Sysco is working with a number of other states to establish EV fleets and hopes to do the same in Georgia.

Questions from Study Committee members revealed that Sysco operates primarily within states lines and that they are largely agnostic about how states recoup losses from gas tax fees.

General Motors
Michael Maten is the Director of EV Policy and Regulatory Affairs with General Motors. He explained that General Motors is transforming into an all-electric company and has allocated $35,000,000,000 through 2025 to EV and autonomic vehicles. Of the $35 billion, $750 million is dedicated to building a charging ecosystem around the country. For many years, General Motors has offered the Bolt, which is the lowest priced EV in the country. They are planning a high volume launches next year for the electric Silverado, Blazer, Equinox, and Hummer. General Motors is planning to have 1 million units by 2025.

General Motors is partnering with EVgo, and building 3250 DC fast chargers into 52 markets. Additionally, GM is working with Pilot Company to build a coast-to-coast fast charging network, where they will install up to 2,000 EV charging stalls at 500 Pilot/Flying J centers.

To address other concerns around charging, GM is partnering with their dealer network to deploy 40,000 destination chargers in local dealer communities. GM believes that its dealers know where chargers are needed in their communities and gives them discretion to select an appropriate site. GM is sponsoring up to 10 level two chargers.

General Motors is planning to start making their own battery cells with LG Energy Solutions. They plan to have three battery facilities that will produce about 40 or 50 gigawatt hours of energy storage capacity a year. This will not only support GM, but will encourage a battery supply chain in the United States. Mr. Maten does not expect EV batteries to end up in landfills because there is so much value in those batteries.

Further, Mr. Maten shared that OEMs have mileage data on vehicles they manufactured, but they consider the data to be owned by the motorist.

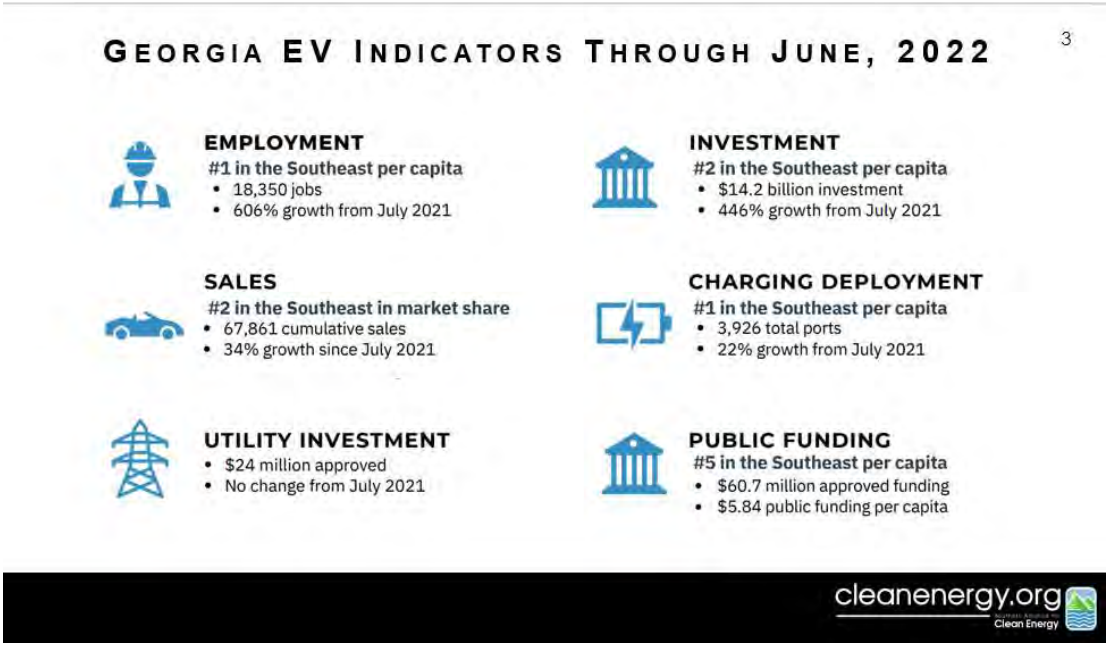
Clean Cities Georgia
Frank Morris, the Executive Director of the Clean Cities of Georgia presented to the committee. Clean Cities of Georgia is a non-profit funded by the Department of Energy to do outreach and education for the use and adoption of alternative fuels in transportation. Mr. Morris explained that the organization is fuel agnostic and is funded by Congress. The organization started in the 1990s and is the only program funded by the Department of Energy to advocate for the adoption

of clean fuels in transportation. The organization represents the entire state, but does collaborate with different municipalities, such as Savannah, Macon, and Dawsonville.

Mr. Morris explained how the organization has used various grants and that they have displaced over 12 billion gallons of gasoline. Mr. Morris echoed details provided by previous speakers about IRA clean vehicle tax credits. He also provided the Clean School Bus Rebate Funding awards for Georgia that were provided by the Bipartisan Infrastructure Law. The program ended up awarding 919 million dollars to support schools to purchase the buses, and $20,000 for charging infrastructure.

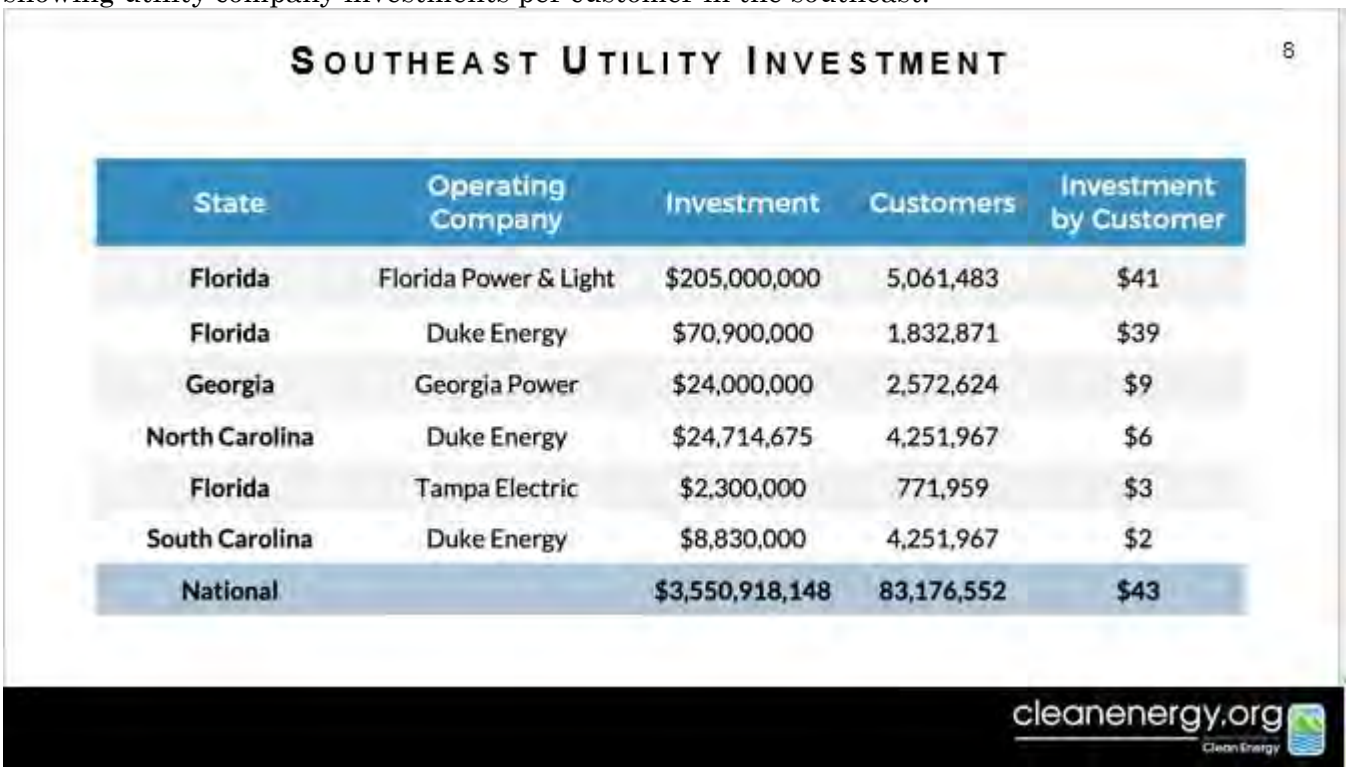
Southern Alliance for Clean Energy

Stan Cross, the Electric Transportation Policy Director for the Southern Alliance for Clean Energy, which is running a program called Electrify the South. The program's goal is to accelerate the transition to electric transportation. Every six months they publish a series of market indicators that they rely on for policy recommendations. Mr. Cross provided data introduced by previous speakers showing the increased adoption of EVs and projected adoption in the future. He explained that they also track sales and charging deployment and in Georgia they are focusing on six major pieces of data, including: Employment, Investment, Sales, Charging Deployment, Utility Investment, and Public Funding. He noted that Georgia is doing really well in employment, investment, charging deployment, and sales.



He highlighted that Georgia is approaching the five percent adoption rate, and that often, after new technologies pass the five percent adoption rate, the adoption grows exponentially.

Mr. Cross provided details about the southeast United States EV market shares and adoption rates; he noted the region as a whole lags behind national average. He also provided information about neighboring states providing incentives and funding to support EV adoption, and a slide showing utility company investments per customer in the southeast.

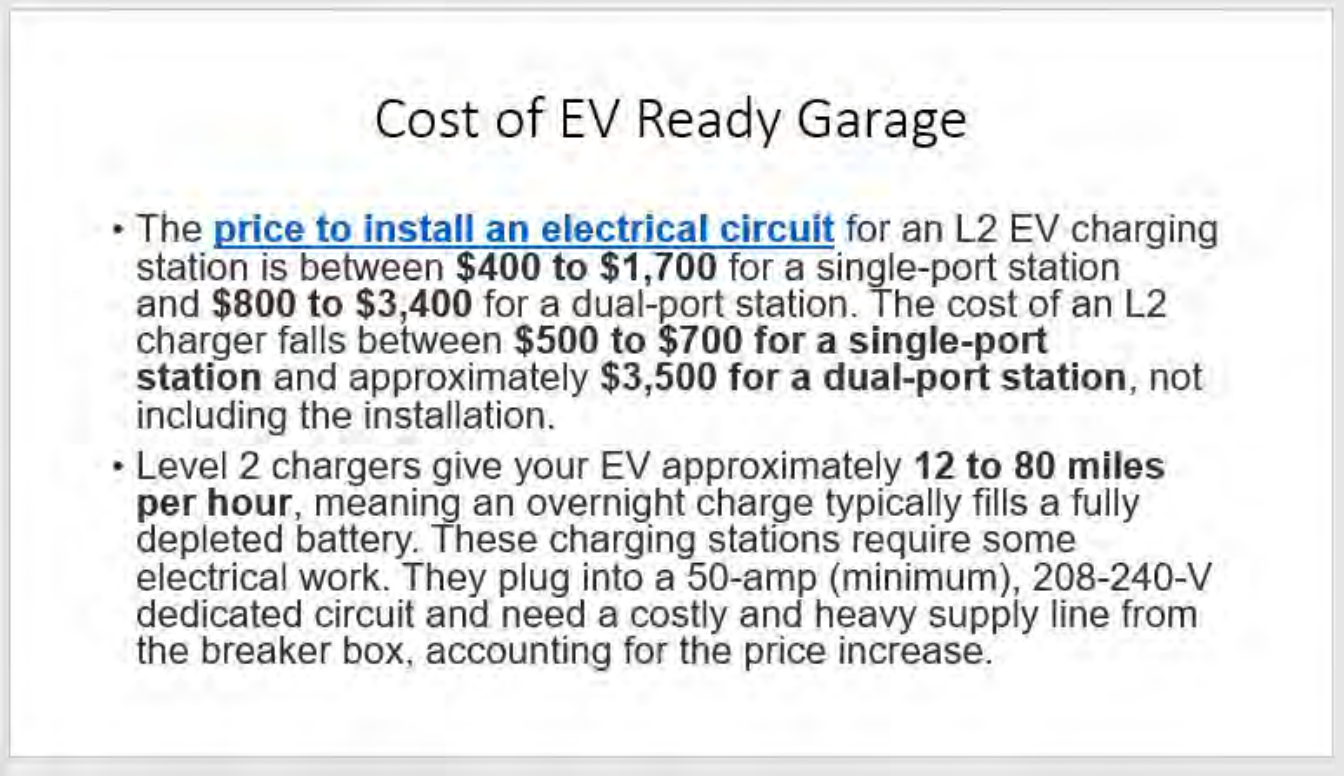


State	Operating Company	Investment	Customers	Investment by Customer
Florida	Florida Power & Light	$205,000,000	5,061,483	$41
Florida	Duke Energy	$70,900,000	1,832,871	$39
Georgia	Georgia Power	$24,000,000	2,572,624	$9
North Carolina	Duke Energy	$24,714,675	4,251,967	$6
Florida	Tampa Electric	$2,300,000	771,959	$3
South Carolina	Duke Energy	$8,830,000	4,251,967	$2
National		$3,550,918,148	83,176,552	$43

He noted that in Georgia, utilities are not investing heavily in charging infrastructure and that the state is certainly well below Florida in terms of utility investment. He also noted that Georgia has not put any money toward EV charging infrastructure, but he believes that this will change once GDOT's NEVI plan is implemented. Summarily he pointed out the relatively low investment by Georgia Power and very little investment by the state; The infrastructure that has been deployed has come from the private sector.

Home Builders Association Georgia
Austin Hackney is the Executive Vice President at the Home Builders Association of Georgia, an organization made up of twenty-three local home builder associations throughout the state. The association represents about 1,450 builder member companies and 3,500 member companies.
Mr. Hackney expressed that he would like to address the impact of adopting EV technology on homebuilding in Georgia. He provided data showing how many permits for home building were issued in 2021 and the fiscal impact that home building has on communities. He explained what contributes to housing costs, specifically, land, lumber, labor, lending, and laws. He noted that 26.9 percent of the final price of a new single-family home built in Georgia is attributable to regulations imposed by government. This is higher than the national average, which is 23.8 percent.

Mr. Hackney provided a slide outlining the cost of an EV ready garage. He further noted that only Atlanta has an ordinance that requires a garage be EV ready. However, others are unofficially requiring EV ready garages.



Mr. Hackney provided quotes and survey results indicating that some do not believe installing an EV charger increases a home's value and that EV chargers are the least desired high-tech home feature of the 3,200 home buyers surveyed.

Mr. Hackney further explained that the mandating EV ready garages in state construction codes could have a negative effect on homebuyers. He explained that when $1,000 is added to the price of a new home, the cost becomes prohibitive for about 117,932 households nationally, in Georgia it would be 4,851 households.

Lucid Motors
Daniel Witt is the Director of State and Local Public Policy for Lucid Motors, an American luxury electric car manufacturer. Lucid boasts having the EV with the longest range available today. This vehicle can go 550 miles on a single charge due to the efficiency of the vehicle. Therefore, they do not believe that range is restricted by battery weight. He made an argument for allowing direct sales from EV manufactures to consumers. His position largely reflected commentary heard in previous meetings.

Georgia Auto Dealers Association
Ben Jordan, from the Georgia Auto Dealers Association returned to give testimony a second time. He reiterated comments from his previous testimony. He expressed that the dealers are ready, willing, and capable of selling EVs to the market, and that direct sales are an unnecessary carve out. He further expressed that EVs are not special and don't require a separate distribution system.

RaceTrac
AJ Siccardi, is the President of Metroplex Energy, which he described as the wholesale arm of RaceTrac. It sells hydrocarbons, biofuels, and an assortment of other fuels. He noted that RaceTrac has about 760 stores across 13 states, with 125 locations in Georgia. The company is headquartered in Georgia and employs about 3,000 people.

He noted that the sale of high speed EV charging is different from the sale of liquid fuels. Liquid fuels do not provide the consumer a "do-it-yourself option." For example, consumers have to go to a convenience store that has the infrastructure of storage tanks to purchase fuel. However, with EV charging, it is estimated that 70-80 percent of motorists will be charging at home.

He provided a slide demonstrating how a Circle K fueling station in Norway adapted to the changing marketplace and adjusted to meet consumer needs. He noted that the convenience store still provided a canopy for vehicles that were fueling, restrooms, and attendants with the store for motorists. He highlighted the juxtaposition to chargers that are placed in parking lots with no attendants, restrooms, amenities, or car canopy.

Mr. Siccardi then explained electricity pricing. He stated that it is essentially composed of consumption of power and the price for demand. He expressed that adding a NEVI compliant charger would result in a 600 KW demand, which is roughly six times a RaceTrac's current demand. He explained that increasing the demand results in increased costs. He provided a graph showing the projected cost of electricity for EV charging, which was later questioned. The yield curve was based on a blended rate and caused a significant amount of conversation and some confusion. Commissioner Pridemore later commented that the PSC allows for three EV tariffs and the projection displayed did not match any of them. Further, she noted that only one of those tariffs has a demand charge.

Mr. Siccardi's projections anticipated gross losses for EV charging providers for seven years before becoming profitable in Georgia. He compared this to a projection based on Alabama Power's model,

which appeared much more business friendly. He voiced other concerns about deployment in the future. Primarily, that private business cannot compete with power utility monopolies. He further explained that unfavorable electricity rates will stifle, if not outright stop, private investment in EV charging. Mr. Siccardi asked for a level playing field, which included two things: (1.) prohibit rate basing the cost of EV chargers by utility companies; and (2.) requiring utility companies to purchase energy at the same rate as other retailers.

Jay Smith, Charge Ahead Partnership
Jay Smith is the Executive Director of Charge Ahead Partnership, which is a consortium of business organizations and individuals who are advocating for policies that help expand EV charging networks. He reiterated some previous concerns in a condensed format, and left the Study Committee with three recommendations:
1. Allow for the resale of electricity by the kWh, not based on time;
2. Prohibit the use of ratepayer funds from a regulated monopoly from competing with the private sector- by requiring EV charging to be a separate subsidiary; and
3. Require that power companies in the EV charging business operate under the same rates, terms, and conditions as private retailers.

Georgia Association of Convenience Stores
Angela Holland, President of the Georgia Association of Convenience Stores, returned and echoed sentiments she shared in previous testimony. She provided two major concerns for her convenience store owners: (1.) that they be allowed to sell power by the kWh; and (2) that they have a fair and level playing field when competing against power suppliers. When asked, she provided that a blended rate is not necessarily what her members would ask for.

Alan Powell
The Honorable Alan Powell, State Representative of the 32nd House District, presented his thoughts to the Study Committee. He began with a brief explanation of the legislation he introduced in the preceding legislative session (2022) and noted that he believes that the committee, and legislature, should be focusing on all the available fuel sources. Specifically, he cautioned the Committee against turning their backs on other alternative fuel sources simply because electricity has been supported by others.

He further stated that he does not support public utilities competing against private companies to sell EV charging, except in the case of a third party subsidiary. Lastly, he highlighted the importance of recovering the lost revenue due to decreased motor fuel sales.

Georgia Power
Stephanie Gossman, with Georgia Power, returned to present to the Study Committee. She reiterated points from a previous meeting but was joined by Seth Blocker.

Seth Blocker, the Pricing Design Manager for Georgia Power, presented information concerning pricing options at Georgia Power. He explained that Georgia Power is well known for having an innovative and robust price portfolio for rate options. He specifically mentioned a tariff program called the Charge It rider which they are hoping to get approval for in the current rate case. Georgia Power would like this rate option to be available next years. He expressed some concern over the numbers provided previously by Mr. Siccardi and encouraged clarity on the misunderstanding.

Green Power EMC
Jeff Pratt returned to present concerns to the Study Committee. He repeated testimony given at a previous meeting.

Meeting #6: November 30, 2022

The final meeting of the Study Committee was held on November 30, 2022 at the State Capitol in Room 450. The Study Committee discussed and voted upon this report and recommendations. Members[38] in attendance included:

Co-Chairman Senator Steve Gooch
Co-Chairman Representative Rick Jasperse
Senator Frank Ginn
Senator Bill Cowsert
Senator Larry Walker
Senator David Lucas (*Ex Officio*)
Senator Randy Robertson (*Ex Officio*)
Representative John Corbett
Representative Alan Powell
Representative Don Parsons
Commissioner Tricia Pridemore

Thirty-eight recommendations and findings were presented to the Study Committee. The recommendations were sorted into categories and the members discussed multiple items at one time because many of the recommendations were in conflict with one another (whether diametrically opposed or merely divergent). However, the members voted on each item individually. This resulted in the Study Committee adopting 20 recommendations, some including minor amendments, and tabling seven recommendations.

After significant discussion on the merits and the motion to table, the committee ultimately tabled a collection of recommendations relating to EV charging stations owned and operated by Georgia Power and EMCs. Co-Chairman Jasperse led the discussion of this section and provided a notation that he wished to be considered by the Study Committee as an alternative recommendation.

When the Study Committee voted to table, there was a tie vote of 3-3. The Co-chairmen were divided on their preference to table. However, Co-Chairman Jasperse reconsidered his vote. Ultimately, he decided to have his notation added to the meeting summary rather than considered as a recommendation and to have the tabled recommendations stated in the meeting summary. His notation expressed that there was "significant disagreement between members on recommendations 6 and 7 versus 10 and suggested that the study committee find that the legislative process be used to determine what is best for the state."

Representative Parsons believed that the recommendations should not be tabled, but voted upon. He explained that these areas were largely addressed in Representative Alan Powell's HB 1322, which passed out of the House unanimously. He believes the purpose of the study committee was to make a decision on what's best for the state after further examining the issues, and that the study committee was not doing what it was charged with. Representative Alan Powell voiced concerns about the tabled amendments being memorialized in the record of this report.

[38] Senate Ex Officio members David Lucas and Randy Robertson participated in debate but did not cast votes, according to their Ex Officio status. Similarly, Representatives Thomas Frye and Brad Thomas participated by submitting recommendations and attending the final meeting but did not cast any votes.

At the request of the Chairman, the tabled recommendations are provided below[39]:

> *"6. The Study Committee recommends legislative action to restrict electric suppliers under the jurisdiction of the Public Service Commission for the purposes of setting rates from participating in the business of EV charging, except through a separate, deregulated subsidiary.*
> *7. The Study Committee recommends legislative action to restrict electric suppliers from participating in the business of EV Charging, except through a separate, deregulated subsidiary.*
> *8. The Study Committee recommends legislative action requiring electric suppliers to provide electricity to EV charging companies (including electric supplier subsidiaries) at the same rates, terms, and conditions.*
> *9. The Study Committee recommends legislative action prohibiting an electric supplier from allocating to or recovering from the ratepayers of the electric supplier the cost to provide, own, operate, or maintain EV charging equipment.*
> *10. The Study Committee recommends the preservation of all electric utilities ability to provide investment in charging stations as approved through their existing market structures, with a particular focus on underserved and rural communities.*
> *11. The Study Committee finds that Electric Cooperatives owning and operating EV chargers are continuing to serve in their historic role of selling electricity to the public and should be allowed to continue to do so."*

These discussions were archived in a video recording and are available as part of the public record.[40] Additionally, the list of recommendations that were presented to the members for voting and were read aloud in the meeting are attached in APPENDIX VI: Materials from Meeting #6.

[39] The numbering in this quotation does not match the adopted recommendations because it originated from a different draft.
[40] http://www.senate.ga.gov/committees/en-US/2022StudyCommittees.aspx

SECTION V -

STUDY COMMITTEE RECOMMENDATIONS AND FINDINGS

kWh Pricing

1. The Study Committee recommends legislative action to require EV charging to be metered by the kilowatt hour when sold or given away.
2. The Study Committee recommends legislative action to adopt language from HB 1322 introduced in the 2022 legislative session which clarifies current law to allow commercial EV service providers to bill for charging services based on the kWh.
3. The Study Committee suggests that alterations to the Territorial Act be made in a prudent and judicious manner.

Inclusion of Alternative Fuels

4. The Study Committee recommends that any legislative action taken concerning the electrification of vehicles, be done with an understanding and appreciation for the potential of future development in fuel sourcing for vehicles. Further, the Study Committee recommends that any legislative plan should include all alternative fuel types, so that the state has a mechanism in place for collecting revenue on all fuel sources.

PSC Appeal/ Demand Charges

5. The Study Committee recommends all electric suppliers offer an EV charging rate that collects electricity costs through a volumetric charge (kWh). The purpose of this legislation would be to address demand charges associated with EV charging. The Study Committee recognizes that electric utilities may need to vary their rates by time of day or real time pricing capability.

EV Charging Rate/ Rate Structure

6. The Study Committee finds that Georgia law should not prescribe a rate structure for commercial EV charging.

GDOT Plan

7. The Study Committee recommends the Georgia Department of Transportation consider the impact on free market providers of EV charging stations, either already in place, planned, or projected to be in place by 2035, when determining the placement of stations funded with federal grants.
8. The Study Committee encourages the Georgia Department of Transportation to make every reasonable effort to partner with free market EV charging entities in the placement of federally funded stations.

Motor Fuel Tax Recovery

9. The Study Committee recommends that any legislative action taken to recoup the shortfall in the collection of the gas tax be carefully constructed so that emerging technology and fuel sources can easily be incorporated into a formula or process.
10. The Study Committee supports the Georgia Department of Transportation's pilot program on taxing motorist based on vehicle miles traveled.

11. The Study Committee supports the enforcement of a fair methodology to replace the loss in revenue from motor fuel taxes.
12. The Study Committee recommends legislative action requiring the Georgia Department of Transportation to conduct a study or analysis to determine a fair road usage charge for all EVs operating in Georgia.
    a. The Study Committee recommends legislation requiring the Georgia Department of Transportation to issue a request for proposal for the study to be conducted in calendar year 2023.
    b. The Study Committee recommends legislative action requiring the study to be paid for from the state's general fund and appropriated by the Georgia General Assembly in the 2023 legislative session.
    c. Further, the Study Committee recommends legislative action requiring the study to include typical methods of tracking and collecting road usage data and fees as are applied and utilized internationally including the United States.
13. The Study Committee finds that fees such as road usage charges or vehicle miles traveled should be comparable to the fuel tax paid by an equivalent conventional vehicle.

Permitting/Licensing/Inspections

14. The Study Committee recommends legislative action requiring commercial and other charging stations to be permitted or licensed by the state. Permitting, licensing, and inspection requirements should ensure (1.) accuracy of energy consumption measured by a meter; (2.) safety; and (3.) an accurate accounting of charging stations and their locations.
15. The Study Committee recommends legislative action requiring the licensing and inspection of charging stations be conducted by the Department of Agriculture, as this department currently inspects fuel pumps. Further, the Study Committee recommends adequate funding to support these inspections.
16. The Study Committee recommends that permitting and inspection intervals for paid public charging be differentiated from those chargers which are free for consumers to use.

Public Safety Training

17. The Study Committee recommends that public safety officers and first responders be adequately trained in handling motor vehicle accidents involving electric vehicles and training materials be created and distributed statewide by our Public Safety Training Center. Further, the Study Committee recommends adequate funding to support this training.

Charging Class Conceptualization

18. The Study Committee finds that EV charging facilities can be divided into four classes based on the location of the chargers and the type of vehicle being charged. The Study Committee believes four classes exist: (1) home charging outlets; (2) public charging outlets[41]; (3) destination charging outlets[42]; and (4) fleet charging. The Study Committee believes this rubric can be used as a framework levy taxes against users who are both Georgians and non-Georgians.

	Home Charging Outlet	Public / Transient Charging Outlet	Destination Charging Outlet	Fleet Charging Outlet
GA Resident	X	X	X	-
Non-Resident	-	X	X	-
GA Business	-	X	X	X
Non-GA Business	-	X	X	X

Direct Sales

19. The Study Committee finds that there is not sufficient cause, at this time, to overturn the longstanding automobile dealership franchise structure that dealers and consumers have come to depend upon.

[41] For purposes of this table, Public/Transient Charging Outlets are charging sources used by transient customers who need long range charging for extended trips.

[42] For purposes of this table, Destination Charging Outlets are charging sources found at hotels, retails stores, and CIDs.

SECTION VI -

SIGNATURE PAGE

Respectfully submitted,

THE FINAL REPORT OF THE JOINT STUDY COMMITTEE ON THE ELECTRIFICATION OF VEHICLES

(SENATE RESOLUTION 463)

Senator Steve Gooch, Co-Chair
Senate District 51

Representative Rick Jasperse
House District 11

SECTION VII –

APPENDICES

APPENDIX I: MATERIALS FROM MEETING #1

APPENDIX II: MATERIALS FROM MEETING #2

APPENDIX III: MATERIALS FROM MEETING #3

APPENDIX IV: MATERIALS FROM MEETING #4

APPENDIX V: MATERIALS FROM MEETING #5

APPENDIX VI: MATERIALS FROM MEETING #6

Appendix I

(Material from meeting #1, August 24, 2022)

Georgia Public Service Commission Electric Vehicles & the Territorial Act

EV JOINT STUDY COMMITTEE

AUGUST 2022

CHAIRMAN TRICIA PRIDEMORE

Regulatory Framework for the EV Ecosystem

FEDERAL

Federal Regulation

- FERC regulates wholesale energy sales and **not** retail electric service, and as such, is **not involved** in the regulation of Georgia's provision of retail electric service to EV charging service providers
- FERC also does not regulate the provision of EV charging services

STATE

State Legislature Regulation

- **Title 46 of the Georgia Code**
  - » Electric service rates (tariff schedules and rates of the cost of service associated with EV infrastructure)
  - » Territorial Act

State Regulators

- Georgia Public Service Commission (GPSC) jurisdiction and oversight

GA PSC

- Five elected Commissioners
  - Staff organized
    - Administrative – supports operations of GA PSC
    - Adversary – presents litigation position on cases
    - Advisory – policy assistance to commissioners
- The PSC regulates rates, territory, and oversees the IRP for Georgia Power and the 2.7M Georgians they serve
- The PSC regulates territory and financing for the EMCs
- The PSC regulates territory for municipal electric providers
- The PSC hears Territorial Act cases and adjudicates

Territorial Act History

Overview:

- The Territorial Act (*O.C.G.A. §§ 46-3-1 – 46-3-15*) was adopted in 1973 to (1) assure the efficient provision of retail electric service, (2) inhibit duplication of power lines, (3) foster the extension of power lines so as to preserve the environment, and (4) protect lines lawfully constructed. *O.C.G.A. § 46-3-2*.
- The Act implements a plan whereby every area in the state is either assigned to an electric supplier or declared to be unassigned. It subjects all electric suppliers in Georgia to the requirements of the Act and grants the Commission the power to regulate and enforce the Act.

Key Concepts Under the Territorial Act:

- Other key concepts under the Territorial Act are:
    1. An exception to territorial service rights that gives new customers with a load of 900 kW or greater the right to choose an electric supplier, (i.e. big box store)
    2. A "grandfather clause" that allows electric suppliers to continue serving premises they have previously served, regardless of their location, and
    3. The prohibition of discriminatory rates and tying arrangements.

Application of the Territorial Act to the sale of electricity by those who are not electric suppliers:

- "Electric supplier" means any electric light and power company subject to regulation by the Commission, any electric membership corporation furnishing retail service in this state, and any municipality which furnishes such service within this state. O.C.G.A. § 46-3-3(a).
- Some might argue that the exclusive rights conferred by the Territorial Act extend only against other "electric suppliers." However, no court or Commission decision supports such a limited construction.

Territorial Act Application for EV Charging Services

- The Act specifically addresses the provision of retail electric service to "**Premises**," and defines **Premises** as the **building**, **structure**, or **facility** to which electricity is furnished.

- A motor vehicle, which is inherently mobile and **not** attached to a fixed service point within an assigned service area, has never been characterized as a **Premises**.

- Accordingly, because **EV charging service** is not provided to a **Premises,** but rather, to a transient motor vehicle, EV charging service does not constitute the provision **of retail electric service. Nor has any court ever found the provision of EV charging service to constitute the provision of retail electric service.**

- Georgia Power has provided retail electric service to EV charging service providers (e.g., Tesla, Electrify America) for **many years** and **never claimed** that their provision of EV charging services violates the Territorial Act. We believe this interpretation is consistent with other Georgia electric suppliers' positions.

- EV charging service providers exist across the country, and we are not aware of *any* PSC that has determined that the provision of EV charging services constitutes the provision of retail electric service.

Territorial Act Benefits to State of Georgia Regulated Market Structure

- Lower Rates
- Increased Reliability
- Economic Development

Lower Rates

- **Regulated vs Unregulated Market Price Comparison (Based on 2020 EIA Data):**
  - 18 states (including Washington, DC) have deregulated residential electric service markets
  - Nationwide, the price per kWh is 27% higher in deregulated states (44% higher in investor-owned utilities)
  - In the region that includes Georgia, deregulated states are 5% higher in their cost per kWh for residential customers than regulated states in the same area. (Deregulated states: Delaware, Virginia, Maryland, and D.C.)
    - In Texas, the most deregulated state, the price per kWh is 18% higher than other regulated states in the region

- **Regulated Market Benefits:**
  - In a regulated market, the utility commission is responsible for considering the public good, which includes fair allocation of cost recovery, safety, reliability, and energy conservation – objectives which may be in conflict with a competitive market.
    - In a fully deregulated system, such as Texas, there is no reward for reserve capacity, leading to a thin margin of error than can be overwhelmed in a crisis. With this market structure, utilities are not incentivized to prepare for the worst-case scenarios and reliability can suffer.
  - Regulated markets work to keep prices stable:
    - Deregulated states where utilities are required to divest their generating assets and rely on the wholesale market, customers have experienced wild price swings and market manipulation.
    - Deregulated states that also do not require utilities to divest generating assets, providers often control their prices instead of responding to competition.
  - There does not appear to be tangible benefits to deregulation where utilities experience constructive regulation, rates are affordable, and innovative solutions such as renewable energy growth are being pursued with the regulating body's encouragement.

Lower Rates cont.

- **TOU-RD-6**
  - Basic Service Charge: $0.4603 per day
  - On-Peak kWh: $9.6052 per kWh
  - Off-Peak kWh: $1.0268 per kWh
  - Demand Charge
    - Maximum kWh: $8.21 per kW
- **TOU-REO-13**
  - Basic Service Charge: $0.4603 per day
  - On-Peak kWh: 20.3217¢ per kWh
  - Off-Peak kWh: 5.1638¢ per kWh
- **TOU-PEV-9**
  - Basic Service Charge: $0.4603 per day
  - On-Peak kWh: 20.3217¢ per kWh
  - Off-Peak kWh: 6.9728¢ per kWh
  - Super Off-Peak kWh: 1.4993¢ per kWh

Increased Reliability

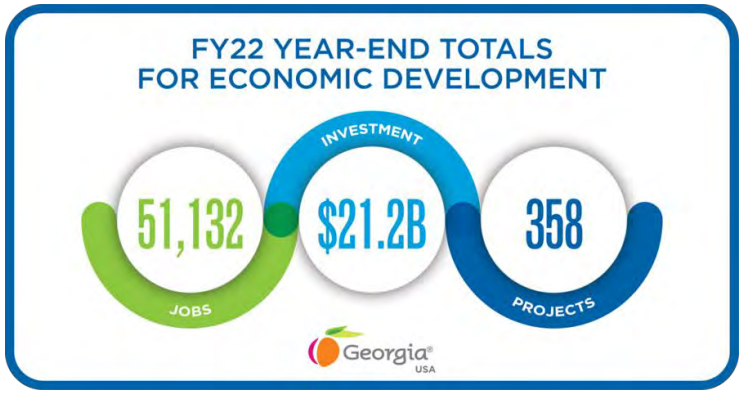
- **Reliability Market Comparison:**
  - Compared to other markets, in 2021 the average Power Quality and Reliability satisfaction score of utilities in the Southeast region ranked first in the residential and first in the business segment as measured by the J.D. Power 2021 Electric Utility Residential Satisfaction Study^{SM} and J.D. Power 2021 Electric Utility Business Satisfaction Study^{SM}. (Study participants included MISO, PJM, Southwest Power Pool, ERCOT, etc.)
    - Power Quality & Reliability is a measure of providing quality electric power (in terms of spikes, drops, or surges), supplying electricity during extreme temperatures, avoiding brief and lengthy outages and, when an outage occurs, promptly restoring power all while keeping customers informed about the outage.
- **Reliability Focus:**
  - Georgia Power Company considers both reliability and economics in its reliability (reserve margin) studies often resulting in a higher level of reliability or target reserve margin than other areas.
    - The Territorial Act enables Georgia's electric suppliers, using its defined territory, to be able to plan for future economic growth.
  - The Georgia PSC has a "line of sight" over all aspects of reliability for Georgia Power Company
    - Georgia Power Company is a vertically integrated utility meaning the GA PSC has purview and jurisdiction over all aspects of reliable service to customers: Generation, Transmission, Distribution.
- **PSC cases in 2016 and 2019 laid the ground work for successful EV generation and transmission needs.**

Increased Reliability cont.

- In 2019 EV program costs were included in retail rate base and operating income for Georgia Power
- The Commission Order in the 2019 Georgia Power Rate Case (for the years 2020-2022) approved what is now referred to as "EV Make-Ready" - "*provides that funds for electric vehicle infrastructure will be allowed as proposed by the Company with an additional $6 million per year to be invested in support of wire and transformer upgrades for customer sited charging stations.*"
- "EV Make Ready" gives priority to "desert charging"
- Georgia Power and Southern Company can make EV investments outside of the rate base in competitive markets without Commission approval
- Georgia Power's 2022 Rate Case is ongoing with a decision by the GA PSC to be rendered in December
  - At the filing, 69 public charging stations
  - At the filing, 187 Georgians prepared for EV "make ready" charging, 512 applications = 45.21 mW

Economic Development

- In Georgia, electric suppliers (municipal's, EMCs and Georgia Power) work together with the state Department of Economic Development to attract business across the entire state of Georgia.
- The Territorial Act and specifically the Customer Choice provision of the Act has been an important tool for economic development in the state.
  - Having the one-time choice of electric supplier is a valuable consideration for large companies that want to ensure they are getting the most value and best reliability for their energy dollar.
- Georgia has been voted "**Top State for Doing Business"** for the last 8 years running.
  - Large Corporation's that have utilized the Customer Choice provision of the Territorial Act and invested in Georgia include:
    - Hyundai - $5.54 billion investment - 8,100 jobs
    - Rivian - $5 billion investment - 7,500 jobs
    - Microsoft - $1.3 billion investment - 2,000+ jobs
    - Jack Links - $450 million investment - 800 jobs
    - Amazon - $260 million investment - 1,000 jobs

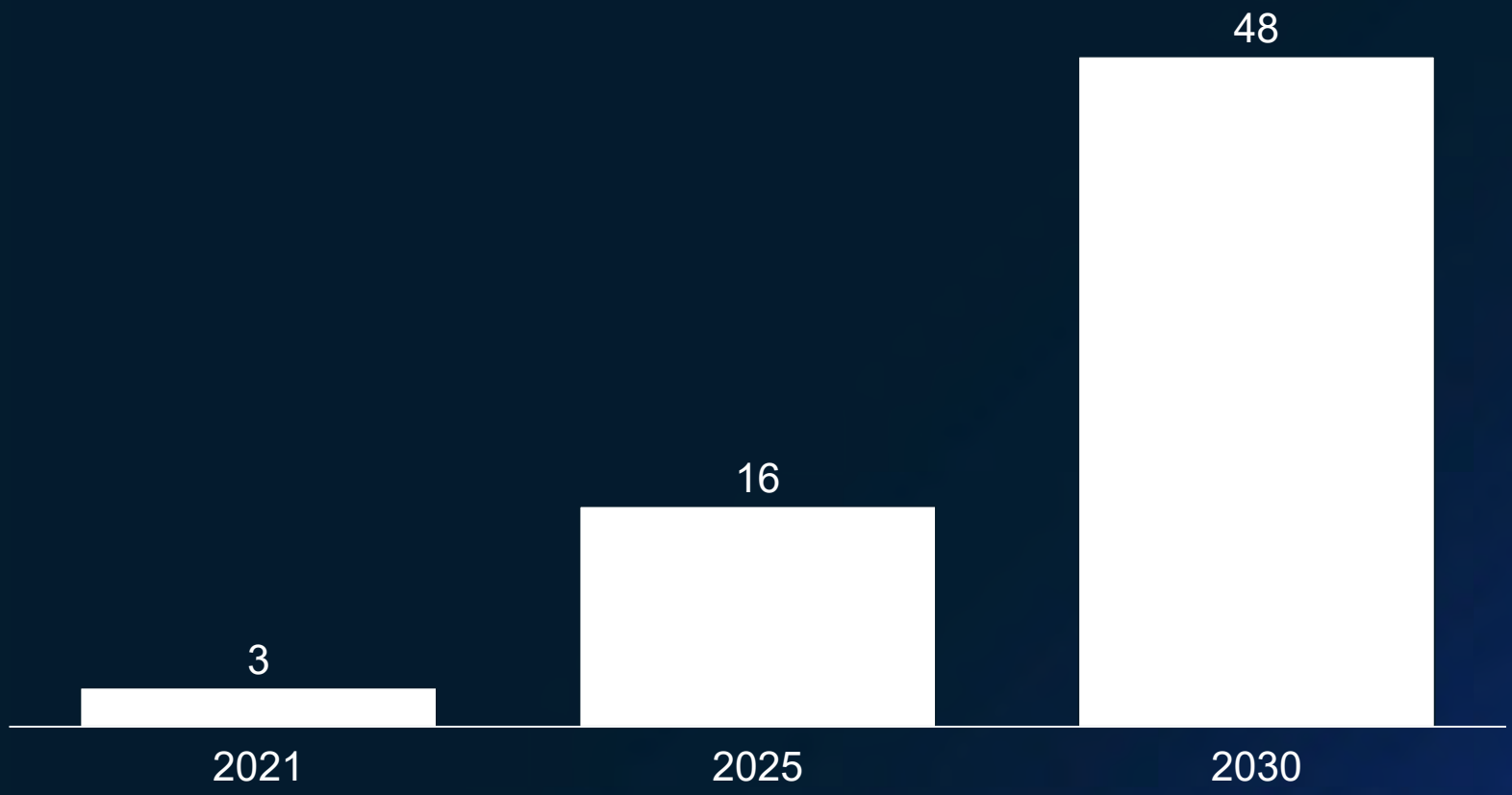


Key EV/EVCI questions facing states

1. What will demand be for EVs and thus, EV chargers?
2. Where should chargers be located?
3. How can the EV/EVCI investment be funded or financed?
4. How can states support this transition?

48M electric vehicles could be on the road in less than 8 years

EV parc (total number of vehicles)[1], Millions of BEVs and PHEVs



1. Based on a scenario where zero emissions vehicles (battery electric vehicles, plug in hybrid electric vehicles, fuel cell electric vehicles) account for half the vehicles sold in the United States in 2030, in line with a federal target that half of new passenger cars and light trucks sold in 2030 are zero emissions vehicles

Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

Automakers and battery manufacturers have announced new US manufacturing plans

Recent announcements for EV production and supply chain investments

Not comprehensive

Automotive OEMs

"**GM plans $4 billion** to convert the Orion, Mich. Assembly plant to produce **electric versions of the Chevrolet Silverado and GMC Sierra** pickup trucks. Production of the **Bolt EV and Bolt EUV** will continue during the conversion." ***(Forbes,1/25/22)***

"…**Ford to bring electric zero-emission vehicles at scale** to American customers… Called BlueOval City, the complex will be constructed on a nearly **6-square-mile site in west Tennessee** and build next-generation electric F-Series pickups…" ***(Ford, 7/21/21)***

"The local (Georgia) economic development agency…approved its portions of the deal (for) **Hyundai Motor Group to build a $5.5 billion electric car plant** near Savannah… Hyundai plans to build **the company's first U.S. plant dedicated to electric vehicles**… to start construction next year and begin producing up to 300,000 vehicles per year in 2025" ***(AP, 7/19/22)***

"**Rivian to site second manufacturing plant in Georgia**… in Morgan and Walton Counties. The project represents a $5-billion site development and manufacturing investment. Once ramped, the Georgia facility will be capable of **producing up to 400,000 vehicles per year**." ***(Rivian, 12/16/21)***

Battery Manufacturers

"**Panasonic, Tesla's main battery manufacturer** and a key investor in the company's earliest days, says it intends to build a **massive $4 billion battery plant in Kansas** to supply packs for the auto industry's fast-moving shift to electric cars and trucks…The project will be **one of the largest battery plants in the U.S.**" ***(Forbes, 7/14/22)***

"The **U.S. Energy Department** on Monday announced it intends to **loan a joint venture of General Motors Co (GM.N) and LG Energy Solution (373220.KS) $2.5 billion to help finance construction of new lithium-ion battery cell manufacturing facilities.**" ***(Reuters, 7/25/22)***

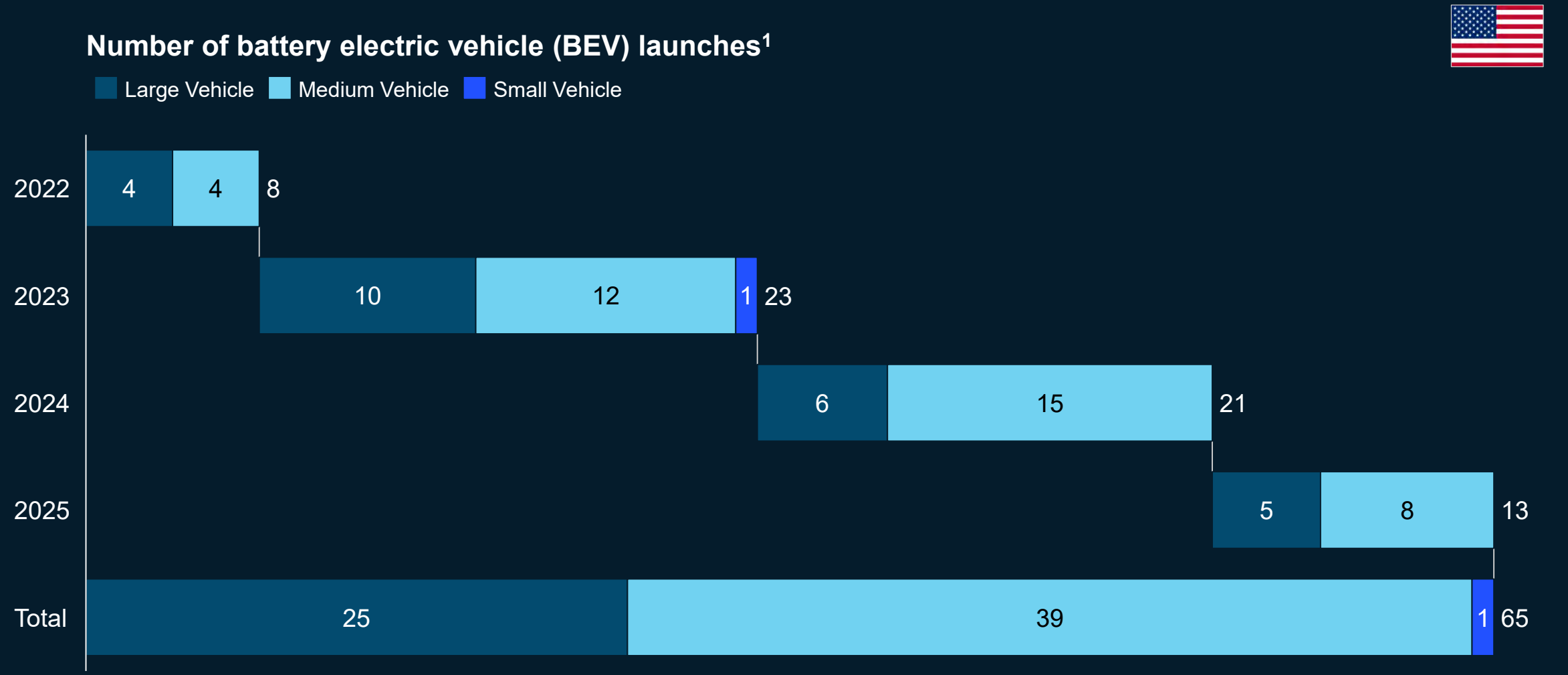
Materials Production and Mining

"**Albemarle** Corp (ALB.N) plans to build a lithium processing plant in the United States that **would produce as much of the electric vehicle battery metal as the entire company produces today**, a bullish bet on America's all-electric…" ***(Reuters, 6/27/22)***

Talon's acquisition of the Michigan Nickel Properties is **directly responsive to Senator Manchin and other national leaders on both sides of the aisle to take urgent action to establish a battery mineral supply chain from mine to battery within the United States**" ***(Talon, 8/10/22)***

Source: Press Search (August 12)

Electric-vehicle production is expected to increase by 2025

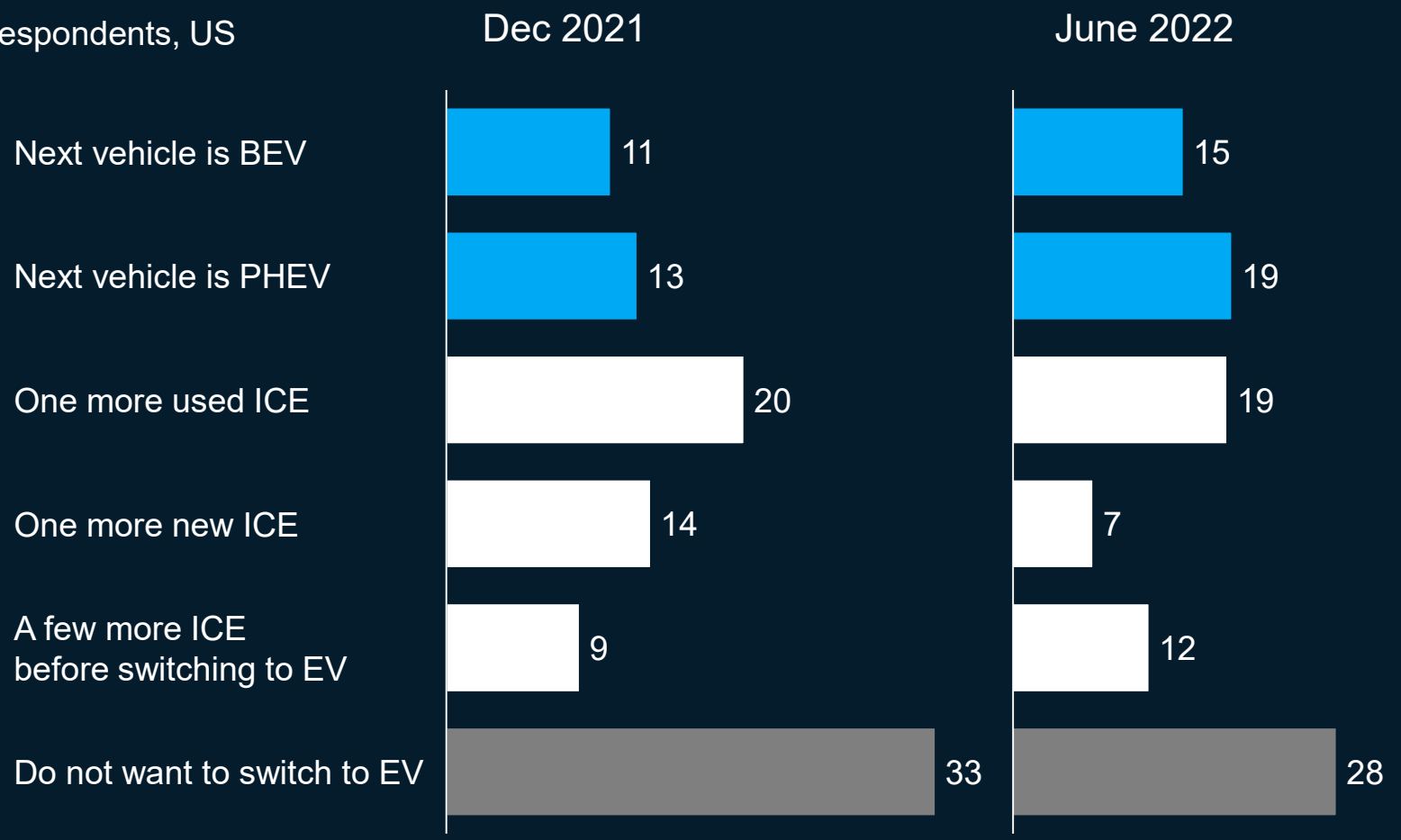


1 Vehicle size classification based on automotive industry class segmentation: small =A/B segment, medium = C/D segment, large = E/F/HVAN segment.
Source: IHS Automotive, "Net-zero emissions in US government fleets" (April 2022)

Next vehicle is electric for 34% of American consumers – significant acceleration of electrification intent in 6 months

Buying waves EV vs. ICE

Share of respondents, US



+10% pts

increase in consumer EV openness since December 2021

Source: MCFM Mobility Consumer insights, Ukraine Crisis Impact consumer survey, dated August 2022, global n = 4,096 US n = 507

What will EV charging demand be by corridor?

4 parc scenarios

30-year time horizon

20+ vehicle and user segments

50 states

8 Use cases


Single-family home


Multi-family home


Work


Destination


Fleet hub


Public overnight


Public fast off-highways


Public fast on-highways

9 charger technologies


AC Slow L1 (<4kw)


AC Slow L2 (4 – 15 kw)


AC Fast L2 (15 – 22 kw)


DC 25 kw


DC 50 kw


DC 120 kw


DC 150 kw


DC 350 kw


DC 500+ kw

Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

Key questions facing DOTs

1 What will demand be for EVs and thus, EV chargers?

2 Where should chargers be located?

3 the EV/EVCI investment be funded or financed??

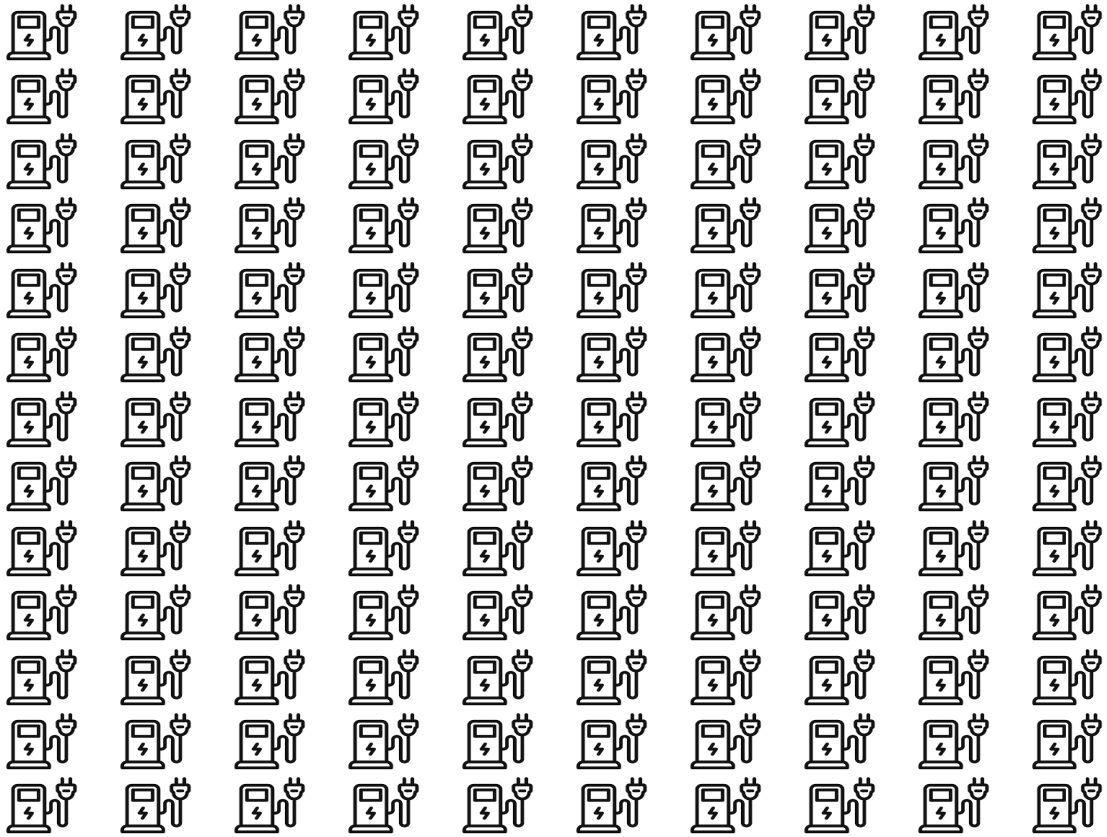
4 How can states support this transition?

1M+ public chargers required by 2030 to meet demand

10,000 chargers

2021 EV Public Chargers

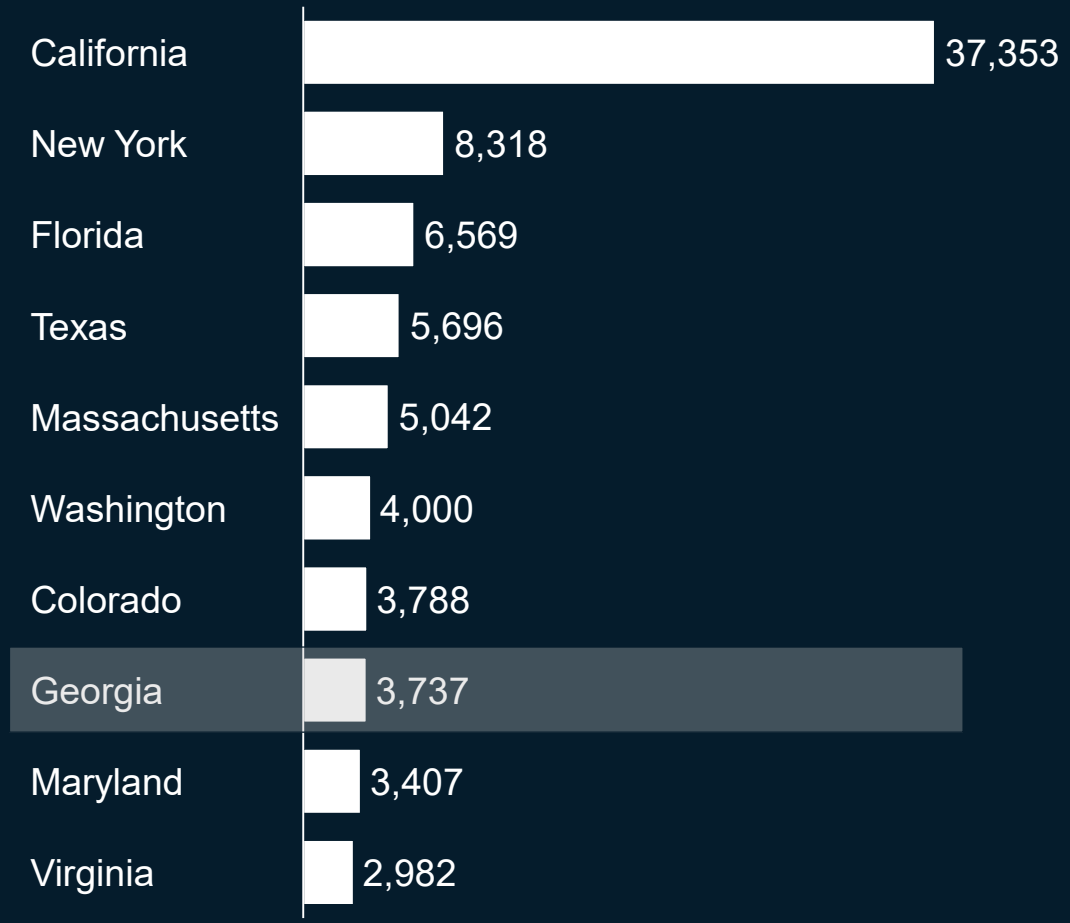
2030 EV Public Chargers



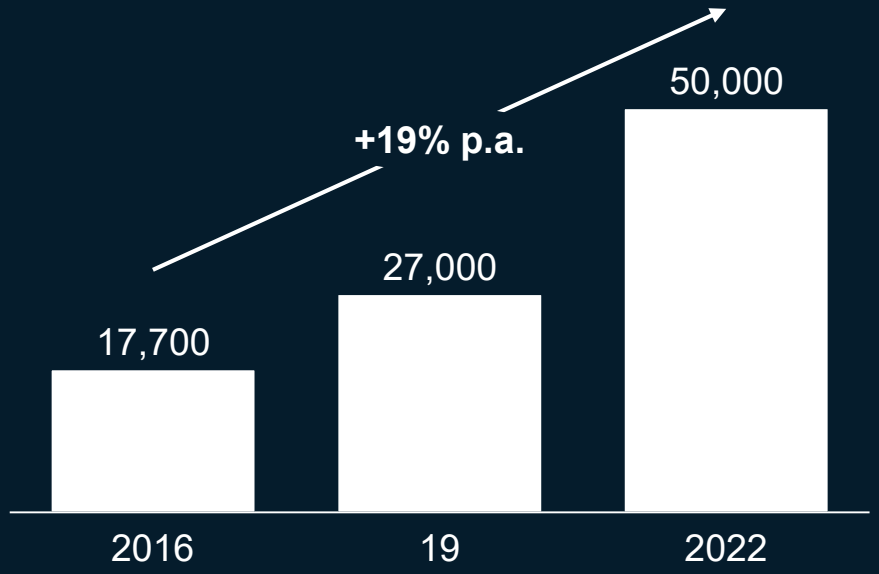
Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

The US electric-vehicle charging-infrastructure network has expanded significantly in recent years

Publicly accessible charging outlets in the US,
Number of outlets*



Publicly accessible charging stations in the US,
Number of stations*



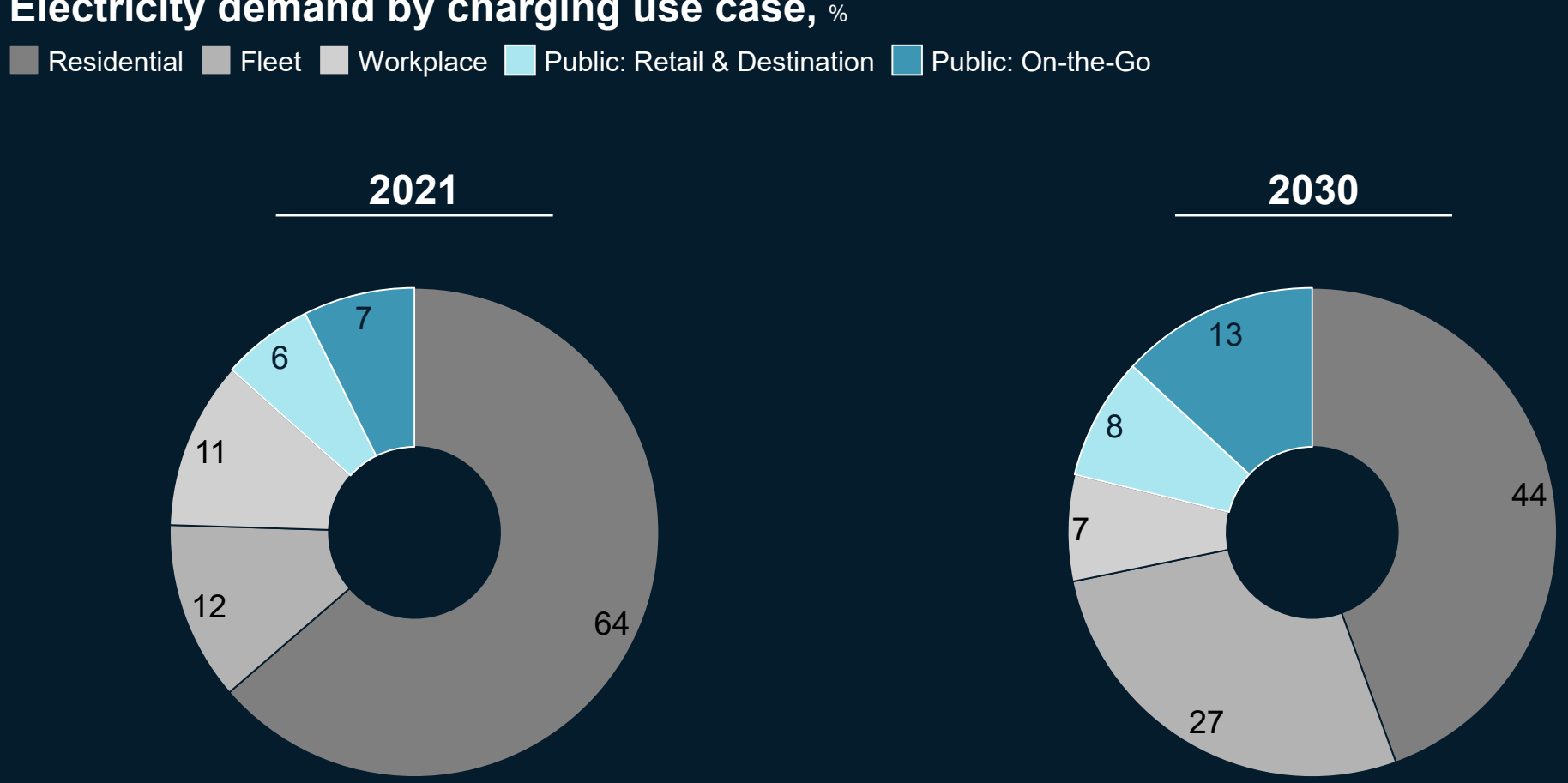
Total public stations in 2022*,
~50,000

Total public charging outlets in 2022*,
~128,000

* As of August 2022
Source: US Department of Energy, Alternative Fuels Data Center, “Net-zero emissions in US government fleets” (April 2022)

Public chargers would need to deliver more than 20% of the electricity consumed by EVs in 2030

Electricity demand by charging use case, %



* Based on a scenario where electric vehicles account for half the vehicles sold in the United States in 2030, in line with a federal target.
Source: McKinsey Center for Future Mobility, Building the electric-vehicle charging infrastructure America needs (April 2022)

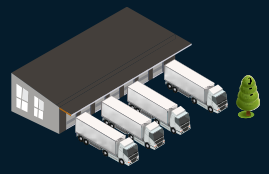
EVs have multiple options to "refuel" – out-of-home use cases with strongest growth until 2030

United States View | Base case | Apr 2022 | All vehicle types

Charging use case

Residential
(single & multi family)
- Private and/or shared parking
- Multiple hours/day

Work
(e.g. office, govt property)
- Shared parking
- Few hours during work (2-10 hours)



Fleet depot
(e.g. vocational, courier)
- Private parking
- Charging need dependent on fleet management

Public overnight
(e.g. on street / curb-side)
- Public parking
- Multiple hours overnight (>8hrs)

Destination
(e.g. mall, car park)
- Public parking
- Few hours during visit (<4 hours)

On-the-go
(e.g. retail EV charging stations)
- Public parking
- Quick necessary on-the go (<1 h)

% of energy charged

Today

~60% | ~10% | <5% | <1% | ~10% | ~15%

~70% across home and work

Commercial vehicles drive ~5-10x passenger vehicles miles with lower efficiency

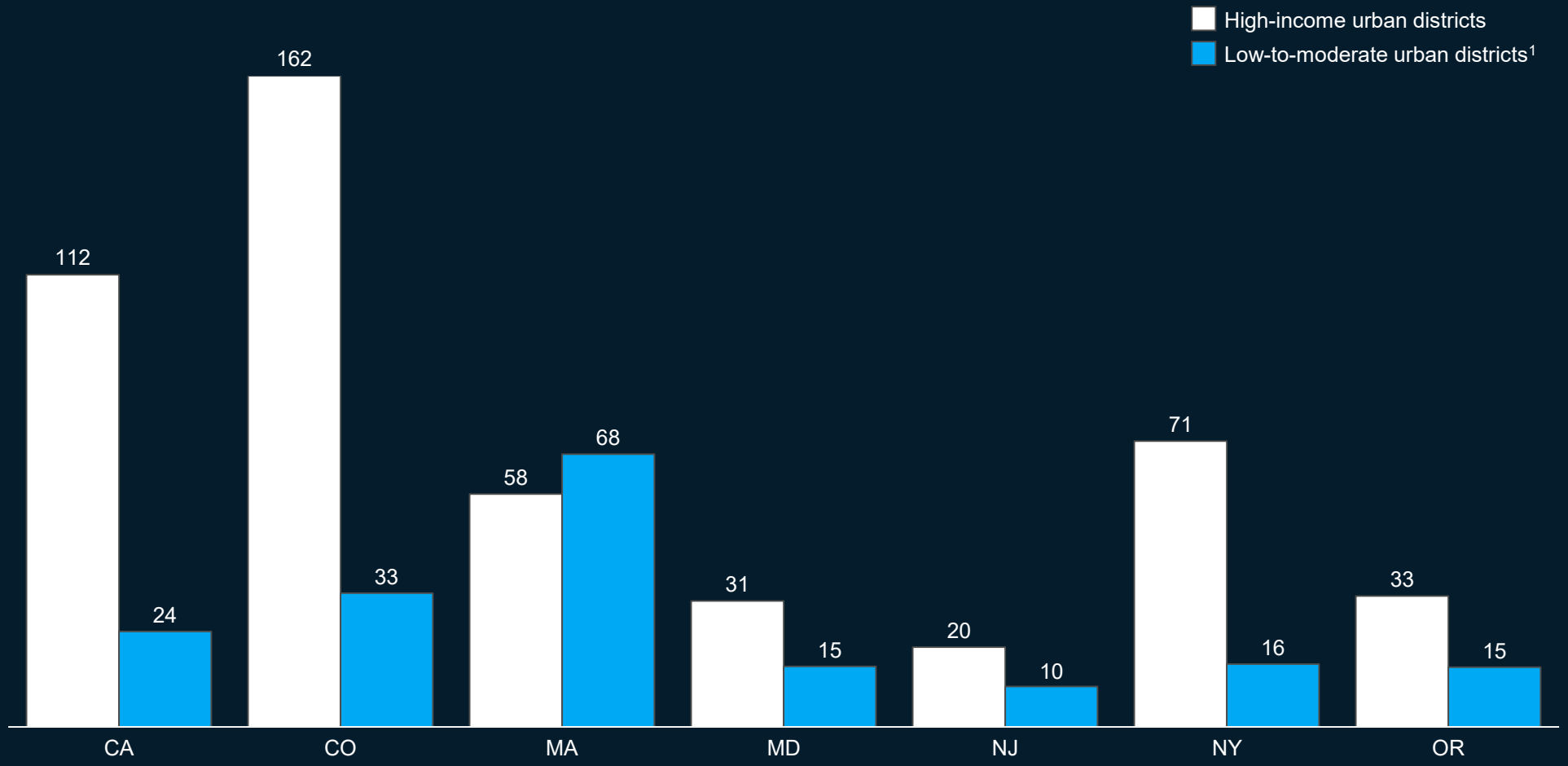
2030

On-the-go use cases

Source: McKinsey Center for Future Mobility (Apr 2022)

Public EV chargers are currently concentrated in high-income urban areas

Chargers per 100,000 households, by income level



1) Defined as having income levels lower than 80% of the area median income (AMI)

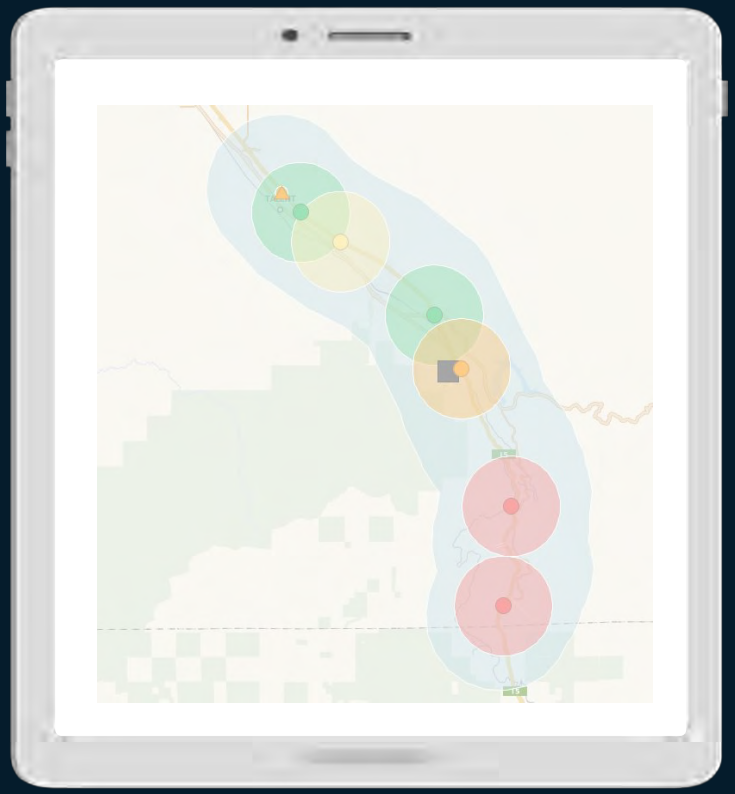
Source: Alternative Fuels Data Center, US Census, US Department of Housing and Urban Development, Building the electric-vehicle charging infrastructure America needs (April 2022)

At the micro-site level, where should chargers be placed?

A scoring rubric can be applied to each highway exit or rest area

Criteria	Average annual daily traffic		# of quick service restaurants		# of retail locations		# of gas stations		
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Other index
Strong	> 100k	> 40k	> 15	> 6	> 50	> 10	> 4	> 4	< 100
Middle	60k-100k	20k-40k	10-14	3-5	35-49	5-9	3	3	100-200
Weaker	< 50k	< 15k	< 5	0	< 25	< 2	0	0	> 300

Each highway exit and rest stop gets a rating



Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

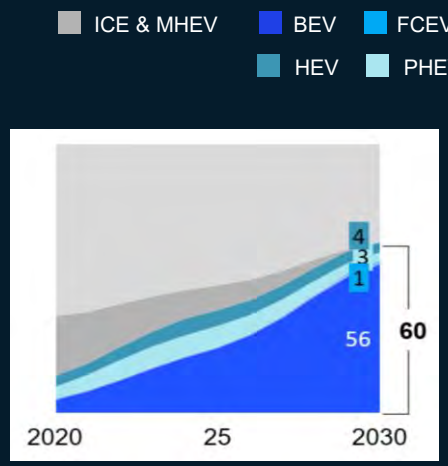
What infrastructure requirements at each site?

Not exhaustive **Exemplary**

1 EV parc

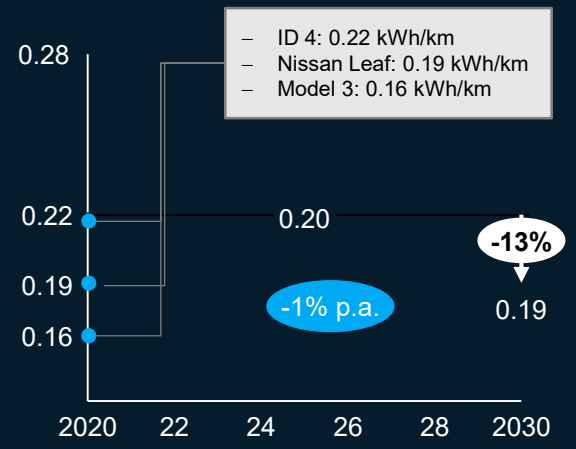
EV uptake, # of vehicles

Example



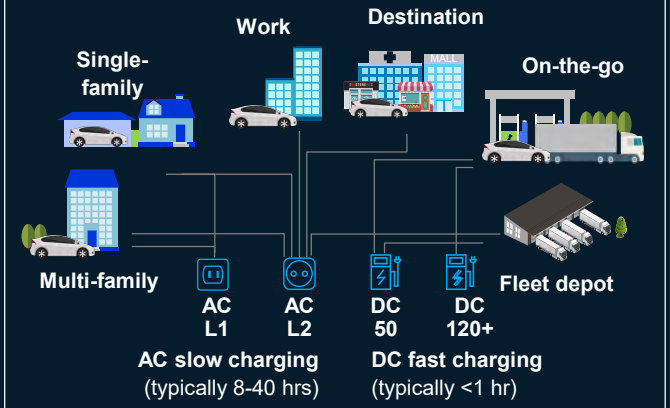
2 Energy demand

Vehicle efficiency, kWh/km



3 Charging behavior

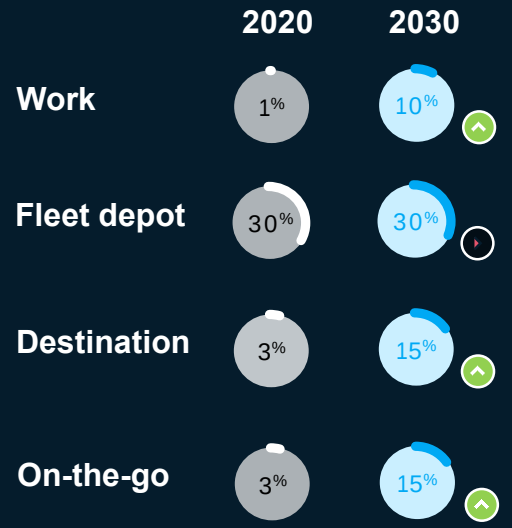
Use cases & technologies



4 Infrastructure need

Charger utilization, in %

Example DC 150 kw charger



Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

Key questions facing DOTs

1. What will demand be for EVs and thus, EV chargers?
2. Where should chargers be located?
3. How can the EV/EVCI investment be funded or financed?
4. How can states support this transition?

>$30B still to be accounted for installing public chargers

Additional Funding

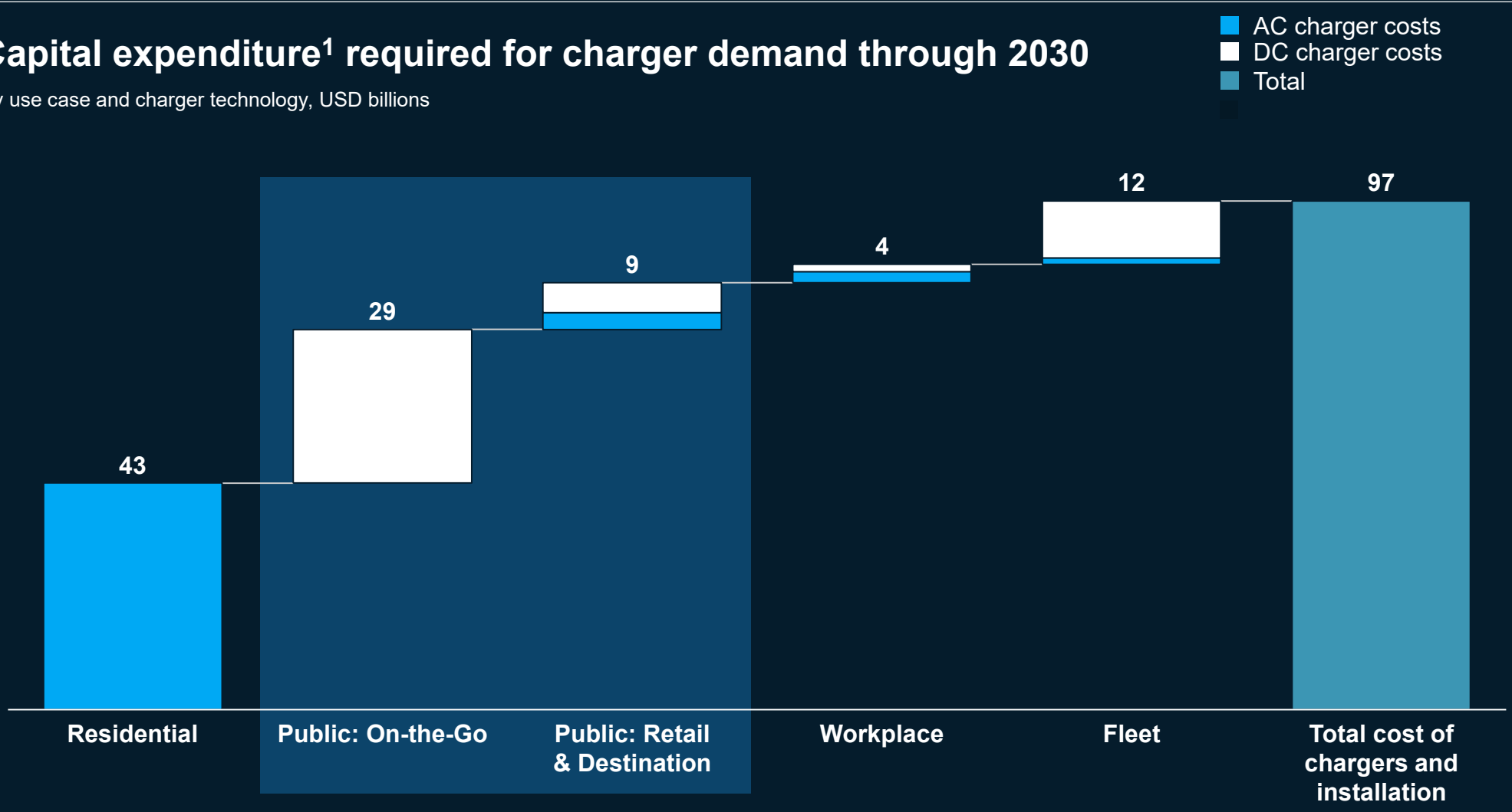
BIL Funds for installation of public EV chargers

Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

Hardware, planning, and installation for public charging could cost more than $35 billion through 2030

Capital expenditure[1] required for charger demand through 2030

By use case and charger technology, USD billions



1) Includes the cost of charger hardware, planning and engineering, and charger installation; does not include costs for grid and site electrical upgrades

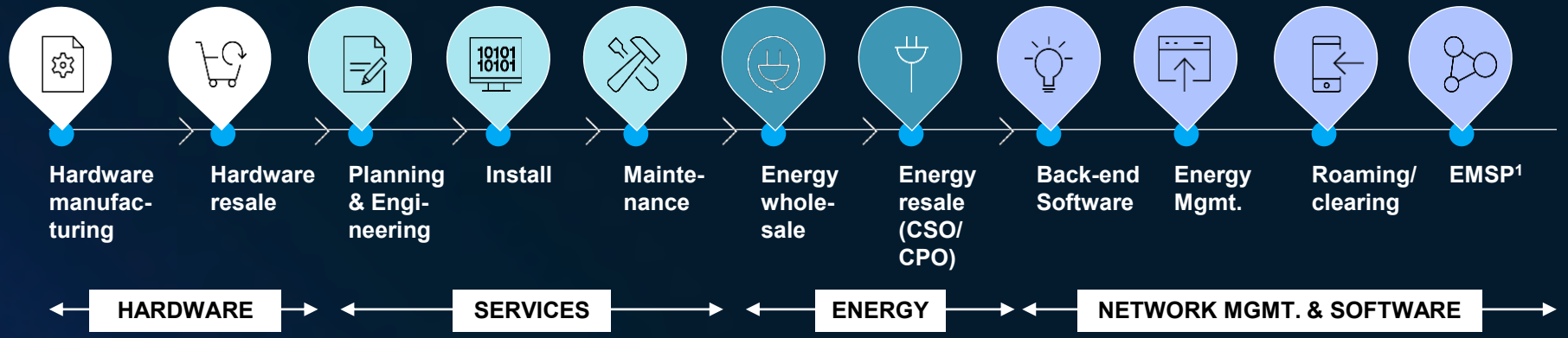
* Based on a scenario where electric vehicles account for half the vehicles sold in the United States in 2030, in line with a federal target.
Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

IRA reforms energy tax incentives through a mix of extensions, modifications, and new programs over the next 10-years

Not comprehensive

Source: Press Releases, Senate

11 value chain steps



7 dimensions (not exhaustive)

4
EV Penetration scenarios

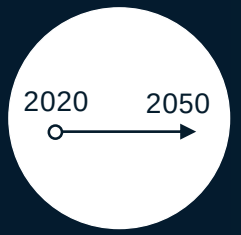
50
States

10+
Vehicle Segments

8
Use Cases

9
Charging tech-nologies

5
Regional Arche-types[1]



30
years

1. Only for Passenger Cars

Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

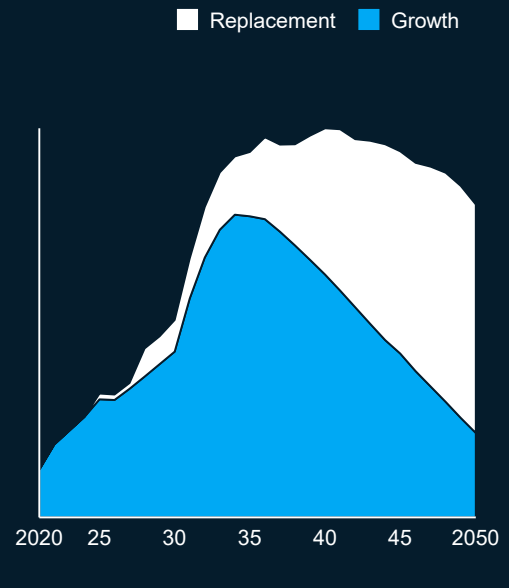
Where can private investment be leveraged?

Not exhaustive

1 Charging infrastructure

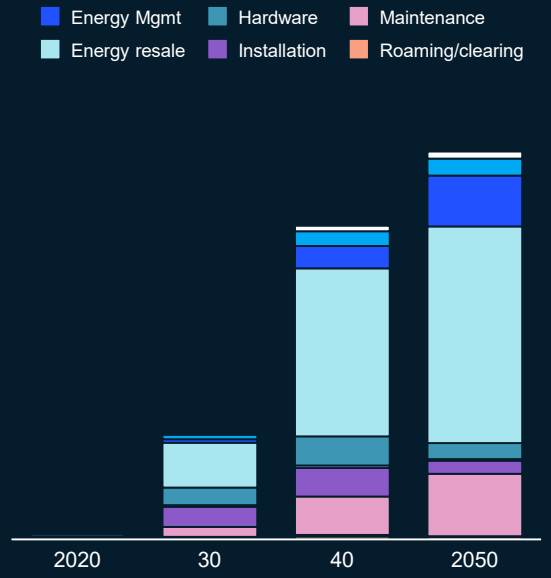
Total charger sales

Example



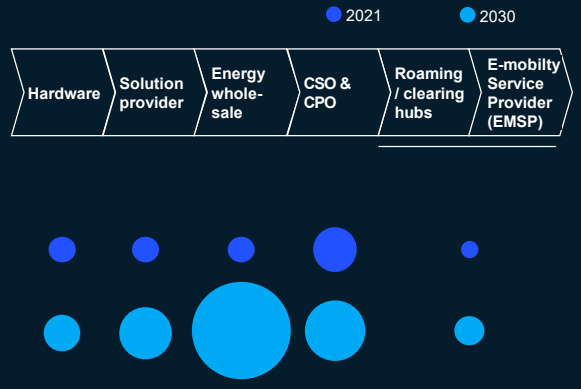
2 Revenues & investments

Revenues by value chain step



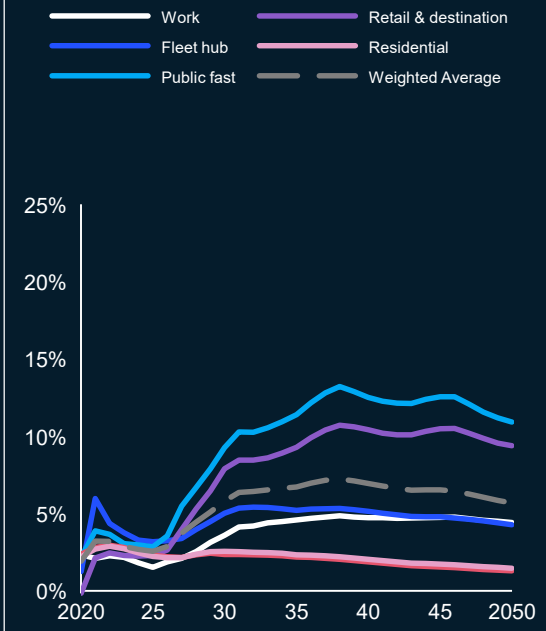
3 EBITDA/ EBIT

EBITDA by value chain step



4 Return on invested capital (ROIC)

By use case in percent



Source: McKinsey Center for Future Mobility (April 2022), AASHTO GIS Conference (April 2022)

Key questions facing DOTs

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4. How can states support this transition?

Considerations for states regarding EV adoption and EVCI buildout

Use data-driven baseline and decision-making for site and partner selection

Ensure holistic long-term vision and iterative planning for additional chargers and facilities needed

Take a lifecycle budgeting approach and seek private sector engagement

Be intentional around diverse stakeholder engagement, preparing for barriers and adapting to them

Promote continuous program improvement opportunities

Consider equity as a priority across location selection and workforce development goals

Source: Expert interviews

Joint Study Committee on Electrification of Transportation

The National Electric Vehicle Infrastructure (NEVI) Program

Jannine Miller, MPA, MBA
Director of Planning
Georgia Department of Transportation

Governor Kemp's
Electric Mobility & Innovation Alliance
https://www.georgia.org/mobility

Launched in August 2021

Led by the Georgia Department of Economic Development

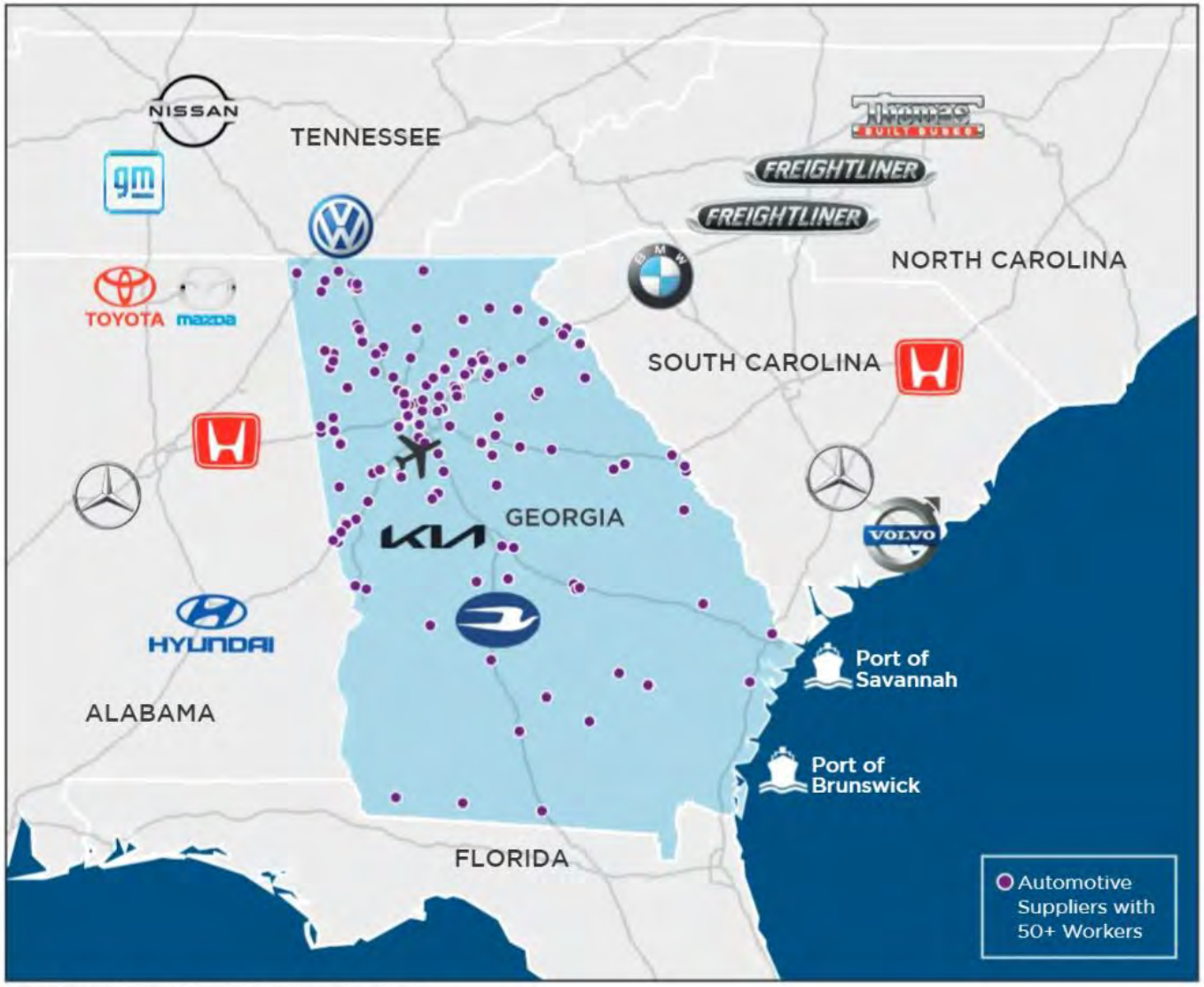
Collaboration of government, industry, electric utilities, nonprofits

5 Committees, including Infrastructure:
- ✓ Fleet: OEMs, vehicle owners (personal and commercial), auto dealers, etc.
- ✓ Charging: equipment manufacturers, service providers, site owners
- ✓ Electric Utilities: GA Power, EMCs, ECG/MEAG, GA Transmission Corp.

#1 IN EV

Auto registrations in the Southeast US

Georgia's Automotive Industry:
Epicenter of Commerce in the Southeast



Source: Georgia Power Community & Economic Development

Recent EV Developments in Georgia (2018-2021)

- ✓ SK Innovation invests in Lithium-ion battery facility
- ✓ Blue Bird debuts all-electric school buses
- ✓ TEKLAS creates first North American Headquarters
- ✓ EnChem Co. invests in battery electrolyte facility
- ✓ PowerPlug – green hydrogen fuel cell systems for e-mobility
- ✓ Duckyang – supplier of automotive battery modules and energy storage systems

Federal Highway Administration's EV Alternative Fuel Corridor (AFC) Designations

"Pending" Corridor

Intent to satisfy currently insufficient distance and station level/connector requirements

"Ready" Corridor

Round 1-5:

50 miles or less between charging sites and 5 miles or less off the highway

•Round 6:
- Interstates preferred

•- 50 miles or less between sites and 1 mile or less off the highway*

"Fully Built Out" *

50 miles or less between charging sites and 1 mile or less off the highway

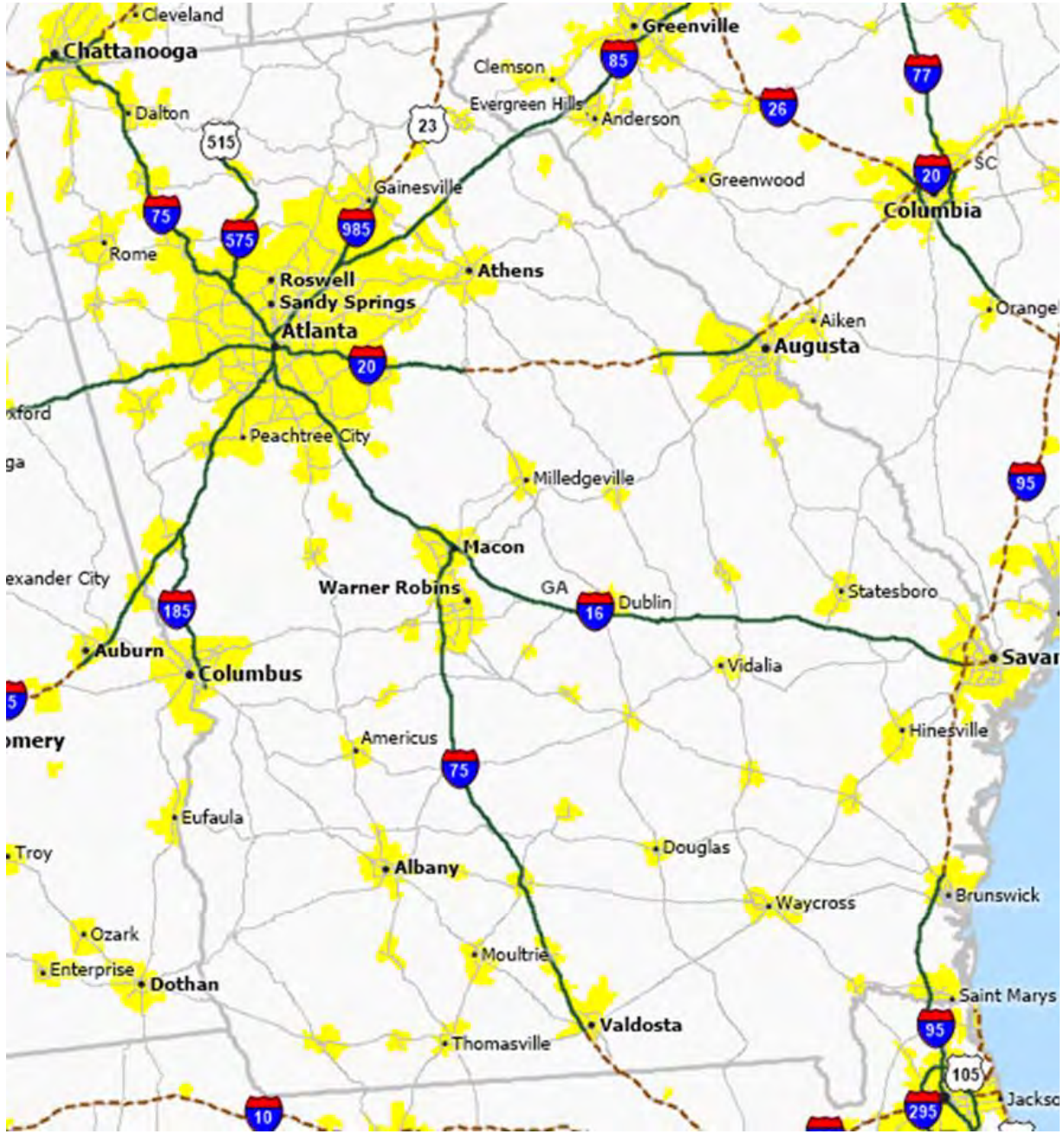
Minimum of 4CCS ports that can simultaneously charge 4 electric vehicles

At least 150 kW per port

**Per the Bipartisan Infrastructure Law*

Georgia's EV Alternative Fuel Corridors: Pending and Ready

(through 2021)



Expanding Georgia's EV AFCs: GDOT's Assessment

Determining nominations for AFC Rounds 6 based on customer-driven corridor evaluation criteria

AADT/Mile

Link length x AADT from GDOT 2019 traffic count ÷ total length

Real Estate Feasibility

Clusters of hotels, gas stations, retail/shopping centers along corridors

Evacuation Route Impact

Overlaying AFCs with GEMA's evacuation route map

Geographic Balance

Impact on balance of coverage across regions

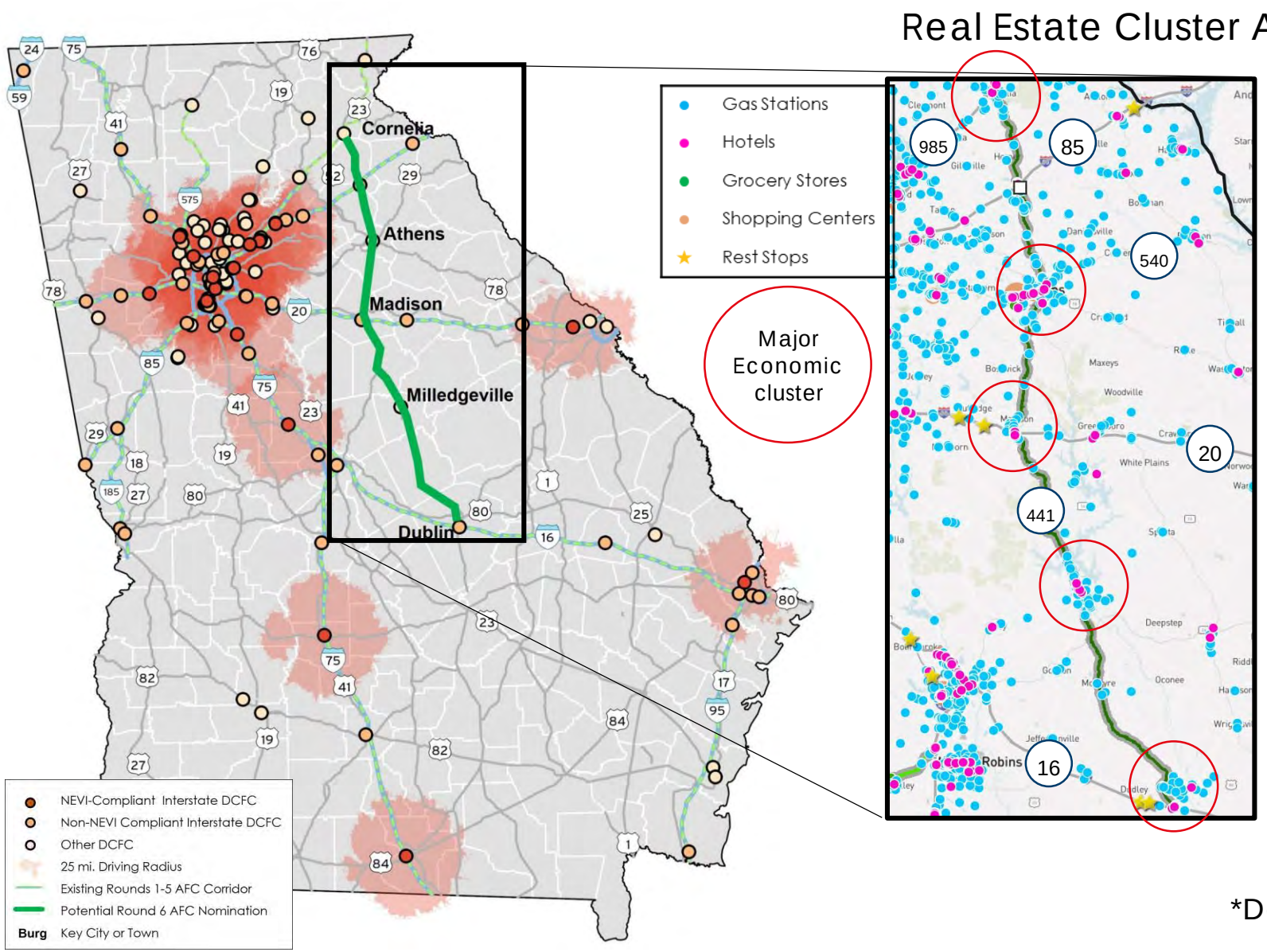
Tourism

Based on proximity and density of tourist destinations

EV Adoption

% of areas with EV market share

Newly Designated AFC*: US-441 (Dublin to Cornelia)



Real Estate Cluster Analysis

Corridor Benefits

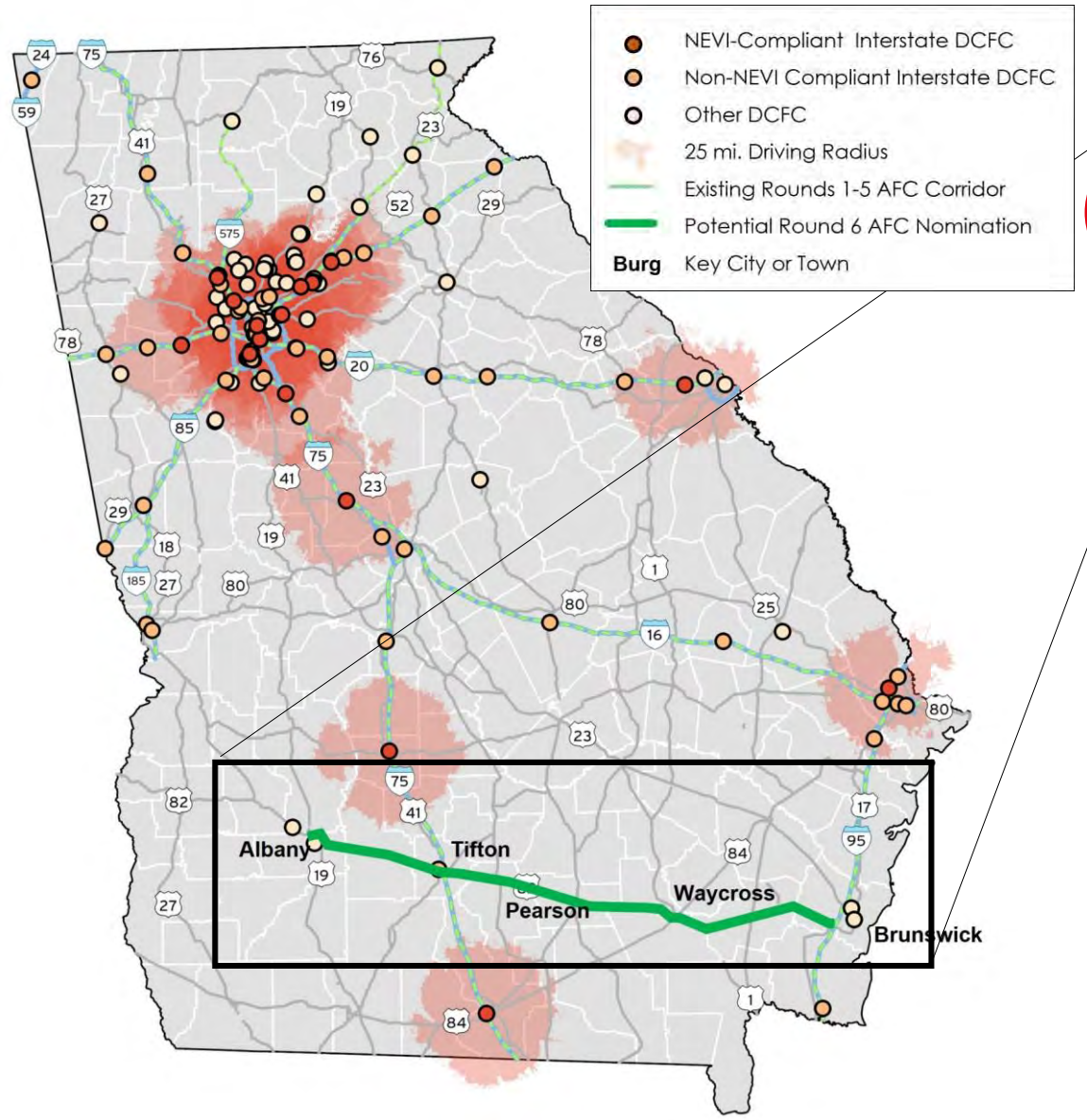
- Strong site host potential with 5 major economic clusters
- Popular tourist sites
- Relatively high EV share of new vehicle sales in majority of counties

Corridor Characteristics

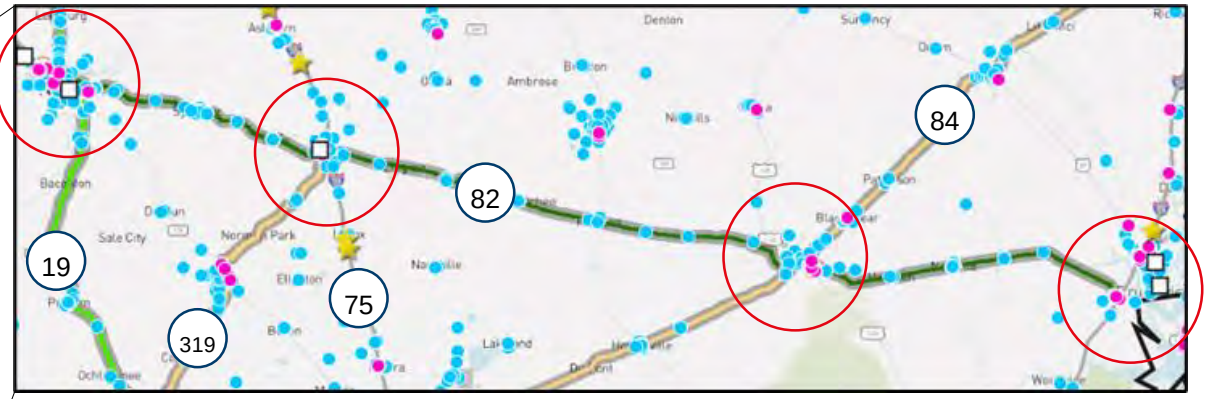
- Length = 165 miles
- Estimate 5 stations, 3 could overlap other AFCs (US-23, I-20, I-16)

*Designated by FHWA

Newly Designated AFC*: US-82 (Albany to Brunswick)



Real Estate Cluster Analysis



Gas Stations
Hotels
Grocery Stores
Shopping Centers
Rest Stops

Major Economic cluster

Corridor Benefits

- GEMA Evacuation Route
- Serves SE Georgia

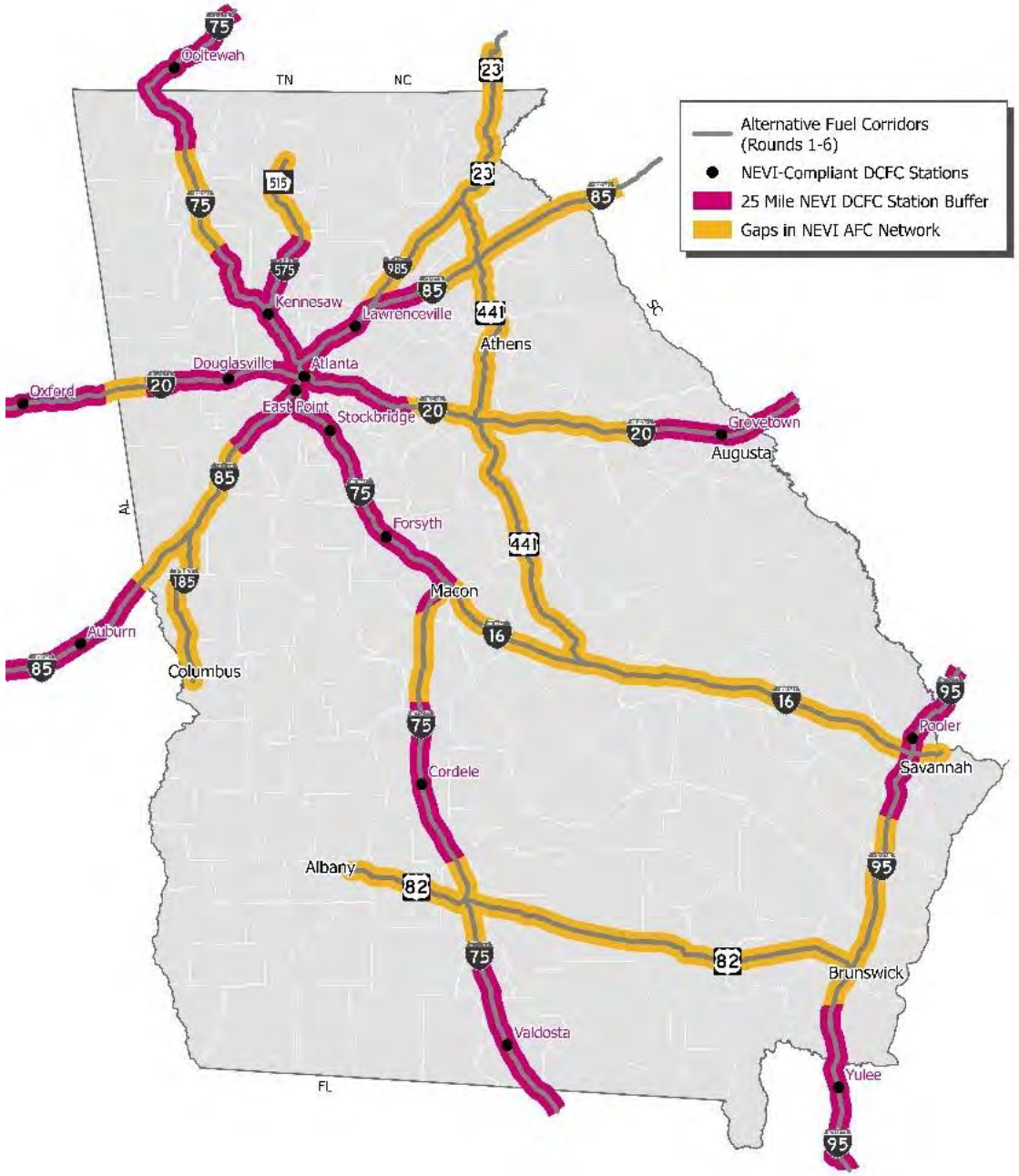
Corridor Characteristics

- Length = 163 miles
- Estimate 5 stations, 3 could overlap other AFCs (US-19, I-75, I-95)

*Designated by FHWA

Georgia's Current EV Alternative Fuel Corridors for Build-Out

Investing across the state



Georgia's EV AFCs

- 12 corridors
- 1,556 miles

FHWA's National Electric Vehicle Infrastructure Program:
Nationwide Allocation of $7.5 billion through FY2026

$4.2 billion Federal Formula Funds to State DOTs

- Strategic deployment of EV charging infrastructure for an interconnected network to facilitate data collection, access, and reliability.
- Build out the national network of EV "Alternative Fuel Corridors", particularly on Interstate Highway System
- Public-private partnerships encouraged

$500 million of Federal Grants to fill gaps in AFCs

$300 million for the new "Joint Program Office" of U.S. Departments of Transportation and Energy

$2.5 billion of Federal Discretionary Grants

- Corridors
- Communities

} *for EV charging plus infrastructure for hydrogen, propane, and natural gas fueling*

USDOT & USDOE National Electric Vehicle Infrastructure (NEVI) Program

Purpose

- Create a nationwide network of 500,000 EV chargers by 2030
- Ensure a convenient, reliable, affordable, and equitable charging experience for all users

USDOT / USDOE Goals

- Accelerate equitable adoption of EVs, including for those who cannot reliably charge at home
- Position U.S. industries to lead global transportation electrification efforts

NEVI Program Overview

Federal Funding

- Total NEVI funding is $5B over federal FY 2022 – 2026
- $135M* apportioned to Georgia with maximum 80% federal share

NEVI Plan

- NEVI required GDOT to prepare a plan compliant with federal requirements from FHWA/Joint Office of Energy and Transportation (JPO) guidance, FAQs, notice of proposed rulemaking (NPRM) and webinars
- Key elements of the plan include considerations for:
  - ✓ Station "uptime"
  - ✓ 24/7 accessibility by the general public
  - ✓ Cybersecurity
  - ✓ Stakeholder engagement
  - ✓ Equity benefits / Justice40
  - ✓ Workforce development

*Subject to appropriations

NEVI Plan: GDOT's Stakeholder Engagement To-Date

Different stakeholder types provide insight on unique interests and considerations

Private Businesses

- Inform private sector of GDOT's customer-driven approach
- Laws and structure unique to GA
- Best procurement practices, vendor/site host business models and recommendations for O&M models

Equity Communities

- Conformance with Justice40
- Opportunities that may arise in relation to delivery of services in disadvantaged communities

Utilities

- Assess grid power availability/site upgrade costs needed for EVSE
- Strategies for approaches to ownership and make-ready
- Rates/tariffs and grid/load management for EVSE*

*Electric vehicle supply equipment

GDOT's NEVI Goals

GDOT will seek to invest in a way that catalyzes further investment in EV charging stations across the state where utilization is anticipated but the private sector may not otherwise be economically motivated to install and operate EV charging stations.

Federal Rules and Regulations for NEVI Fund Deployment

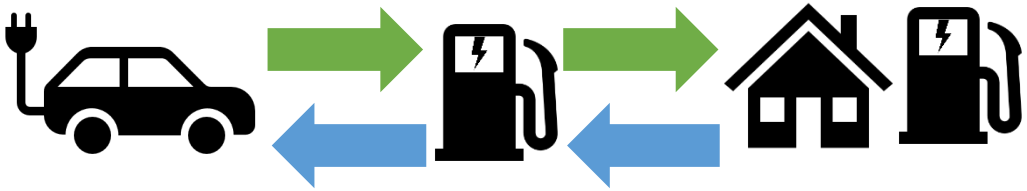
Requirements

- Fully build out Alternative Fuel Corridors first
  - Minimum of four 150kW (total 600kW) Direct Current (DC) fast chargers with Combined Charging System (CCS) ports at each station
  - Minimum 50 miles apart and 1 mile from the corridor
  - 11 NEVI-compliant stations currently fully built out along AFCs
  - 30-35 gaps to fill with new/upgraded sites
- Satisfy Justice40 requirements
- Buy America compliance
- Other

Evolving Guidance

- Original guidance provided in February
- Notice of Proposed Rule Making / Q&A released in June
- Additional ADA guidance provided in August
- Final rulemaking (e.g., cybersecurity, data) TBD

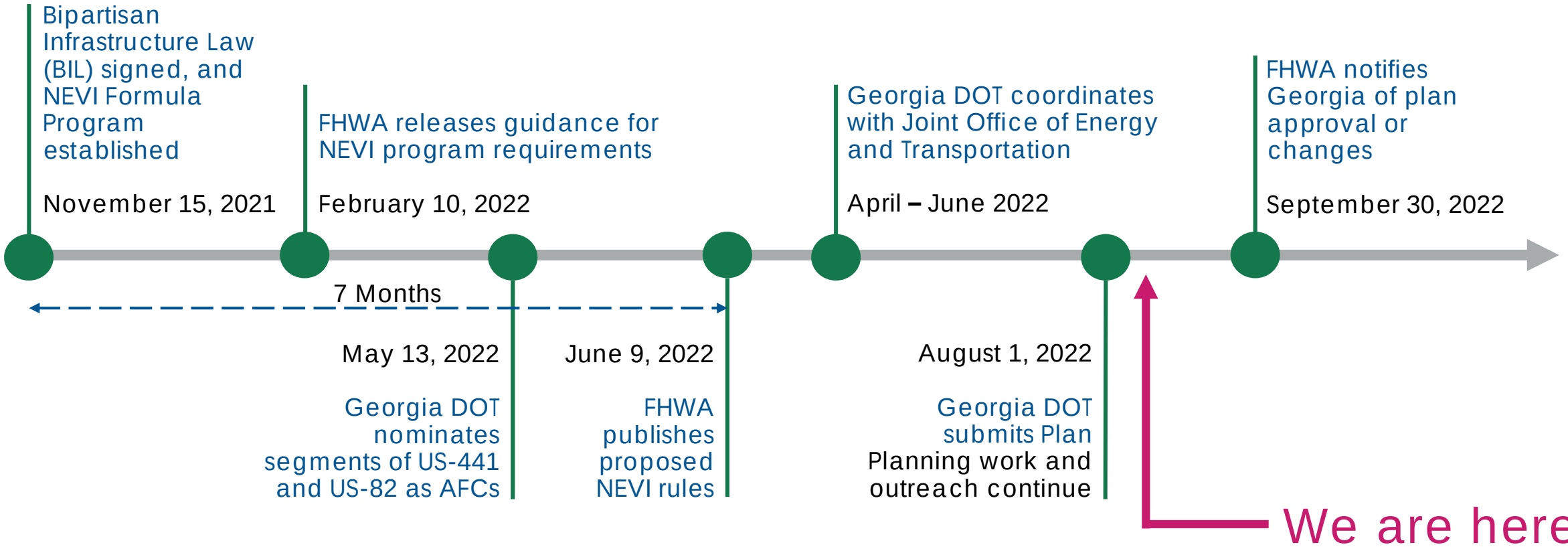
Customer Driven Deployment: EV Trip Types

Trip	Description	Typical charger type	Federal Eligibility for New EV Program
Short, local trips • Charge at/near home • E.g., Atlanta - Marietta	Charges at home and can complete entire trip in one-charge 	Level 2 Chargers	✗
Long trips (100 – 250 miles) • Charge overnight at location • E.g., Atlanta – Augusta	Charges at home and utilizes level 2 or DCFC charging at destination 	Level 2 Chargers	✗
Very long-trips (250+ miles) • Requires charging mid-route • E.g., Atlanta – Jacksonville	Charges at home, utilizes DCFC charging mid-trip and level 2 or DCFC at destination 	DC Fast Chargers (DCFC)	✓

GDOT's Initial Evaluation of Potential Private-Sector Ownership and Operation for a Sustainable and Reliable Network

	Land Use Type							Others	
Considerations	Big Box	Hotel	Gas	Restaurant	Grocery	Other Retail	Rest Areas	Utility	EV Charging Provider
Availability of power infrastructure									
Real Estate factors, including site locations									
Preference for EVSE ownership									
Ability and willingness to manage O&M									
Preference for DC Fast Charging									
Ability to satisfy other Federal requirements									

NEVI timeline



GDOT's Next Steps

- ❑ Approval of GDOT's NEVI Plan by Federal government (pending)
- ❑ Monitor outcomes of the work of this Joint Study Committee
- ❑ Further engagement with stakeholders and general public
- ❑ Continued analysis of location options based on customer-driven factors, Federal requirements, and State law
- ❑ Review and comply with federal guidance & rules, and engage with U.S. Departments of Transportation & Energy Joint Program Office

THANK YOU!

@GeorgiaDOT

@GADeptofTrans

@gadeptoftrans

GDOT's NEVI Plan → https://nevi-gdot.hub.arcgis.com/
(pending Federal approval)

Appendix II

(Material from meeting #2, September 7, 2022)

ASPIRE

NSF Engineering Research Center

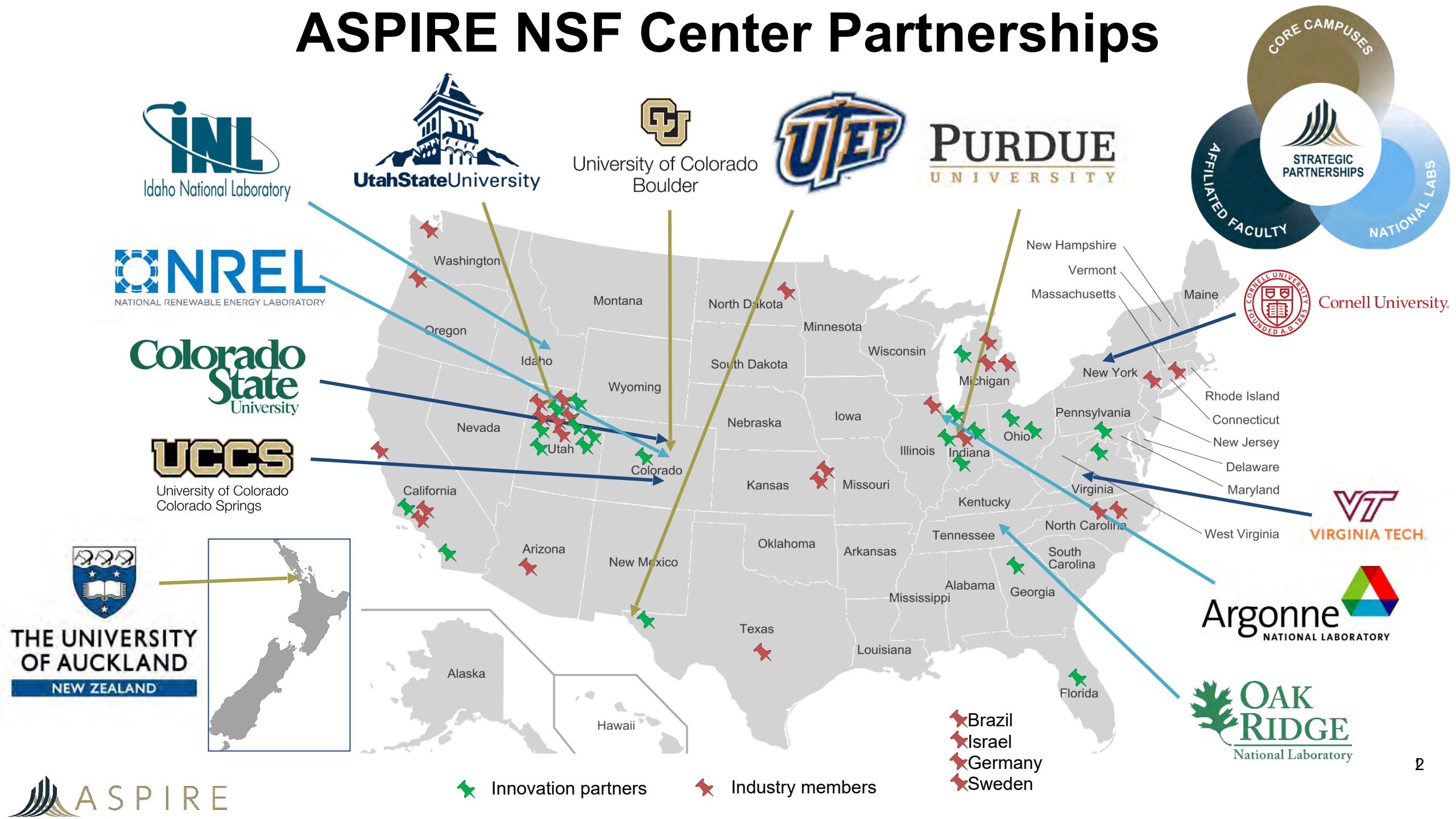
Advancing Sustainability through Powered Infrastructure for Roadway Electrification

Georgia Legislative Committee on Electrified Transportation

Allie Kelly
The Ray, Executive Director

ASPIRE, Executive Advisory Board - Chair

ASPIRE NSF Center Partnerships



Business as Usual?

500 mile range semi-truck

$150,000 battery

15,000 lb battery

2 MW+ for 30 min charge

>$1 per mile electricity

(at $150 per kWh battery, 15 lb per kWh, 2 kWh per mile, $0.50 per kWh electricity)

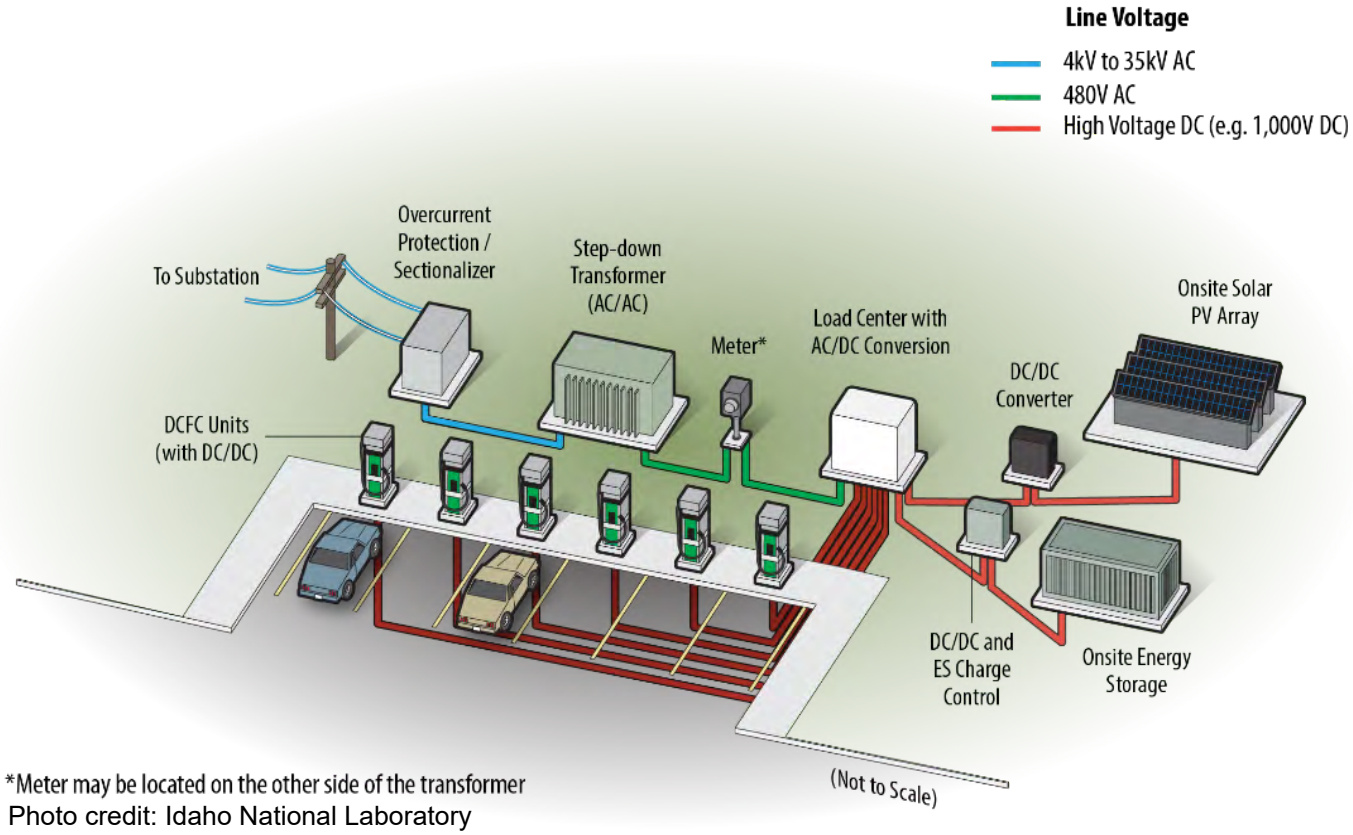


Photo credit: Idaho National Laboratory

Total US Vehicle Battery Cost at 100% adoption, 500 mile range

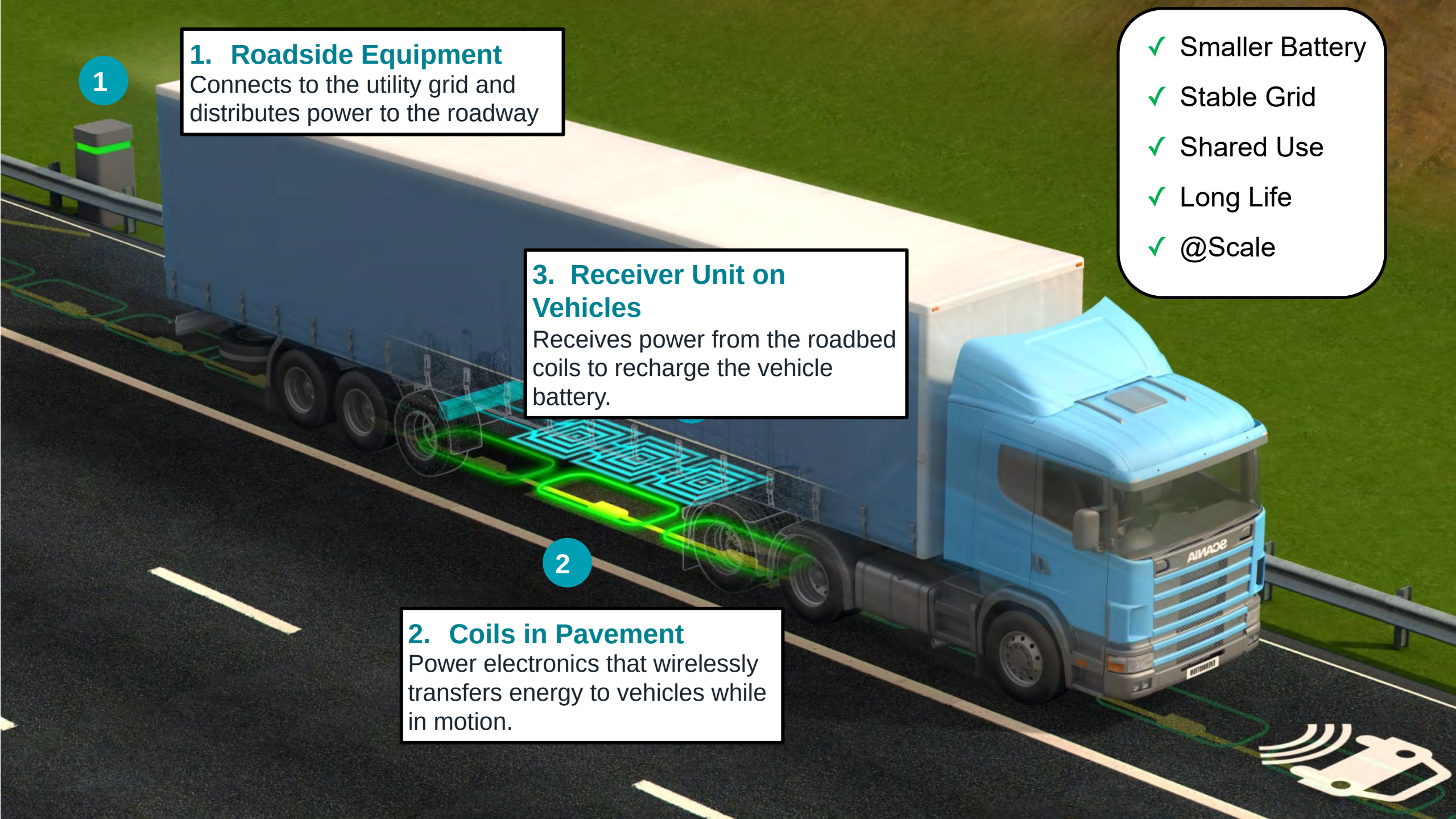
$7.8 Trillion

ASPIRE

Cost Comparison

Gas or Diesel	$0.16 / mile	$0.67 / mile
Long Range Battery + Ultra Fast Charging	$0.20 / mile	$1.25 / mile
Electric Road	$0.07 / mile	$0.30 / mile

ASPIRE


1
1. Roadside Equipment
Connects to the utility grid and distributes power to the roadway
3. Receiver Unit on Vehicles
Receives power from the roadbed coils to recharge the vehicle battery.
2
2. Coils in Pavement
Power electronics that wirelessly transfers energy to vehicles while in motion.
✓ Smaller Battery
✓ Stable Grid
✓ Shared Use
✓ Long Life
✓ @Scale

Wireless Extreme Fast Charging Demonstrations

500 kW Wireless Extreme Fast Charging at Port of Los Angeles

Megawatt Wireless Charging in Seattle & Portland

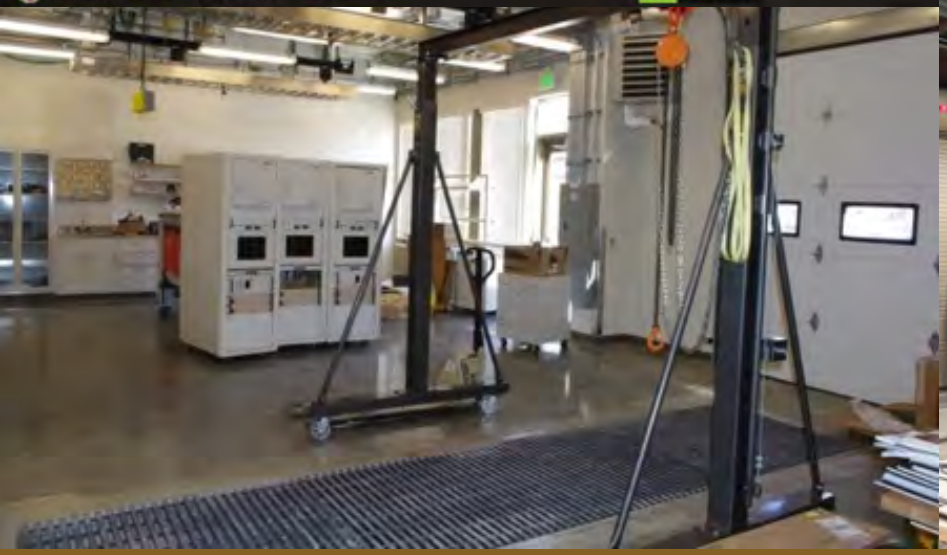
ASPIRE

PURDUE UNIVERSITY

ASPIRE

Wireless EV charging via highway pavement to be tested in Indiana

STEPHEN EDELSTEIN JULY 26, 2021 View Gallery



Full-scale Dynamic Wireless Power Transfer and Pilot Project Implementation

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

JOINT TRANSPORTATION RESEARCH PROGRAM Discovery with Delivery Since 1937 JTRP

Research Team:
Profs. John Haddock
Nadia Gkritza,
Dionysios Aliprantis,
Steve Pekarek

The 1st Wireless Electric Road System in the U.S.

electreon

The world's most advanced electrified road

STREETS: 1 mile wireless dynamic charging + static charging on city and state roads

VEHICLES: Charging shuttles, passenger vehicles, class 6 trucks, AV, and transit buses

INNOVATION: Urban living lab supporting mobility & electrification innovation

STATUS: Planning, design and use case development. Start of operation in 2023

In Partnership with

MICHIGAN OFFICE OF FUTURE MOBILITY & ELECTRIFICATION

MDOT Michigan Department of Transportation

CITY OF DETROIT

MICHIGAN CENTRAL

MICHIGAN ECONOMIC DEVELOPMENT CORPORATION

Jacobs

NEXTENERGY

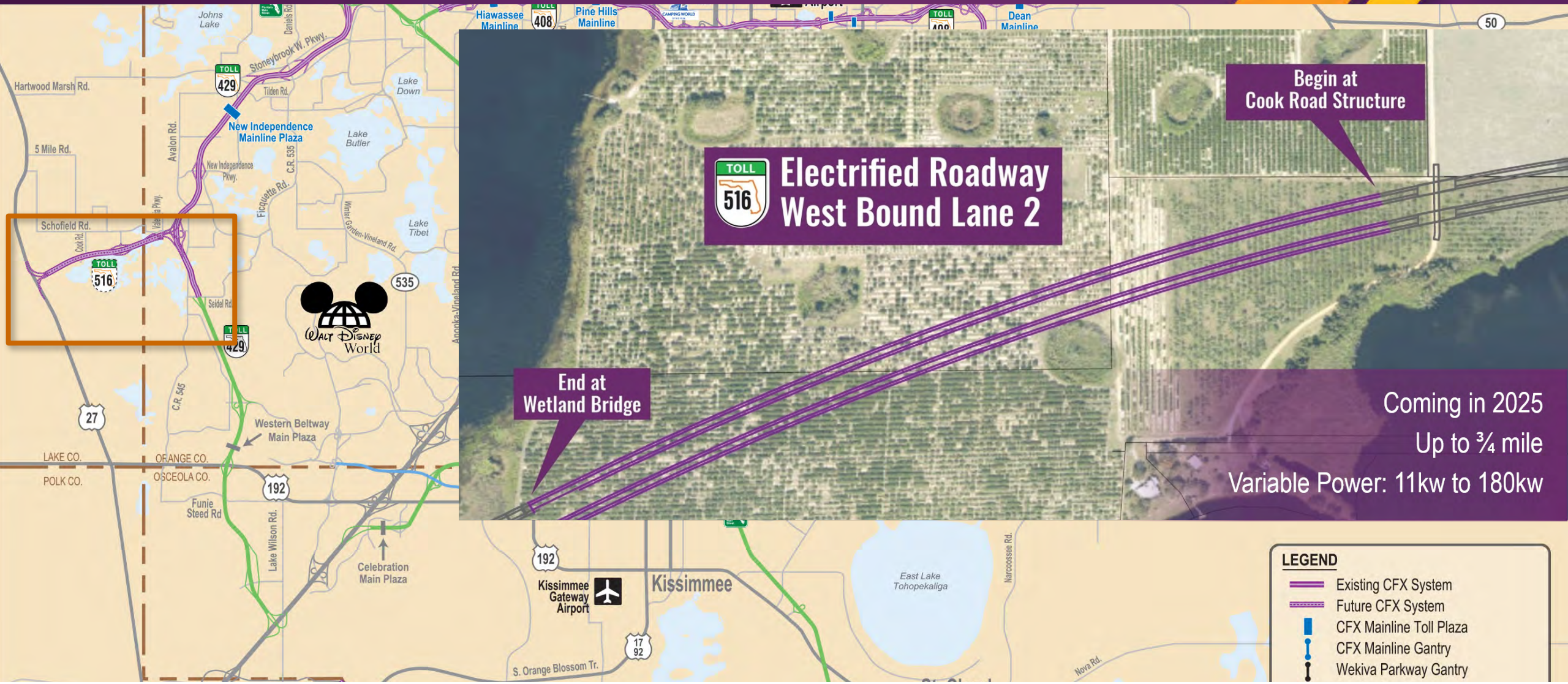
Ford

EGLE

DTE

Kiewit

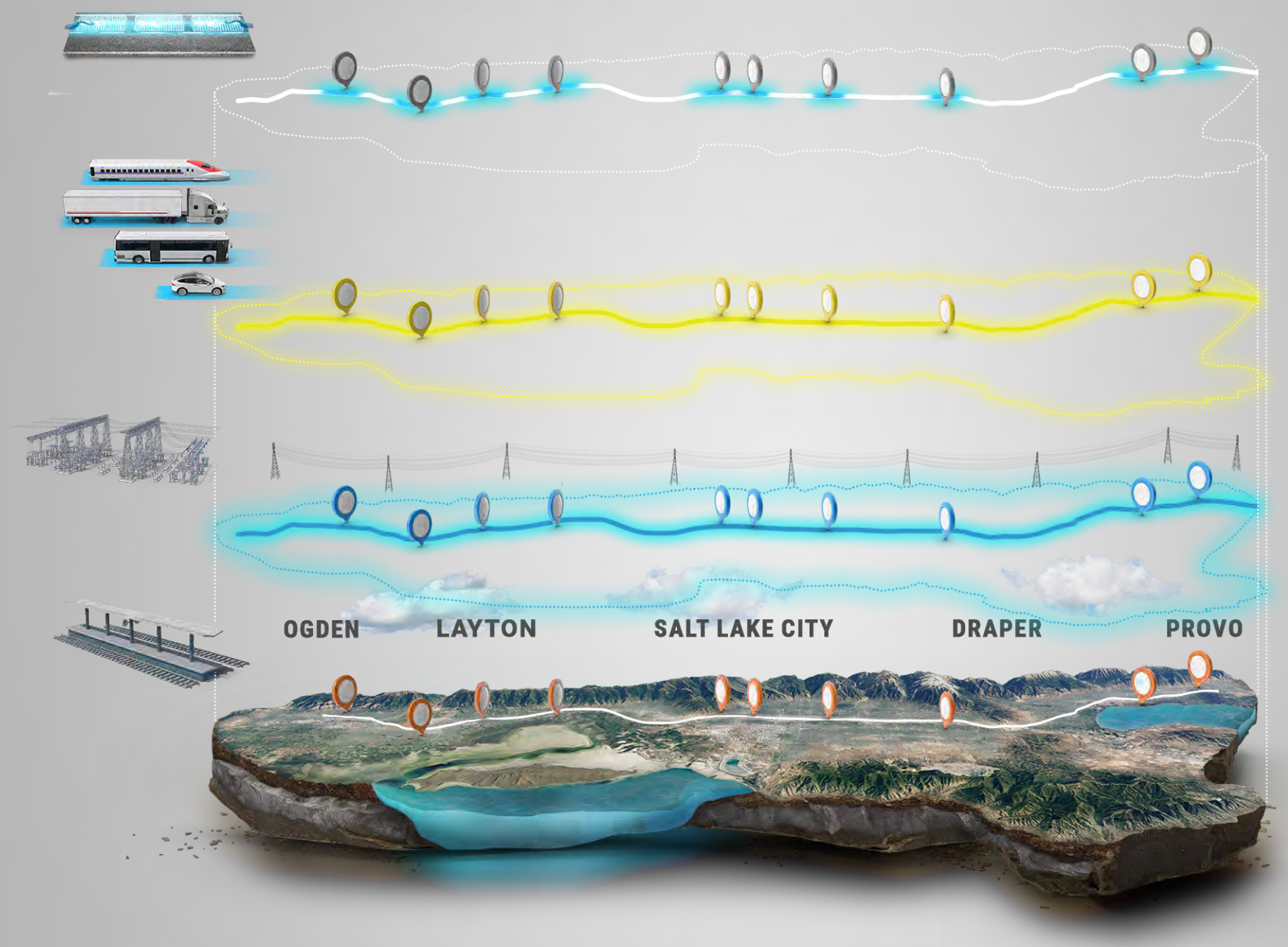
CFX Lake/Orange Expressway Pilot Project



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

ASPIRE
NSF Engineering Research Center

Intermodal Utah Electrification Plan



Commuter and light rail serve as roadmap for intermodal charging hubs

Multi-megawatt substations at hubs with coordinated grid loading

Fast charging networks leverage rail infrastructure for trucks, buses, and passenger vehicles

Future electric roads leverage shared rail & road infrastructure along corridor

Shared public infrastructure with load management reduces cost and emissions for all transportation

20-Year Roadway-Electrification Roadmap

2023
Phase 1 Pilots
(1/4 - 1/2 mile)

2023: Electric Roadway pilots installed in Utah, Indiana, and Florida.

2026
Extended Pilots
(1 - 2 miles)

2026: Initial learnings extended as supply chain is built out.

2030
Road Segments
(5 - 10 miles)

2030: Installing roadway segments in key locations across the US.

2035
Corridors
(50 - 100 miles)

2035: Electric Roadway corridors established.

2040
Interstate Highways

2040: Electric Roadways expand from metro areas.

ASPIRE

NSF Engineering Research Center

Advancing Sustainability through Powered Infrastructure for Roadway Electrification

Electrified Roadway Overview

Allie Kelly
The Ray Executive Director
allie@theray.org

Current Electric Vehicle Charging Obstacles

1) Regulated utilities can utilized their status as a monopoly to gain a competitive edge over private business. Only Georgia Power, or one of the 43 electric membership corporations or the 53 municipal power entities may sell electricity in Georgia. Since those companies do not cross competition lines (except for over 900kw loads), there is a non-competitive monopoly on the sale of electricity for the use of electric vehicles.
2) Power companies may underwrite their investment in EV charging stations by charging all their rate payers. This practice is referred to as "rate basing." Private businesses do not have access to a pool of risk-free capital like the utilities do when they rate base. In 2018, the PSC granted Georgia Power the autonomy to invest $6 million into electric vehicle charging stations.
3) Power companies, if allowed to charge businesses for EV electricity bundled with the current business rate, will have a clear advantage due to the extra tariffs and fees such as demand charges.

Is it too early to seek legislative change in Georgia? Certainly not.

1) As of March 2021, 35 states and DC have taken measures to ensure a competitive marketplace for EV charging. In 2021, Texas, Kansas and North Dakota were also seeking legislative changes to resell electricity for electric vehicle consumption.
2) This year, Louisiana's Governor Edwards signed Senate Bill 460 sending a direct message to LA's PSC to establish a consistent rate for the resale of electricity for EV charging in order to promote road development o a statewide electric vehicle charging network.
3) In May 2020, Georgia Power had 37 charging sites. Today, according to the Georgia Power map they have over 50 charging stations deployed around the state. This is an addition of 13 new sites in 20 months. (As presented August 24, they now have 187 sites ready or almost ready)
4) GA Power has a strategic deployment plan in place for Georgia. Siting cities in both metro and rural areas to fill the EV charging gap. According to GP's documentation, the value they provide to a "site host" is $0 investment, covering all costs including installation, maintenance, and electricity. How does GP supply the electricity solely for EV charging? If they can do that for themselves, surely, they can do it for private businesses.
5) Currently, Georgia ranks 8th in states that have charging stations and charging outlets. There are nearly 4,000 charging outlets and over 1,500 charging stations. According to Georgia.org, there are over 430 DC-fast charging outlets, Georgia ranks #1 in EV auto registrations in the Southeast & there were nearly 45,000 total sales of electric vehicles as of Sept 2020. (Compared to the over 150,000 gas pumps maintained by convenience store retailers)
6) Recently, Chrysler (2028), Volvo (2030), Jaguar (2025), Audi (2026), Hyundai, and Kia, have committed to no longer producing gas powered engines. Meanwhile, General Motors, Ford, and nine other automakers have signed the 2021 UN Climate Convention conference of the Parties (COP26) agreement to accelerate transition to zero-emission vehicles.
7) In November 2021, Ford Motor Company teamed up with Purdue University to invent charging technology that could make fueling an electric vehicle as fast as filling a gas tank.

Should separate EV rates be established to offer the public?

1) Currently, GP promotes a 25 cents per minute charge for fast charging. However, utilizing www.plugshare.com, fees vary wildly, including monthly membership/pass fees, per minute, per hour, and free to the end user.
2) Free charging, means the business that has chosen to offer this service, is saddled with the extra expense. Right now, with only 45,000 EV's in Georgia, this might work, but it won't work as EV purchases increase.
3) The town of Derry, New Hampshire installed EV chargers from 2018 until 2021. Prior to adding demand charges, the typical bill from their power supplier was $184. After demand charges were added in 2021, the typical bill rose to over $570. Demand charges accounted for 78% of the bill. Derry ultimately removed their charging stations.
4) Retailers have indicated in addition to a demand fee, if they exceed peak, there is an additional demand fee of $1,500 charge per month.
5) A single DC fast charger pulls 150% more power than an entire store during peak time. Adding a DCFC increases a stores electric bill an average of $1,600 more per month - $1,500 for the demand charge and $100 for the energy.

What legislative changes will allow the retail community to be competitive in the EV marketplace?

1) A limited ability to resell power solely for the charging of electric vehicle batteries. Georgia businesses need to be able to resell power rather than sell time at a charging station thereby providing a more transparent pricing structure.
2) A competitive rate structure and infrastructure solely for reselling power. An EV rate should be established to increase competition, transparency, and infrastructure.
3) Public utilities must be required to charge their competitors a price for electricity which is NO higher than the price at which they transfer power to their own refueling facilities.
4) A level playing field between private enterprises and public utilities. Power companies must be equally competitive to the retail marketplace/ private enterprises.

For decades, the convenience store industry has embraced alternative fuels, including biofuels, and ethanol fuels. Electricity is no different. The market dynamics that govern the retail fuel industry today should be replicated to accommodate EVs. While utility companies should be focused on modernizing the power grid & ensuring a reliable and adequate supply of clean power to meet the dramatic increases that will come with enhanced EV penetration.

EV Study Committee

Testimony on behalf of Georgia's EMCs

Jeff Pratt, President, Green Power EMC

GREEN POWER EMC
RENEWABLE ENERGY

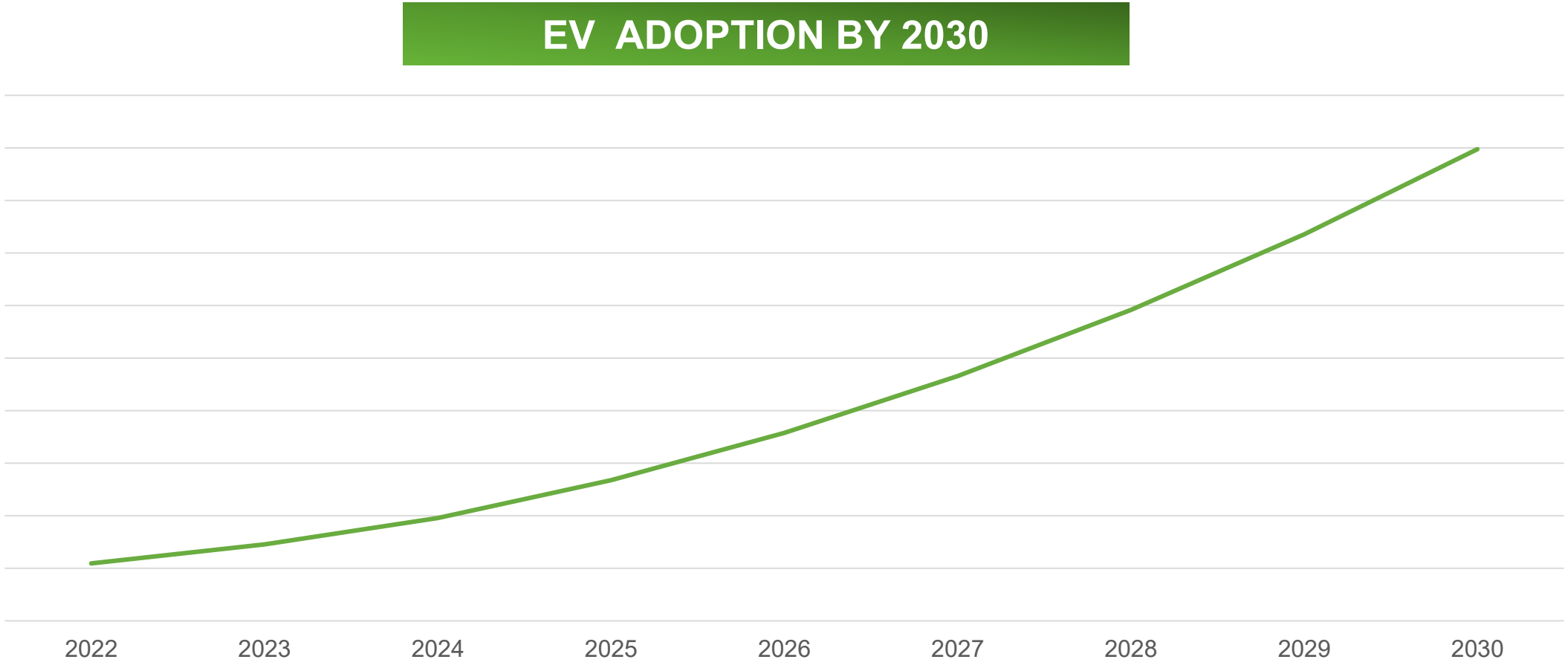
Strategy

EDUCATION AND AWARENESS

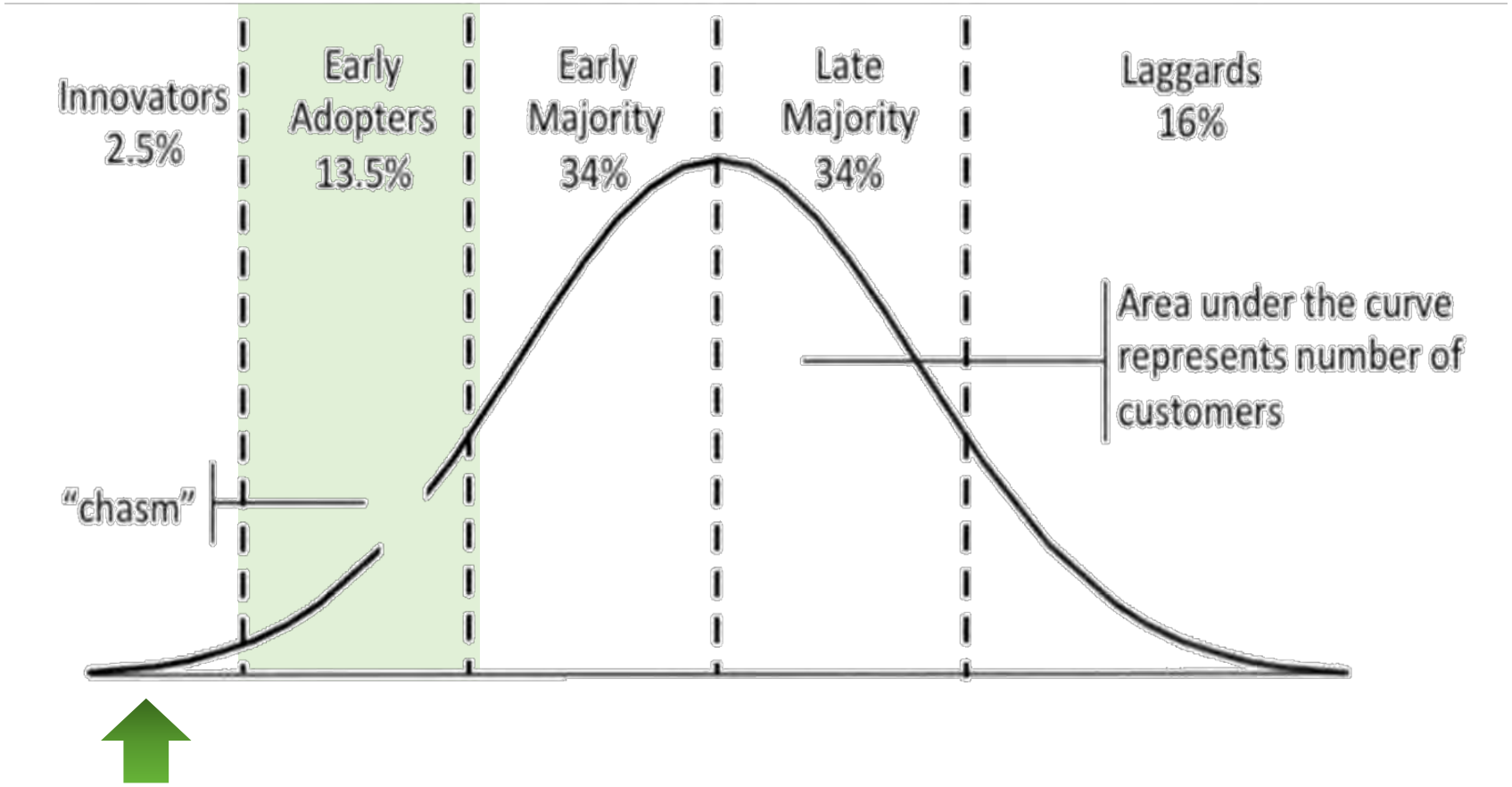
EXPERIENCE

ENGAGEMENT

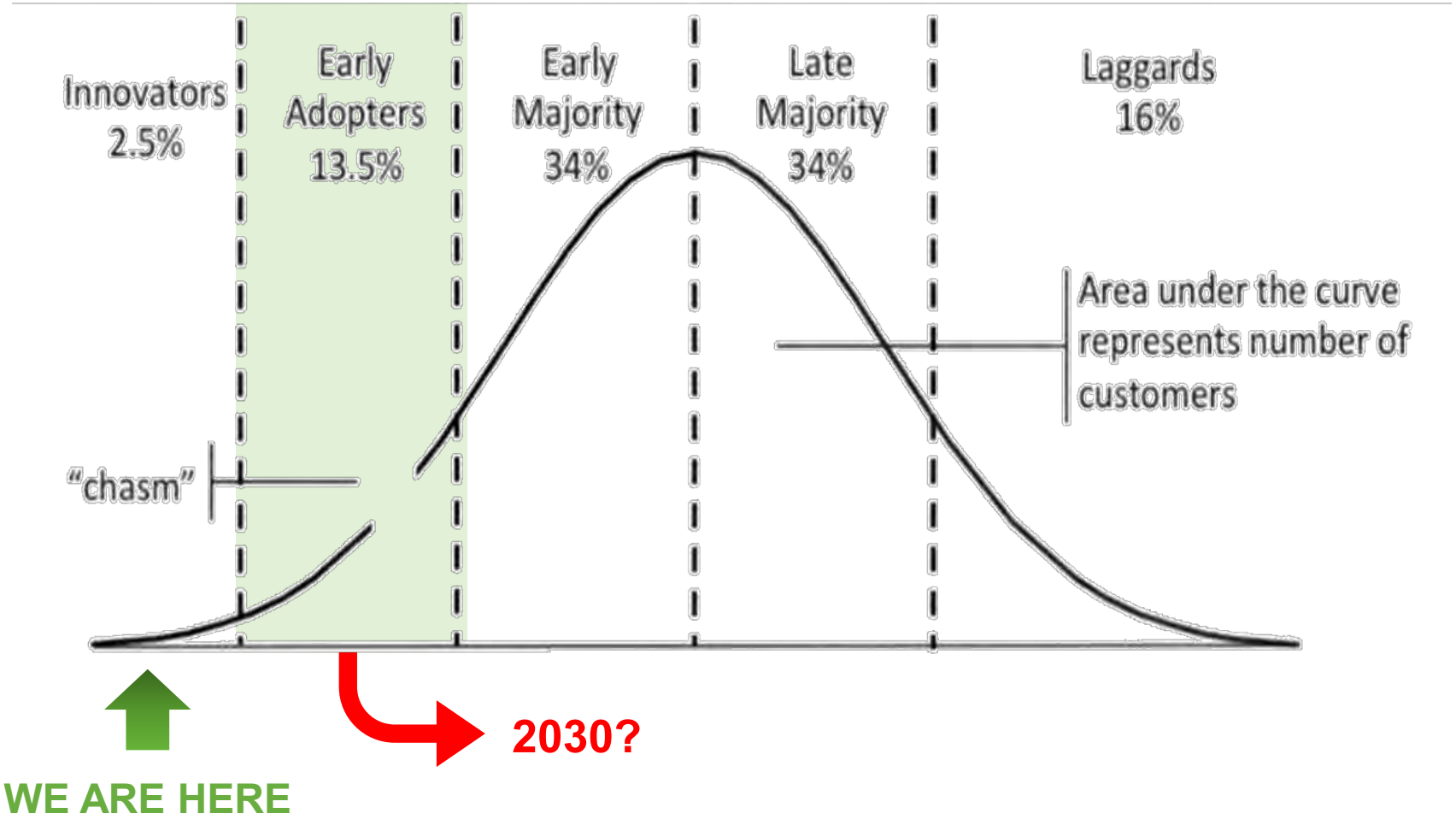
Is the Grid Ready?



Is the Grid Ready?

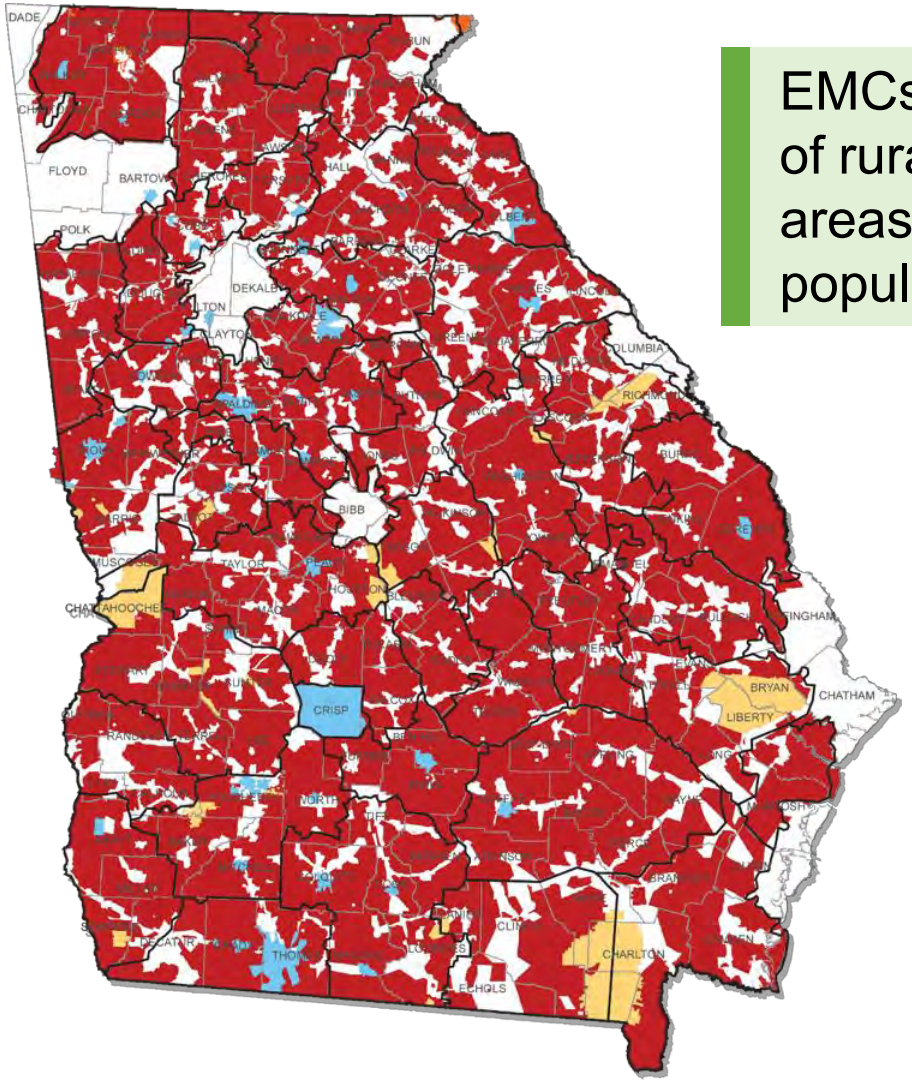


Is the Grid Ready?



EMC-sponsored Public Charging

- Helps educate member-consumers/ EV Drivers
- Helps accelerate market maturity
- EMCs are prepared to provide charging service to rural/ underserved areas



EMCs serve much of rural Georgia – areas with low population densities.

Embracing Change

PUBLIC EV CHARGING UNCERTAINTY

- Unknown rate of adoption
- Uncertain customer behavior
- Evolving technology — rapidly changing car technology/charging technology

HOW GEORGIA'S EMCS ARE RESPONDING

- Actively following technology changes
- Working with likely public charging service providers to:
  - Forecast and monitor rate of adoptions and resulting electrical load
  - Identify win-win rate structures for charging service providers
  - Implement and test new rate structures

What Early EV Adopters Want

- Public chargers that are **reliable**
- **Interoperability** between public charging service providers
- Pay for charging **by volume of energy,** not time

Georgia Power
Electric Transportation

9/07/2022

Georgia Power

Partnering on Electric Transportation in Georgia

We support the energy needs of *all* customers, including
Georgia's growing electric transportation sector.

Our Focus:

- Investing in the infrastructure leading up to EV chargers
- The sale of retail electricity to EV charging providers
- Providing electricity and capacity **to meet all customers' needs—** including EV owners and charging providers

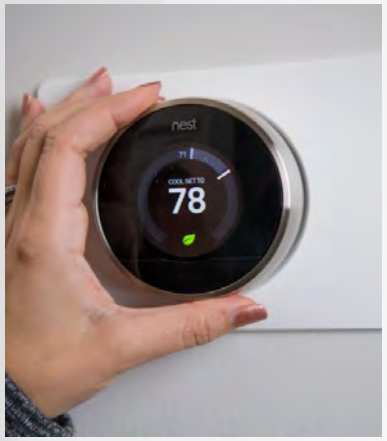
How We Deliver:

- ✓ Continue investing in our grid to ensure readiness for the projected growth of EV chargers throughout Georgia
- ✓ In limited instances, provide EV charging services as a provider of last resort in underserved areas through our community charging program
- ✓ Offer rate structures that support the ET market
- ✓ Continue to encourage and support private EV investment and economic development

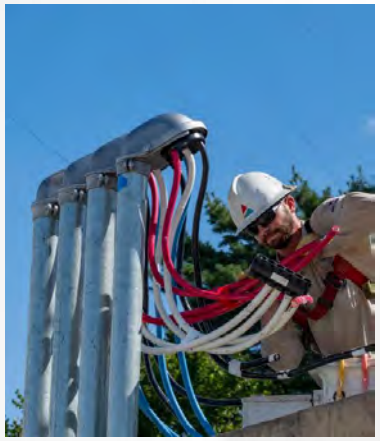
Georgia's Grid – Meeting Demand

At Georgia Power, we're continuously planning and making critical, essential investments to meet our customers' evolving needs today and for years to come.

Utilities and Coordinated Operations and Coordinated Planning



Electrical Load Forecasting



Distribution Planning and Infrastructure Investments

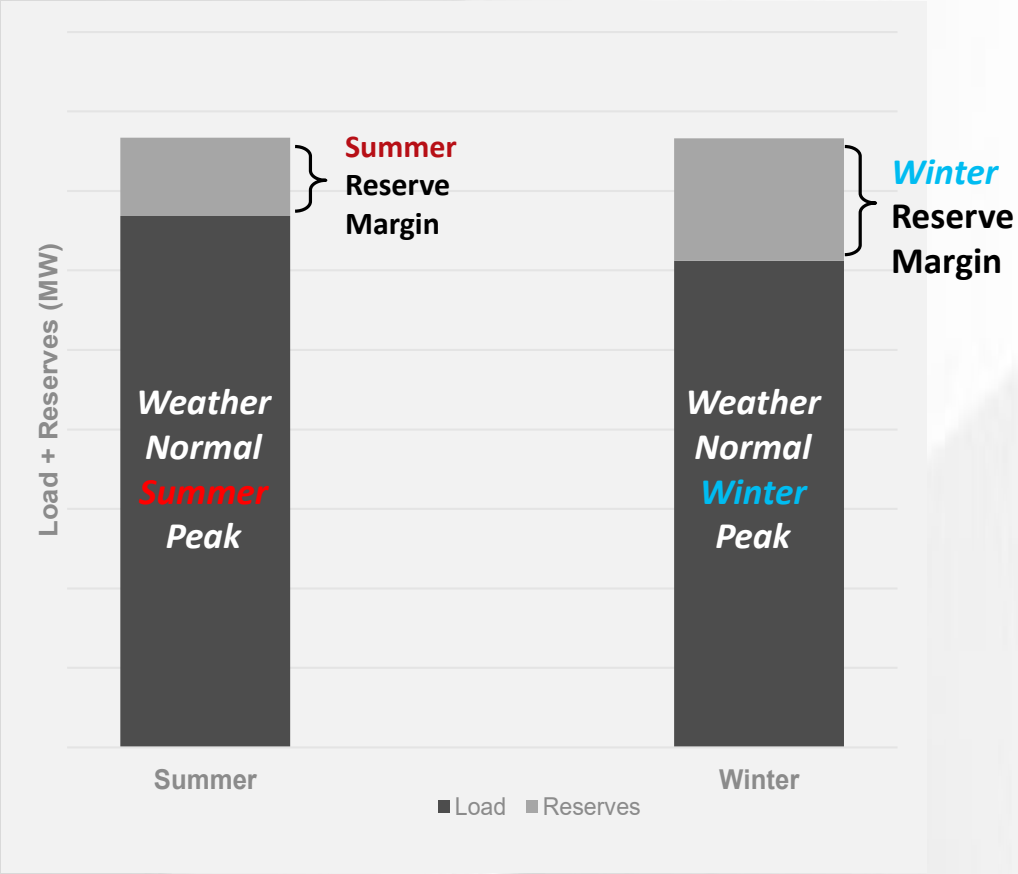
Transmission Planning and Infrastructure Investments

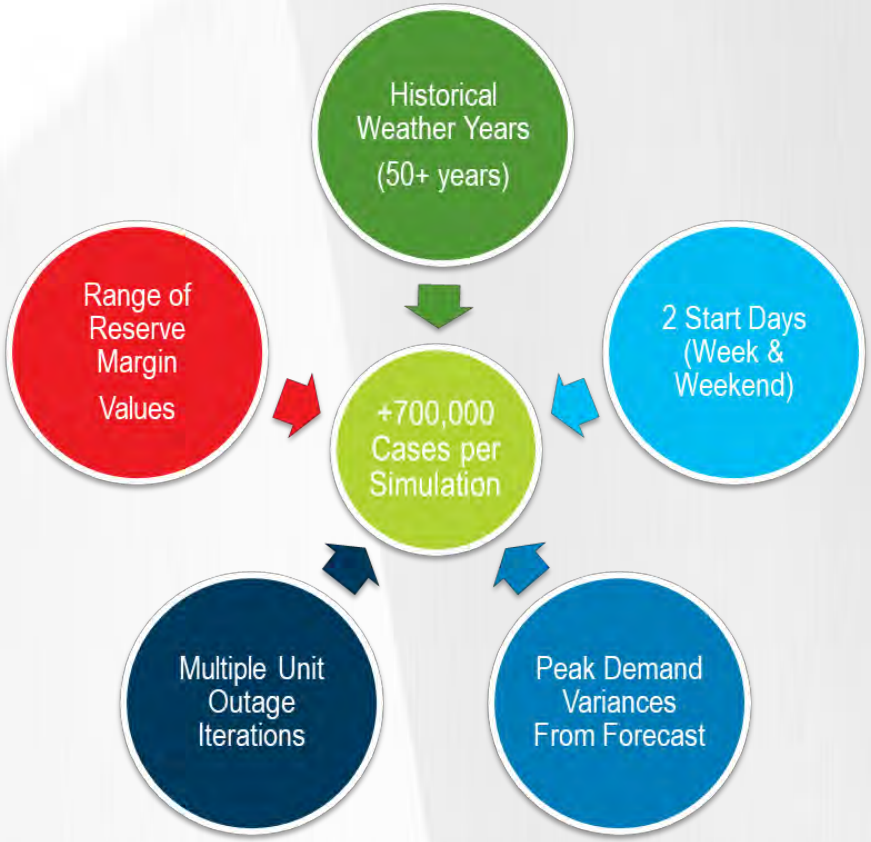
Generation Resource Adequacy and Fleet Diversity

Market Structure and Governance

Generation Reliability Planning

Our planning considers projections of peak load, energy forecasts, available generation technologies, energy efficiency and demand response programs, and more.





Georgia Power

Projecting light-duty electric vehicle sales in the National Energy Modeling System (NEMS)

For

Second Meeting of the Georgia Joint Legislative Study Committee on the Electrification of Vehicles

September 7, 2022

By

Michael Dwyer, Energy Information Administration

Outline

- Introduction to the AEO and NEMS
- Modeling methodology for light duty vehicles in NEMS
- AEO2022 light duty vehicle results
- AEO2022 assumptions
- Future uncertainties

Annual Energy Outlook (AEO)

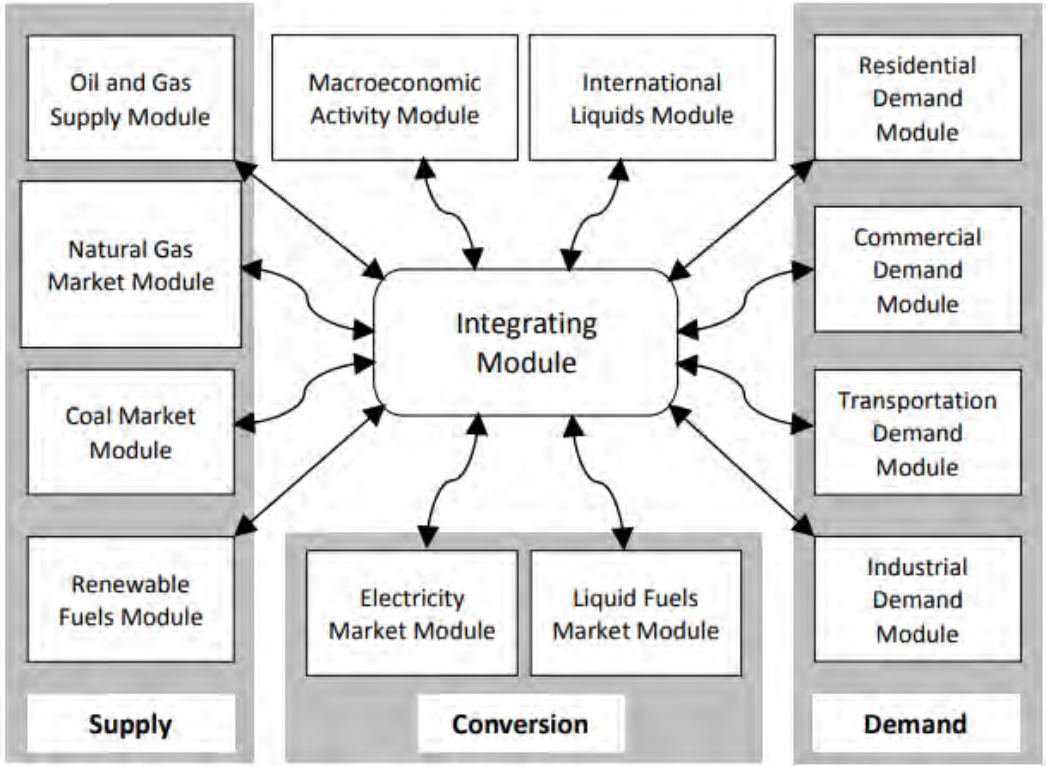
- The AEO, developed using NEMS, is centered on the *Reference case*, which is not a prediction of what will happen, but rather a modeled projection of what might happen given certain assumptions and methodologies.

- The *Reference case* incorporates only existing law and policies, and is used as a case to which EIA can compare the relative impacts of alternate policies

- The *Reference case* typically projects technological evolutions rather than technological revolutions and therefore does not identify disruptive technologies or the timing of their availability and adoption.

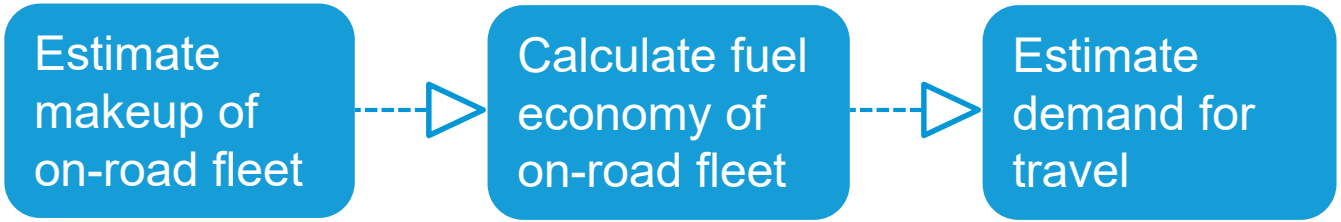
- AEO2022 modeling was completed in November 2021

NEMS is a general equilibrium model that iterates until supply and demand converge



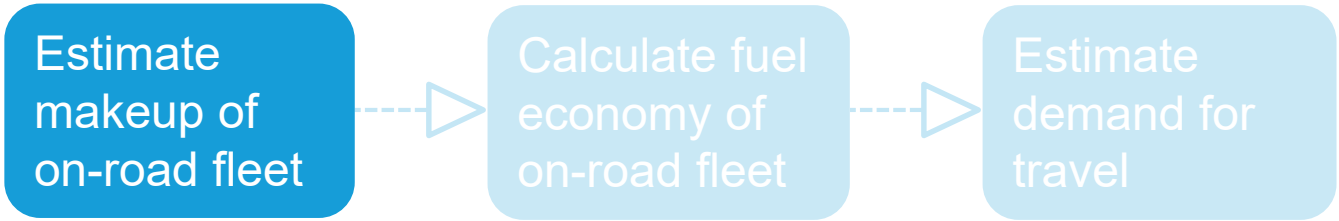
AEO2022 light duty vehicle modeling methodology

Transportation model: Light duty vehicles



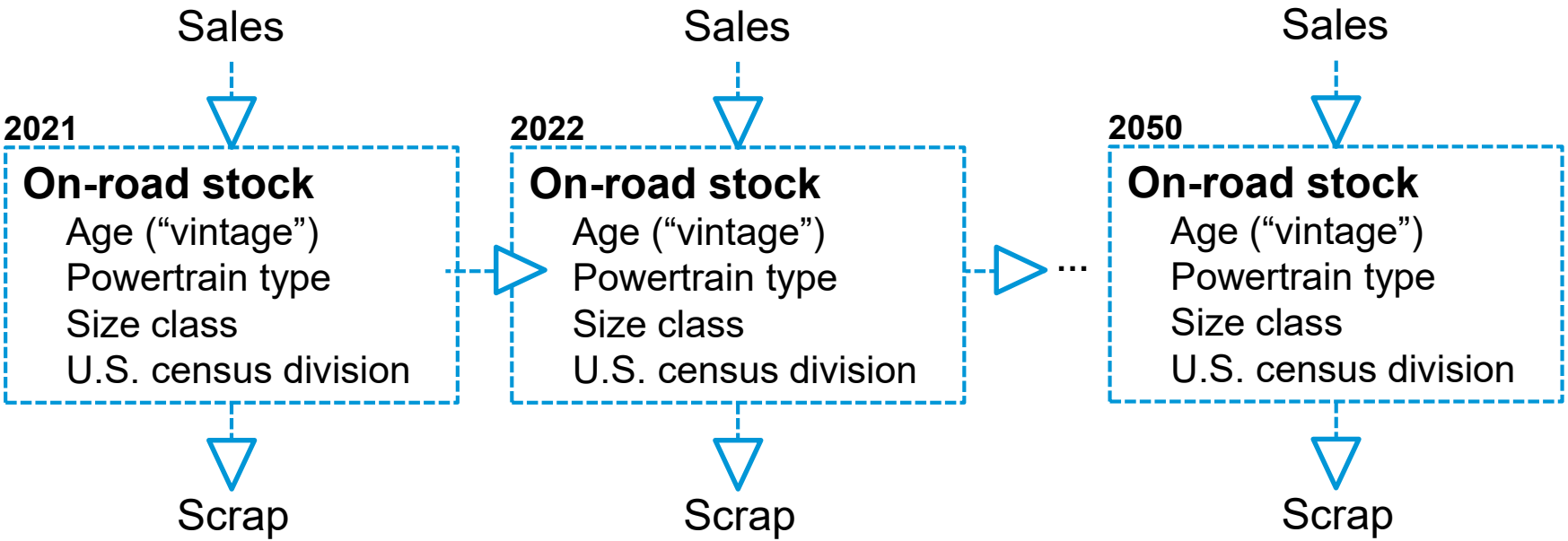
$$Energy = \frac{Miles\ travelled}{fuel\ economy}$$

Transportation model: Light duty vehicles

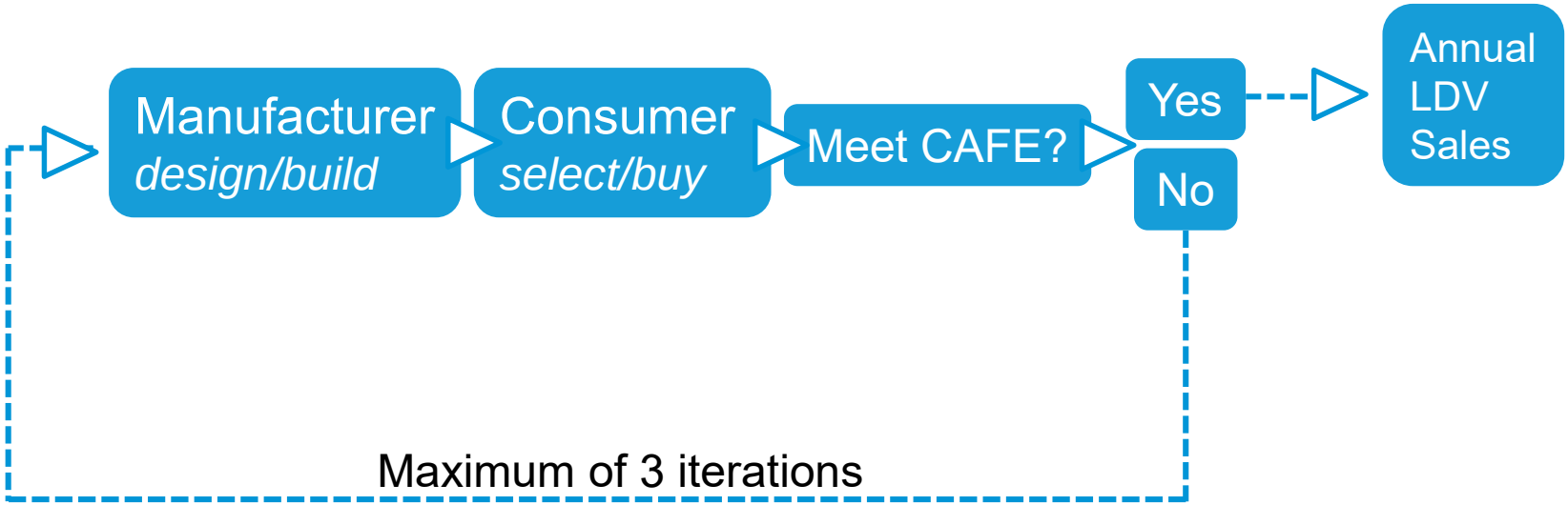


$$Energy = \frac{Miles\ travelled}{fuel\ economy}$$

Projecting changes in the U.S. light duty vehicle fleet in NEMS



Sales projection: involves both manufacturers (building) and consumers (buying)



Sales projection: involves both manufacturers (building) and consumers (buying)

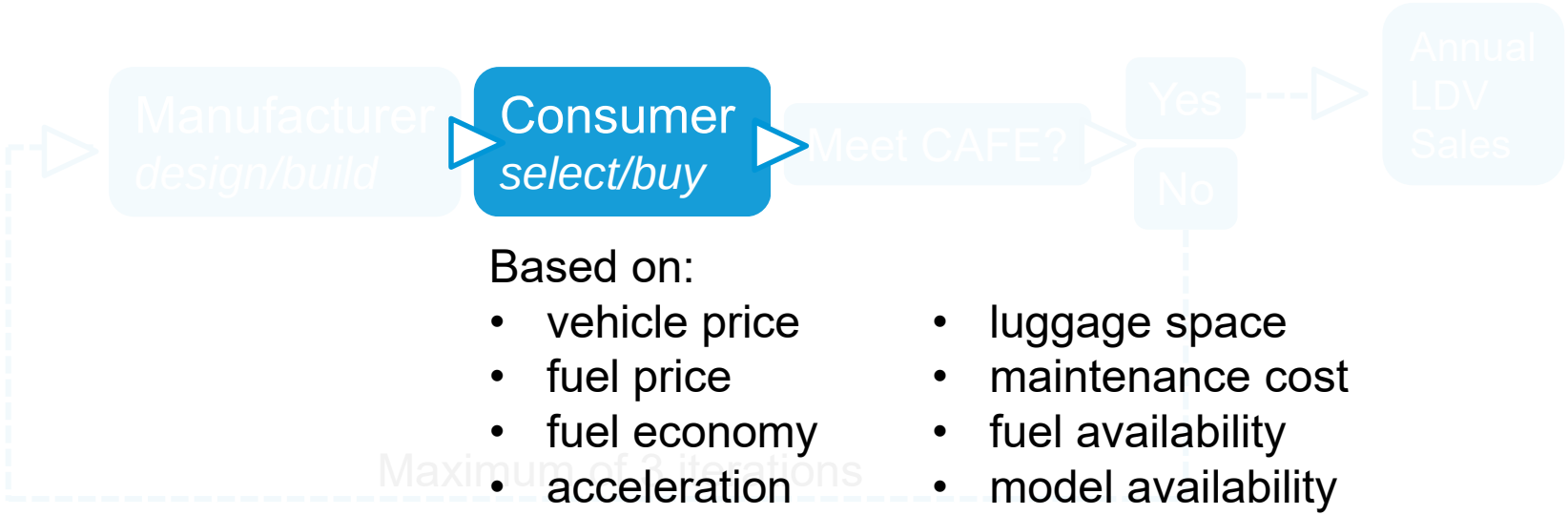
Manufacturers Technology Choice Component (MTCC)

Passenger Car Size Class	Light-Duty Truck Size Class
Mini	Small Pickup
Subcompact	Standard Pickup
Compact	Small SUV
Midsize	Standard SUV
Large	Small Van
2 seater	Standard Van
Small CUV	Small CUV
Large CUV	Large CUV

Vehicle powertrains	
Gasoline	Diesel Hybrid
Diesel	Gasoline Hybrid
Flex Fuel (ethanol)	Dedicated CNG
Electric—100 mile range	Dedicated LPG
Electric—200 mile range	Bi-fuel CNG
Electric—300 mile range	Bi-fuel LPG
Plug-in Hybrid Electric—20 mile	"Blank" Fuel Cell
Plug-in Hybrid Electric—50 mile	Hydrogen Fuel Cell

Within each **size class (left)**, manufacturers build a vehicle with each of the available **powertrains (right)**, with a fuel economy, vehicle price, acceleration, range, luggage space, etc.

Sales projection: involves both manufacturers (building) and consumers (buying)



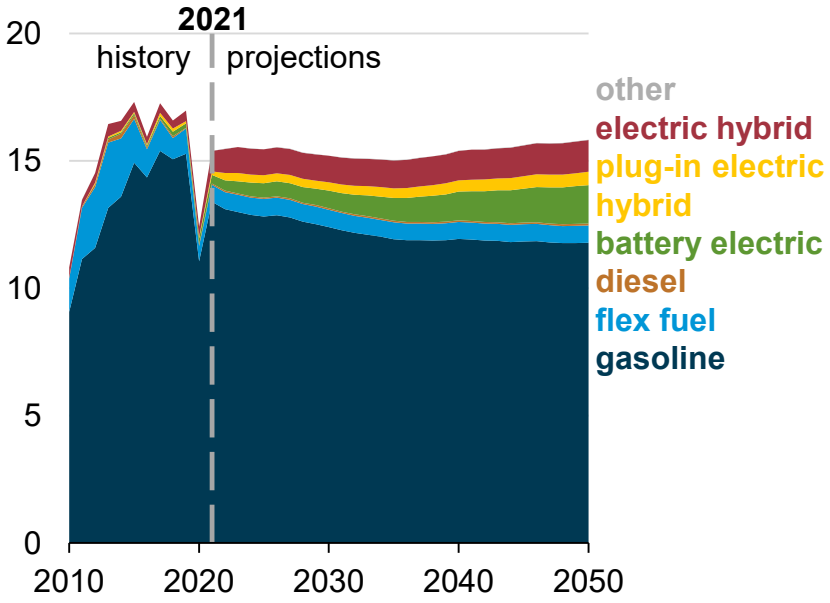
Based on:

- vehicle price
- fuel price
- fuel economy
- acceleration
- range
- luggage space
- maintenance cost
- fuel availability
- model availability
- home refueling

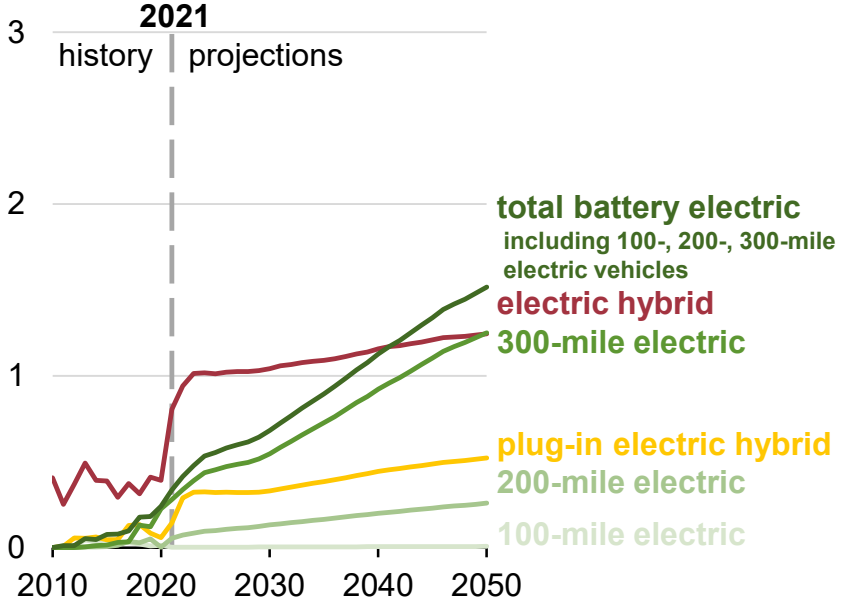
AEO2022 light duty vehicle results

Light-duty vehicle sales by technology or fuel type

Light-duty vehicle sales by technology or fuel
AEO2022 Reference case
millions of vehicles

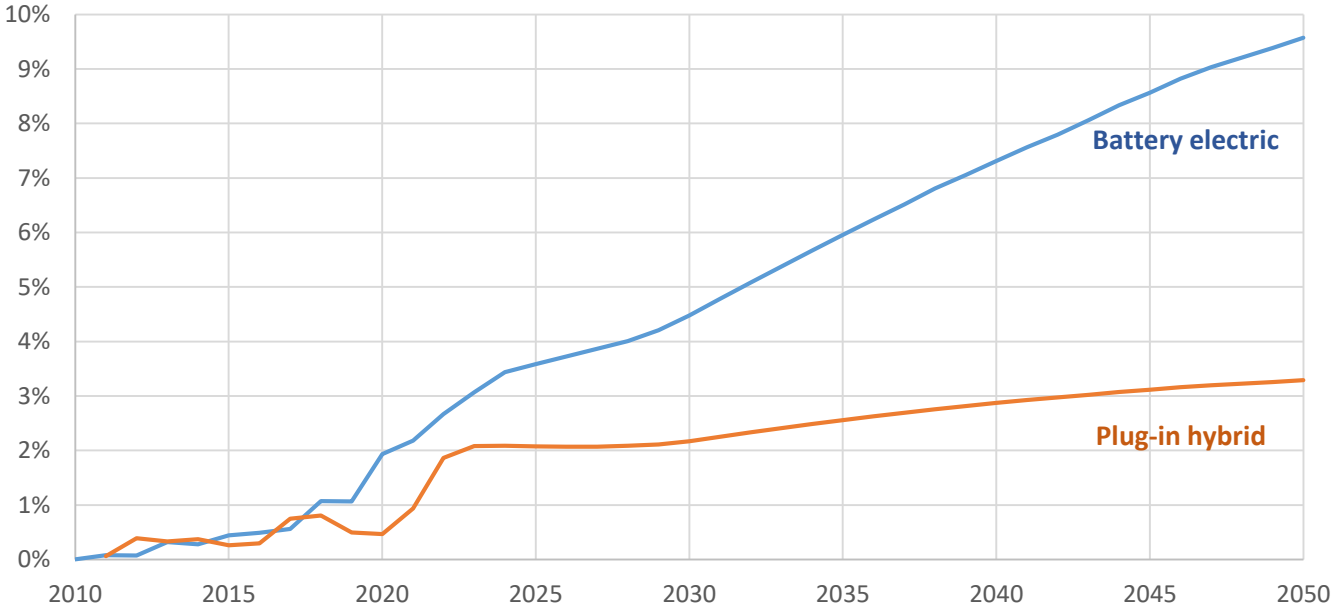


New vehicle sales of battery-powered vehicles
AEO2022 Reference case
millions of vehicles



Plug-in electric vehicle sales and stocks projection

Plug-in electric vehicle sales shares, AEO2022 Reference case



What drives EV adoption?

NOT explicitly modeled in NEMS: Manufacturer aspirations

Statements on the Biden Administration's Steps to Strengthen American Leadership on Clean Cars and Trucks regarding 40-50% EV sales in 2030:

- Ford/GM/Stellantis: "…can be achieved only with the timely deployment of the full suite of electrification policies committed to by the Administration in the Build Back Better Plan, including purchase incentives, a comprehensive charging network of sufficient density to support the millions of vehicles these targets represent, investments in R&D, and incentives to expand the electric vehicle manufacturing and supply chains in the United States."
- BMW/Ford/Honda/VW/Volvo: "…bold action from our partners in the federal government is crucial to build consumer demand for electric vehicles…includes a strong nationwide greenhouse gas emissions standard, continued investments in charging infrastructure, and broad consumer incentives for all electric vehicle purchases"

Source: https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/statements-on-the-biden-administrations-steps-to-strengthen-american-leadership-on-clean-cars-and-trucks/

Conditions affecting electric vehicle sales

- Policy
- Incremental electric vehicle costs
- Fuel prices (cost to drive)
- Consumer sentiment
  - Range anxiety and recharging availability/time
  - Model availability (e.g., no EV pickups in 2021)

Conditions affecting electric vehicle sales: policy

- Federal plug in electric vehicle tax credit: up to $7500 tax credit for BEVs and PHEVs
- **2020**: Safer Affordable Fuel Efficient (SAFE) Rule – updated CAFE standards
  - Sets annual MPG improvement to 1.5% (previously around 5%)
  - Revoked California authority to set its own standard and enforce the ZEV mandate

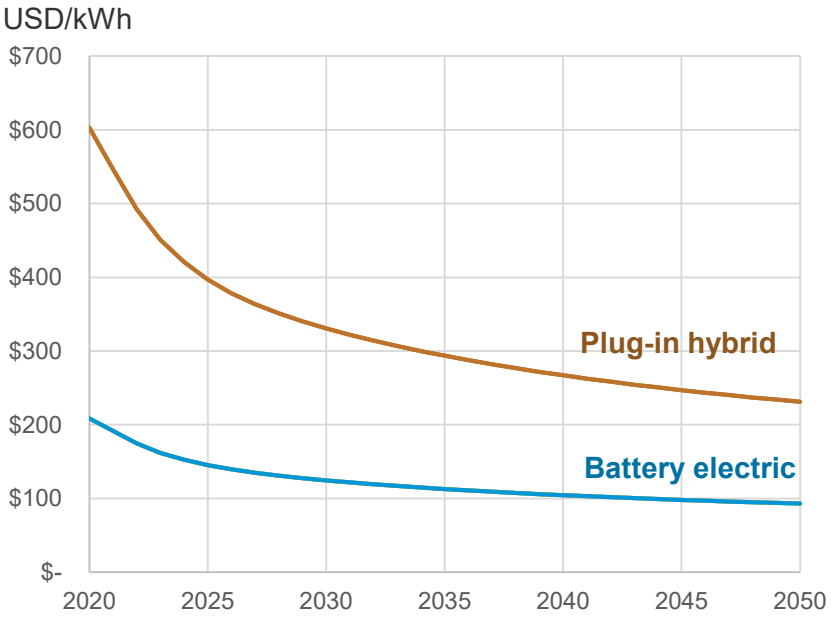
Included in AEO2022

- **2021**: NHTSA repeals SAFE I (12/21/2021)
- **2021**: Infrastructure Investment and Jobs Act / Bipartisan infrastructure law (11/15/2021)
- **2022**: EPA reinstatement of California's CAA waiver (3/14/2022)
- **2022**: NHTSA CAFE update (3/21/2022)
- **2022**: Inflation Reduction Act (8/16/2022)
- Evolving State policies (e.g. 2035 CA ICE vehicle ban)

Not included in AEO2022

Conditions affecting electric vehicle sales: purchase price

Retail price equivalent battery prices



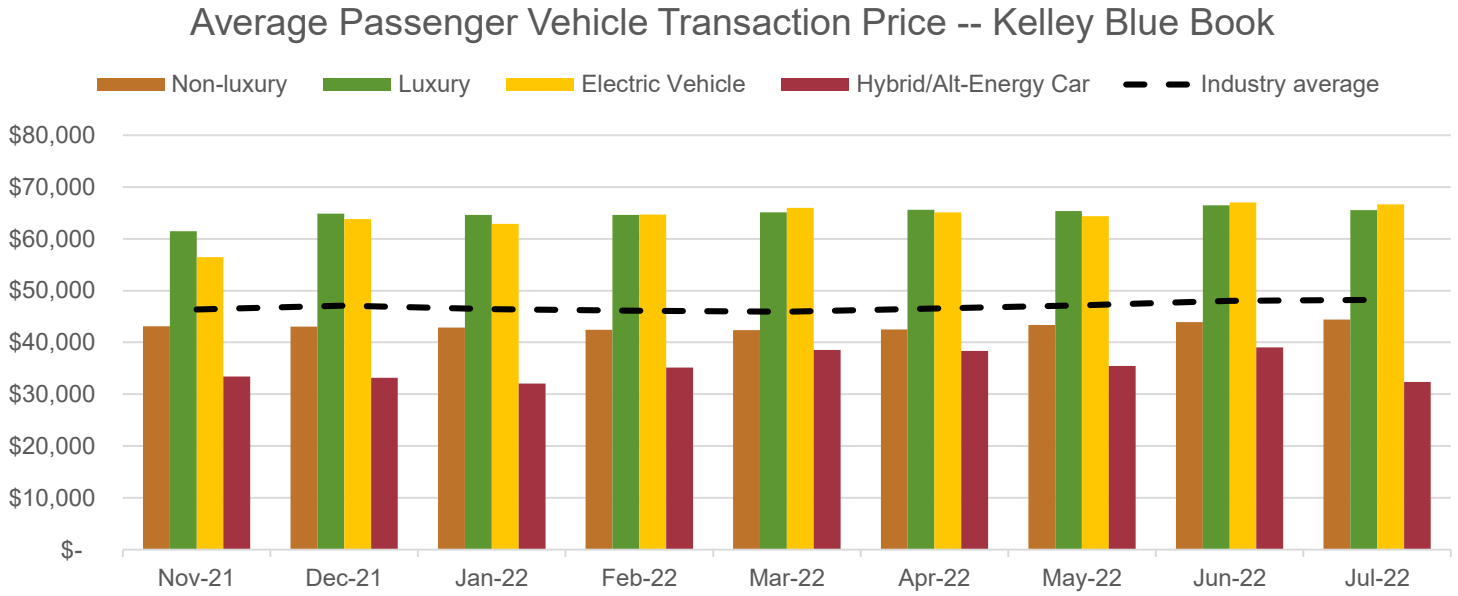
Uncertainties:

Technology breakthroughs: solid state batteries? Ultra fast charging capability?

Raw material supply chain – materials shortage looks highly likely in the mid/late-2020s, under high EV- penetration scenarios estimated by manufacturers and others

Will battery cost reductions go to range improvement or vehicle cost reduction?

Electric vehicles are priced similar to luxury vehicles



Source: Kelley Blue Book press releases

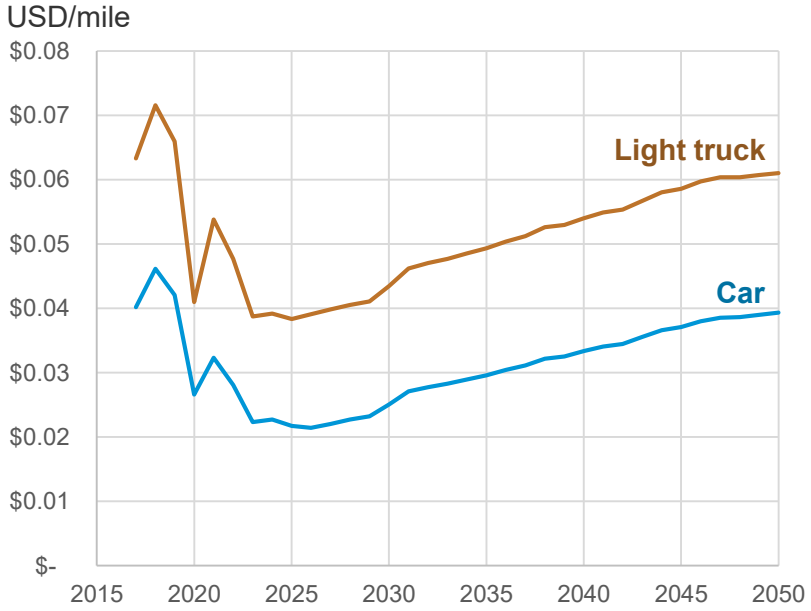
Conditions affecting electric vehicle sales: Cost to drive

Uncertainties:

NEMS assumes home charging (residential) electricity prices, which are considerably lower than those charged for public charging (in particular public fast charging). This cost advantage would likely shrink by half, or more, if one were to assume public fast charging.

The trajectory of future fuel prices in general – both gasoline and electricity – is highly uncertain.

How much more expensive is it to drive a Gasoline ICE versus an EV300?



Q & A

GEORGIA & DIRECT SALES

RIVIAN AUTOMOTIVE

SEPTEMBER 2022

RIVIAN

RIVIAN

US-based electric vehicle manufacturer founded in 2009

10,000 employees nationwide including 6,000 at our first manufacturing center in Normal, IL

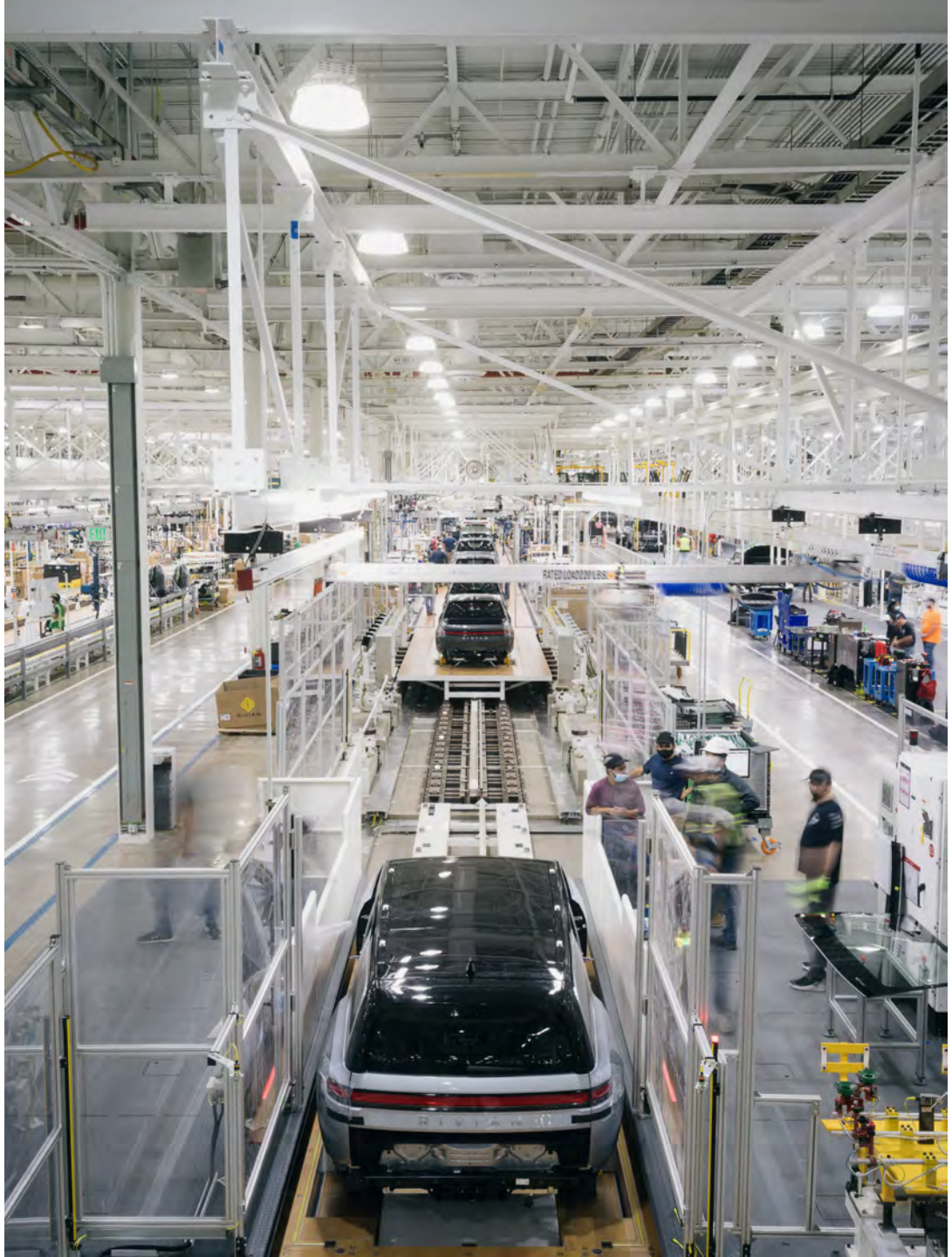
Additional footprints in Michigan, California, and Vancouver, with staff in Europe and China

Publicly traded as RIVN

3 vehicle lines currently in production, including the first all-electric pickup in America

Built and delivered over 8,000 vehicles so far

Building nationwide networks of retail locations, service centers, and charging stations



FOREVER STARTS NOW.

The speed at which we all act right now will determine what the history books say about the state of our planet 1,000 years from now. We are living through an inflection point that will determine the living conditions of many future generations to come.

We hope our products inspire not just our customers to explore and protect the world, but other businesses to build and develop a whole different set of products to compete with ours.

RJ Scaringe
Founder and CEO

RIVIAN IN GEORGIA

Partnership announced December 2021

$5 billion investment by Rivian

7,500 advanced manufacturing jobs

Construction to begin 2022; Production 2025

Eventual production capacity for 400,000 vehicles/year

Site in Walton, Newton, Monroe, and Jasper counties

GA Department of Education has launched Electric Vehicle Career Pathway

THE PROBLEM

In 2015, Georgia changed state laws to block new, EV-only manufacturers from direct sales in the state.

Georgia allows an exception for Tesla, which operates 5 manufacturer owned dealers in the state.

This will prevent Rivian vehicles built in Georgia from being sold here in the state.

A FREE AND OPEN EV MARKET IN GEORGIA

BENEFITS OF DIRECT SALES

- Local Jobs and Investment
- Consumer Choice
- Free Market Competition
- Greater EV Adoption
- New Retail Experiences

Will Georgia's drivers be able to purchase Rivian vehicles built in their own state?

DIRECT SALES STRENGTHENS AMERICAN LEADERSHIP ON AUTO MANUFACTURING & INNOVATION, WITH GEORGIA IN THE LEAD

WHY DIRECT SALES

ESSENTIAL FOR EV ADOPTION AND PROLIFERATION

2/3rds of EVs in the US have been sold via direct sales, even with restrictions in over half of states

Direct sales is the path to success for EV-only automakers

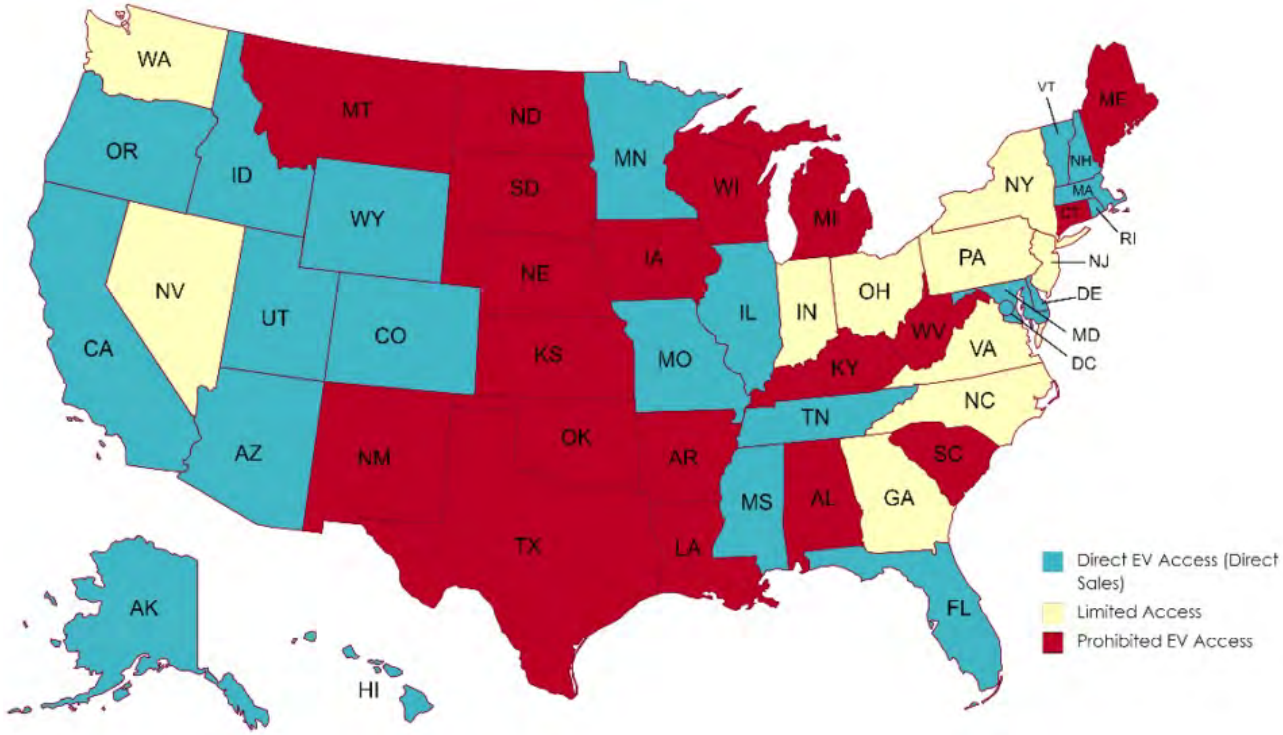
WHY RIVIAN WILL SELL DIRECTLY

- Customers need greater education before investing in new technology
- Offers price transparency
- Does not use service as a profit center
- Vehicles are built-to-order

Dealerships slow to embrace EVs, remain hesitant

FTC: 100,000 customer complaints about car dealerships every year; hundreds of enforcement actions

There is no policy justification for blocking direct sales.



FREE MARKET ADVOCATES CALL FOR DIRECT SALES

THE HEARTLAND INSTITUTE

"BREAK THE AUTO DEALERS' SALES MONOPOLY ... FOR ALL AUTOMAKERS" (2014)

AMERICANS FOR PROSPERITY

"we oppose efforts by state legislatures or regulatory commissions to forbid car manufacturers from opening their own stores or service centers in order to deal directly with consumers." (2015)

R Street
Free markets. Real solutions.

"a quintessential example of how cronyism and lobbying are corrupting the free market and destroying innovation, growth and jobs across the country." (2015)

CATO INSTITUTE

Prohibitions on direct sales are "an egregious case of regulatory moat building." (2018)

MACKINAC CENTER FOR PUBLIC POLICY

"It's questionable whether banning direct auto sales was appropriate in the first place, but now it's crystal clear that there's no reasonable basis for continuing this practice." (2021)

MERCATUS CENTER
George Mason University

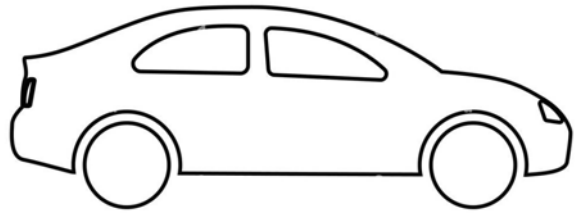
These restrictions "come at the public's expense" and "politicians would do better to let innovation arise from market competition." (2022)

DIRECT SALES MEANS FREEDOM TO BUY

NEW CARS ARE THE ONLY PRODUCT WHERE A MIDDLEMAN IS REQUIRED (and only in the United States!!)

Realtor
OR
For Sale By Owner

Apple Store
OR
Best Buy



DEALER
REQUIRED

ARE DEALERSHIPS HARMED BY DIRECT SALES?

No! A rising tide lifts all boats

2012 – 2021 DEALERSHIP SALES GROWTH

70% increase nationwide

81% increase in open states

50% in closed states

2021 GA Dealership Sales

$36 Billion

Up from $19 billion in 2012

89% sales growth

2012 – 2021 DEALERSHIP EMPLOYMENT GROWTH

9% nationwide

11% in open states

6% in closed states

Source:

NADA DATA 2021

ANNUAL FINANCIAL PROFILE OF AMERICA'S FRANCHISED NEW-CAR DEALERSHIPS


RIVIAN

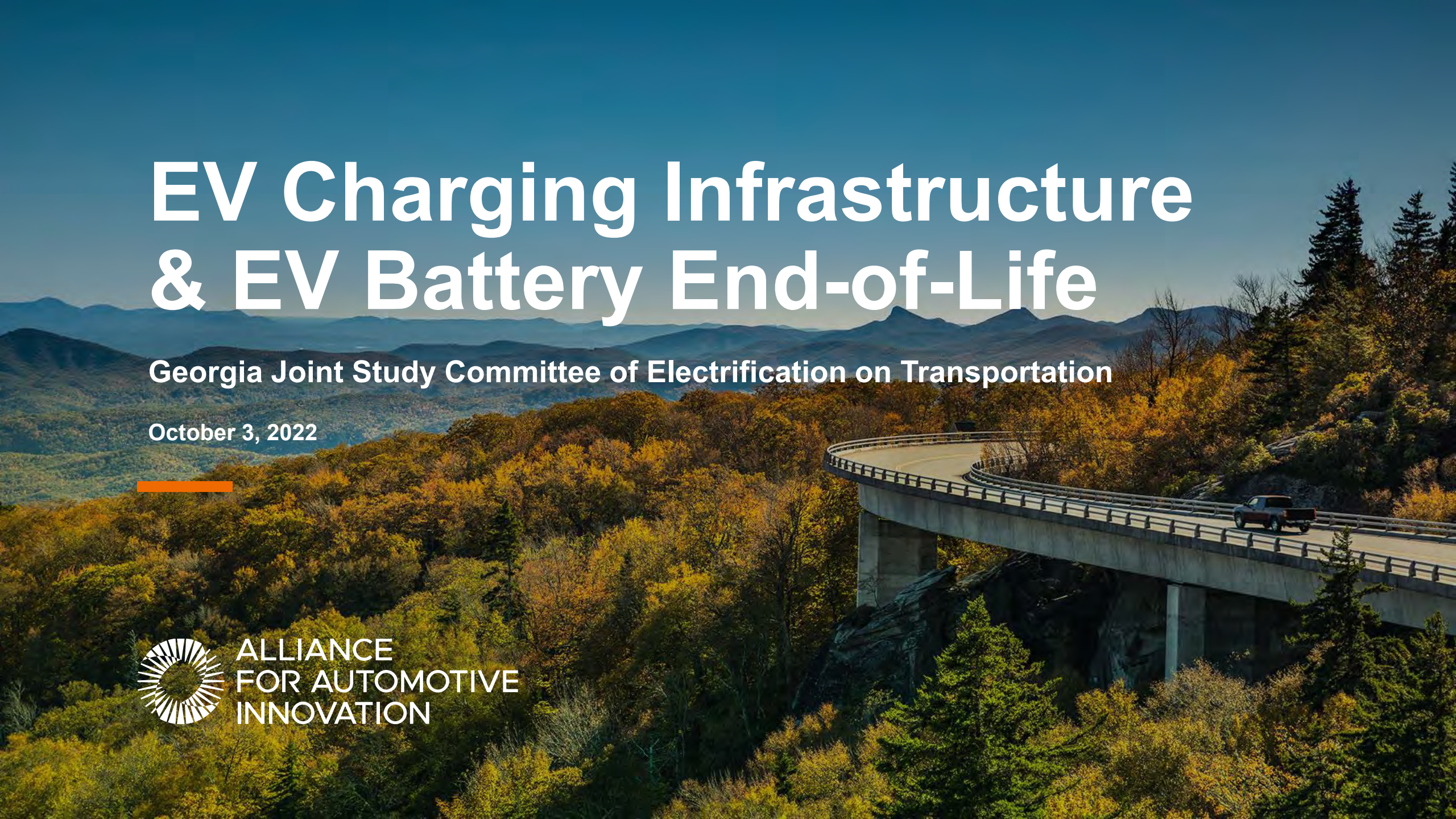
Appendix III

(Material from meeting #3, October 3, 2022)

EV Charging Infrastructure & EV Battery End-of-Life

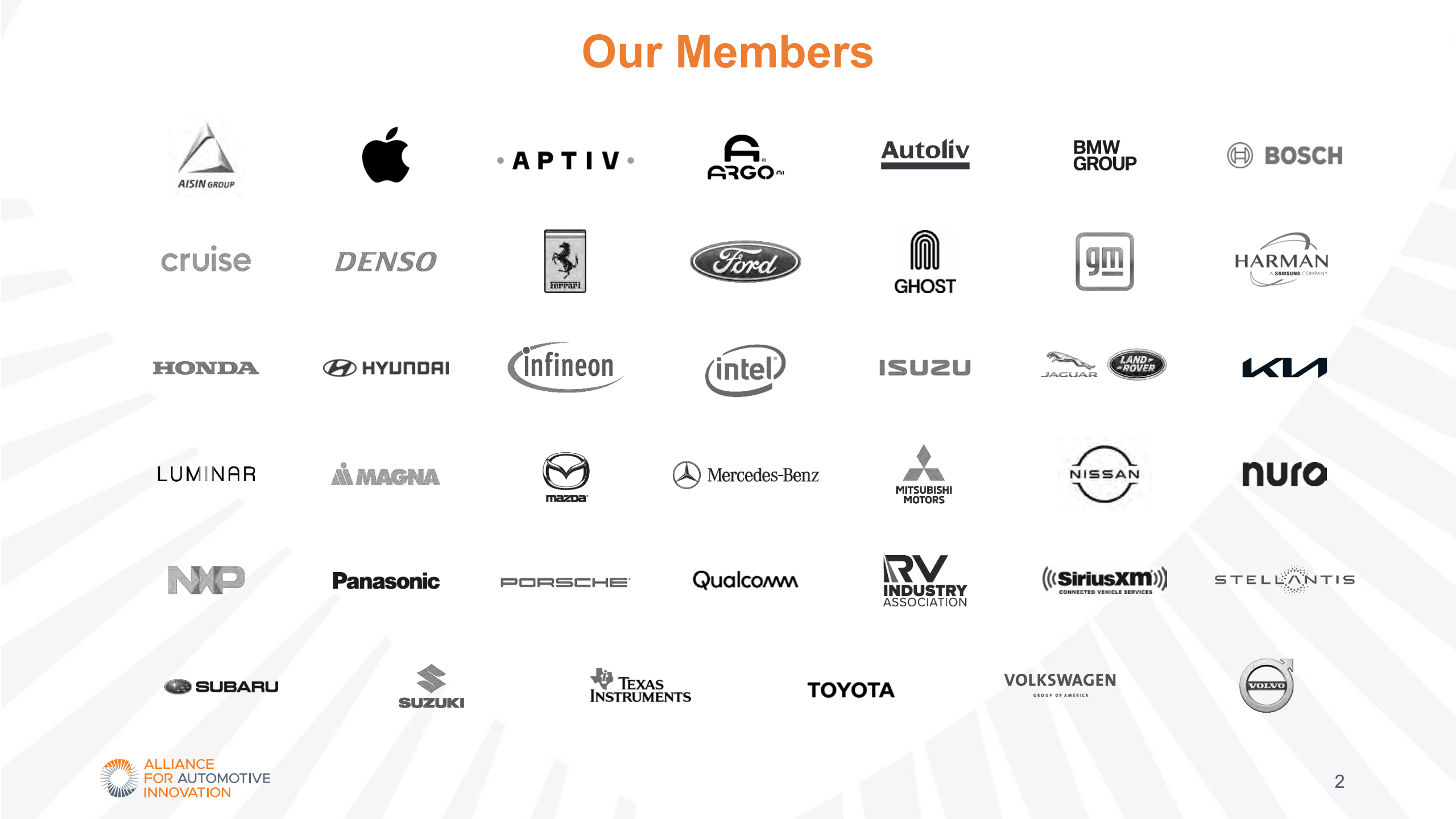
Georgia Joint Study Committee of Electrification on Transportation

October 3, 2022



ALLIANCE FOR AUTOMOTIVE INNOVATION

Our Members


AISIN GROUP
APTIV
ARGO AI
Autoliv
BMW GROUP
BOSCH
cruise
DENSO
Ferrari
Ford
GHOST
gm
HARMAN
A SAMSUNG COMPANY
HONDA
HYUNDAI
Infineon
intel
ISUZU
JAGUAR
LAND ROVER
KIA
LUMINAR
MAGNA
mazda
Mercedes-Benz
MITSUBISHI MOTORS
NISSAN
nuro
NXP
Panasonic
PORSCHE
Qualcomm
RV INDUSTRY ASSOCIATION
SiriusXM
CONNECTED VEHICLE SERVICES
STELLANTIS
SUBARU
SUZUKI
Texas Instruments
TOYOTA
VOLKSWAGEN
GROUP OF AMERICA
VOLVO

EV Charging Infrastructure

Leveling Up – EV Charging Basics

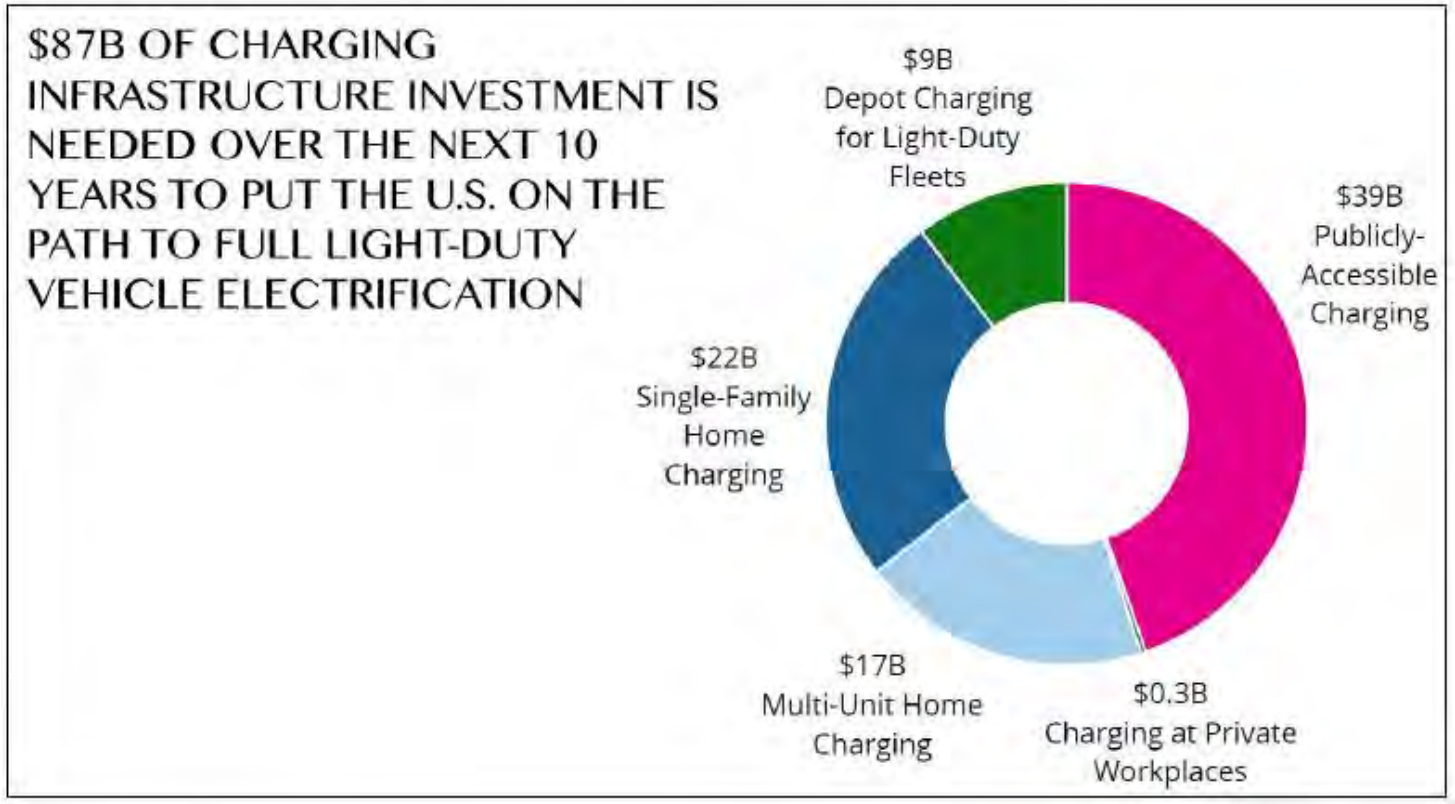
		Range	Application
Level 1		**3 to 6** Miles of range/hour	• Residential PHEV • Airports • Some workplace
Level 2		**20 to 40** Miles of range/hour	• Residential • Workplace • Public • Fleet (overnight)
Level 3 (Direct Current Fast Charge, DCFC)		**250 to 500** Miles of range/hour	• Corridor (IIJA) • Transit hub (TNC, Taxi) • City Center Cluster • Fleet

EV Charging Infrastructure Gap

Currently Available	Total Ports		Non-Proprietary	
	Georgia	U.S.	Georgia	U.S.
Level 2	2,858	94,166	2,391	92,725
DC Fast Chargers	718	25,593	331	10,249

To reach 100% EV sales by 2035, **$39B required for publicly-available charging by 2030**

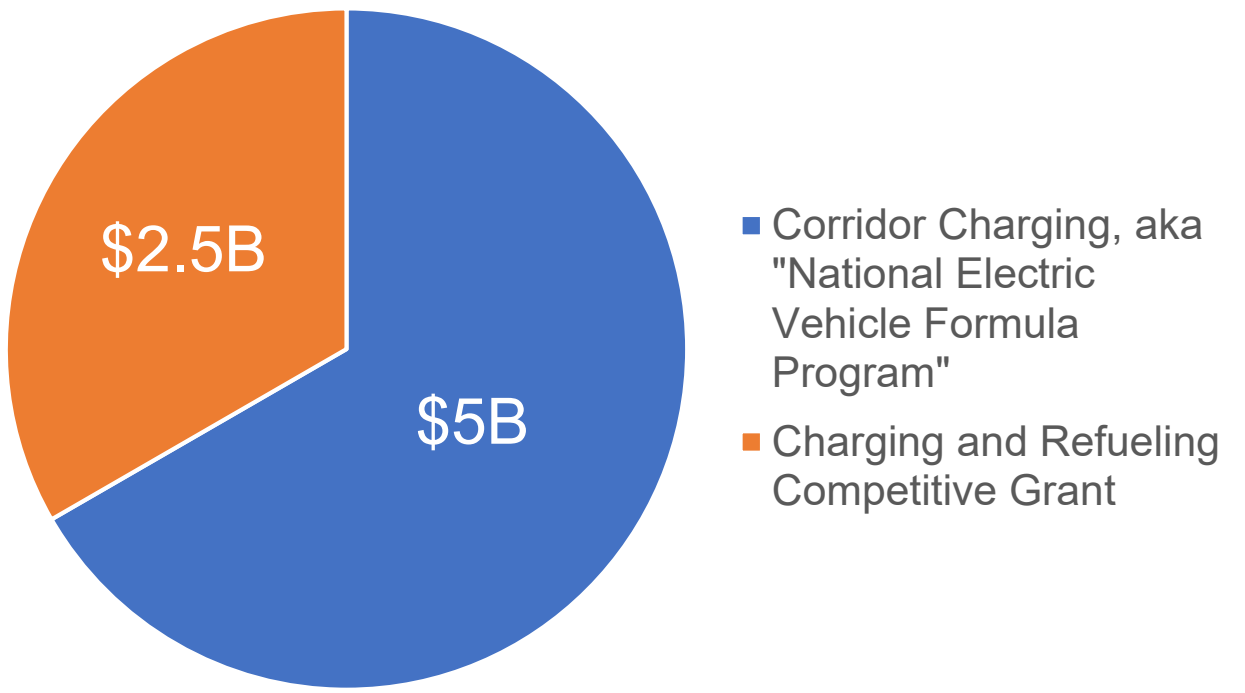
(Analysis assumes all DCFCs are 350kW. If chargers are 150kW, cost increases to $52B)



ALLIANCE FOR AUTOMOTIVE INNOVATION

Sources:
EV charging figures as of June 22, 2022: https://afdc.energy.gov/stations/#/analyze?country=US&fuel=ELEC&ev_levels=dc_fast
EV charging infrastructure investment analysis: Atlas Public Policy, *U.S. Passenger Vehicle Electrification Assessment* (April 2021)

Infrastructure Investment & Jobs Act EV Charging Infrastructure



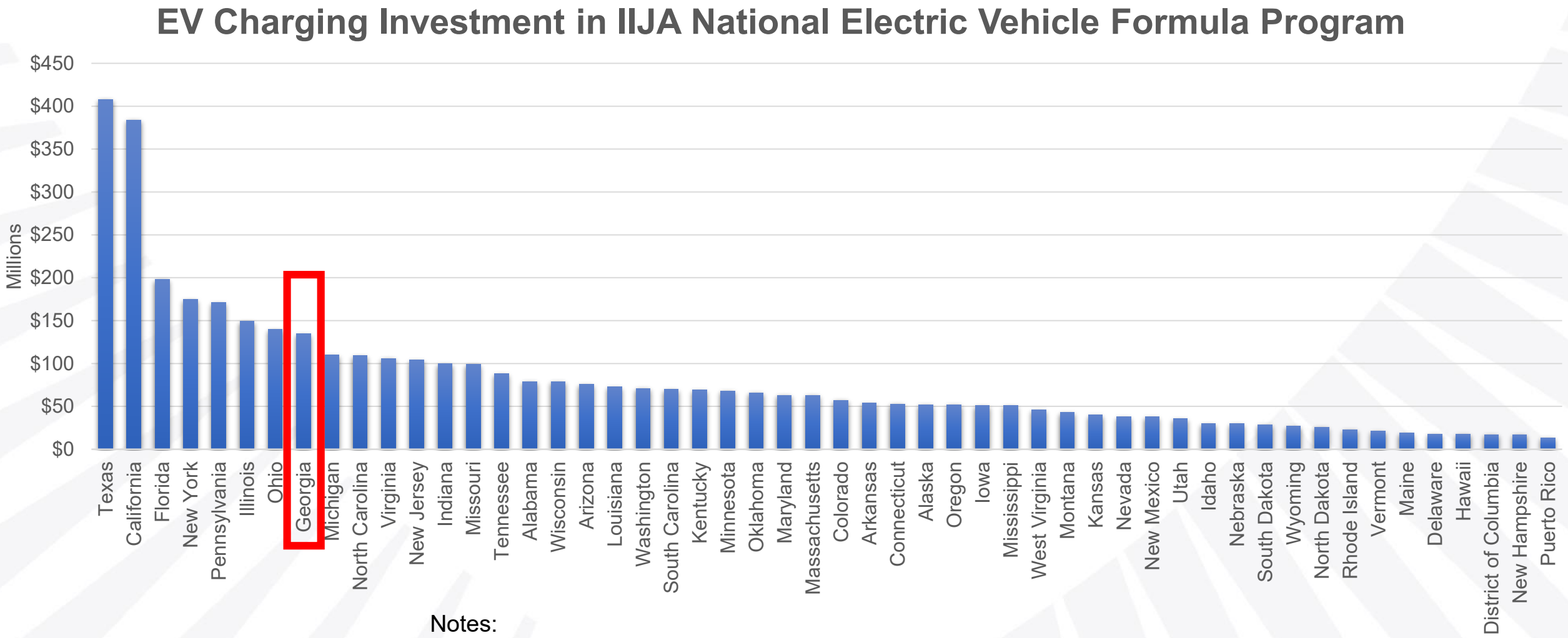
National EV Formula Program

- FY22 – FY26; Federal share = 80%
- Funds allocated to states using formula (23 U.S. Code § 104 subsection (c))
- To be used for EV charging on alternative fuel corridors
  - If alt. fuel corridors fully built out, funding may be used for publicly available chargers
- States must submit plans to DOT on intended funding usage
- DOT and DOE must provide guidance to states to prioritize investments, i.e.:
  - "current and anticipated market demands for [EV] charging infrastructure, including with regard to power levels and charging speed, and minimizing the time to charge current and anticipated vehicles"

Charging and Refueling Infrastructure Grants

- FY22 – FY26; Federal share up to 80%
- Charging *and* hydrogen, propane, and natural gas fueling
- 50% along FHWA-designated Alt. Fuel Corridors & 50% "Community Grants"
- Publicly accessible projects outside of Alt. Fuel Corridors given priority for rural, low income and underserved communities, and multi-unit dwellings

State EV Charging Funding through National Electric Vehicle Formula Program



Notes:

- Values rounded to the nearest $million.
- Does not take into account $2.5B for competitive grants.
- Source - White House Fact Sheets

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NEVI EV Charging Minimum Standards NPRM

	NEVI NPRM	Auto Innovators Recommendations
Minimum Power Level	150 kW	350 kW
Station Type	DCFC	DCFC
Connector Type	SAE CCS	SAE CCS
Distance Between Chargers	50 miles	50 miles (as a starting point)
Ports/Station	4	Multiple
Communication	Outages, malfunctions, pricing, etc. in real time via Open Charge Point Interface (OPCI) 2.2	Must be able to communicate to drivers charging station status
Charger-to-Network Communication	Open Charge Point Protocol (OCPP)	OCPP
Accessibility	24/7	24/7
Payment Methods	All major debit/credit cards, not restricted by membership or payment type. Plug and Charge payment capabilities is required	Credit cards via credit card reader at a minimum
Pricing	$/kWh	$/kWh
Uptime	97%	Required, but not specified
Station Configuration	No requirement, but encourage states to take into account larger vehicles and vehicles with trailers	Consider different vehicle configurations and vehicles with trailers
EV Charging Signage	Not included due to open proceeding on updating the Manual on Uniform Traffic Control Devices	Allow signage on highway service signs

EV Charging Infrastructure Summary

- Significant gap in pending funding and charging needs to support electrification goals
  - Additional public and private investment is necessary

- $39B to $52B investment estimated needed nationally in publicly-available charging by 2030
  - Investment range depends on power level of DC Fast Chargers (350 kW versus 150 kW)

- $7.5 billion in Infrastructure Investment & Jobs Act is a good down payment
  - Begins to address corridor charging, but charging at other locations is still needed

EV Battery End-of-Life

Opportunities for Used EV Batteries

Reuse: refurbishing battery modules or packs to as good or better quality and performance levels through the replacement of worn or deteriorated components and re-certifying them to OEM specifications.

Repurpose: refurbishing EV battery components or packs to fulfill a different use from what was originally intended.

Recycle: treating EV batteries to recover the maximum amount of raw materials for reuse in identical or alternative industries.

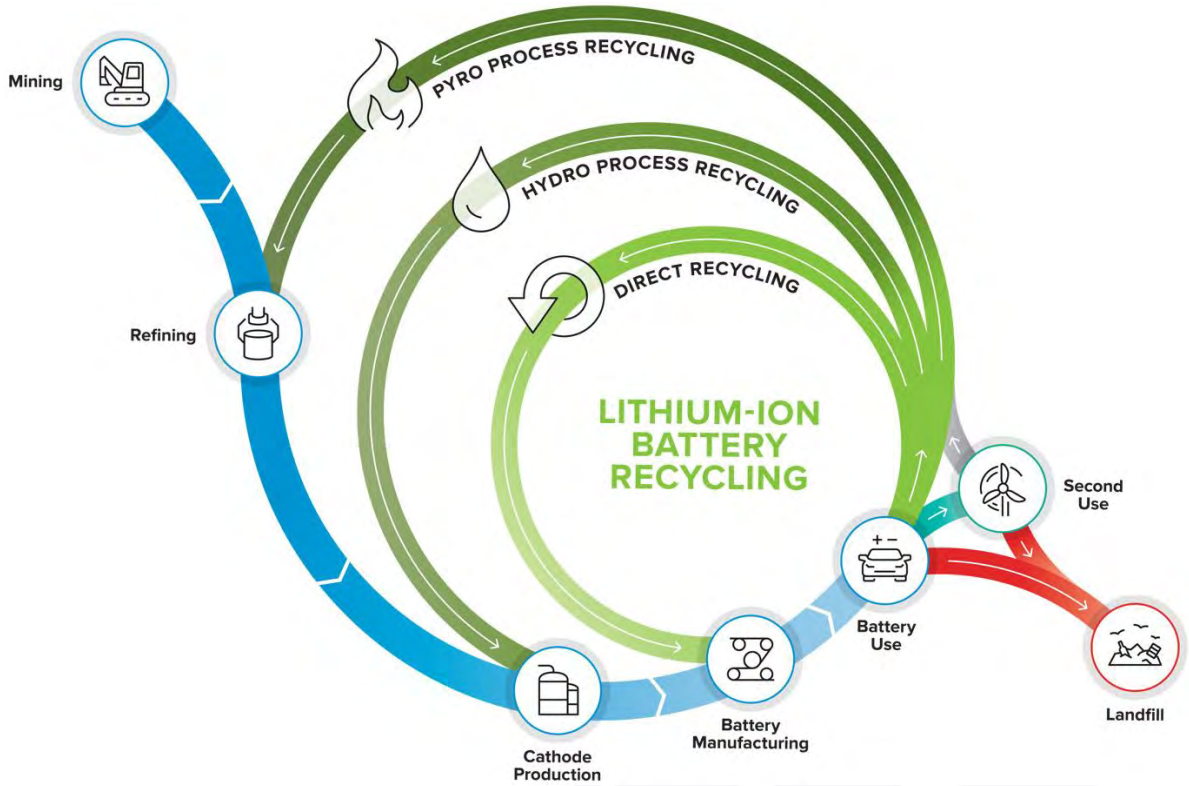
EV Batteries - Circular Economy Growth – North America

Time Frame	Near Term (~2020-2025)	Medium Term (~2026-2030)	Long Term (beyond 2030)
EV Battery Manufacturing in US	• First cell plants (beyond Gigafactory) open • Scrap from cell plants will promote more recycling facilities	• >10 EV battery cell plants • Direct positive-value recycling facilities increasing	• >20 EV battery cell plants • Potential for direct recycling/cathode and anode recovery
EV Battery Supply Chain Development	• First domestic CAM & precursor plants • Input material supply chain tied only to mining operations • Recycled material validation	• Refining/processing comes on-line • First mines/extractions • Supply chain hooking up with recyclers • Recycled material use begins	• Mature domestic supply chain, including recycling with appropriate standards like plastics industry • Recycled material is a significant portion of battery material
EV Battery Re-use Technology/Market	• "R&D" phase	• "Start-up" phase	• "Mature" phase
Large Format Li-Ion Recycling Volume	• Most batteries refurbished (few entire batteries are scrapped) • Low quantities of batteries processed through pyro processes	• Some batteries/vehicles reach EOL • Positive-value recycling scaling up	• Closer to "steady state" of used EV battery flow
kWh of vehicle Li-ion batteries recycled / year	• LOW	• LOW and growing	• MEDIUM and growing
Battery Recycling	• Positive-value recycling emerging	• Positive-value recycling technology and logistics growth	Cathode manufacturing uses a high percentage of recycled material like copper industry

Li-Ion Battery Recycling Opportunity

Domestic battery recycling can:

- Provide national energy security
- Reduce our dependency on foreign nations for materials
- Create domestic jobs
- Lower EV battery costs
- Stabilize critical mineral supply chain
- Enhance lifecycle environmental footprint



https://recellcenter.org/research/

Non-Vehicle Secondary Use Batteries

Retired EV batteries retain significant capacity

Batteries can support national energy security for use as a distributed energy resource, microgrid, utility buffering, renewable energy storage, etc.

BMW Battery Storage Farm, https://cleantechnica.com/2017/10/30/bmw-group-officially-commissions-battery-storage-farm-leipzig/

EV Battery End-of-Life Summary

- EV battery recycling offers strategic and economic opportunity for U.S.
- Secondary use batteries can provide positive impact to national energy security and trade policy
- EV battery policy should be flexible and not hinder EV battery innovation
- Resilient domestic policy will bolster U.S. jobs, energy security, and leadership in electrified future

Auto Innovators Resources

- Auto Innovators Get Connected EV Quarterly Report
  - State-by-state and National status of EV sales, charging stations, EV price, etc.

- Auto Innovators Recommended Attributes for Charging Stations (Dec. 2021)
  - 350kW DCFC on corridors and transit hubs, SAE J1772 and SAE CCS connectors, credit card payment, 24/7 access, networked, standardized $/kWh pricing, etc.

- Auto Innovators EV Charging Infrastructure Guiding Principles (Sept. 2021)
  - No-compromise mobility, need for public-private partnerships, utility rates and programs, grid upgrades, benefit to all customers, and building code requirements

- Auto Innovators EV Battery Recycling Policy Framework
  - EV battery recycling policy framework to ensure as close to 100% of end-of-life EV batteries are properly recycled or reused

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Transforming Personal Mobility

Dan Bowerson
Senior Director, Energy & Environment
dbowerson@autosinnovate.org

Alliance for Automotive Innovation

Electric Vehicle Fees

October 3, 2022

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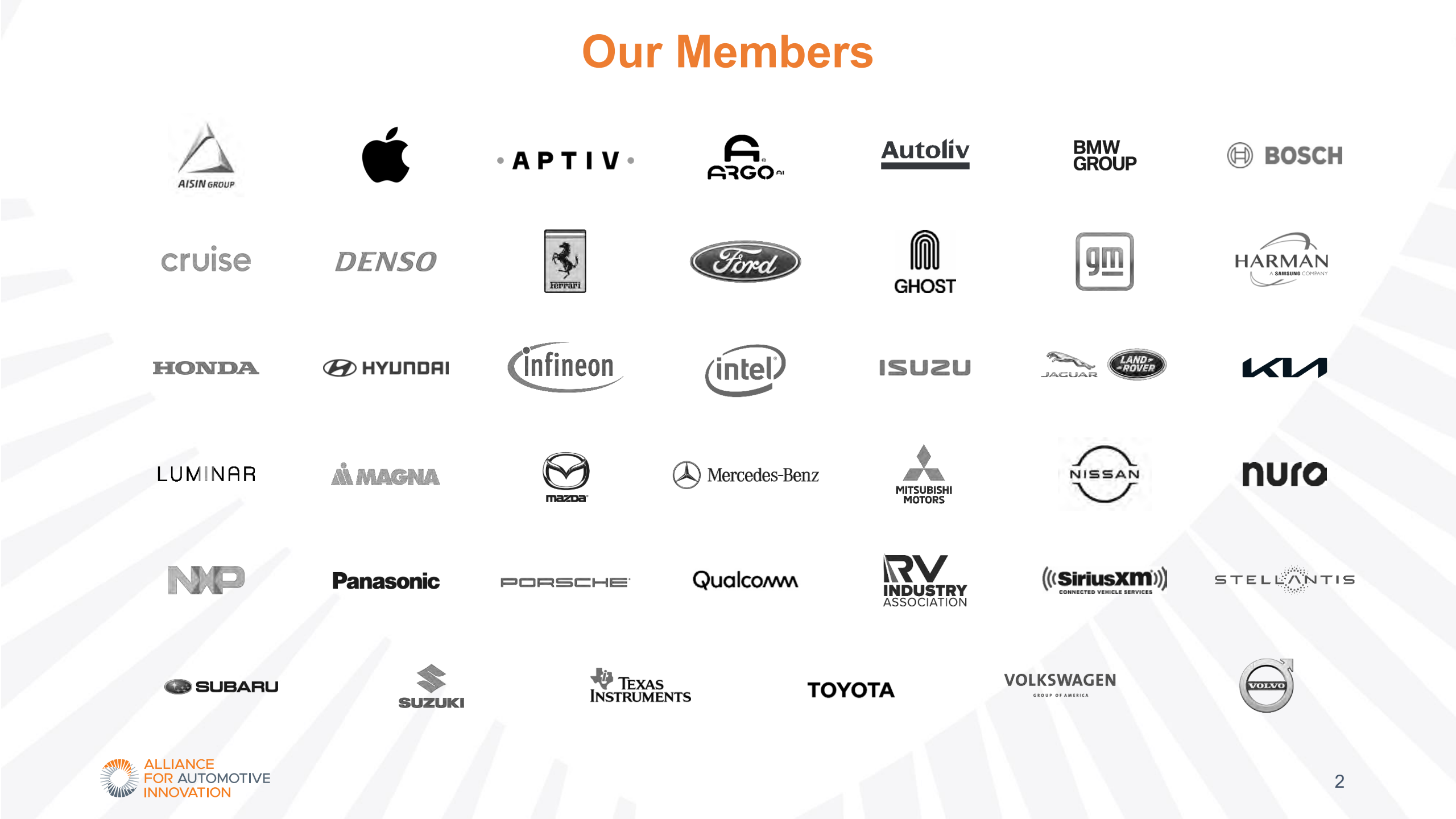
AISIN GROUP
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BMW GROUP
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cruise
DENSO
Ferrari
Ford
GHOST
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HARMAN
A SAMSUNG COMPANY
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MAGNA
mazda
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nuro
NXP
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Qualcomm
RV INDUSTRY ASSOCIATION
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CONNECTED VEHICLE SERVICES
STELLANTIS
SUBARU
SUZUKI
Texas Instruments
TOYOTA
VOLKSWAGEN
GROUP OF AMERICA
VOLVO

Georgia's EV Market

- Demand for EV's remains strong
- 71% of consumers are interested in an EV as their next purchase

2022 First Half EV Market Share by State

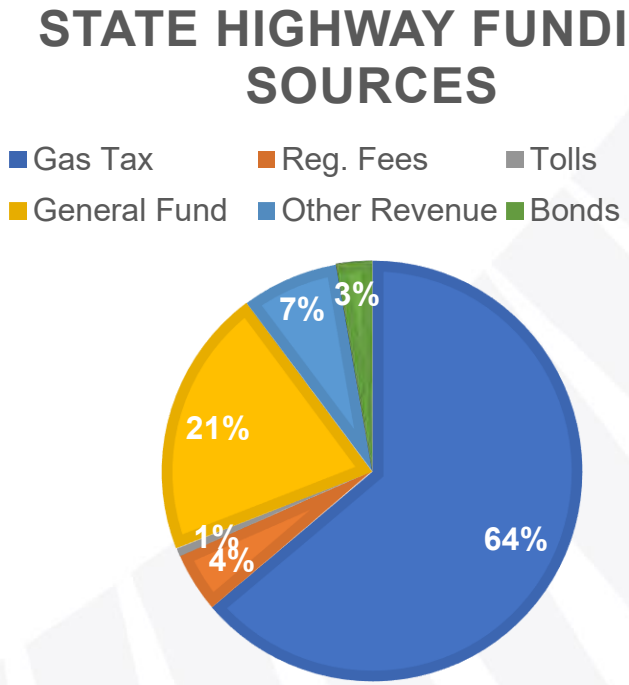
1	CA*	18.32%	**11**	CT*	6.83%	**21**	GA	4.59%	**31**	KS	3.07%	**41**	IA	2.56%
2	DC	12.70%	**12**	VA	6.71%	**22**	ME*	4.29%	**32**	WI	2.93%	**42**	AK	2.25%
3	WA*	10.36%	**13**	UT	6.35%	**23**	NC	4.18%	**33**	MI	2.92%	**43**	KY	2.21%
4	OR*	9.51%	**14**	VT*	6.10%	**24**	MN	4.12%	**34**	MT	2.92%	**44**	AR	1.87%
5	CO*	8.91%	**15**	AZ	5.85%	**25**	PA	3.85%	**35**	IN	2.88%	**45**	AL	1.76%
6	NV	8.64%	**16**	IL	5.39%	**26**	TX	3.67%	**36**	OK	2.86%	**46**	WY	1.57%
7	NJ*	7.93%	**17**	FL	5.23%	**27**	NM	3.57%	**37**	OH	2.84%	**47**	LA	1.51%
8	MA*	7.43%	**18**	NY*	5.16%	**28**	TN	3.36%	**38**	SC	2.64%	**48**	SD	1.42%
9	HI	7.34%	**19**	DE	4.73%	**29**	NH	3.30%	**39**	MO	2.61%	**49**	WV	1.29%
10	MD*	7.15%	**20**	RI*	4.67%	**30**	ID	3.26%	**40**	NE	2.57%	**50**	MS	1.17%
												51	ND	0.92%

Replacing Fuel Revenue:

- Impact of fuel-efficient vehicles and the cost of construction goods and services on revenues

- In Georgia, 65.6 percent of state highway funding derived through gas taxes (2020 analysis, Consumer Reports)

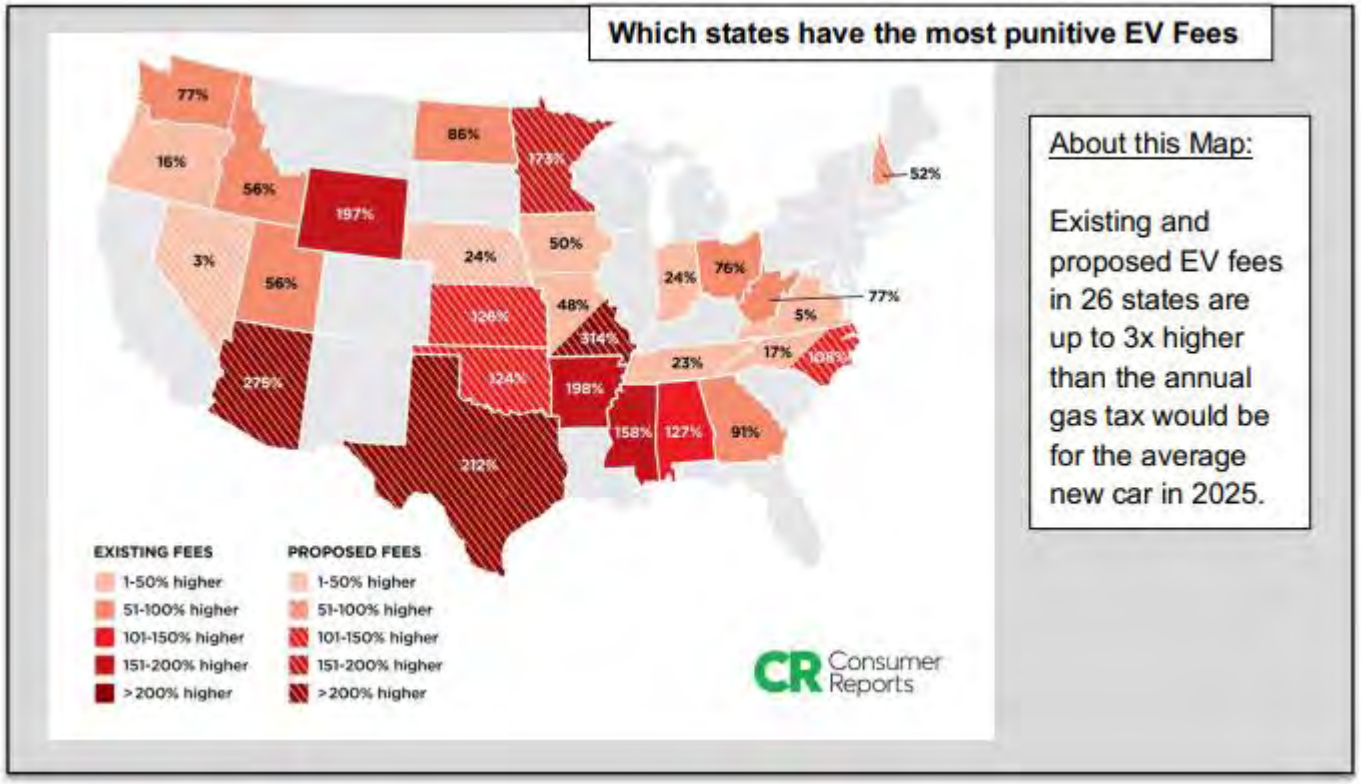
- Other causes of declining revenues



ALLIANCE FOR AUTOMOTIVE INNOVATION

EV Fees Nationally and in Georgia:

- Average annual EV in place in states with an EV fee = $121
- Average annual gas tax paid by residents with an ICE vehicle = $134
- Current fees counterproductive; don't raise revenue & serve as barrier to adoption



Road Funding Principles

The protection of consumer privacy and freedom of movement are priorities when considering any funding mechanism.

Policymakers must consider the potential impact, positive and negative, of these programs on underserved communities.

Regardless of program type, any fees or taxes should not be so high as to be a barrier to EV adoption *(gas-tax equivalency).*

Collection of vehicle mileage data should be through voluntary good faith reporting by the vehicle owner

Supporting Policy – Updated Building Codes

- 80-90 percent of charging occurs at home
- Benefits of charging at home
- Long-term societal benefits to increased access to home charging
- Level of charging needed
- Legislation specifics

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Transforming Personal Mobility

Georgia Joint Study Committee of Electrification on Transportation

EV Infrastructure Development Considerations

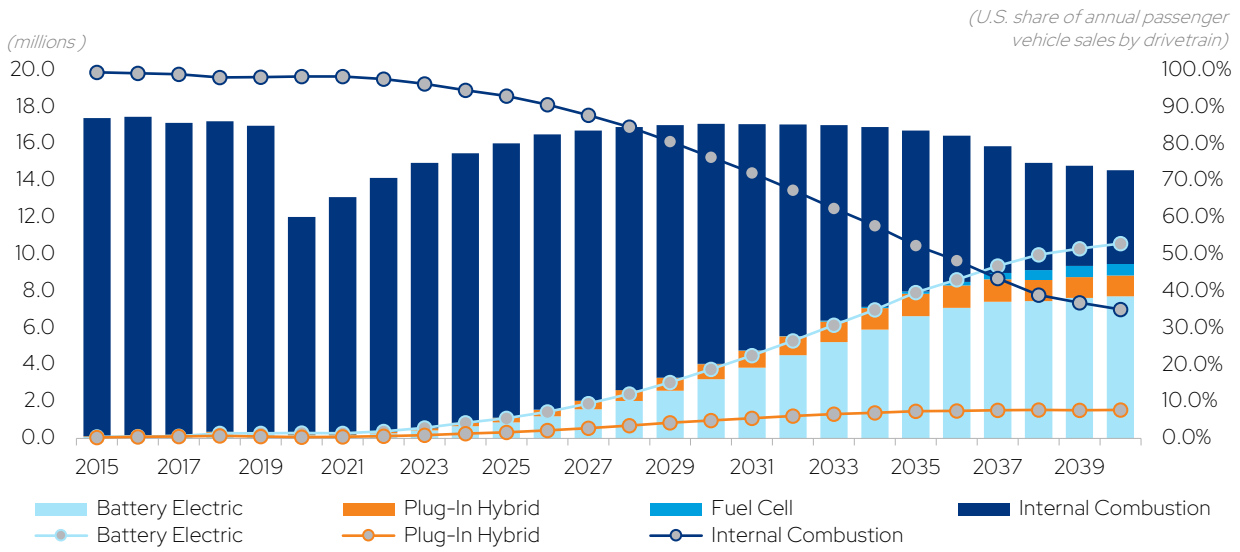
October 3, 2022

Table of Contents

The US BEV Market has Continued to Grow with Incentive Programs and New Models

The U.S. comprised 15% of electric vehicle sales globally in 2019, however infrastructure concerns in the U.S. persist

U.S. Annual Passenger Vehicle Sales by Drivetrain



Federal Incentives / Programs in Place

BEV Targets

- While there is no Federal target in terms of BEV sales, numerous states have enacted legislation for zero-emission vehicle ("ZEV") targets by 2025 and 2050:
  - 2025: 3.3 million ZEVs in 11 states (1)
  - 2050: All passenger vehicle sales to be ZEVs in 10 states (2)

Inflation Reduction Act of 2022

- All EVs assembled in the US and put in service after December 31,2022 will be eligible for a $7,500 federal tax credit
  - EVs at least 2 years old are eligible for a tax credit up to $4,000
- Tax credits are extended for alternative fuel refueling property (EV Charging) placed in service before December 31, 2032 and removes the per location limitation
- The previous phase-out policy for companies that have produced over 200,000 EVs has been removed

According to a Deloitte Global Auto Consumer Study, U.S. consumers are now most concerned about the lack of EV charging infrastructure than they were in 2018 about cost/price

In your opinion, what is the greatest concern regarding all battery-powered electric vehicles?

	2018	2020
Driving range	24%	25%
Cost/price premium	26%	18%
Time required to charge	10%	14%
Lack of electric vehicle charging infrastructure	22%	29%
Safety concerns with battery technology	8%	13%
Others	10%	1%
Total	100%	100%
Sample size	1,513	3,006

Source: IEA Global EV Outlook (2020), Deloitte Global Auto Consumer Study, Bloomberg New Energy Finance.
1) The California Air Resources Board (CARB) manages the Zero-Emission Program (ZEP) which includes PHEV, BEV and FCEV. Ten other states have adopted the program: Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island and Vermont.
2) As part of ZEP Alliance membership: California, Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont and Washington.

EOS' Presence in Georgia

EOS' First Installation

Location Details

- **Installation Date:** 10/13/2021
- **Address:** Peachtree City, Georgia
- **Location:** BP Stevens Entry
- **Location Partner:** BP

EOS' first Charge Station was deployed in Peachtree City, Georgia.

$5M investment in GA in 2022.

- As of today, 28 locations with EOS Aurora Charge Stations deployed in Georgia.
- A minimum of 18 additional Stations are expected to be installed in Georgia before year end.

Additional key connections to the State

- Manufacturer of displays – LG-MRI – based in Alpharetta.
- Lease of staging area in Stone Mountain.

Developing the Right Plan Begins with Understanding the Key Challenges

- **EOS market installation**
  - Georgia, Tennessee, Texas, Alabama
  - Working toward North Carolina, South Carolina, Florida
  - Arizona and New Jersey as first stages in new regions
- **We started prepping for Georgia in Q1 of 2021 and installations in October of 2021.**
  - Installed at 10 locations in the last two months.
  - Ramp up time took almost two years.
- **Time is not on the side of the commercial enterprise**
  - The accelerated, exponential growth of the EV industry requires an even faster pace of infrastructure development
  - Things are getting better but we hear similar messaging from most cities - "we are working on a plan so please check back in six months to a year.
    - Translation - "go someplace else"
- **Challenges that drive product and business model changes**
  - Administrative
  - Business

Developing the Right Plan Begins with Understanding the Key Challenges

- **Extending infrastructure from the current highway programs into the communities.**
  - Building beyond the NEVI program focus on electrifying the highways.
  - Establishing programs that are inclusive of economic development, LMI (low-middle income), and multi-tenant housing.
- **Ensuring safety and accessibility for consumers.**
  - Implementation of consistent requirements regarding ADA compliance.
  - Security integration and site placement requirements. Lighting and amenities included.
- **Standardizing the regulatory framework for EV chargers to increase speed to market.**
  - Currently, most jurisdictions have no EV permit and struggle to classify the various types of charging stations that exist.
  - Many of these solutions have secondary sources like digital out of home advertising, mobile integration, and data collection revenue to help subsidize the installation and bridge the gap until self-sustaining revenues can be attained in EV charging. These also provide enhanced customer functionality and potential commercial subsidization for the driver as well.
  - Future phases of development and expansion to avoid re-permitting to add additional chargers.
- **Effectively accounting for lost gas tax revenues.**
  - The financial transaction with EV drivers is drastically different from fossil fuels.
  - For EVs to facilitate the collection of this replacement revenue the technical solution needs to be connected, interconnected, and data rich.
- **Providing public support and funding in ways that incentivize the right behavior.**
  - Public investment focus on foundational infrastructure needs rather than commodity and consumable resources.
  - Commercial industry focus on capital investment in EV charging hardware.
  - Follow the right components of the federal guidelines regarding networking, standard compliance, accessibility, payment processing.
  - This needs to be interoperable, safe, and easy for the consumer.

THE EOS Approach

Development of a multi-value, edge technology platform

- Consists of an integrated suite of technologies that support electric vehicle charging, enhanced user management capabilities, and brings green energy to the site where possible.
- Our solutions are smart, connected, and allow for interoperability between systems.

Focused on the technology behind the EV equipment

- Vendor agnostic among connected and standard-compliant hardware solutions.
- Facilitates effective management of supply chain risks.
- Focused on bringing the best, customized solution to each use case.

Energy matters

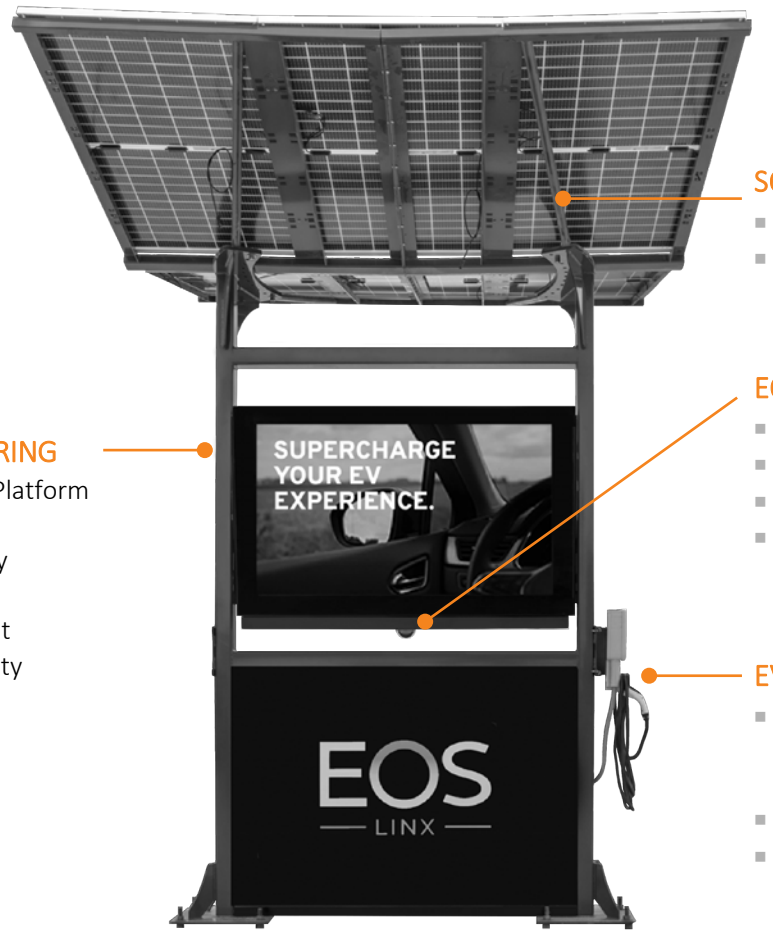
- Managing power concerns and cost through efficient design and storage.
- Generating power where we can.

Building strategic partnerships to deliver comprehensive solutions

- The EOS organizational ecosystem includes expertise in renewable energy, real estate development, telecommunications, technology, implementation, and fund management.

ESG-focused Proprietary Design Backed by the Latest Technology

Solutions are designed for maximum flexibility & sustainability and can easily scale with needs



MEDIA OFFERING
- Marketing Platform
- Branding Opportunity
- Customer Engagement
- Brand Loyalty

SOLAR INFRASTRUCTURE
- Augments grid power feed
- Federal ITC Eligible

EOS SECURITY COMPONENT
- Motion Detection
- Thermal Tracking (COVID)
- Weapon Detection
- Voice Analysis

EV CHARGERS
- 2 sockets per unit with additional standalone chargers available
- DC fast charger capable
- Each base unit can support dozens of additional chargers

EV Retail Design

Large, 75" screen engineered by a digital out-of-home market leader

Self-sustainable with solar panels and a custom backup battery unit

Dome camera with advanced AI functionalities

Customizable with add-on capabilities

Customer Experience Focused

Consumer and public safety

Social media integration

Integrated accessibility and loyalty / VIP programs

Charging site experiential enhancement

ESG Focused

- ✓ Energy created per station (solar): ~3,500 kWh annually
- ✓ Greenhouse gas equivalencies per 500 locations:
  - 85,000 gallons of gasoline
  - 100 homes energy use for one year
  - 850K pounds of coal burned

Design Flexibility Provides Location-Specific Deployment Ability

Unit Flexibility allows EOS to accommodate customer needs and reposition deployment based on the local regulatory environment

Aurora Charge Station

- High impression count
- Big impact locations
- EV educational awareness
- Flagship product in production
- Modular data center at the edge
- Solar incentive integration

Solstice Charge Station

- Medium impression count
- Permit friendly
- Extremely modular
  - Solar option
  - Digital option
- Smaller footprint

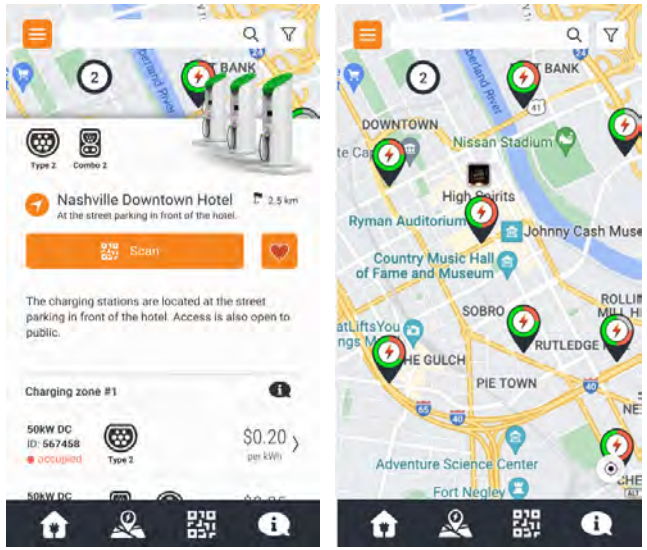
Axis Charge Station

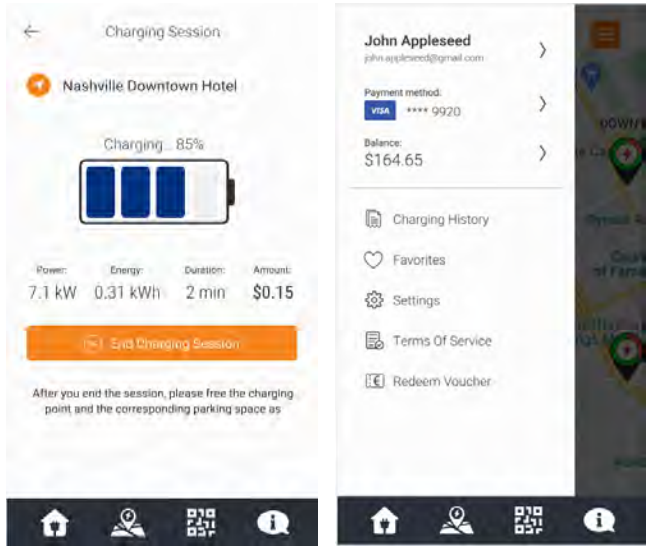
- Can be extended off either charge station or standalone
- ADA compliant satellite stations
- Indoor facilities
- Urban settings
- Fleet integration

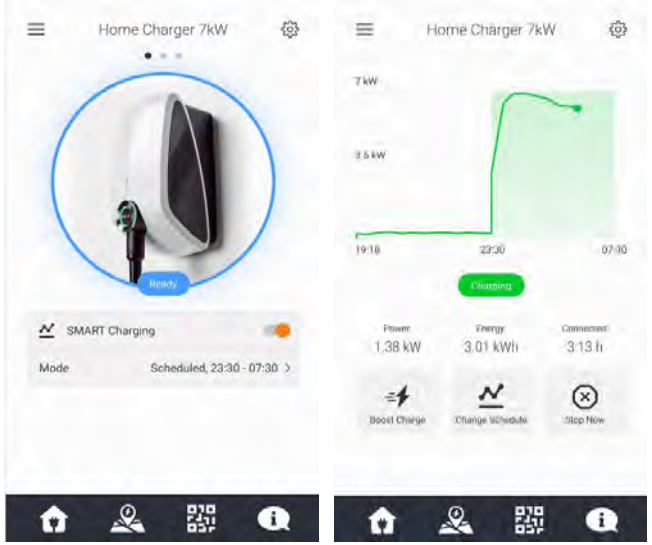
Mobile Application

EOS Charge

- Simple and easy to use
- Integrated loyalty not just for EOS but for our location partners and advertising clients
- Highly customizable partner programs and rate management
- Residential controls for the utilities
- Focused on best practices for customer satisfaction. Site amenities, integrated feedback, reservation system
- Integrated public safety features



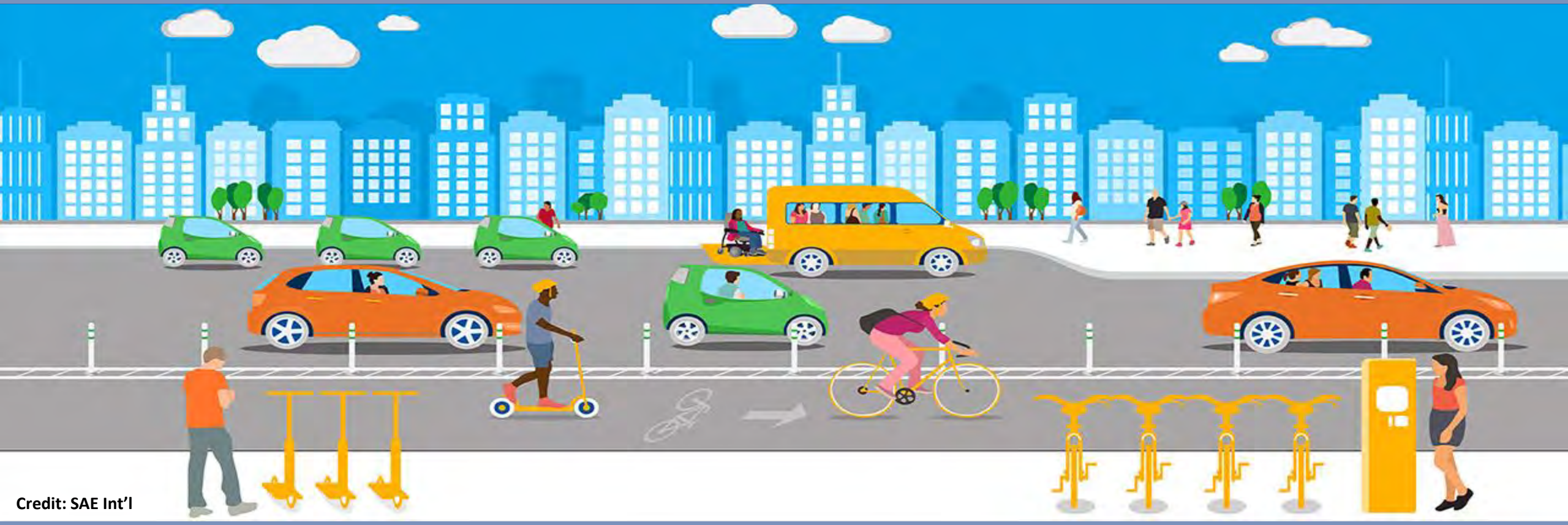




Q&A

Electrification Planning in the Atlanta Region

Joint Study Committee of Electrification on Transportation



Credit: SAE Int'l

Mike Alexander, ARC Chief Operating Officer
John Orr, ARC Transportation Planning Manager

Atlanta Regional Commission

The Electric Vehicle (EV) Revolution Creates Opportunities for Georgia

Infrastructure and Jobs Act (IIJA) includes $18.6 billion focused on new and existing EV-related programs

Source: White House IIJA guidebook, May 2022 edition

Implications for Georgia and Atlanta Region

- EVs rapid introduction is supported by trends from 1) the private sector (automobile manufacturers) and 2) the public sector (funding support and tax policy)
- The long-term shift to EVs requires the State and local communities to strategically plan now so that future benefits are maximized:
  - Working with stakeholders to deploy the needed EV infrastructure in coming years
  - Preparing the State's communities, including those in rural and disadvantaged areas, for an EV future

New Federal Tax Policy Will Increase Future Rates of EV Adoption

The Inflation Reduction Act (IRA) Significantly Impacts Georgia and the Atlanta Region

EV Tax Credits

- Up to **$7,500** for a qualifying new vehicle
- Tax Credit extended through **December 31, 2032**
- Prior manufacturer cap of 200,000 vehicles removed

Income Limits

- **$300,000** for married filing joint and surviving spouse
- **$225,000** for heads of household
- **$150,000** for others, including single filers

Estimated % of Georgia Tax Filers Eligible for EV Credits*

*Estimated using 2019 IRS Data

Georgia's Emergence as an EV Manufacturing Center

The Inflation Reduction Act (IRA) Requires a Significant Commitment to Domestic Manufacturing

The final assembly of EVs **must occur** within North America. Approximately **700,000** future EV's will be manufactured annually in Georgia, based on 2022 announcements alone.

Rivian: **400,000** vehicles per year

Hyundai Motor Group: **300,000** vehicles per year

100% of battery components must be manufactured or assembled in **North America** by **2029**

2025: **No** critical battery minerals can be sourced from a "Foreign Entity of Concern"

2027: **80%** of all critical battery minerals must be extracted or processed in a country the US has a free trade agreement

2029: **100%** of all battery components must be manufactured or assembled in North America.

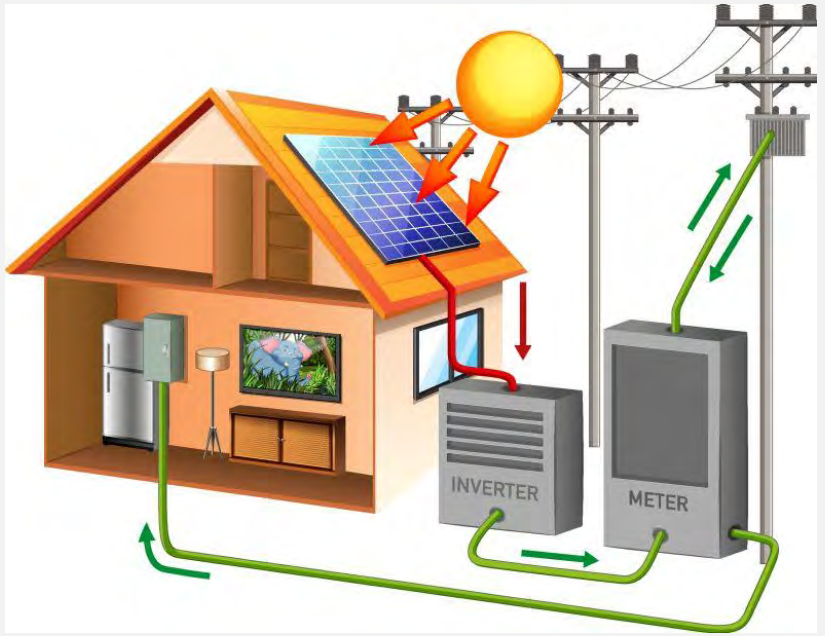
Federal Incentives for Installing Home Solar Complement Home EV Charging

The Residential Clean Energy Credit in the IRA Provides Strong Incentives for Home Solarization

Solar Tax Credits

- 30% tax credit for the cost of installing solar, electricity generation, and other solar home products
- No dollar limit on expenses
- No income limit to be eligible
- Tax Credit effective through December 31, 2032

Wider adoption of home solar has the potential to ease consumer concerns about the ability to charge vehicles at home in the event of major power outages



https://www.hahasmart.com/blog/3143/how-home-solar-ties-to-the-grid

State Figures: 2021 Light-Duty Vehicle Registration Counts by Fuel Type

State	Electric (EV)	Plug-In Hybrid Electric (PHEV)	Hybrid Electric (HEV)	Biodiesel	Ethanol/Flex (E85)	Comp Nat Gas (CNG)	Propane	Hydrogen	Methanol	Gasoline	Diesel	Total	Share EV	Share EV. PHEV, HEV
California	563,100	315,300	1,355,900	163,600	1,343,200	12,600	1,500	11,800	0	30,512,600	710,500	34,990,100	1.6%	6.4%
Hawaii	14,200	4,500	28,800	2,800	42,200	100	0	0	0	968,200	15,700	1,076,500	1.3%	4.4%
District of Columbia	3,700	2,500	16,100	300	17,400	100	0	0	0	278,900	2,100	321,100	1.2%	6.9%
Washington	66,800	24,300	240,000	59,000	359,700	600	100	0	0	5,792,000	283,600	6,826,100	1.0%	4.9%
Oregon	30,300	16,900	123,200	43,900	193,700	300	100	0	0	3,094,700	217,800	3,720,900	0.8%	4.6%
Nevada	17,400	6,300	50,200	21,300	133,600	300	100	0	0	2,140,700	84,700	2,454,600	0.7%	3.0%
Colorado	37,000	16,100	113,600	53,800	346,700	600	100	0	0	4,456,600	208,400	5,232,900	0.7%	3.2%
New Jersey	47,800	18,500	121,500	23,900	412,200	500	100	0	0	6,346,100	86,400	7,057,000	0.7%	2.7%
Arizona	40,700	15,500	132,200	51,000	460,400	900	900	0	0	5,395,300	191,800	6,288,700	0.6%	3.0%
Vermont	3,400	3,200	15,800	5,600	42,000	100	0	0	0	511,900	15,000	597,000	0.6%	3.8%
Utah	16,500	7,500	58,500	51,600	190,200	2,600	700	0	0	2,428,900	153,800	2,910,300	0.6%	2.8%
Massachusetts	30,500	22,200	138,800	17,500	306,900	400	0	0	0	4,816,400	59,700	5,392,400	0.6%	3.6%
Florida	95,600	32,200	287,000	129,300	1,154,600	600	100	0	0	15,595,900	336,900	17,632,200	0.5%	2.4%
United States	**1,454,400**	**786,800**	**5,491,800**	**2,194,100**	**21,244,900**	**40,800**	**7,600**	**11,800**	**0**	**240,699,500**	**7,110,300**	**279,042,000**	**0.5%**	**2.8%**
Maryland	25,600	17,200	130,900	27,700	347,200	400	0	0	0	4,380,600	89,500	5,019,100	0.5%	3.5%
Connecticut	13,300	9,200	55,400	8,800	140,700	400	0	0	0	2,578,400	44,300	2,850,500	0.5%	2.7%
New York	51,900	44,600	221,600	43,000	663,700	900	100	0	0	10,116,400	152,400	11,294,600	0.5%	2.8%
Virginia	30,700	15,800	176,500	35,300	506,600	600	100	0	0	6,661,000	154,300	7,580,900	0.4%	2.9%
Illinois	36,500	18,300	214,300	48,100	822,300	800	100	0	0	8,657,800	169,900	9,968,100	0.4%	2.7%
Georgia	**34,000**	**13,600**	**128,200**	**70,200**	**745,200**	**700**	**300**	**0**	**0**	**8,123,100**	**203,200**	**9,318,500**	**0.4%**	**1.9%**
Delaware	3,000	2,000	16,700	4,100	67,400	100	0	0	0	796,400	14,600	904,300	0.3%	2.4%
Texas	80,900	30,600	304,700	376,300	2,422,300	2,200	1,600	0	0	20,599,100	765,100	24,582,800	0.3%	1.7%
New Hampshire	4,000	3,500	27,000	11,300	102,800	200	0	0	0	1,187,400	29,300	1,365,500	0.3%	2.5%

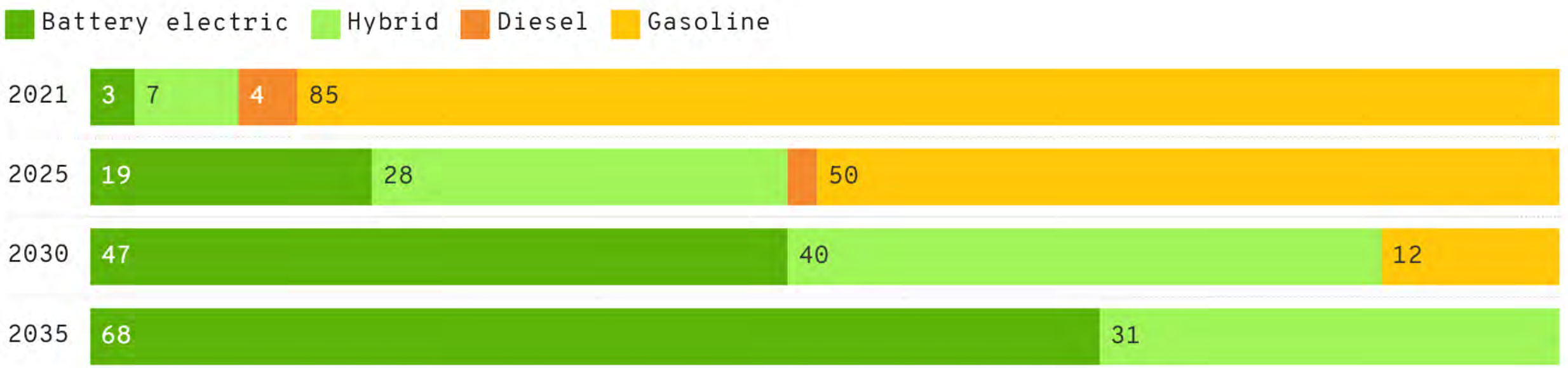
County	Passenger Vehicles	Trucks	Buses	Total	Electric Vehicles	% Electric Vehicles
Barrow	58,216	25,984	289	84,489	187	0.22%
Carroll	75,358	34,965	398	110,721	166	0.15%
Cherokee	181,369	53,526	599	235,494	1,394	0.59%
Clayton	165,355	37,632	753	203,740	339	0.17%
Cobb	501,958	103,351	1,962	607,271	5,750	0.95%
Coweta	94,524	33,503	523	128,550	538	0.42%
Dawson	21,324	9,975	102	31,401	111	0.35%
DeKalb	440,687	62,999	1,939	505,625	5,460	1.08%
Douglas	87,931	25,109	490	113,530	369	0.33%
Fayette	86,285	25,327	397	112,009	981	0.88%
Forsyth	168,194	43,080	648	211,922	2,872	1.36%
Fulton	662,010	88,774	4,330	755,114	12,471	1.65%
Gwinnett	612,129	126,470	3,019	741,618	5,368	0.72%
Henry	154,194	41,255	645	196,094	701	0.36%
Newton	81,460	26,447	312	108,219	210	0.19%
Paulding	103,130	34,761	476	138,367	386	0.28%
Pike	13,359	8,930	106	22,395	19	0.08%
Rockdale	56,033	17,245	353	73,631	204	0.28%
Spalding	45,302	17,153	232	62,687	81	0.13%
Walton	66,996	30,433	319	97,748	193	0.20%
Subtotal: 20 Counties	3,675,814	846,919	17,892	4,540,625	**37,800**	**0.83%**

Source: Georgia Drives e-Services, https://eservices.drives.ga.gov/_/#1

While electric vehicles are a small percentage of the registered fleet in the Atlanta Region in 2022, this will grow rapidly in the future

Variability in National EV Sales Forecasts Require Flexibility in Planning

Under more aggressive forecasts, battery electric vehicle sales will make up 47% of new cars sold in the U.S. by 2030



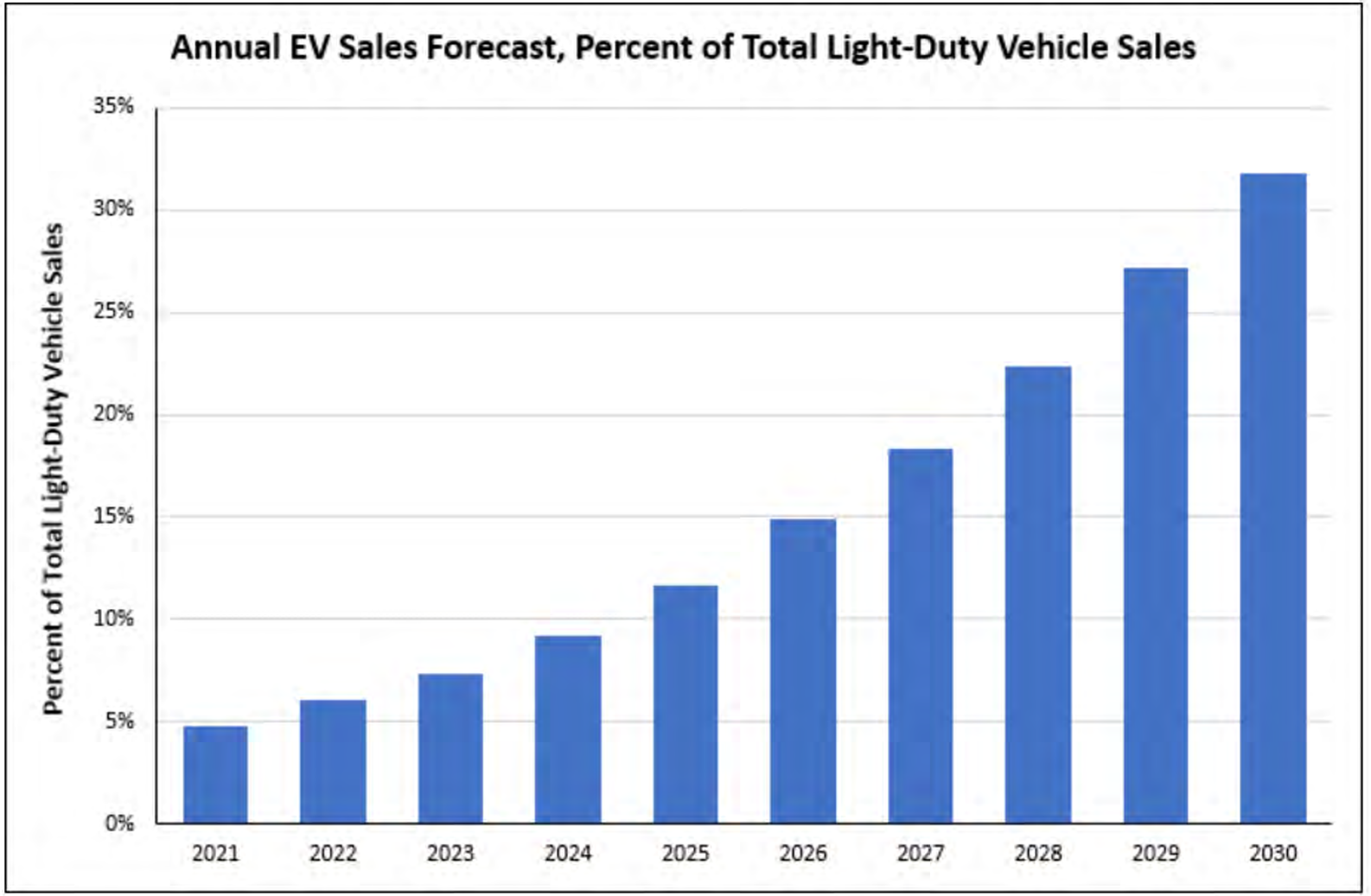
Note: Less than 1% of vehicles sold are projected to be fuel cell electric.

Source: BCG • Created with Datawrapper

protocol

Variability in National EV Sales Forecasts

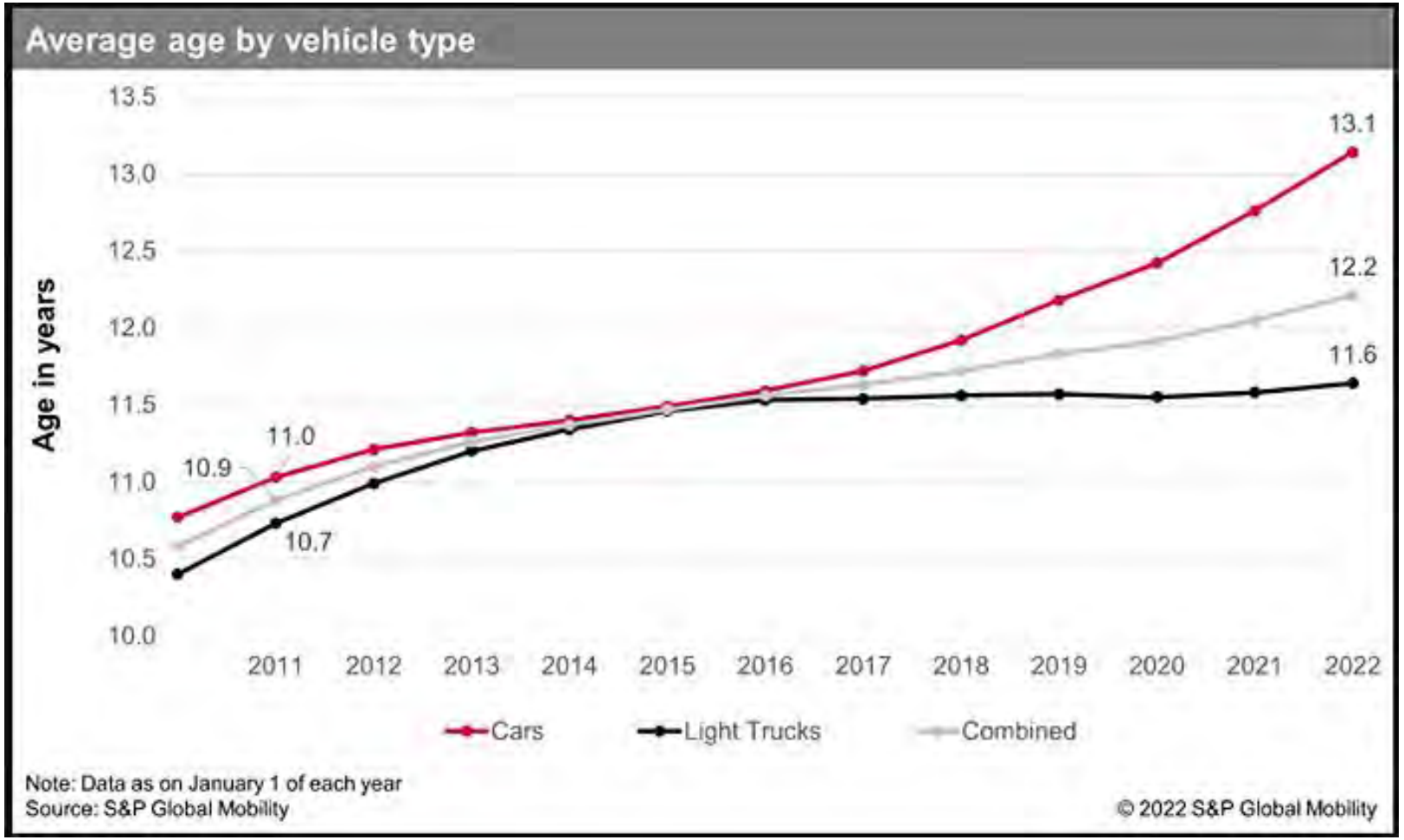
Under more conservative forecasts, electric vehicle sales make up 32% of new cars sold by 2030



Source: EEI, https://www.eei.org/-/media/Project/EEI/Documents/Issues-and-Policy/Electric-Transportation/EV-Forecast--Infrastructure-Report.pdf

The Average Age that a Vehicle Remains in the Fleet is over 12 Years

Requiring decades for the fleet to be fully alternative fuel



If 32% of the new vehicle fleet sales are battery electric by 2030, it is unlikely that all gasoline-powered vehicles will be out of the fleet by 2050

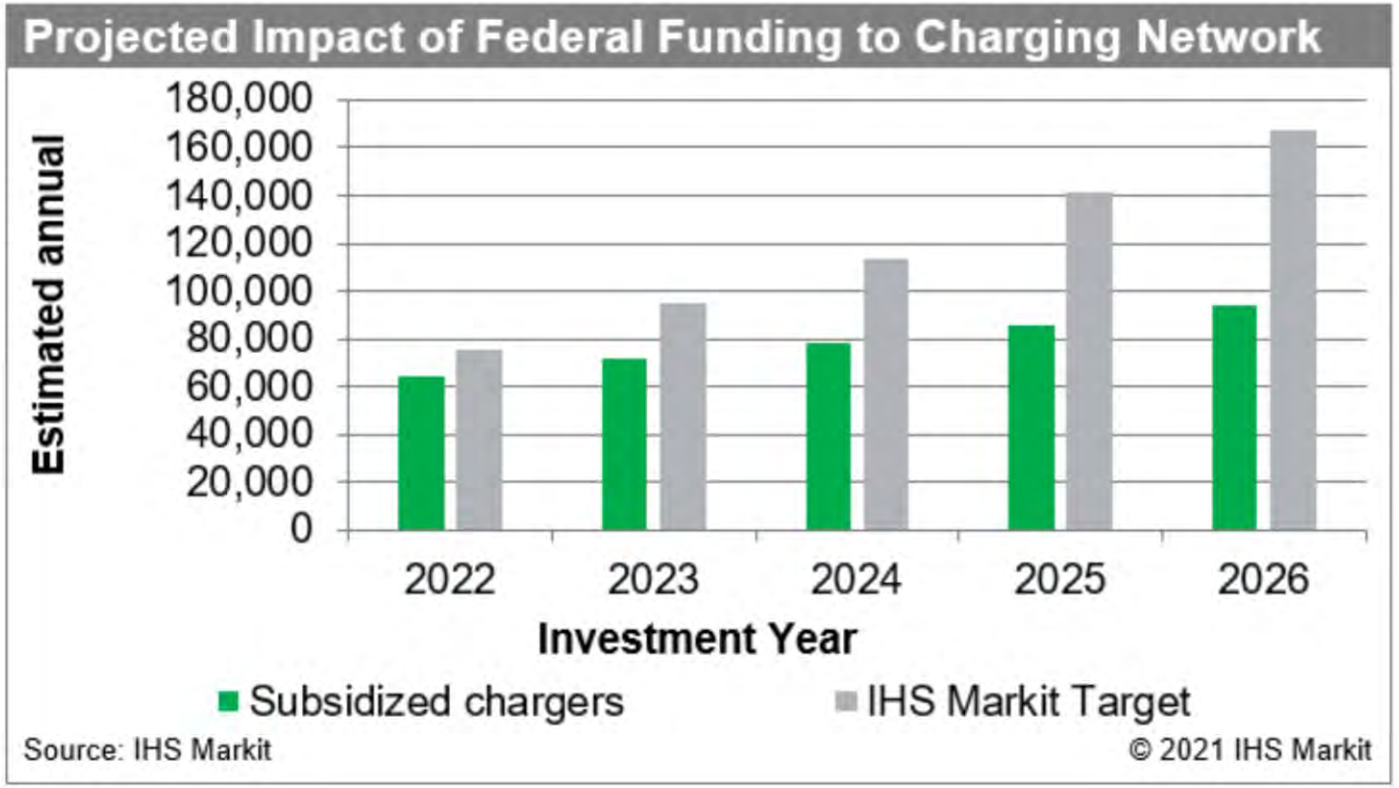
Source: https://www.motor.com/2022/05/average-age-of-vehicles-in-the-us-increases-to-12-2-years-according-to-sp-global-mobility/

Federal IIJA Funds Provide Funding for 400,000 EV Chargers

But an additional 600,000 public chargers are needed by 2026

Needed EV Charging Infrastructure by 2026

- Federal investment contributes to the construction of approximately **400,000** Level 2 AC and Level 3 DC Fast chargers
- Need for about **600,000** additional chargers installed at another **100,000** public locations by 2026
- Figures do not include **3.2 million** domestic, private Level 2 chargers to be installed in residential homes - mostly in garages



Atlanta Regional Commission Responses to the EV Revolution...

Focus on Preparing Communities to Take Advantage of Quality of Life and Economic Opportunities

Atlanta Regional Transportation Electrification Plan

Atlanta Regional Freight Plan

Upcoming Atlanta Regional Transportation Electrification Plan

Consultant to Begin Work Activities in Q1 2023 and Be Complete by End of 2023

Conduct Engagement and Assess Needs

- Land use and travel patterns
- Older populations
- Public transportation
- Freight & supply chain needs
- Grid capacity
- **Industry/market conditions, including an overview of the existing state of EV charging, current and projected EV ownership**

Prepare a Regional Transportation Electrification Vision

- Support federal goal of accelerating equitable adoption of EVs
- Enhance quality of life and economic competitiveness
- Reduce transportation-related ozone precursors and greenhouse gas emissions
- **Position the region's workforce to support future investments**
- Establish regional performance targets

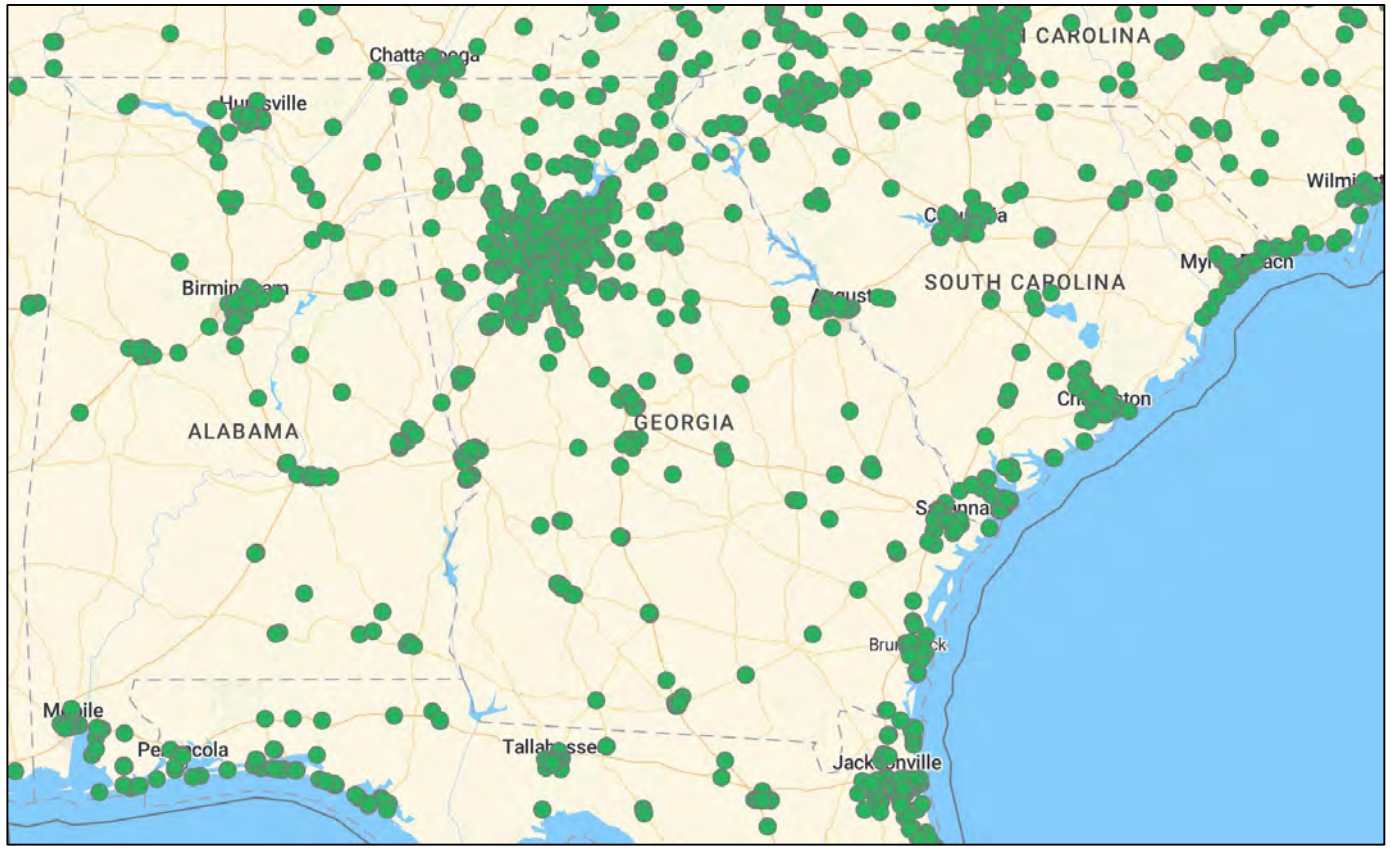
Detail and Pursue Implementation Strategies

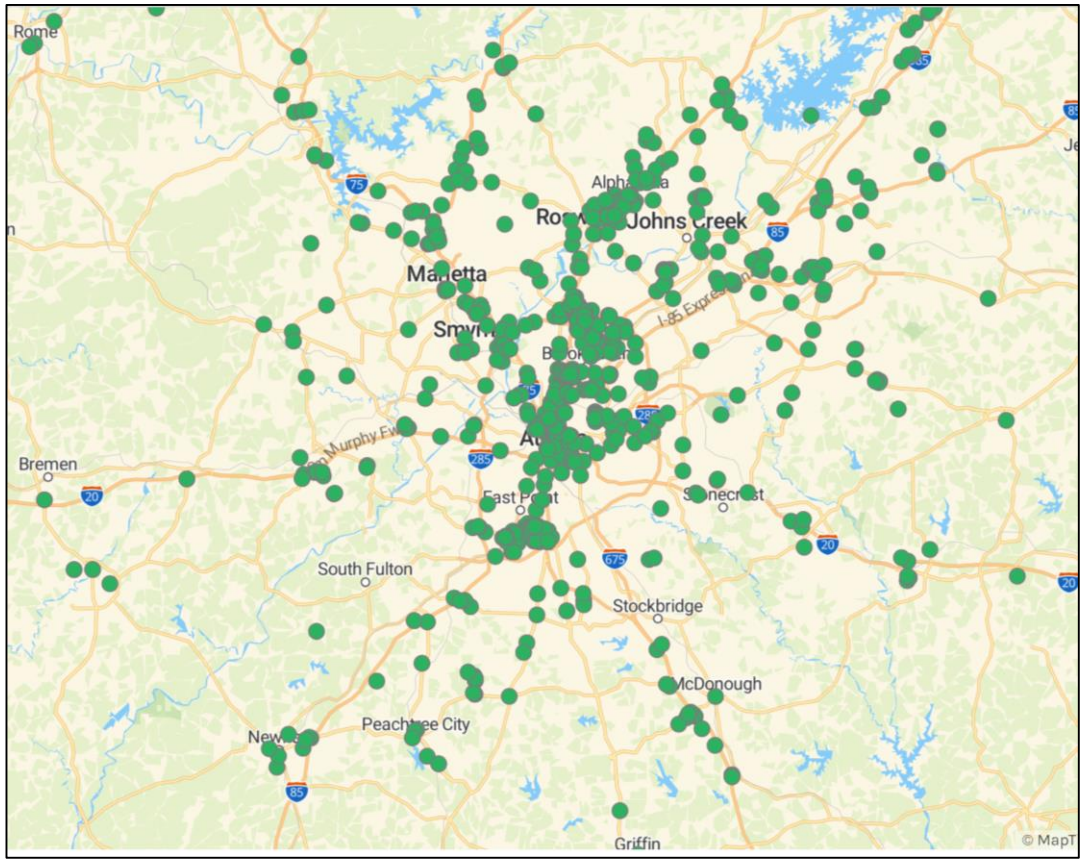
- **Implementation strategies and guidance for local communities**
- Develop a corridor network, including planned new charging location types, as well as existing charging locations planned for upgrade or expansion
- Develop tools to help identify and prioritize charging locations in the future

Atlanta Regional Transportation Electrification Plan Questions...

How can underserved and rural areas be served with electric charging infrastructure?

The Atlanta region has the heaviest concentration of electric charging stations in the Southeast, but 1) large gaps exist both south of I-20 and 2) outside of the larger employment centers

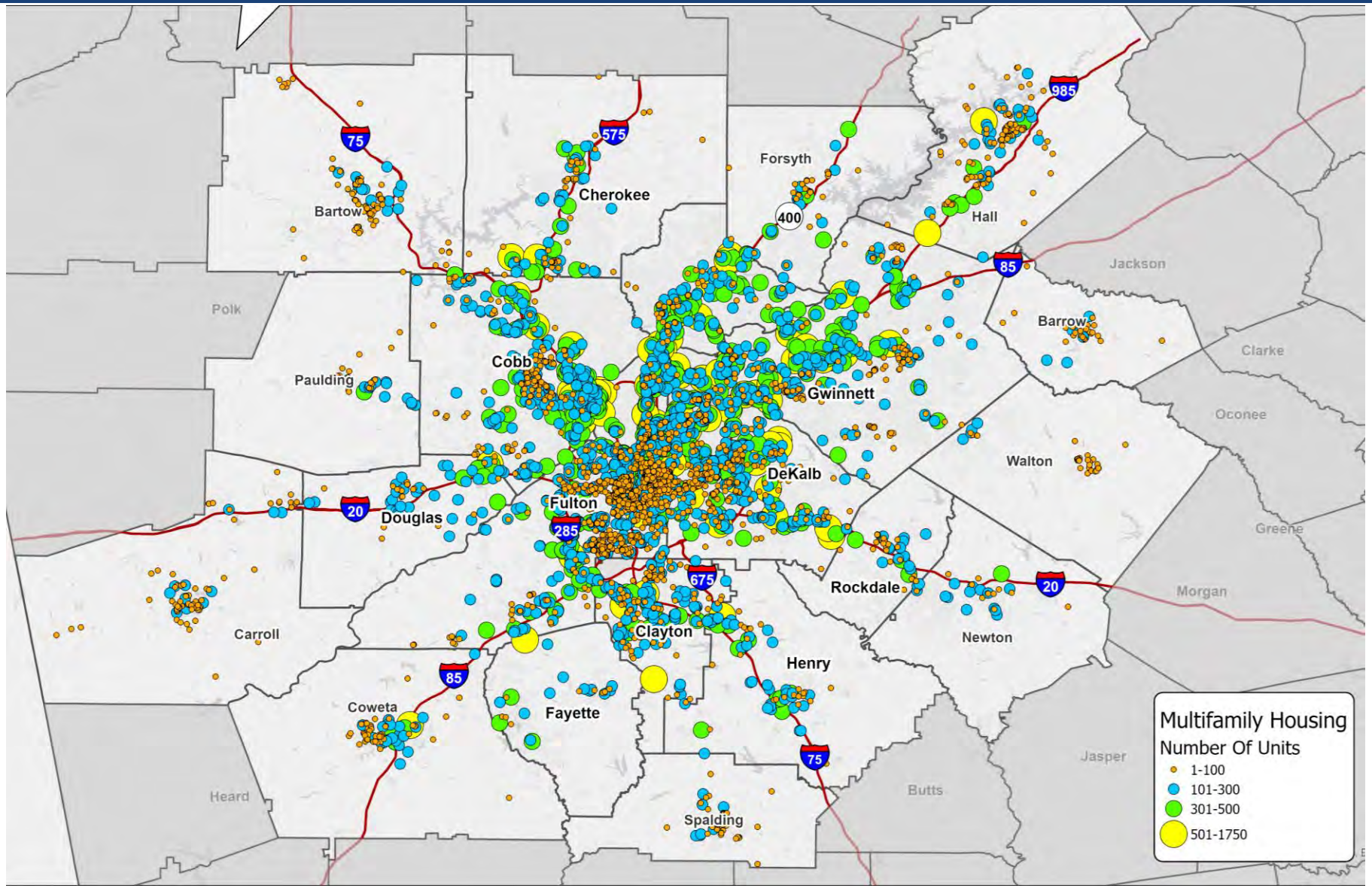




Source: US Dept. of Energy, https://afdc.energy.gov/stations#/find/nearest?fuel=ELEC

Atlanta Regional Transportation Electrification Plan Questions...

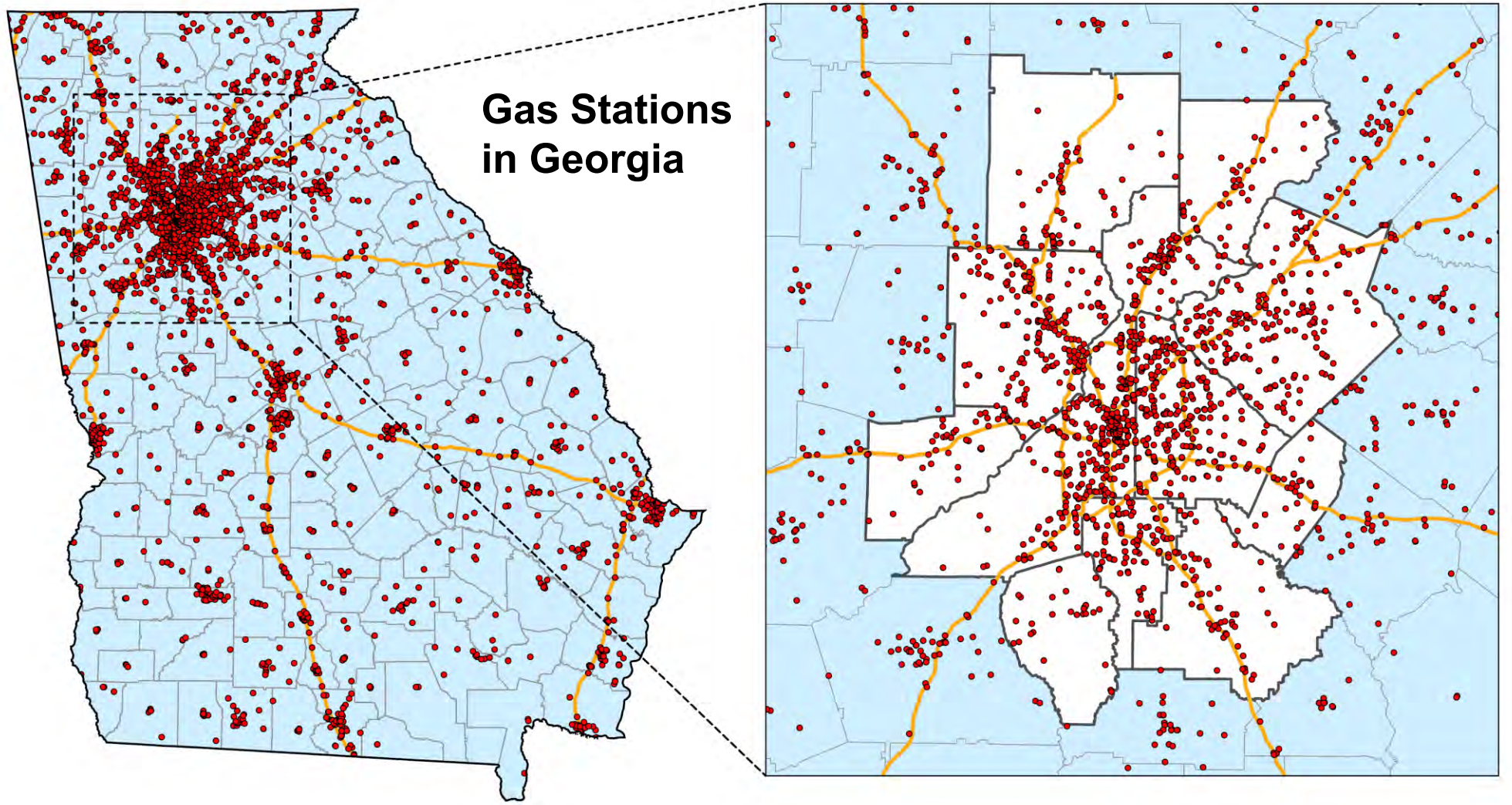
How will people that do not own their home or apartment access charging infrastructure?



Between 2010 and 2020 the Atlanta region added the **4th most people** of any region in the nation. Over **30%** of the population currently rents homes or apartments.

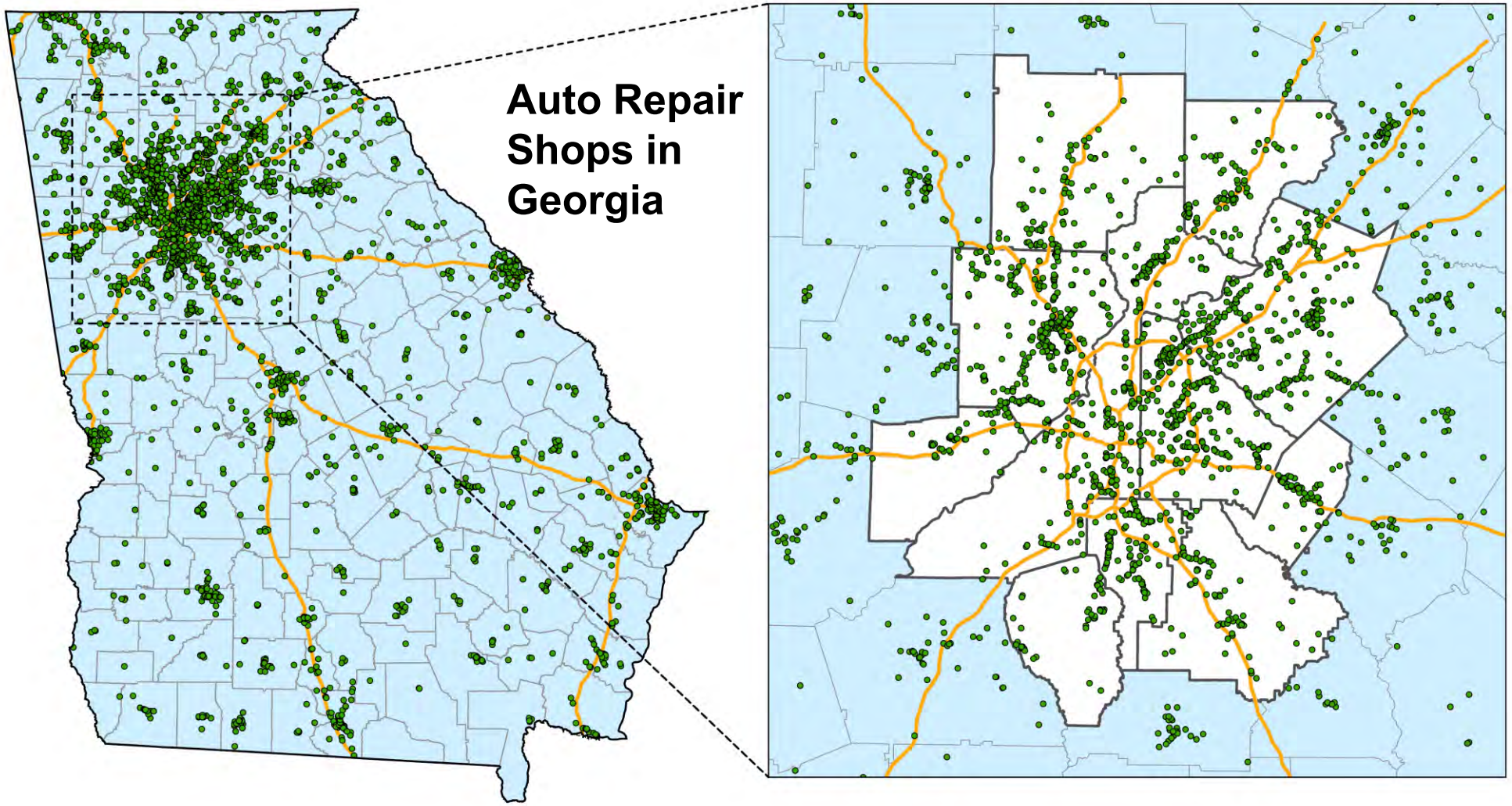
Atlanta Regional Transportation Electrification Plan Questions...

What is the long-term impact to gas stations?



Atlanta Regional Transportation Electrification Plan Questions...

What is the future of auto repair shops?



Atlanta Regional Freight Plan Includes an Analysis of the Impacts of Electrification on Freight Clusters and Industrial Areas

Plan is underway and will be complete in 2024

Technology and Alternative Fuels Analysis

- Quantify expected deployment of electric trucks in the region
- Determine the associated fueling/charging infrastructure needs
- **Distinguish between charging infrastructure that is likely to be installed at private truck depots vs. public charging**

Land Use Assessment and Industrial Analysis

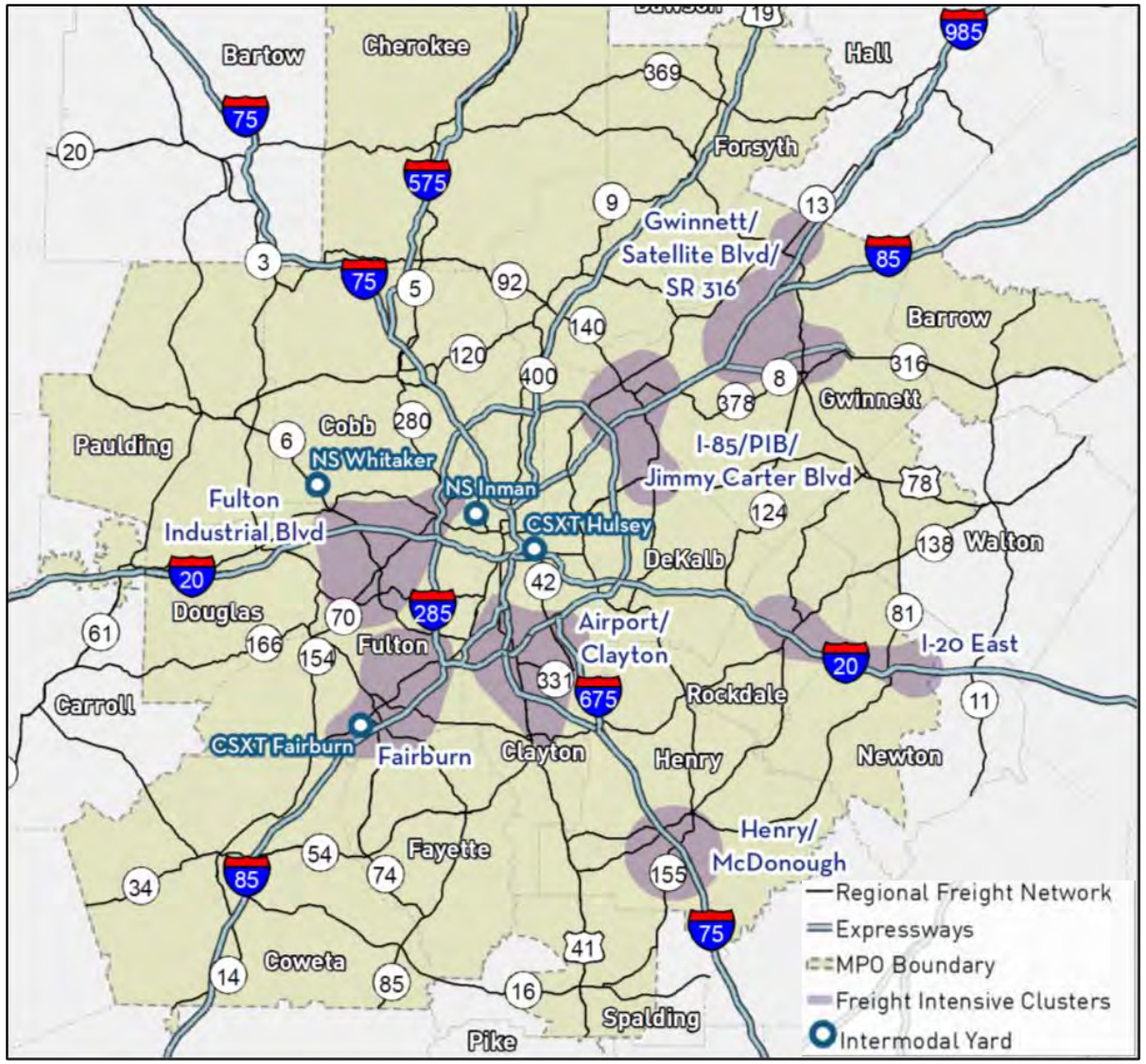
- Support the growth of the freight industry
- **Identify trends that may influence the development of future industrial uses**
- Review recent and planned industrial developments to assess changes in building and site design, tenant or end user needs

Design Guide and Model Truck Parking Ordinance

- Design concepts for lane widths, turn radii, sidewalk access
- Model ordinance framework that includes location and design recommendations;
  - **Site amenities (restroom facilities, electric charging)**
  - Safety and security considerations (lighting, security)

The Atlanta Region's Freight Clusters are Among the Nation's Largest

Industrial and warehousing areas will require adequate truck charging facilities in the future

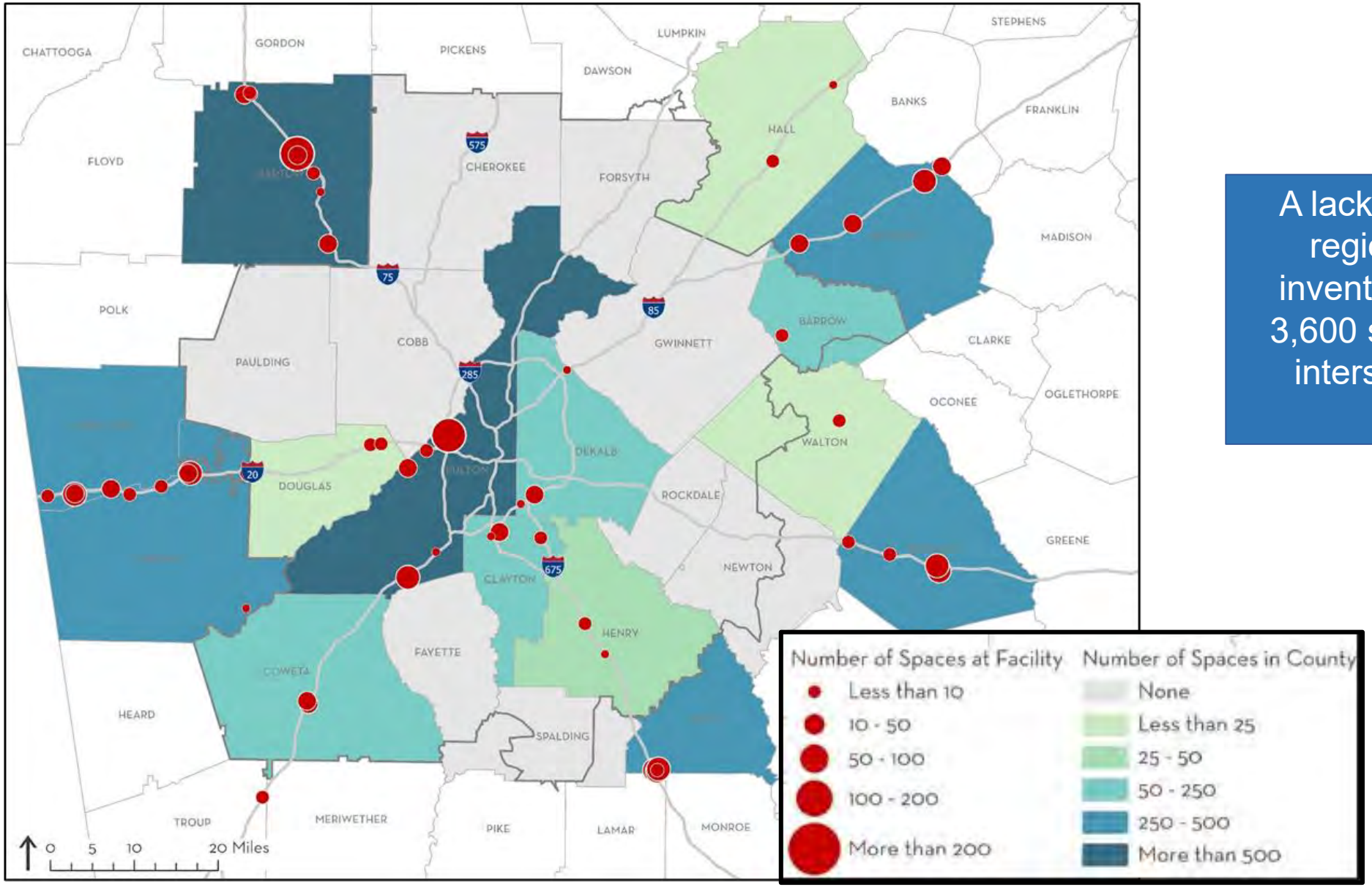


The Atlanta Region's Industrial Development is Growing Rapidly

- **National leader in space absorption rate in Q2 2022, 11.7 million square feet***
- Average industrial rents climbing; **$6.77** per square foot
- Industrial vacancy rates in Q2 fell below **3%** for the first time in market history

*Data sources: Cushman & Wakefield

Adequate Truck Parking, Including Access to Future EV Charging, is Essential For Economic Competitiveness



A lack of truck parking is a regional issue, with an inventory of approximately 3,600 spaces (2016). Major interstate segments lack truck parking.

FOR ADDITIONAL INFORMATION

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EV Charging Considerations for Georgia

Ben Kessler, Public Policy Manager - Southeast

October 3, 2022

Prepared for

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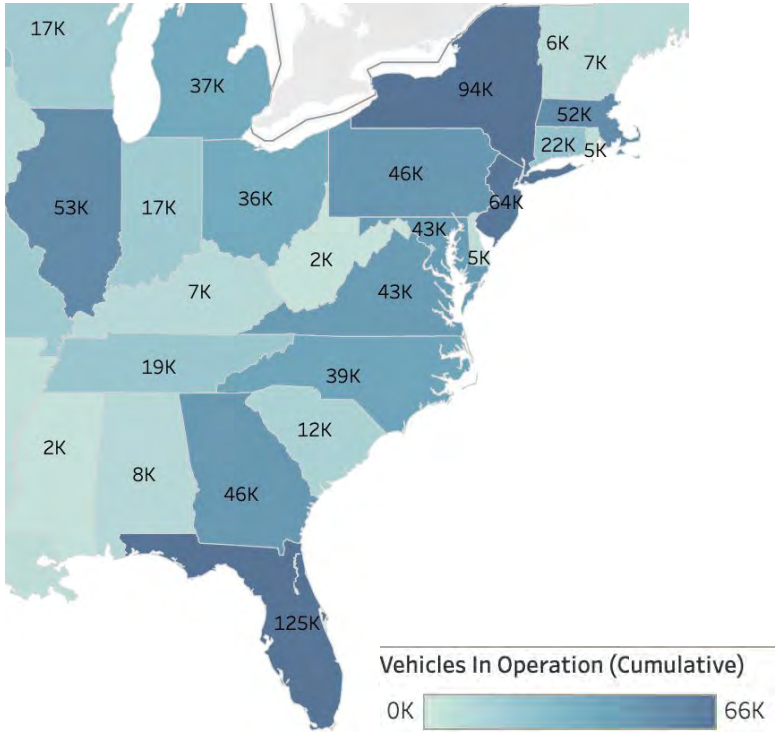
The Future of Mobility Is Electric



Georgia EV Announcements:

- Rivian: $5bil, 7,500 jobs
- SK Innovation: $2.6bil, 2,600 jobs
- Hyundai: $5.54bil, 8,100 jobs

Recent EV Related Investments in Georgia

Company	County	Product	Year
Rivian	East Atlanta Megasite	EV OEM	2021
SK Innovation	Jackson	Electric vehicle batteries	2018 &2020
Aurubis	Augusta-Richmond	Recycling copper for use in EV batteries	2021
Aspen Aerogels	Bulloch	Aerogel thermal barrier solutions	2022
GEDIA	Whitfield	Stamped parts for MBUSA EV	2020
EnChem	Jackson	Battery electrolyte	2020
Ascend Elements	Newton	Lithium-ion battery recycling	2022
Duckyang	Jackson	Modules and storage systems to SK	2021
Hyundai TRANSYS	Troup	Seats for EV manufacturers	2021
TEKLAS	Gordon	Mfg/R&D engine parts for EV	2020
Heliox	Fulton	E-mobility charging stations	2021
EcoPro	Fulton	Battery cathode material	2020
Dongwon Tech	Hall	Duct manufacturing for SK	2020
Plug Power	Camden	Liquid hydrogen for fuel cell EV fleets	2021
Wonbang Tech	Gwinnett	Clean rooms for battery manufacturing	2020
Hyundai Sungwoo Solite	Fulton	Batteries for vehicles	2019

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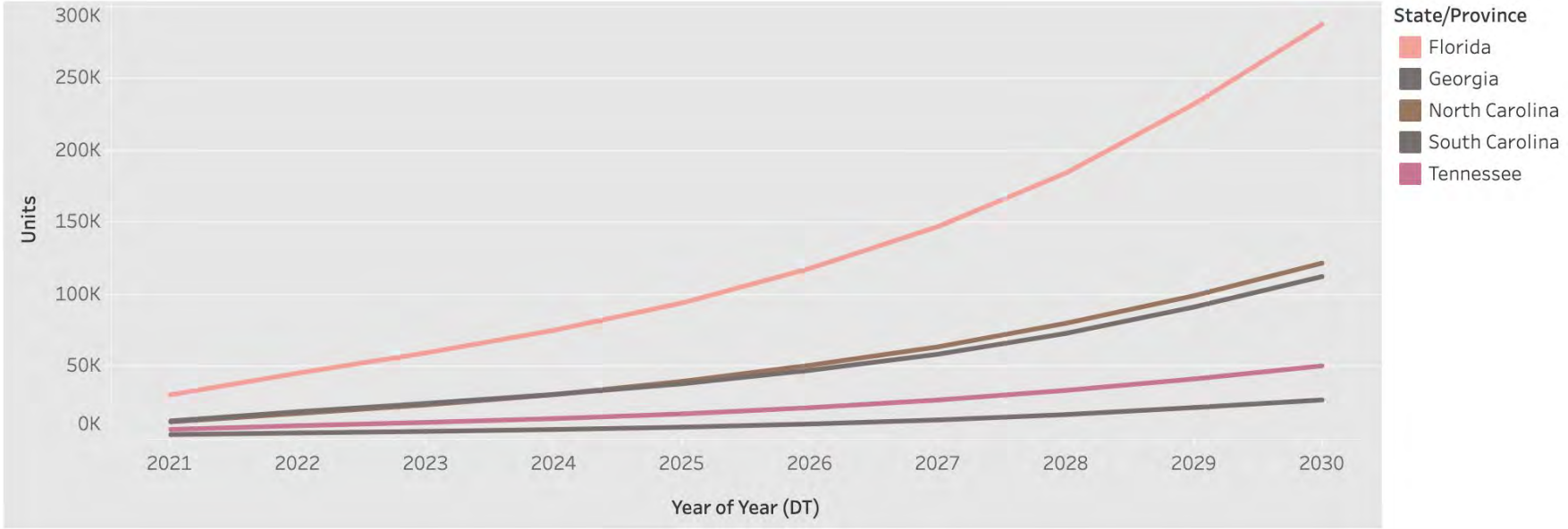
The Future of Mobility Is Electric



2021 Georgia Annual EV Sales: ~12,000
2022: ~18,300
2026: ~50,600
2030: ~112,150

Guidehouse/Navigant

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We Make Electric Easy for You

54%
of Fortune 500 companies use ChargePoint*

chargepoint

Separately Owned and Operated Places to Charge…

Reliable hardware, software and services designed to work together

Delivered in One Network for Drivers…

4.5★ 13.8K reviews | 500K+ Downloads | Everyone

Integrated with Ecosystem Platforms for a Convenient, Seamless Experience

Apple Pay, Apple CarPlay, Google Pay, android auto, Works with Amazon Alexa, VOYAGER, WEX

Apple, Google, Amazon, fleet platforms and more

*2021 Fortune 500 list

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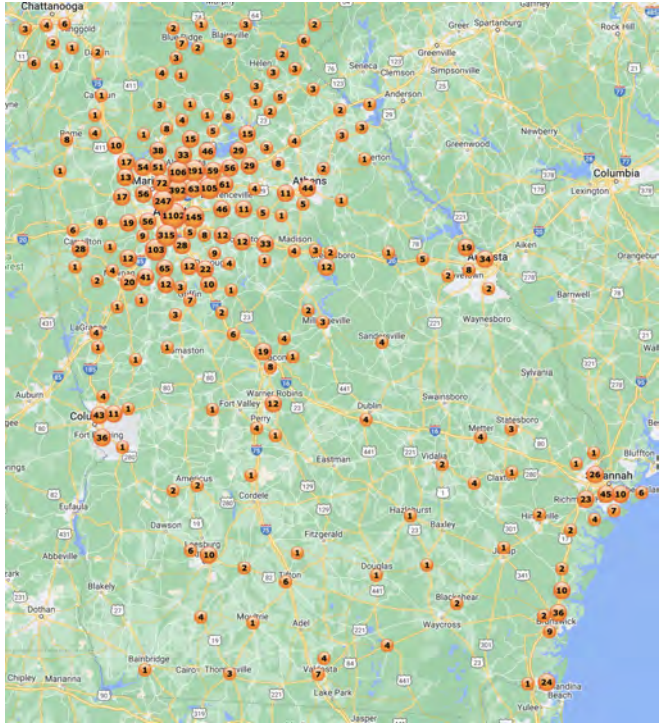
Unrivaled Network Reach

200,000+ activated ports | **11,500+** activated DC ports

355,000+ ports accessible via roaming integrations

A leader in North America all-purpose charging

+ Operating across verticals
+ $5 Billion Market Cap
+ ~1,700 Employees
+ Integrated into where people live, work, play



Georgia Market:

+ ~5,000 Total Ports, ~2100 Commercial/Public Ports
+ Partnerships with convenience and fueling retailers, stores, municipal, and utilities

*As of September 2022. “Activated” ports are installed and activated on our network.

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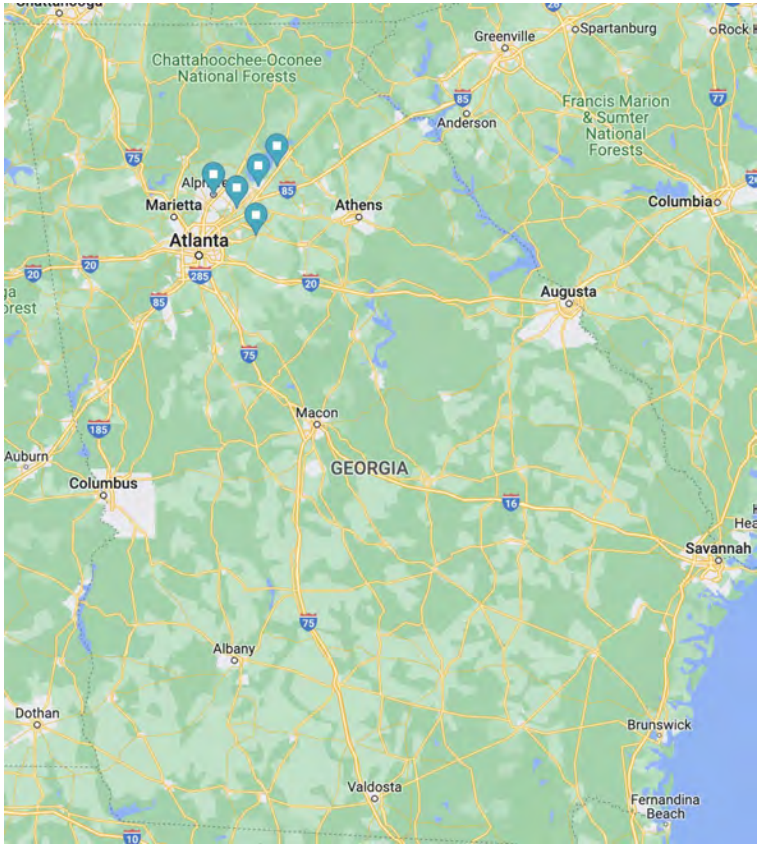
ChargePoint is Local! Our Vendors in Georgia

- NextStar Communications - Duluth, GA
- Stanton Electric - Oakwood, GA
- Blue1USA - Buford, GA
- Craft Electric - Snellville, GA
- MySupplier - Alpharetta, GA



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ChargePoint Is Ready for NEVI

Workforce Development

- ChargePoint has Partnered with the National Electrical Contractors Association
- Develop training programs for electrical contractor members

Buy America

- Shoring up domestic suppliers and clarifying definitions for Buy America
- Expanded manufacturing facility will be able to produce 10,000 DCFC dispensers and 10,000 Level 2 chargers by 2026.

Cyber Security

- ChargePoint has unrivaled cybersecurity protection on hardware and software solutions
- Meeting ISO Certificates - manufacturing, SOC-2 – cloud, PCI DSS – payment

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Case Studies: Georgia Charging Stations

Economic Development and Tourism

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Siting Charging Stations

Keep Driver Experience in Mind

- Amenities
- Safety & Security
- Points of Interest/Traffic Corridors
- Restrooms

+ County - CANYON
+ Parcel - RXXXXXXXXXX
+ Owner – XXXXX XXXX LLC
+ Utility - IDAHO POWER

Equipment: 4x Expresss Plus Power Link Chargers

1. Existing Utility 208V xfrmr
2. Proposed NEW Utility 480V xfrmr - Chargers
3. New Meter, 1400amp Secondary + (4) Power Blocks
4. 5 Parking Stalls / 4 Dispensers
   w/ 12'8 ADA accessible Stall & 5' Access Aisle
5. Tie in Path of travel accessibility

Think of ways you can support your community with economic engagement

- Main Street
- Parks and Tourism
- Mixed Use Developments

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Generating EV Charging Investments in Georgia

Diving into kwh pricing, utility programs, fleet, multifamily

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Charging by the kwh

- EV charging site hosts are not competing with utilities
- Convivence and fueling, car dealerships and others are providing a value-added service
  - Same as a laundromat
- Federal Highway Administration Proposed Rulemaking
  - NEVI program
- Pricing of EV charging service allows competition among site hosts

Model	Max Charge Rate (kW)	EVSE Power Capacity (kW)	Time to Charge 0-80%	Cost at $.25min
Chevy Bolt	55kW	150kW	70min	$17.5
Polestar 2	155kW	150kW	32min	$8

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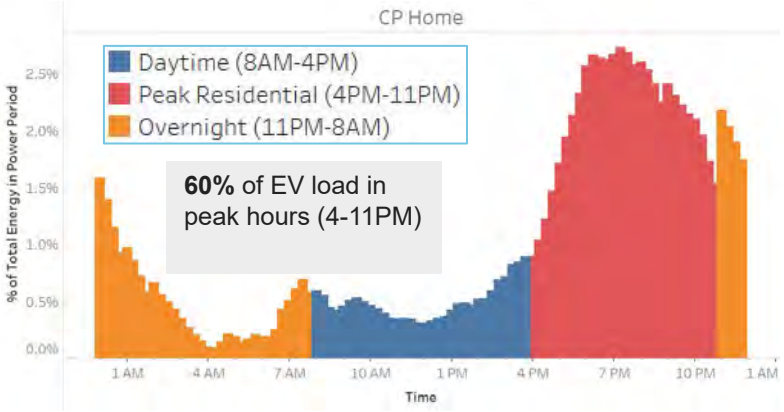
Load Management

- Evaluating commercial rates tailored to support DC fast charging applications
- Utilizing EV TOU rates or DR capabilities in the home to encourage off peak charging

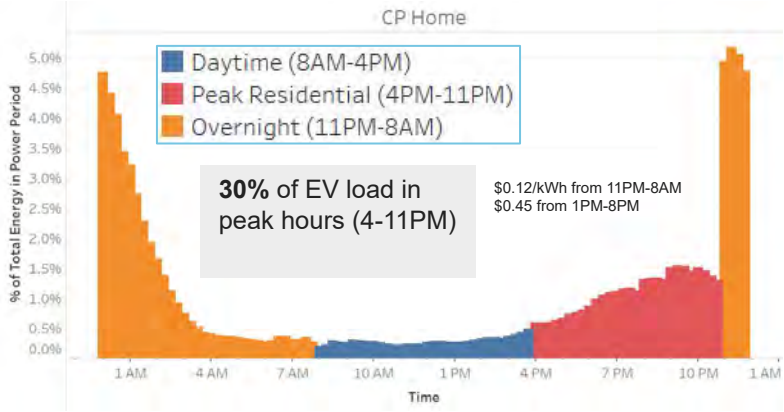
King County, WA



60% of EV load in peak hours (4-11PM)

Customers charge when they arrive home. Peak charging at 6 – 8 pm.

Santa Clara County, CA



30% of EV load in peak hours (4-11PM)

$0.12/kWh from 11PM-8AM
$0.45 from 1PM-8PM

EV TOU rates delay peak charging until 11pm.

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Medium and Heavy-Duty Fleets

Support Freight and Port activity

- Major Commercial and Industrial have sustainability goals
- 5,000+ commercial customers electrifying

Lead by Example: Government Fleets

Charging behavior is different than Light-Duty

- “Behind-the-Gate”/Depot Charging
- Real estate considerations

Make Ready and Demand Charges for

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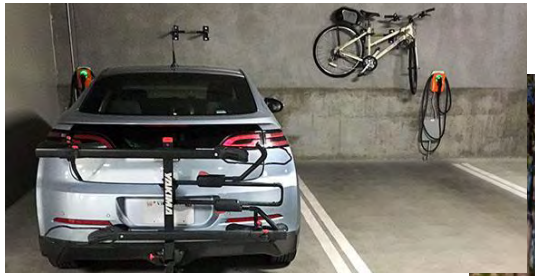
Multi-Family and Single Family



~80% of EV charging happens at home or work on Level 2

Opportunity for Make-Ready Programs and Building Codes

Adopting language to support laying conduit and wiring at building construction

Home Charging enables confidence

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Let’s Summarize

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What's important

- EVs are coming and EV charging is part of the local ecosystem
- EV charging supports economic goals and tourism
- Pricing by kWh enables certainty for site hosts and investors
- Time of Use rates can provide beneficial electrification
- Fleets will play a critical role in freight competitiveness
- Multifamily dwellings benefit from code updates to include EV charging readiness

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Thank You

Ben Kessler

Public Policy Manager, Southeast/Mid-Atlantic

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EV Infrastructure Revenue

- EV drivers should pay their fair share, but not be penalized

- 2022 Polestar 2:
    - 89mpge
    - 18,334 miles/year
    - $210.96 Annual registration fee

- 2022 Chevy Malibu Hybrid
    - 18,334miles/year
    - 49mpg combined
    - $0.291 gas tax/gal
    - $108.88 Annual fuel tax

Comparing Alternatives

Option	Drivers: Width, Weight, Miles	Administrative Efficiency	Emissions Efficiency	Interstate Cost Recovery
Gas and diesel tax	High	High	Low	High
Annual fixed fee	Low	High	Low	Low
Annual fee adjusted by width and weight	Medium	High	Medium	Low
Annual fee based on battery capacity	Medium	High	Medium	Low
VMT uniform per mile driven	Low	Medium	Low	Low
VMT adjusted by width and weight	High	Medium	Medium	Low
Electricity tax—dumb charging and rates	High	Low	Medium	High
Electricity tax—smart charging and rates	High	Medium	High	High

Regulatory Assistance Project (RAP)®

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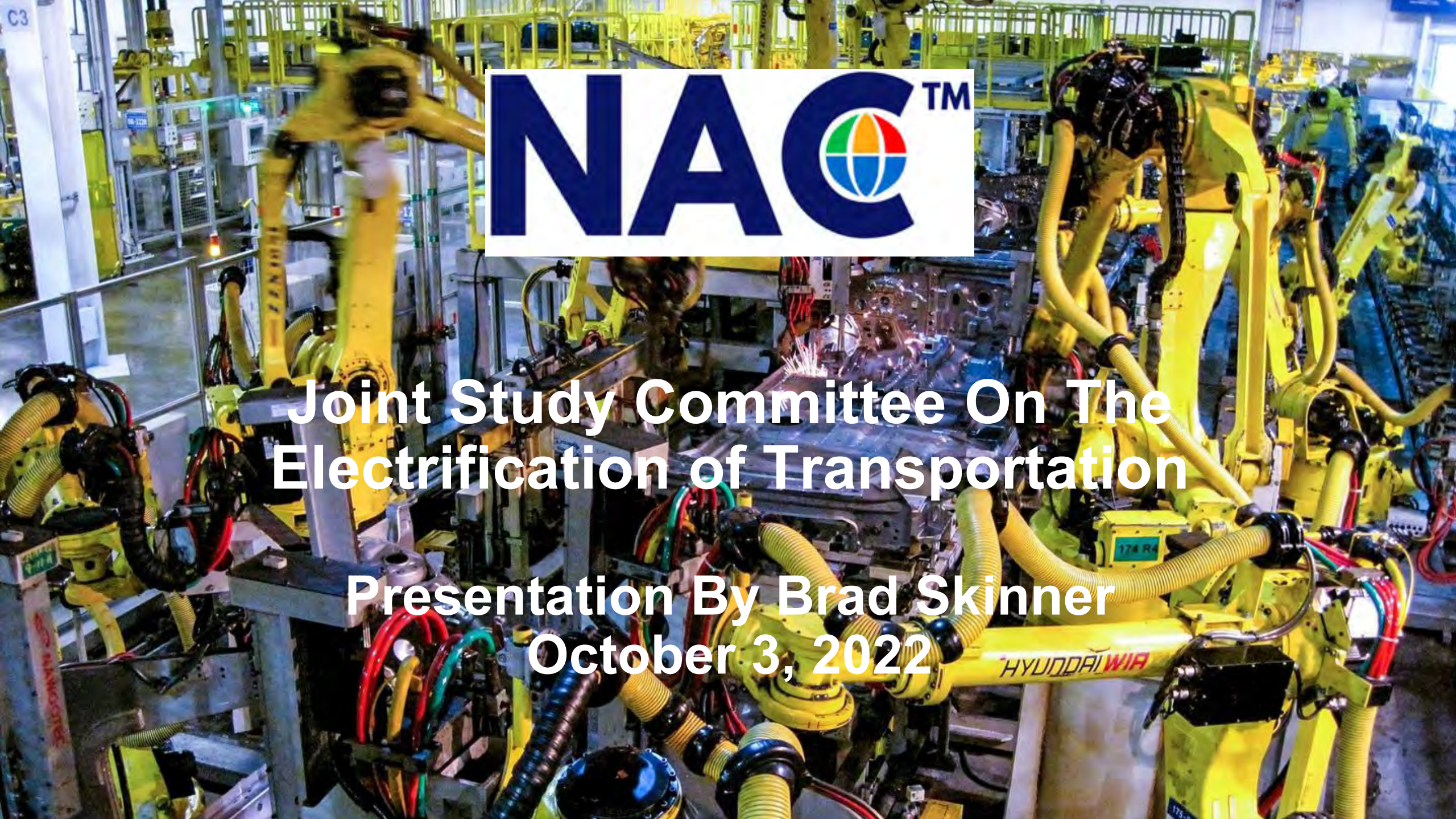

NAC™
Joint Study Committee On The Electrification of Transportation
Presentation By Brad Skinner
October 3, 2022

Georgia is laying the groundwork for leading the transportation industry.

- EV Production
- Battery Technology Production & Innovation
- Charging Infrastructure & Dedicated Lanes

All of these innovations enhance Economic Development, Environmental Stability, Roadway Safety, and Transition to < lower carbon footprint >.

“Lead, follow or get out of the way”

- Green jobs are the future
- Modern factories are the present and the future
- Public-Private Partnerships are channel for national policy and economic development

Fuel Cost Comparison Between Diesel and Electric Class 8 Tractors

Diesel	
Average Miles per Gallon	8.0
Average Gallons per Mile	0.125
Price per Gallon of Gasoline	$3.28*
Daily Range (mi)	200
Operational Days	250
Gallons Burned per Day	25
Cost of Fuel per Day	$82.00
Estimated Annual Fuel Cost	**$20,500**

* 2021 average weekly U.S. price per EIA

Electric	
Miles per Kilowatt Hour (kWh)	0.5
Kilowatt Hour per Mile	2.0
Price of Electricity per kWh	$0.112*
Daily Range (mi)	200
Operational Days	250
Electricity Consumed Per Day (kWh)	400
Cost of Electricity Per Day	$44.80
Estimated Annual Electricity Cost	**$11,200**

* 2021 average U.S. price of electricity – all sectors per EIA

Approximate Annual Fuel Savings per Vehicle:

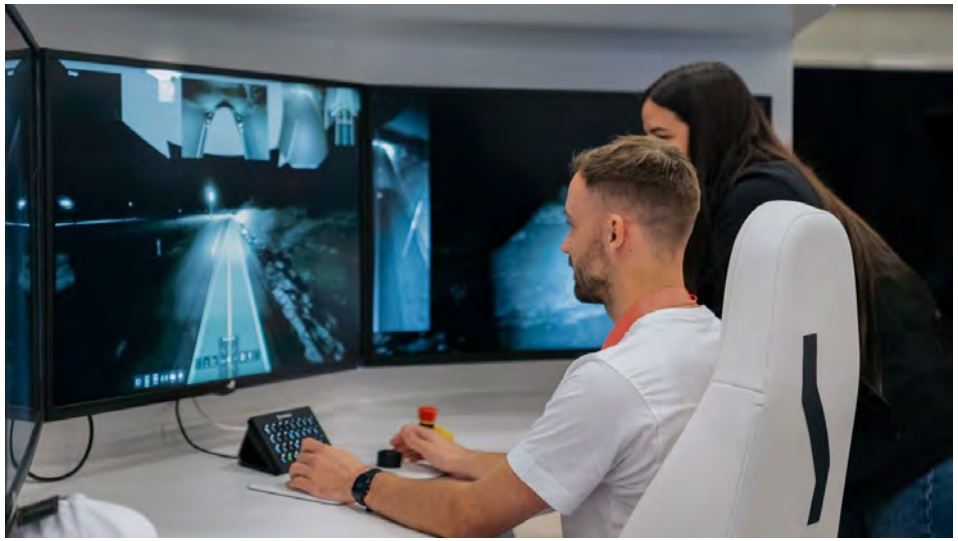
$9,300

NACFE
NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

Freightliner eCascadia

Volvo VNR Electric

Einride Pod & Remote Driver at GE Appliances Kentucky



Outrider Automated Electric Yard Trucks

Wabtec Battery-Electric Locomotive

Georgia is Better Positioned than any other State.

➔ **Georgia understands that Green Jobs can further transform the quality of life in urban and rural areas of the State.**

Georgia’s Leadership will address and solve the challenges that these innovations bring.

Mobile Learning Lab Concept For Georgia

The Foundation is laid for innovations in product, workforce development, taxation alternatives, higher paying skilled jobs, and in producing a sustainable energy policy.

STUART COUNTESS

President & CEO

Kia Georgia, Inc.

Kia EV Strategy: Steadily Increasing EV Sales, EV Models

Plan S: $25 Billion Shift to Electrification

More EVs/hybrids/PHEVs, new mobility

U.S. EV Strategy

More EV models with more range … increase EV sales 10x

Brand: **TRANSFORM** … More Techy, More Green, More Advanced

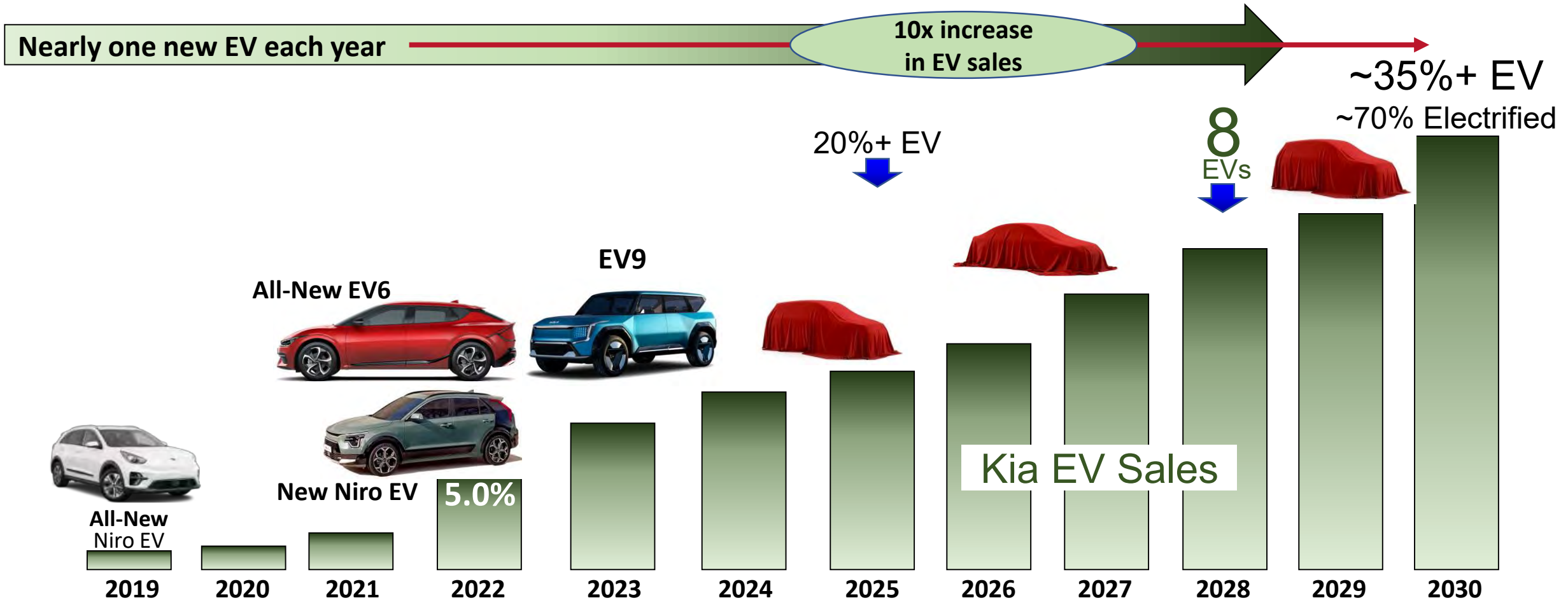
1) **Aggressive EV shift (EV6)**

2) **Launch mainstream EV SUV (EV9)**

3) **Broaden EV portfolio**

Sources: March 2022: Investor Day (global) update

$25 Billion Plan S Product Plan Yields One New EV Each Year



Sources: March 2022: Kia Investor Day (global) update

- **One new EV each year through the decade**
- **35%+ of 2030 Kia sales to be EV**
- **Product focus: EV SUVs**

Preparations

Manufacturing Skill Transitions

- ❑ Fundamentals of Electric – Sources > Path > Load > Ground.
- ❑ Structural Technology – New Design Standards
- ❑ Equipment Needed – Safety, Manufacturing, Diagnostic, Testing
- ❑ Electrical Hazards Related to Battery Systems – PFMEA Analysis
- ❑ Battery Design/Performance
- ❑ Hazardous Waste Risks & Handling
- ❑ “What if” Scenarios - Fire, Damage, Spills
- ❑ “What to do” Scenarios - Personal Injury, Who to Call, How to Contain

Logistics & Management

- ❑ Weight Considerations; Transportation, Towing, Parking Decks, Road Wear
- ❑ Storage Parameters – Charge-Based Duration
- ❑ Roadway Assistance
- ❑ Charging Station Density

Things that NEVER Happen…

Don’t happen for a reason!

Emergency Services

- ❑ Rescue Standards Development - Assessment, Priorities of Actions
- ❑ Rescue Conditions - Incompatibility with ICE vehicles, immersion, suspension
- ❑ Unintended Electrical Conductors; Grounding
- ❑ Environmental impacts

Discussion

Appendix IV

(Material from meeting #4, October 25, 2022)

Joint Study Committee on the Electrification of Transportation 10.25.22

County Interest in Electric Vehicles

Kathleen Bowen
kbowen@accg.org
404.788.5707

Advancing Georgia's Counties.

County Interest in Electric Vehicles

- Affects on Motor Fuel Collections
  - Local Sales and Use Tax on Motor Fuel
  - LMIG
- County Owned EV Charging Stations
- Zoning / Permits / Inspections
- Public Fleets to Evs
- Economic Development

Affects on Motor Fuel Collections

- Local Sales Taxes Levied on Motor Fuel: (capped at $3 per gallon)
  - LOST, SPLOST, ESPLOST, HOST, MARTA
  - Motor Fuel is exempt from TSPLOST taxation
  - Sales Tax Rates Chart: https://dor.georgia.gov/sales-tax-rates-prepaid-local-tax-motor-fuel-highway-use

- Local Maintenance & Improvement Grant (LMIG) Program:
  - LMIG funds, administered via formula by GDOT, are tied to state motor fuel excise tax collections.
    - Georgia Code specifies that funds allocated each fiscal year for LMIG shall be not less than 10% nor more than 20% of the money derived from motor fuel excise taxes received by the state in the immediately preceding fiscal year.
  - Less motor fuel consumption = less LMIG

- What ever replacement funds are used, ACCG asks that the state's investment in local transportation infrastructure remains.

Examples: County EV Charging Stations / Fleets

- **Elbert County:**
  - 3 EV charging stations at County Courthouse and County Government complex – free public use;
  - Funded by the county, city, and donations; and,
  - Viewed as a marketing tool to get people downtown and as service to their citizens.

- **Cobb County:**
  - 8 customer facing EV chargers; 47 county only EV charging stations
  - One of the largest electric fleets in the Southeast:
    - 66 all-electric vehicles - 110 hybrid Police interceptors - 4 electric motorcycles - 4 Mustang Mach-E's and 1 Ford F150 Lighting
  - County funds + funding from GEFA grants (State Energy Program: from 2014 – 2016 provided local governments w/ rebates to install EV chargers) and local partnerships (i.e. Nissan North America)

- **Putnam County:** "in the que" for an electric fire truck

- **Troup County:**
  - Placing EV charging stations in high density centers on county property;
  - Partnered with their local General Motors dealership; and,
  - Compares this service to the county providing Wi-Fi hot spots for their community.

Zoning / Permits / Inspections

Discussion Points around zoning, permitting and inspections:

- Private Residences vs. Multi-Family and Public Charging Stations

- De-commissioning, if abandoned
- Electrical infrastructure capacity and equipment standards
- Signage
- Security and lighting
- Operation and maintenance

"We are trying to strike a balance with the zoning standards to being EV friendly, while at the same time, not allowing the stations to become a nuisance should they become unsightly, unsafe or inoperative."

Joint Legislative Study Committee on the Electrification of Vehicles

Blue Bird Corporation – October 25, 2022

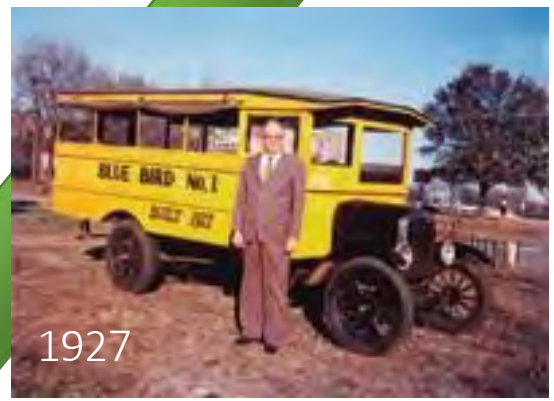
Where did we start?

BLUE BIRD

Georgia Grown

- Founded in 1927 by Albert Luce in Fort Valley, Georgia
- 2,000 employees
- Over 550,000 built
- ~180,000 still on the road today
- Annual volume ~11,000

BLUE BIRD


BLUE BIRD NO. 1
1927


SCHOOL BUS
1937


SCHOOL BUS
2021


BLUE BIRD ALL AMERICAN NO. 1
BUILT 1948
1948


SCHOOL BUS
BLUE BIRD
1987


SCHOOL BUS
2021


SCHOOL BUS
DIVINE PEACE
1982
LUTHERAN SCHOOL
2003


2010


SCHOOL BUS
2021

BLUE BIRD®

A History of Innovation

- 1st school bus body built utilizing steel instead of all wood (1927)
- 1st all-steel body (1937)
- 1st school bus manufacturer to build its own chassis (1952)
- 1st Type D Compressed Natural Gas school bus (1991)
- **1st All-Electric powered school bus (1994)**
- 1st OEM propane-powered school bus (2008)
- 1st Commercial School Bus V2G Deployment (2021)

Blue Bird – First to Market with EV

...in 1994!

BLUE BIRD®

Where are we now?

BLUE BIRD

Blue Bird
The Alternative Power Experts

OVER

30,000

ALT POWER SCHOOL BUSES

POWERED BY PROPANE

POWERED BY GASOLINE

OVER

3000

SCHOOL DISTRICTS

POWERED BY CNG

POWERED BY ELECTRICITY

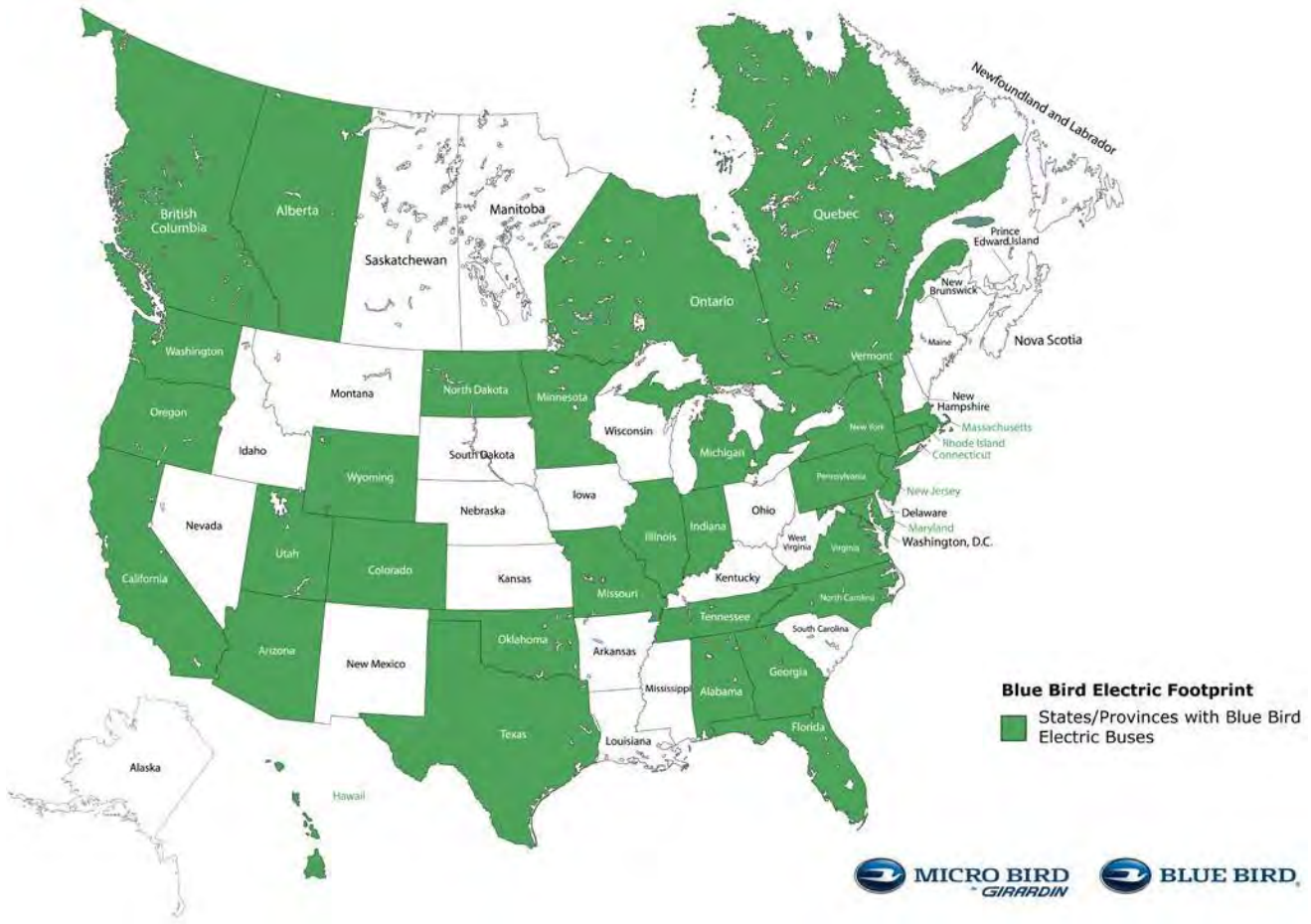
BLUE BIRD®

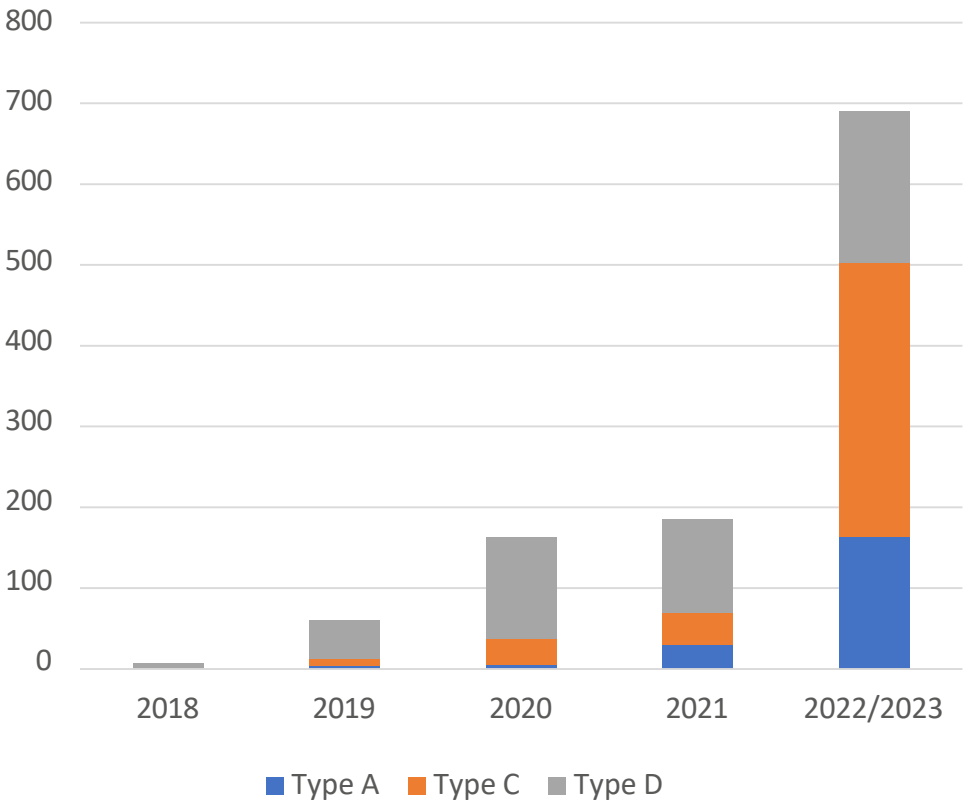
Electric Recharged

- 2016
  - Received a $4.9MM grant from US Department of Energy (US DOE) for development and commercialization of high power V2G school buses.
- 2017
  - Launched current iteration of the Blue Bird electric bus at the STN Expo in Reno, NV
- 2018
  - Delivered first electric-powered school buses to customers in California
- 2021
  - Only manufacturer to produce and deploy electric school buses in Type A, Type C, and Type D
  - Only manufacturer to offer standard CCS1 connector to allow both Level 2 and Level 3 charging
  - V2G capability standard on all of our Electric Buses
  - Over 1,200 EV sales in 31 states and 4 Canadian Provinces!

BLUE BIRD

Deployments and Growth





BLUE BIRD®

Benefits of Electric School Buses

ZERO EMISSIONS
Cleaner air for our children

GRANT FUNDS AVAILABLE
Bus and Infrastructure

REDUCED MAINTENANCE COSTS
Fewer and much simpler parts = substantially less maintenance

OUTSTANDING PERFORMANCE
Drive motor max torque and power at very low RPM's

QUIET OPERATION
Less sound pollution in neighborhoods, and safer driving

VEHICLE TO GRID TECHNOLOGY
V2G technology allows the sale of energy back into the grid

BLUE BIRD®

Diesel vs Electric

	Diesel	Electric
Power	300 HP	315 HP
Torque	2,046 ft-lb (1st gear @ max rpm)	2,400 ft-lb (instantaneous)
Acceleration (0-60 mph)	45 s	20 s
Fuel Cost / mile	$0.41	$0.22*
Fuel Cost / year	$4,941	$2,628
GHG Emissions / year	23 tons	Zero
Maintenance	Engine Oil Change Transmission Fluid Change Fuel Filter Change DEF Fluid & Filter Air Filter Change	Coolant Flush

*Using $0.1413/kWh average rate in Georgia

Where are we going?

BLUE BIRD

EPA Clean School Bus Program

- **Bipartisan Infrastructure Law allocated $5 billion specifically for Clean School Buses over next 5 years**
- **$375k (priority) or $250k (non-priority) per bus**
- **$20k (priority) or $17k (non-priority) per bus for charging infrastructure**
- **Districts can apply for up to 25 buses**

- **First round of grant recipients being announced tomorrow.**
- **Initial tranche $965M**
- **Blue Bird helped 34 school districts in Georgia apply for 304 electric and propane school buses**

BLUE BIRD

Blue Bird Energy Services

END OF LIFE

Recycling program for used or damaged batteries

SERVICE & SUPPORT

Dealer network and EV Powertrain provider supports and services bus throughout its lifetime

TELEMATICS

Tracks bus performance, diagnostics and more

DEPLOYMENT

Build and deliver buses, as well as offer driver, safety and technician training services

ASSESSMENT

Determine what bus fleet best fits the customer's needs based on terrain, climate and route planning

FUNDING

Identify and support customers in obtaining financing through grants, tax breaks, subsidies or lending services

INFRASTRUCTURE

Assess customer infrastructure needs and support energy sourcing and infrastructure installation

V2G/V2X

Provide V2G/V2X capable buses enabling customers to generate revenue and harden their infrastructure

Why does this matter?

- Impact in Georgia
  - Engaged in global supply chain
  - Leveraging experience from Ford, Cummins, and other Fortune 500 companies
  - Training workforce for high skilled jobs associated with EV industry
  - Georgia become national leader in EV manufacturing
- Electrification of vehicles is gaining momentum nationwide
  - School buses have the ideal duty cycle for electrification
  - School buses can also be used for electrical grid stabilization through V2G and provide power for emergency response
- Will require investment in infrastructure to support growing charging demand

BLUE BIRD®

Thank You!

BLUE BIRD®

Complexities & Challenges for EV Infrastructure Installation In Georgia

ENVIRO SPARK

Aaron Luque, CEO and Co-Founder
Stephanie Luque, CGO and Co-Founder

Joint Legislative Study Committee on the Electrification of Vehicles
Meeting #4, 10/25/2022

ENVIROSPARK ENERGY SOLUTIONS, INC.

- EnviroSpark designs, builds, owns, and operates Electric Vehicle Charging Infrastructure
- 50+ Licenses/Certifications in 20+ states
- Strategic partnerships with clients in the multi-family real estate, commercial real estate, utility providers, network operator industries, and government entities

Mission

EnviroSpark believes accessible and reliable EV charging is the key to accelerating the EV revolution. We strive to make EV adoption more equitable by providing turnkey charging solutions to remove barriers to entry and make the process fast, easy, and reliable.

A Few of Our Partners

Multi-Family RE

MAA
CORTLAND
STARWOOD PROPERTY TRUST
perennial PROPERTIES

Commercial RE

PORTMAN HOLDINGS
Fuqua Development
Hines
CUSHMAN & WAKEFIELD

Utility Partners

Georgia Power
JACKSON EMC
Walton EMC

Network Operators

TESLA
RIVIAN
volta

Government

GSA
GAINESVILLE
SAVANNAH savannahga.gov

ENVIRO SPARK

Electric Vehicle Charging Experts

Georgia-Grown Roots

- Founded in 2014 in Atlanta
- Founders are Georgia Tech & UGA grads
- New Headquarters in Midtown
- 5500+ L2 & L3 installs across USA (over 2600 of those in Georgia!)
- Board of Directors include leaders of strong GA-Based Companies
- Creating and supporting jobs in GA

Just a few fun places in Georgia where you'll find us...

ATLANTA BOTANICAL GARDEN

MARY ROSS WATERFRONT PARK

CEDARTOWN MUSEUM OF Coca-Cola MEMORABILIA

Atlanta Symphony Orchestra

OVERVIEW FOR EVSE IMPLEMENTATION

Whether the client is a small single-site business or a large multi-site corporation, knowing how to navigate the complexities of each stage of the the EV Infrastructure installation process and how to customize our approach with each stakeholder is key to successful projects.

Preliminary Consultation

Site Evaluation

Design/Engineering

Permitting & Utility Coordination

Construction & Installation

Long-Term Operation and Maintenance

EnviroSpark encounters stakeholders at every step of the installation process:

- Site Hosts
- Electricians
- Engineers
- Utilities
- Hardware Manufacturers
- Software Manufacturers
- EV Drivers

Preliminary Consultation

- Discuss the client's strategic goals
- Considerations for typical customer's length of stay
  - Lengthy vs. quick stop site
- Discuss Ownership and Operation Models
  - Site-owned vs. operator-owned
- Amenity vs. revenue generating models
- Brand of station (hardware selection)
- Software enablement considerations
- Speed of charge (Level 2 vs. Level 3)
- Quantity of stations needed per site
- Single site vs. portfolio level clients
- Scalability assessment

Policy Considerations

- How will sites be chosen in Georgia? (Sites volunteer vs recruited)
- Priority considerations for locally owned, minority-owned and/or promoting Georgia Tourism?
- interagency cooperation on site selection(Dept of Agriculture Georgia Grown/eligible State Parks or scenic points)?

SITE EVALUATION

- Meeting with Facilities Management team to gain building and systems information
- Conducting an investigation, including an on-site survey to examine existing conditions
- Performing a pre-alteration (hazardous materials) assessment
- Identifying current electric utility service capability
- Performing building load calculations to determine electrical capacity
- Identifying existing code violations related to project work
- Identifying ground disturbing activities and below grade conflicts
- Identifying available incentive programs
- Developing conceptual alternatives
- Developing construction cost estimates & schedules
- Performing financial and feasibility analyses
- Identifying and justifying a preferred alternative (final recommendation)
- Providing reports and presentations

Policy Considerations

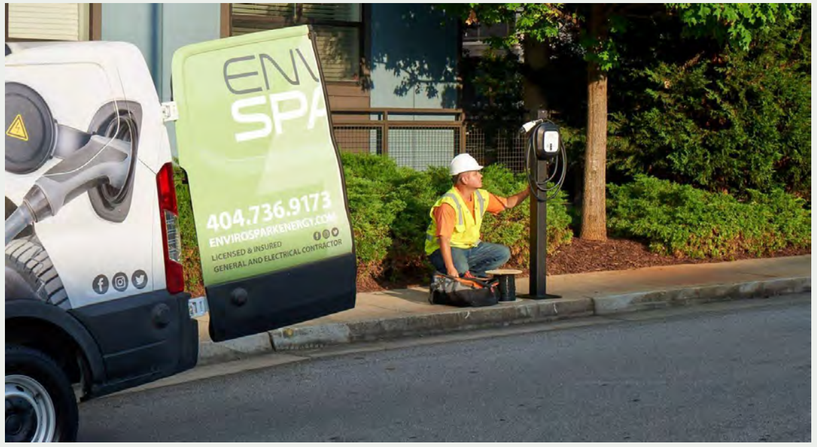
- NEVI Requirements on station count and distance variability (exceed minimum requirements in rural areas and evacuation routes)

DESIGN & ENGINEERING

Preparing conceptual, design development and construction document submissions, including:

- Site plans showing property extent
- Electrical plans showing all electrical system elements
- Trenching details
- Structural plans
- Architectural and Civil plans
- Phasing plans

- Calculations as required
- Signed and sealed bid documents
- Addressing General Requirements thoroughly
- Performing code reviews, quality control reviews, constructability reviews, and design reviews
- Planning construction work sequencing
- Developing submittal schedule
- Establishing project duration/schedule
- Coordinating available incentives and rebates
- Developing load control strategies



Policy Considerations

- NEVI $/kWh requirement is currently illegal in Georgia
- Buy-America Compliance with L3 Stations- Will Georgia need consistency throughout the state?

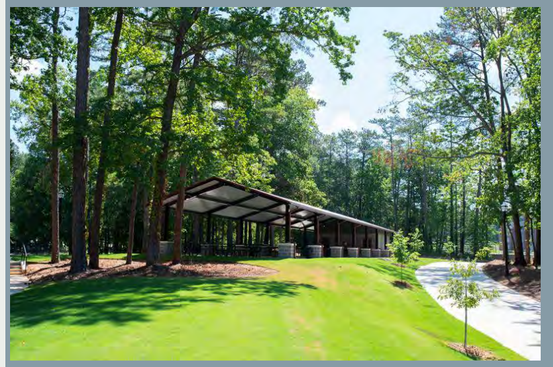
UTILITY COORDINATION & PERMITTING

- Conducting On-site Electrical Evaluations and Service Extensions
- Building relationships with Utilities and EMCs essential
- Navigating the complexities of disparities between municipalities
- Identifying current electric utility service capability
- Coordinating with the utility company for connections and utility markings
- Changes by the Jurisdiction
- Often ***the longest single piece*** in the EV Installation Roadmap

Policy Considerations

- Separate Pipeline for Expedited Review and Remediation Processes specifically for EVSE projects
- State-led Standardized EV Charger Permitting and guidance for “best practices”

Streamlined Permitting Case Study: Brook Run Park



Length of Time:
2 weeks

Causes:
- Clear Communication
- Quick Revision Process

Complex Permitting Case Study: Embassy Suites Centennial Park

Length of Time:
3 Months

Causes:
- Multiple Permits Needed
- Poor Communications for Revision Process
- Requirements in flux

CONSTRUCTION AND INSTALLATION

- Completing the subcontractor buyout phase
- Leading and documenting scope discussions with subcontractors and client
- Reviewing and approving submittals
  (and coordinating with the site host)
- Executing the Quality Control Plan
- Coordinating incentive and rebate programs
- Coordinating with building managers and tenants for scheduling work
- Securing the construction area appropriately
- Coordinating equipment deliveries and on-site storage of materials
- Managing self-performed and all trades to execute the work in accordance with the construction documents
- Installing EVSE per manufacturer installation requirements
- Coordinating IT, communication, & networking requirements
- Performing finish work to repair existing surfaces, infrastructure, landscaping, and parking lot striping
- Scheduling final inspections and participating in punch list activities
- Coordinating shutdowns/power outages
- Programming and activating EVSE

Policy Considerations

- Utilizing EVITP vendors
- Solar and Battery backups for Emergencies or Grid issues, focused on AFCs along evacuation routes.

LONG-TERM OPERATION AND MAINTENANCE CONSIDERATIONS

- Providing comprehensive O&M manuals and warranty documents during close out process
- Ensuring any warranty documents provided have clear timelines associated with them and contact information is understood
- Coordinating with local O&M contractor to ensure inclusion of any EVSE into the O&M contracts and systems
- Provide onsite training to a variety of users including building and maintenance staff, customers and end users

A lack of maintenance planning leads to broken chargers with no one to fix them.

"A Frustrating Hassle Holding Electric Cars Back: Broken Chargers; Owners of battery-powered cars sometimes struggle to refuel on longer trips because public chargers don't work or malfunction while cars are plugged in."

-New York Times, 8/16/22

Policy Considerations

- Standardization of data software throughout Georgia NEVI sites with focus on Emergency Management Coordination
- Should maintenance packages go through installers or be standardized at the state level?

ENVIROSPARK

THANK YOU!

We look forward to continuing to partner with you to make Georgia EV ready

www.envirosparkenergy.com

info@envirosparkenergy.com

EnviroSpark: Permitting Considerations

Electric Vehicle Charging Station Permit Streamlining Requirements & Best Practices

	AB 1236 Compliant (EVCS Friendly)	Not AB 1236 Compliant (Challenging to Deploy Charging)
Required by AB 1236	Ordinance creating an expedited, streamlined permitting process for electric vehicle charging stations (EVCS) including level 2 and direct current fast chargers (DCFC) has been adopted	No permit streamlining ordinance; and/or ordinances that create unreasonable barriers to EVCS installation
	Checklist of all requirements needed for expedited review posted on Authority Having Jurisdiction (usually a city or county) website	No checklist for EVCS permitting requirements
	EVCS projects that meet expedited checklist are administratively approved through building or similar non-discretionary permit	Permitting process centered around getting a discretionary use permit first
	EVCS projects reviewed with the focus on health and safety	EVCS projects reviewed for aesthetic considerations in addition to building and electrical review
	AHJ accepts electronic signatures on permit applications*	Wet signatures required on one or more application forms
	EVCS permit approval not subject to approval of an association (as defined in Section 4080 of the Civil Code)	EVCS approval can be conditioned on the approval of a common interest association
	AHJ commits to issuing one complete written correction notice detailing all deficiencies in an incomplete application and any additional information needed to be eligible for expedited permit issuance	New issue areas introduced by AHJ after initial comments are sent to the station developer
Best Practice	Clear EVCS permitting process detailed on AHJ website	Permitting process not explained on AHJ website
	ZEV Infrastructure permitting ombudsperson appointed to help applicants through the entire permitting process	AHJ does not offer access to an expert who can support station developers through the entire permitting process
	Guidance documents for permitting and inspecting charging stations at single family home, multifamily home, workplace, public (L2 and DCFC), and commercial medium and heavy duty posted on AHJ website	Limited or no information online
	Pre-application meetings with knowledgeable AHJ staff are offered	Full permit package needs to be submitted to gain feedback from AHJ staff
	AHJ has published an ordinance or bulletin clarifying that a plug-in electric vehicle charging space counts as one or more parking spaces for zoning purposes	EVCS installation projects trigger a parking count review
	Concurrent reviews are made available for building, electrical (and planning, if deemed necessary)	Sequential permit reviews only
	Planning for ZEVs and supporting infrastructure is incorporated and prioritized within documents such as the general plan, capital improvement plan, climate action plan, and design guidelines	EV charging guidelines are not incorporated into planning documents
	EVCS are classified as an accessory use to a site, not as a traditional fueling station	AHJ considers charging stations as fueling stations, leading to additional zoning review
	AHJ has established/published timelines for EV permit application review that are expedited when compared to standard building permit review timelines in that jurisdiction.	AHJ does not have expedited permitting process for EV applications – resulting in standard project permitting timelines
	AHJ's expedited EV permit review process encourages permit reviewers to conditionally approve permits (aka "approved as noted")	AHJ does not encourage conditional approval of permits

Source: CA Governor's Office of Business and Economic Development Electric Vehicle Charging Station Permitting Guidebook

ELECTRIFYING OFF-HIGHWAY PRODUCTS

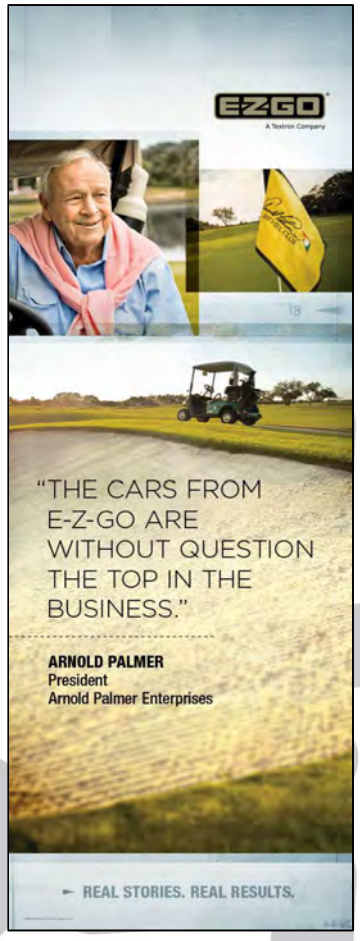
Brandon Haddock
Director, Communications
706.836.7439 (m)
bhaddock@textron.com

TEXTRON SPECIALIZED VEHICLES | EZGO | ARCTIC CAT | TRACKER OFF ROAD | RANSOMES JACOBSEN | CUSHMAN | TEXTRON GSE

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

OUR HISTORY

- Founded in Augusta, GA in 1954
- Acquired by Textron in 1960
- ~3,000 employees worldwide
- Product lines include:
  - Golf cars & PTVs
  - Side-by-sides/ATVs
  - Snowmobiles
  - Commercial turf equipment
  - Aviation ground support



TEXTRON SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

OUR BUSINESS

Powersports

Off Road

ARCTIC CAT

TRACKER OFF ROAD

TEXTRON SPECIALIZED VEHICLES

Snow

ARCTIC CAT

Golf & PTV

Fleet

EZGO

PTV

EZGO

Utility

CUSHMAN

Turf

JACOBSEN

RANSOMES

PG&A

Ground Support

TEXTRON GSE
GROUND SUPPORT EQUIPMENT

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

GEORGIA FOOTPRINT

- Global headquarters in Augusta
- Manufacturing operations in Augusta, Cartersville
- Main production sites for E-Z-GO, Cushman and TUG brands
- Currently employ more than 1,800 employees in Georgia — 1,500 in Augusta; 350 in Cartersville
- Sister Textron businesses with facilities in Lavonia, Columbus

TEXTRON SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

ELECTRIFICATION

- Not just about golf cars anymore!
- Customers across all industries seeking electric vehicles
- Drivers of shift:
  - Need to reduce carbon footprint
  - Consumer preferences
  - Technological advances
  - Cost considerations
- Strategic emphasis to electrify all TSV product lines
  - Dedicated electrification team
  - Leveraging 60+ years of electric-vehicle expertise
  - Enables new approach to vehicle design

TEXTRON SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

GROUND SUPPORT EQUIPMENT

- Air-travel, air-cargo industries electrifying ground operations
- Textron GSE introducing multiple new products to address customer needs
- Entered relationship with GM, PCS to integrate GM lithium technology into product lines
- Introduced TUG Endurance baggage/cargo tractor in September
- Other new products include:
  - TUG ALPHA 1 aircraft pushback
  - TUG 660 Li belt loader

TEXTRON SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

OTHER PRODUCT LINES

- Introduced E-Z-GO ELiTE series of vehicles in 2017
  - Powered by Samsung SDI lithium battery technology
- Manufacture tens of thousands of lithium-ion-powered vehicles annually
- Curtailed use of lead-acid batteries in almost all product lines
- Extending use of lithium battery technologies into adjacent products:
  - Cushman commercial vehicles
  - Jacobsen professional turf equipment
  - E-Z-GO consumer products

TEXTRON SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

TEXTRON

SPECIALIZED VEHICLES

COMPANY CONFIDENTIAL – DO NOT DUPLICATE OR DISTRIBUTE

Electrified Transportation in Georgia

Rising Up to the Opportunities and Challenges

DAVID GATTIE (DGATTIE@UGA.EDU)

UNIVERSITY OF GEORGIA

COLLEGE OF ENGINEERING AND CENTER FOR INTERNATIONAL TRADE AND SECURITY

GEORGIA JOINT LEGISLATIVE STUDY COMMITTEE ON THE ELECTRIFICATION OF VEHICLES

OCTOBER 25, 2022

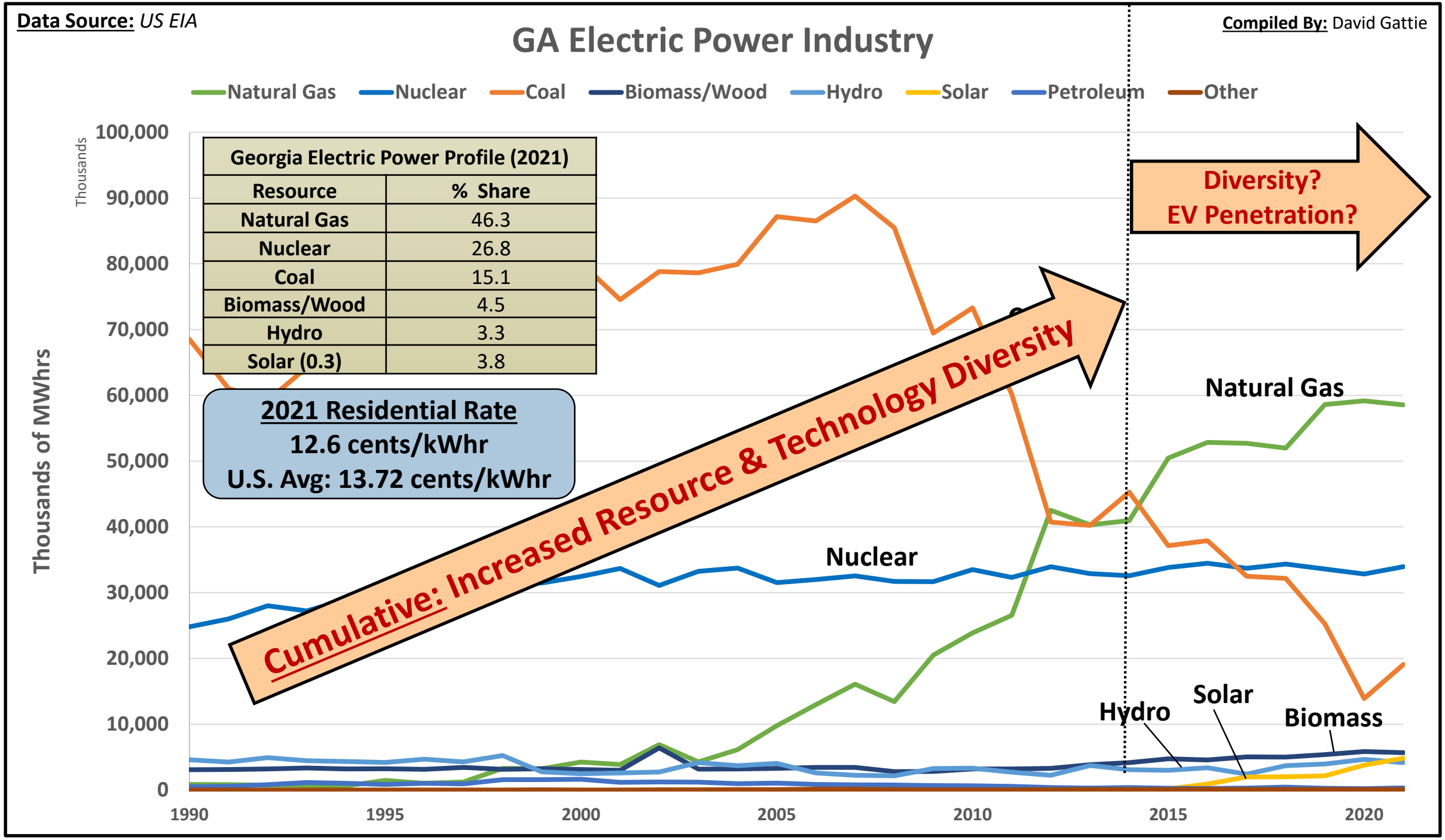
Bottom Line Up Front

- Electrified transportation in Georgia is an economic development opportunity that will have challenges:
  - *Energy resource & grid challenges*
  - *Emerging supply chain challenges*
  - *Top-down national energy & climate policy challenges*
- Georgia's electric power sector is uniquely capable of meeting these challenges:
  - *Vertically-integrated, regulated market structure*
  - *Pragmatic policymaking & long-range Integrated Resource Planning*

Data Source: *US EIA*

GA Electric Power Industry

Compiled By: David Gattie



Data Source: *US EIA*

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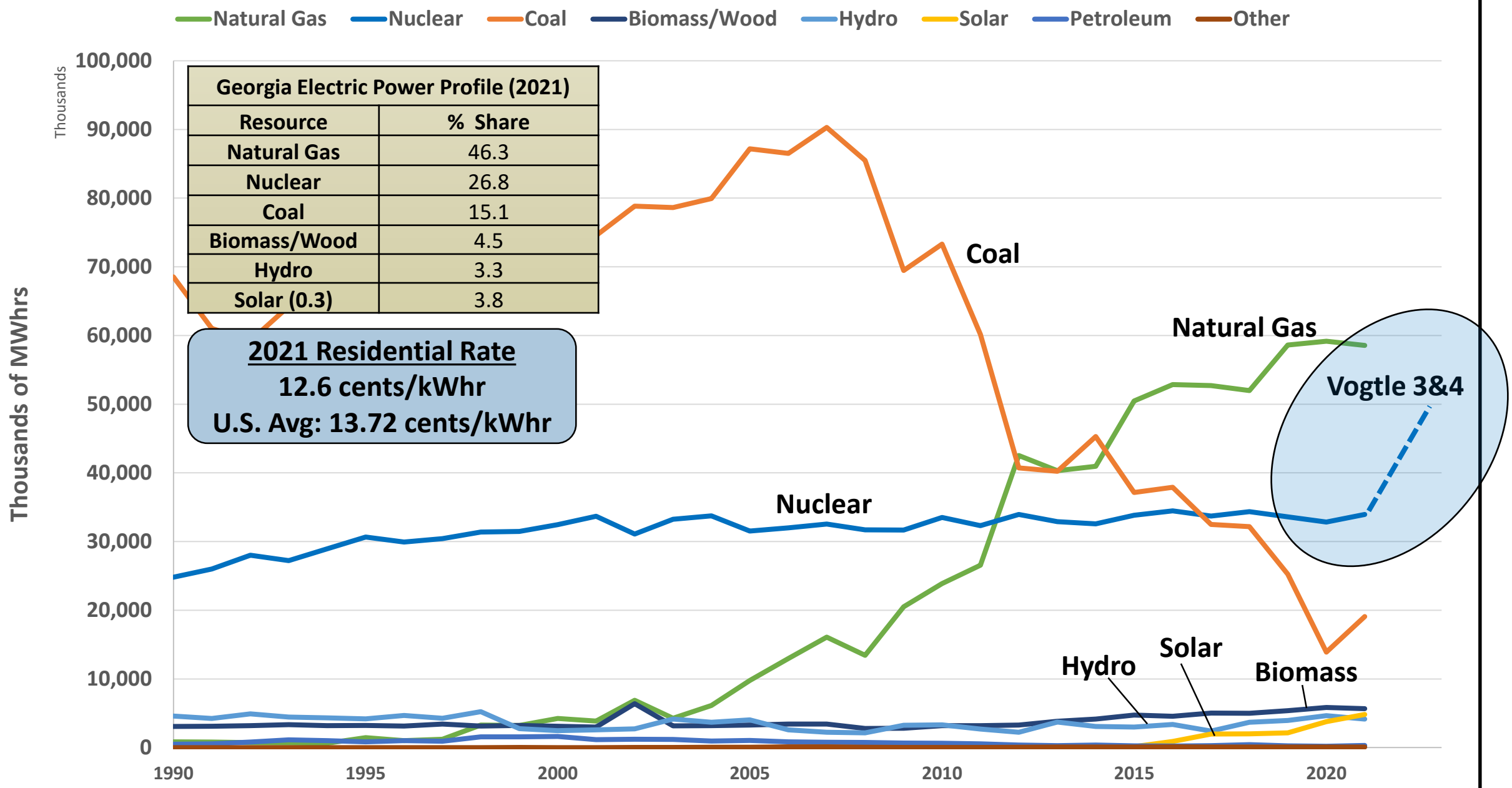


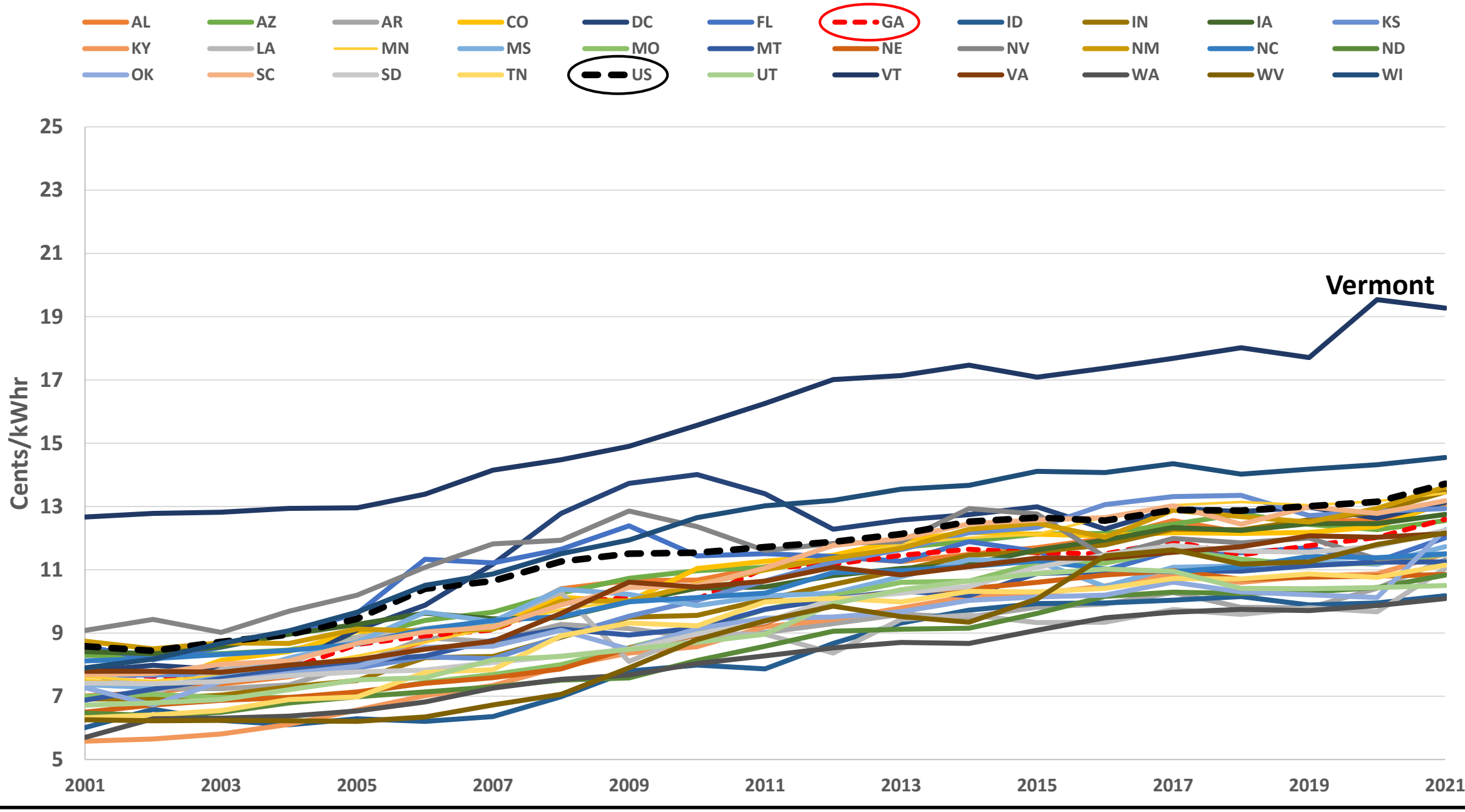
Georgia Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	46.3
Nuclear	26.8
Coal	15.1
Biomass/Wood	4.5
Hydro	3.3
Solar (0.3)	3.8

2021 Residential Rate
12.6 cents/kWhr
U.S. Avg: 13.72 cents/kWhr

Data Source: U.S. EIA

Regulated Markets: Retail Residential Rates

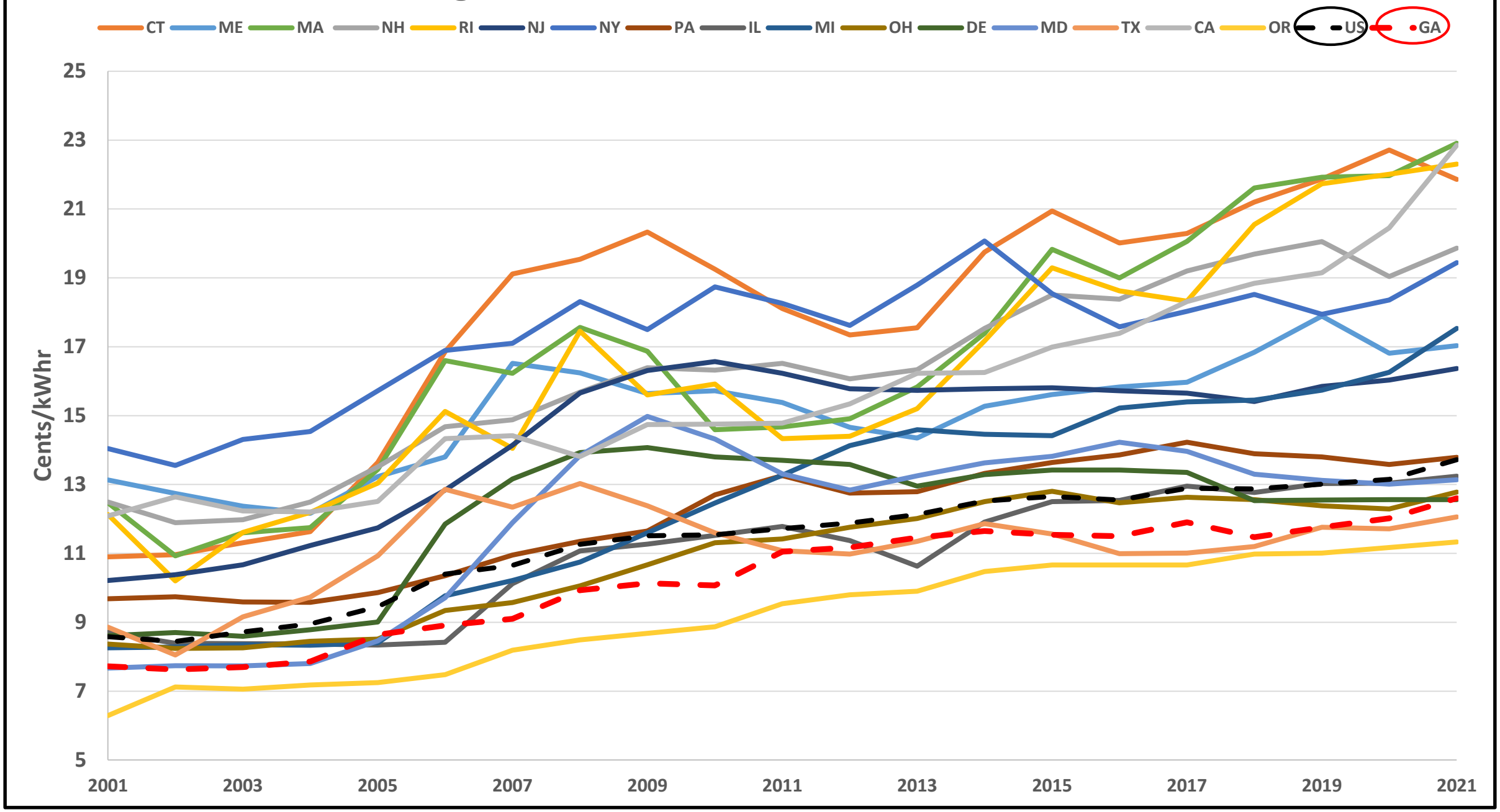
Compiled By: David Gattie

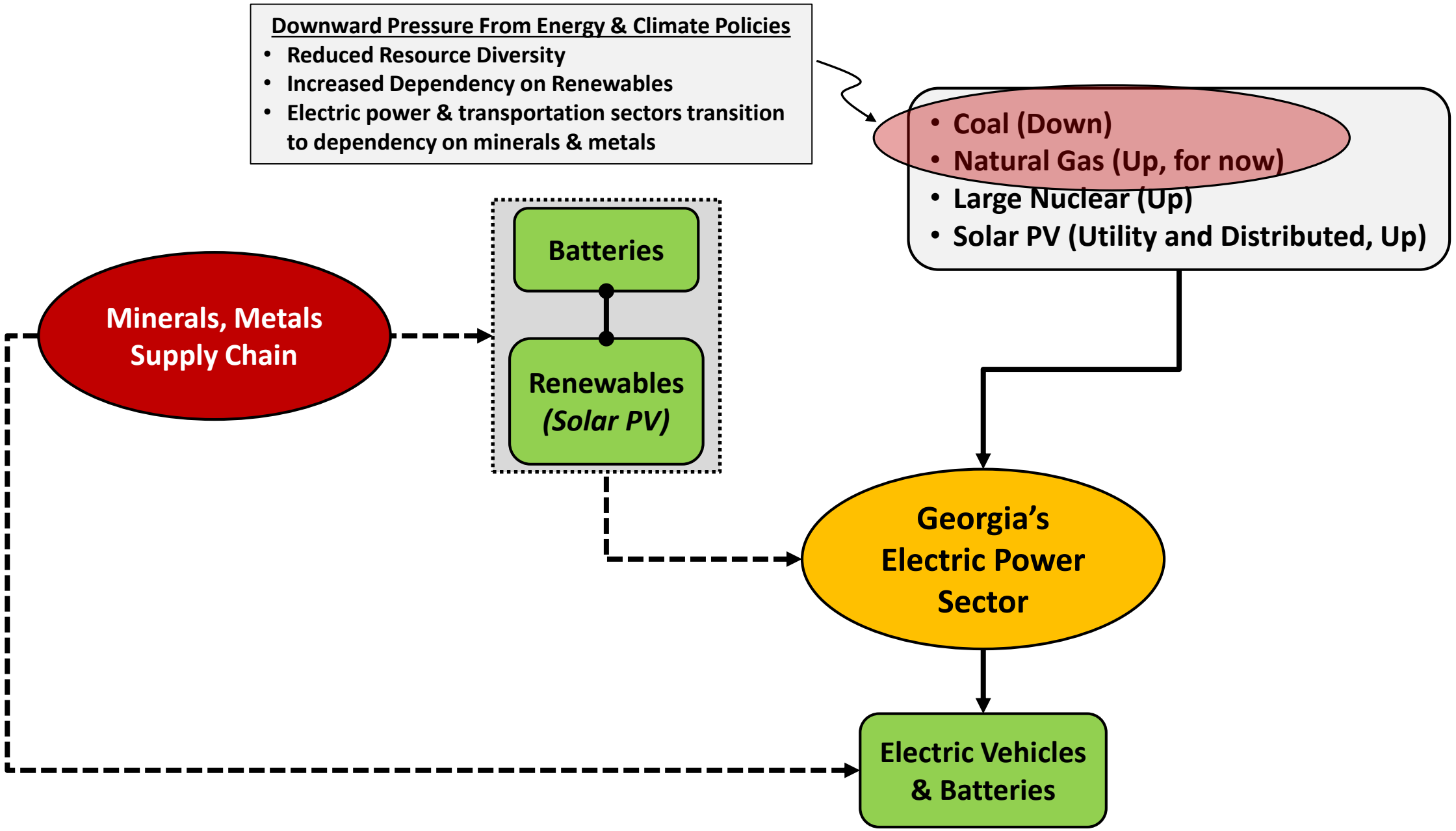


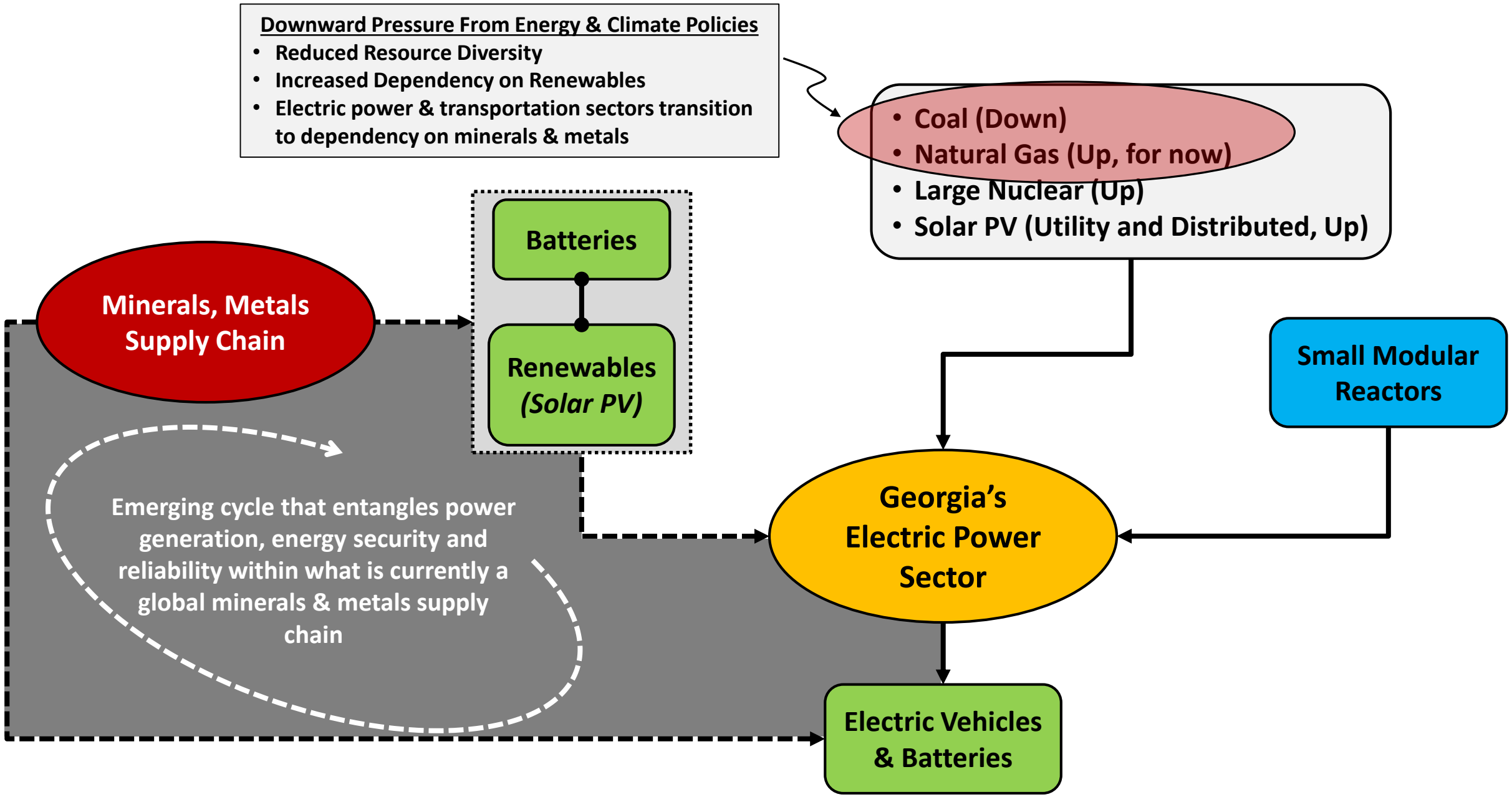
Data Source: U.S. EIA

Deregulated Markets: Retail Residential Rates

Compiled By: David Gattie




Downward Pressure From Energy & Climate Policies
• Reduced Resource Diversity
• Increased Dependency on Renewables
• Electric power & transportation sectors transition to dependency on minerals & metals
• Coal (Down)
• Natural Gas (Up, for now)
• Large Nuclear (Up)
• Solar PV (Utility and Distributed, Up)
Batteries
Minerals, Metals Supply Chain
Renewables (Solar PV)
Georgia's Electric Power Sector
Electric Vehicles & Batteries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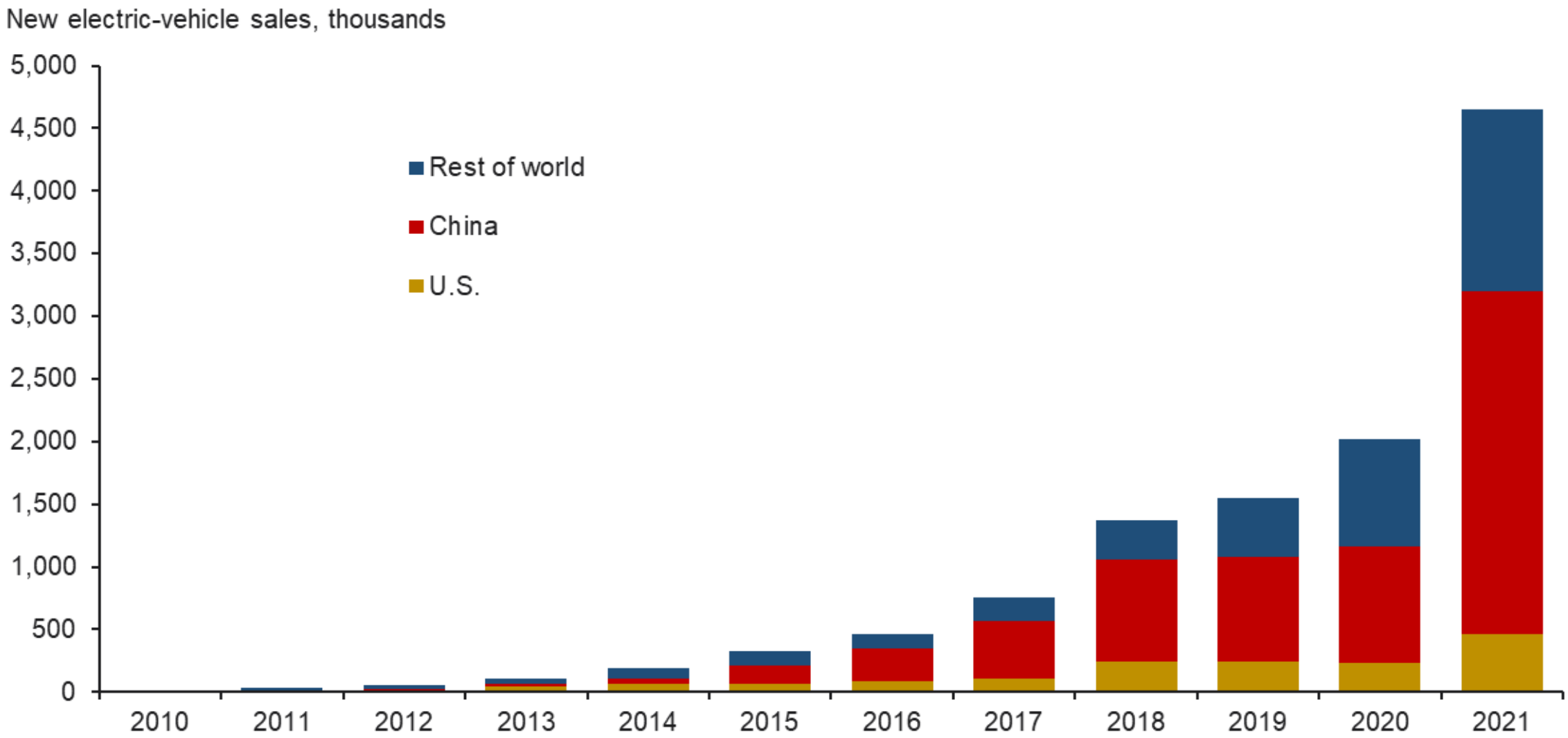
Batteries
Renewables (Solar PV)
Minerals, Metals Supply Chain
Small Modular Reactors
Emerging cycle that entangles power generation, energy security and reliability within what is currently a global minerals & metals supply chain
Georgia's Electric Power Sector
Electric Vehicles & Batteries

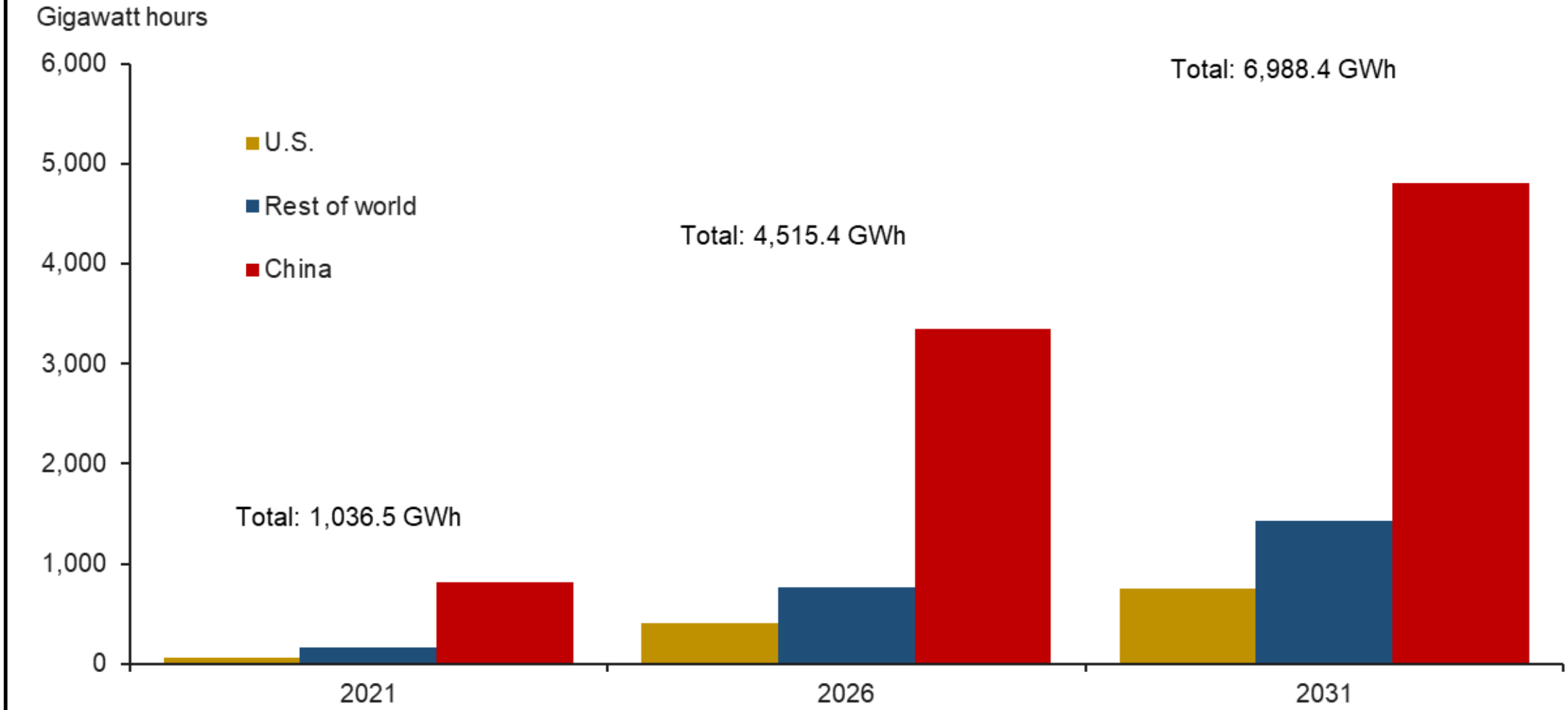
Chart 2
Worldwide Electric-Vehicle Sales Exceed 4 Million Units in 2021



NOTE: Sales do not include partial-hybrid electric vehicles.
SOURCE: International Energy Agency.

Federal Reserve Bank of Dallas

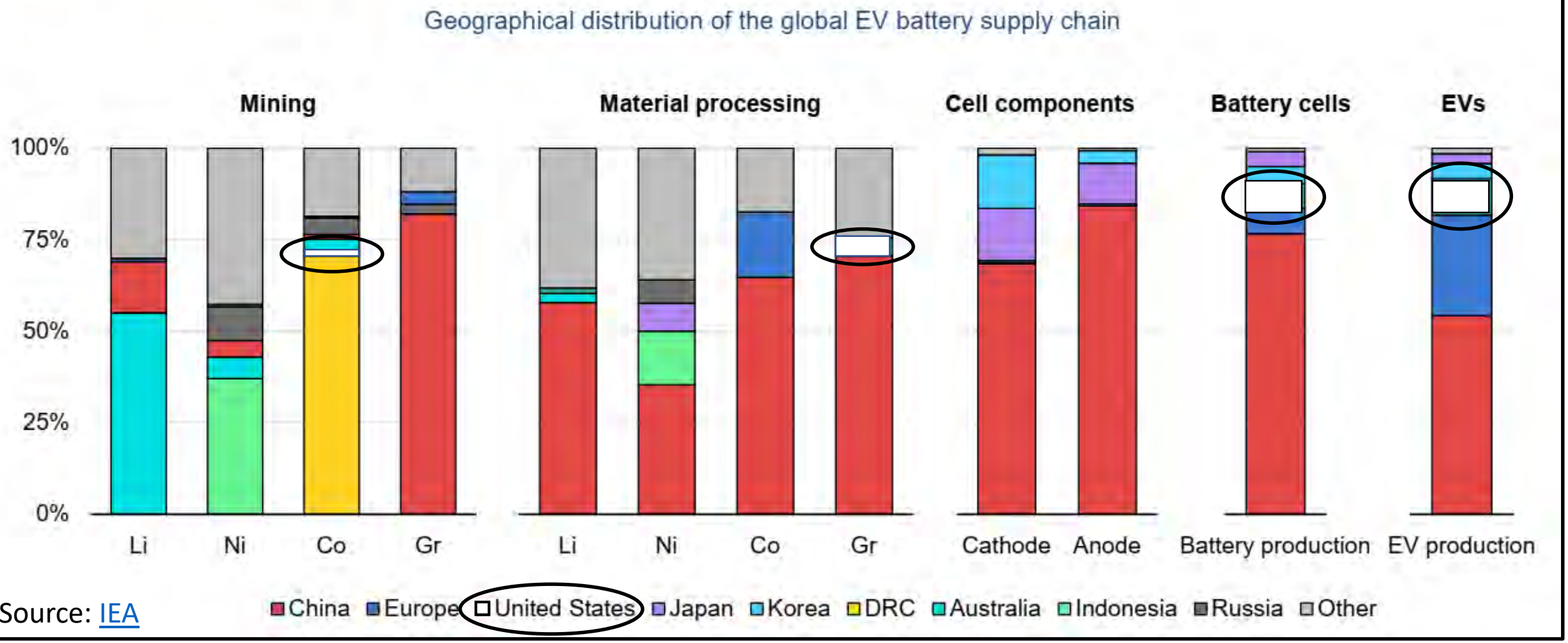
Chart 1
Lithium-Ion Battery Capacity Expected to Surge Around the Globe



NOTE: GWh is gigawatt hours.
SOURCE: Benchmark Mineral Intelligence.

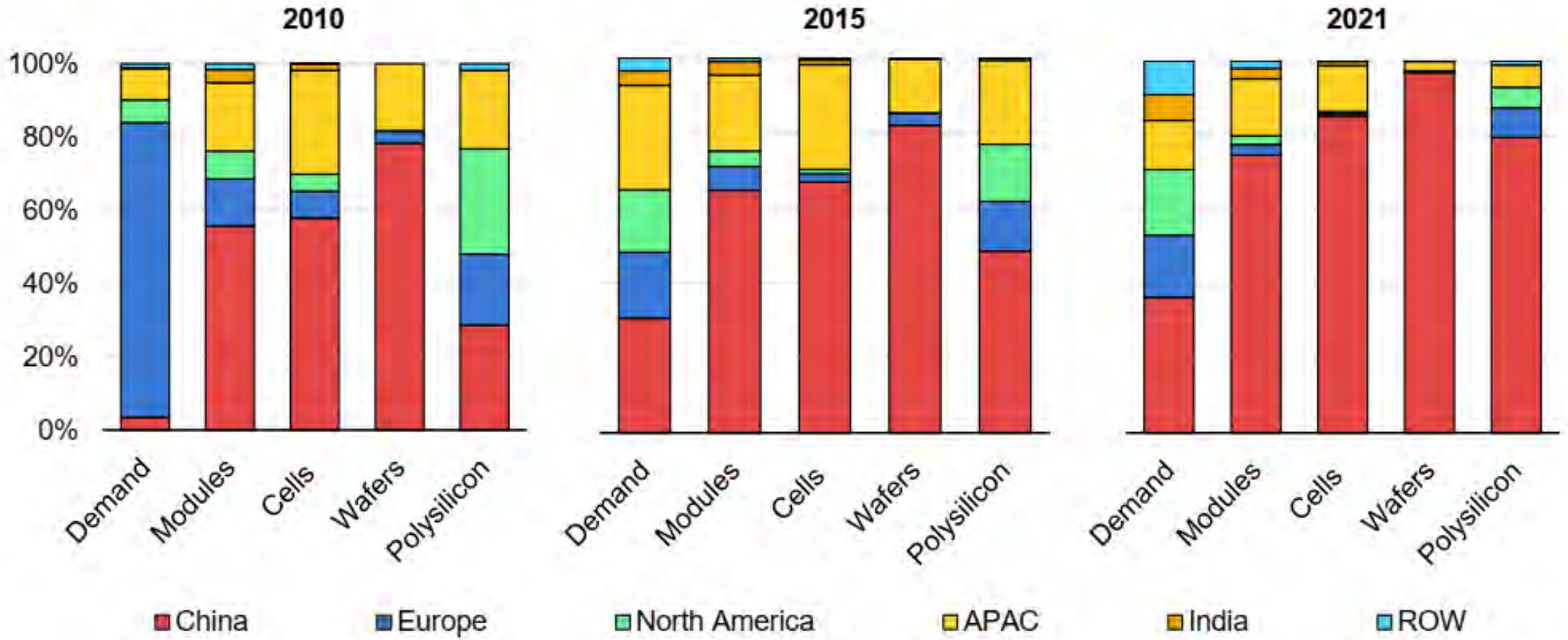
Federal Reserve Bank of Dallas

China dominates the entire downstream EV battery supply chain



Source: IEA

Solar PV manufacturing capacity by country and region, 2010-2021



IEA. All rights reserved.

Notes: APAC = Asia-Pacific region excluding India. ROW = rest of world.

Source: IEA

Source: IEA analysis based on BNEF (2022a), IEA PVPS, SPV Market Research, RTS Corporation and PV InfoLink.

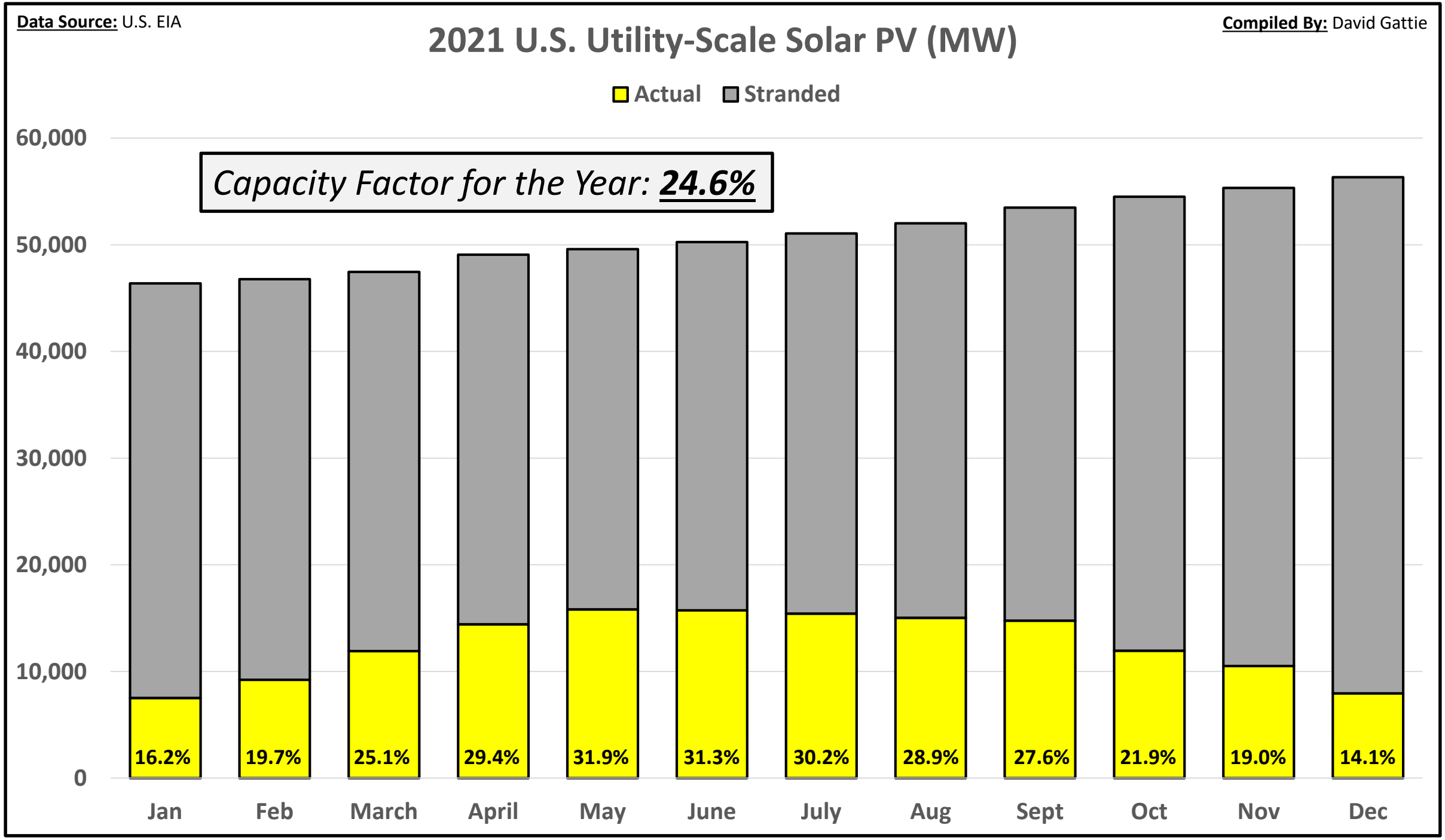
The Key to Reliability: Resource & Technology *Diversity*

Energy Resource	Resource & Power Plant Operational Characteristics	
Coal	• Generally independent of weather conditions • Resource is transportable and stored onsite (1-3 months supply) • Generation is baseload	• Fuel cost is market-based • Carbon emissions high • Annual Capacity Factor: 50%-plus
Natural Gas Combined Cycle	• Generally independent of local weather, subject to upstream supply • Resource is transportable, not stored onsite (just in-time delivery) • Generation is flexible and dispatchable	• Fuel cost is market-based (can be volatile) • Carbon emissions half that of coal • Annual Capacity Factor: 55%-plus
Nuclear	• Generally independent of weather conditions • Resource is transportable, stored onsite (~ 1.5 year refueling) • Generation is baseload	• Fuel cost is low • Zero carbon emissions • Annual Capacity Factor: 90%-plus
Solar and Wind	• Weather-dependent (daily, monthly, seasonally) • Resource is geographically fixed, not transportable, cannot be stored • Generation is not dispatchable, cannot serve as baseload	• Fuel cost is zero • Zero carbon emissions • *Solar:* Annual Capacity Factor: 25% • *Wind:* Annual Capacity Factor: 35%

Data Source: U.S. EIA

2021 U.S. Utility-Scale Solar PV (MW)

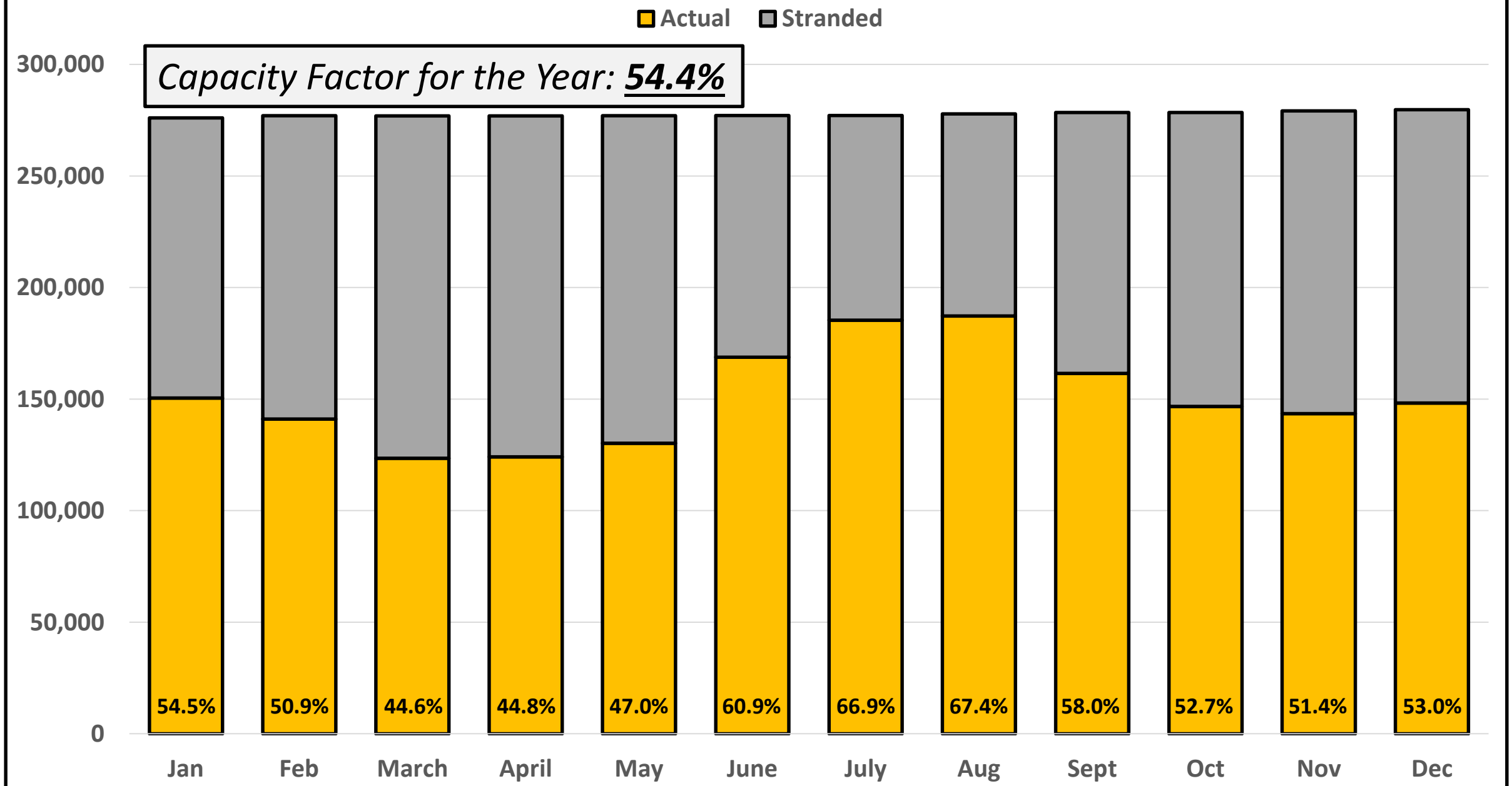
Compiled By: David Gattie



Data Source: U.S. EIA

2021 U.S. Natural Gas Combined Cycle (MW)

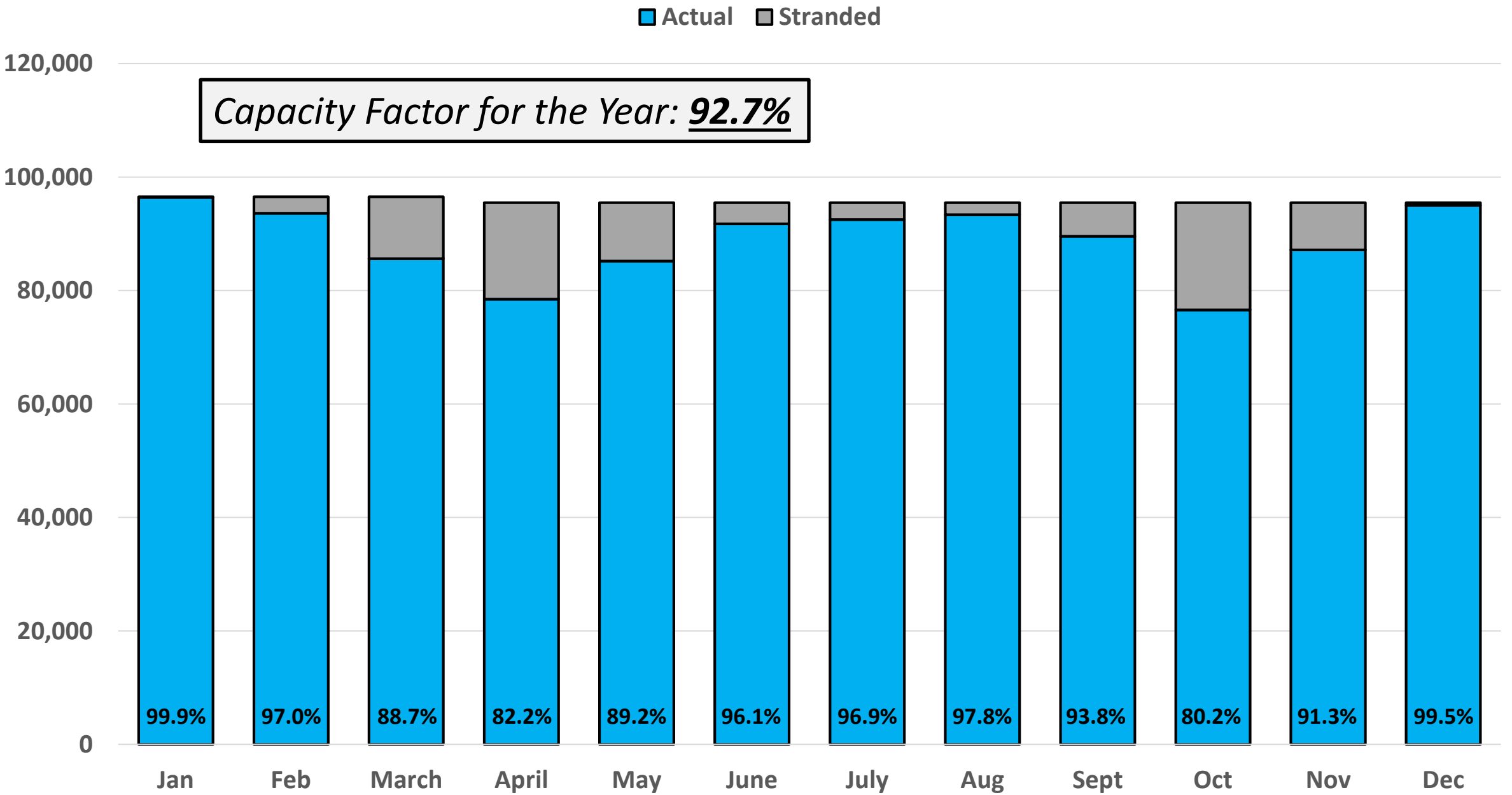
Compiled By: David Gattie



Data Source: U.S. EIA

Compiled By: David Gattie

2021 U.S. Nuclear (MW)



Top 8 GDP States
Power Sector Trends & Challenges

CALIFORNIA, TEXAS, NEW YORK, FLORIDA,
ILLINOIS, PENNSYLVANIA, OHIO, GEORGIA

US Nuclear Reactors: Shutdown & Under Threat

Status	Plant	Nameplate Capacity (MW)	Location	Generation (MWhrs)	Retirement Year (or announced)
Retired (11)	Crystal River	860	Florida	7,000,079	2013
	Kewaunee	566	Wisconsin	4,990,254	2013
	San Onofre 2 & 3	2,150	California	18,097,173	2013
	Vermont Yankee	604	Vermont	5,060,582	2014
	Fort Calhoun	483	Nebraska	3,425,235	2016
	Oyster Creek	608	New Jersey	4,585,091	2018
	Pilgrim	674	Massachusetts	5,414,318	2019
	Three Mile Island 1	803	Pennsylvania	5,214,196	2019
	Duane Arnold	601	Iowa	5,235,716	2020
	Indian Point 2	1,016	New York	8,351,945	2020
	Total	***8,365***		***67,374,589***	
Planned (8)	Diablo Canyon 1 & 2	2,240	California	16,258,298	2024, 2025
	~~Palisades~~	~~772~~	~~Michigan~~	~~5,995,123~~	~~2022~~
	Dresden 2 & 3	1,797	Illinois	15,478,888	2021
	Byron 1&2	2,300	Illinois	15,524,894	2021
	~~Indian Point 3~~	~~1,038~~	~~New York~~	~~9,108,821~~	~~2021~~
	Total	***8,147***		***62,366,024***	
State Action (16)	Davis-Besse	894	Ohio	7,228,063	2020 (Hold)
	Perry	1,240	Ohio	10,990,962	2021 (Hold)
	Beaver Valley 1 & 2	1,808	Pennsylvania	15,393,393	2021 (Hold)
	FitzPatrick	848	New York	6,588,676	2017 (Hold)
	R. E. Ginna	581	New York	4,332,888	2017 (hold)
	Clinton	1,065	Illinois	9,462,481	2017 (Hold)
	Nine Mile Point 1&2	2,054	New York	15,640,608	2017, 2018 (Hold)
	Quad Cities 1 & 2	1,819	Illinois	15,712,445	2018 (Hold)
	Salem 1 & 2	2,295	New Jersey	16,145,436	2020, 2021 (Hold)
	Hope Creek	1,172	New Jersey	10,592,697	2021 (Hold)
	Millstone 2 & 3	2,073	Connecticut	15,714,855	2020 (Hold)
	Total	***15,849***		***127,802,504***	
	Total All	***32,361***		***257,543,117***	

8.5% of 2020 US nuclear level

Shut Down May 20, 2022

Recently preserved by state action

Shut Down April 30, 2021

7.9% of 2020 US nuclear generation

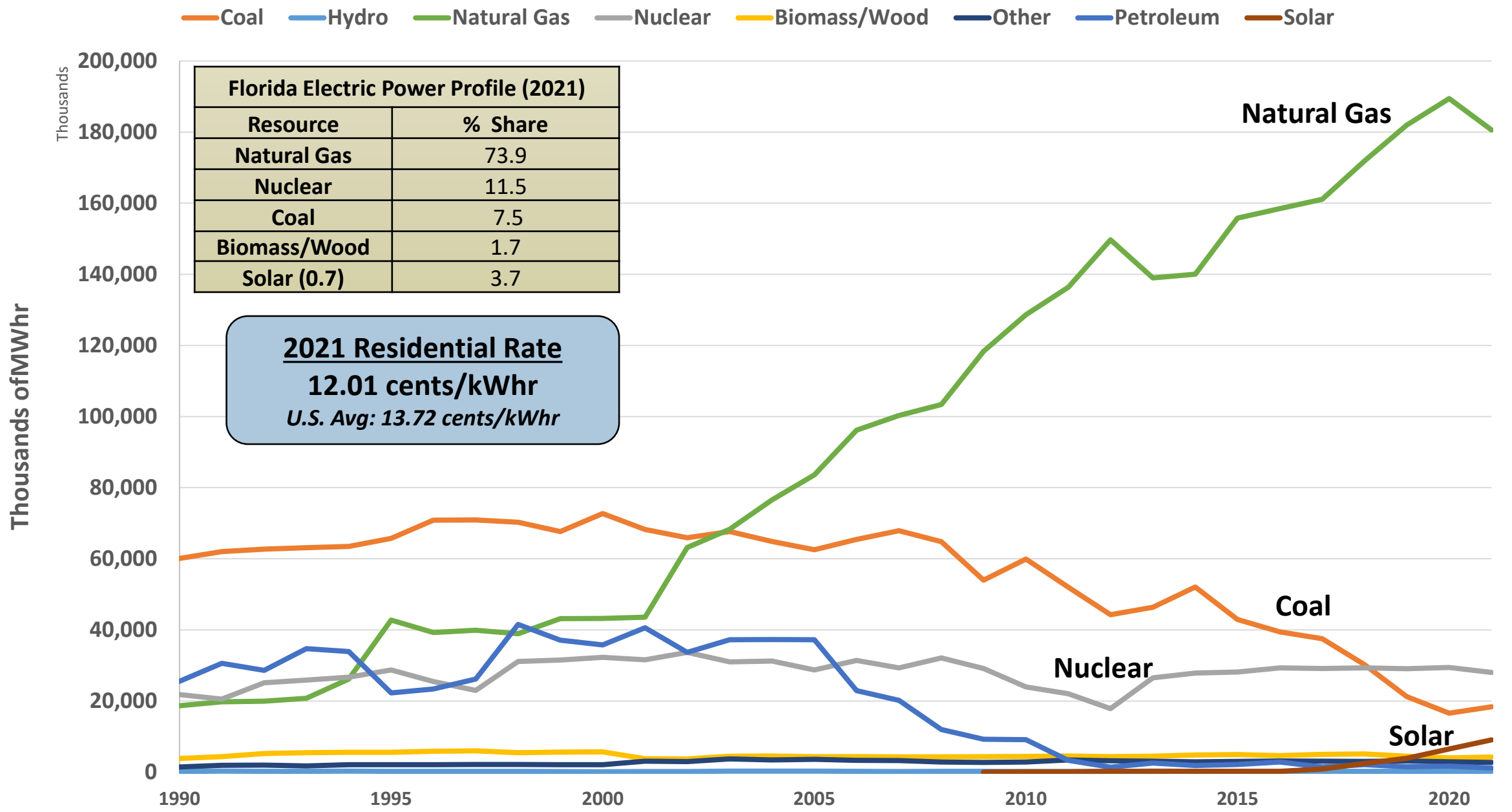
16.2% of 2020 US nuclear generation

Data Source: US EIA; NEI
Retirement Years: Third Way

Data Source: *US EIA*

Florida Generation (Regulated)

Compiled By: David Gattie



Florida Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	73.9
Nuclear	11.5
Coal	7.5
Biomass/Wood	1.7
Solar (0.7)	3.7

2021 Residential Rate

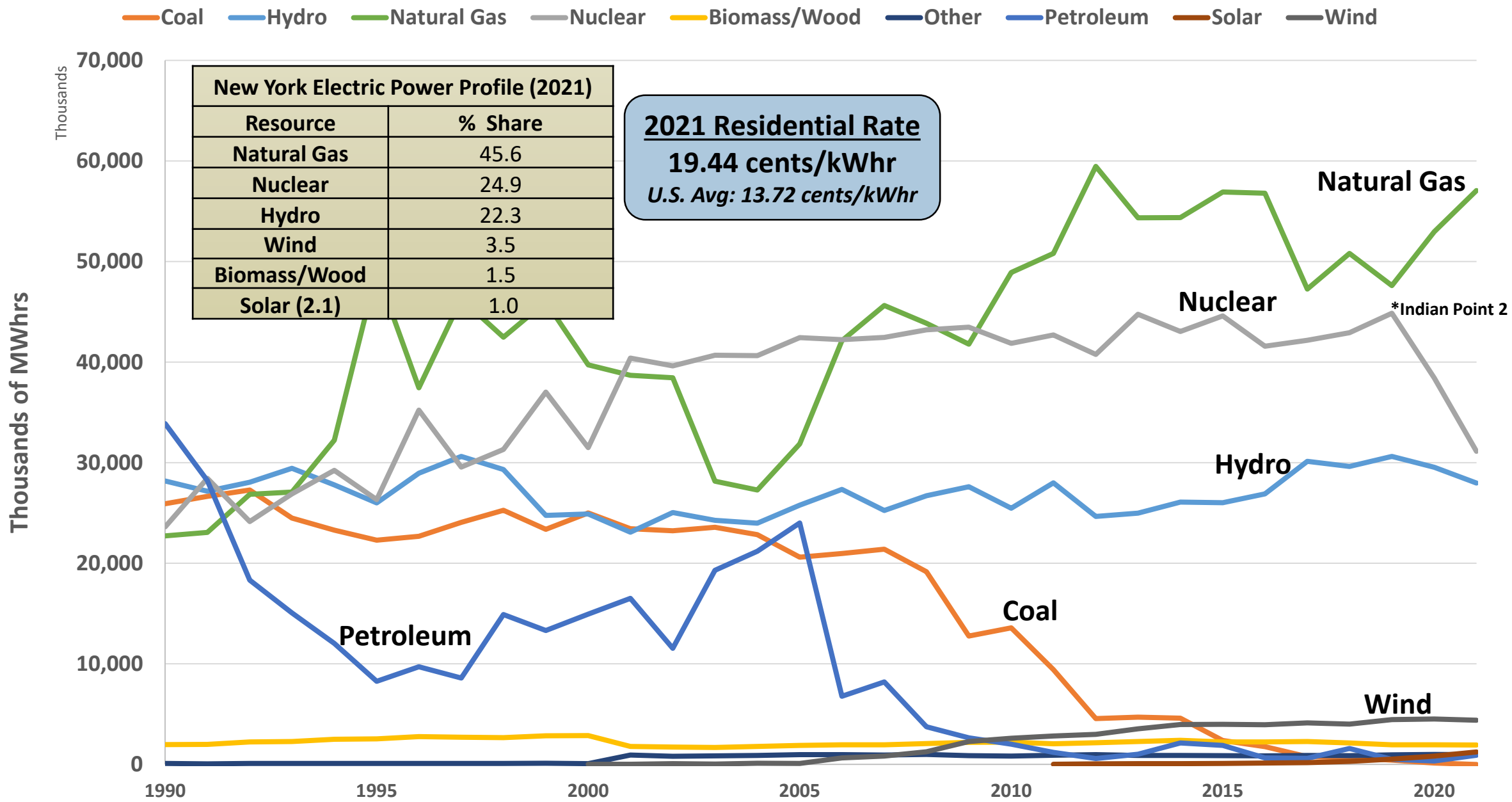
12.01 cents/kWhr

U.S. Avg: 13.72 cents/kWhr

Data Source: *US EIA*

Compiled By: David Gattie

New York Generation (Deregulated)



New York Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	45.6
Nuclear	24.9
Hydro	22.3
Wind	3.5
Biomass/Wood	1.5
Solar (2.1)	1.0

2021 Residential Rate

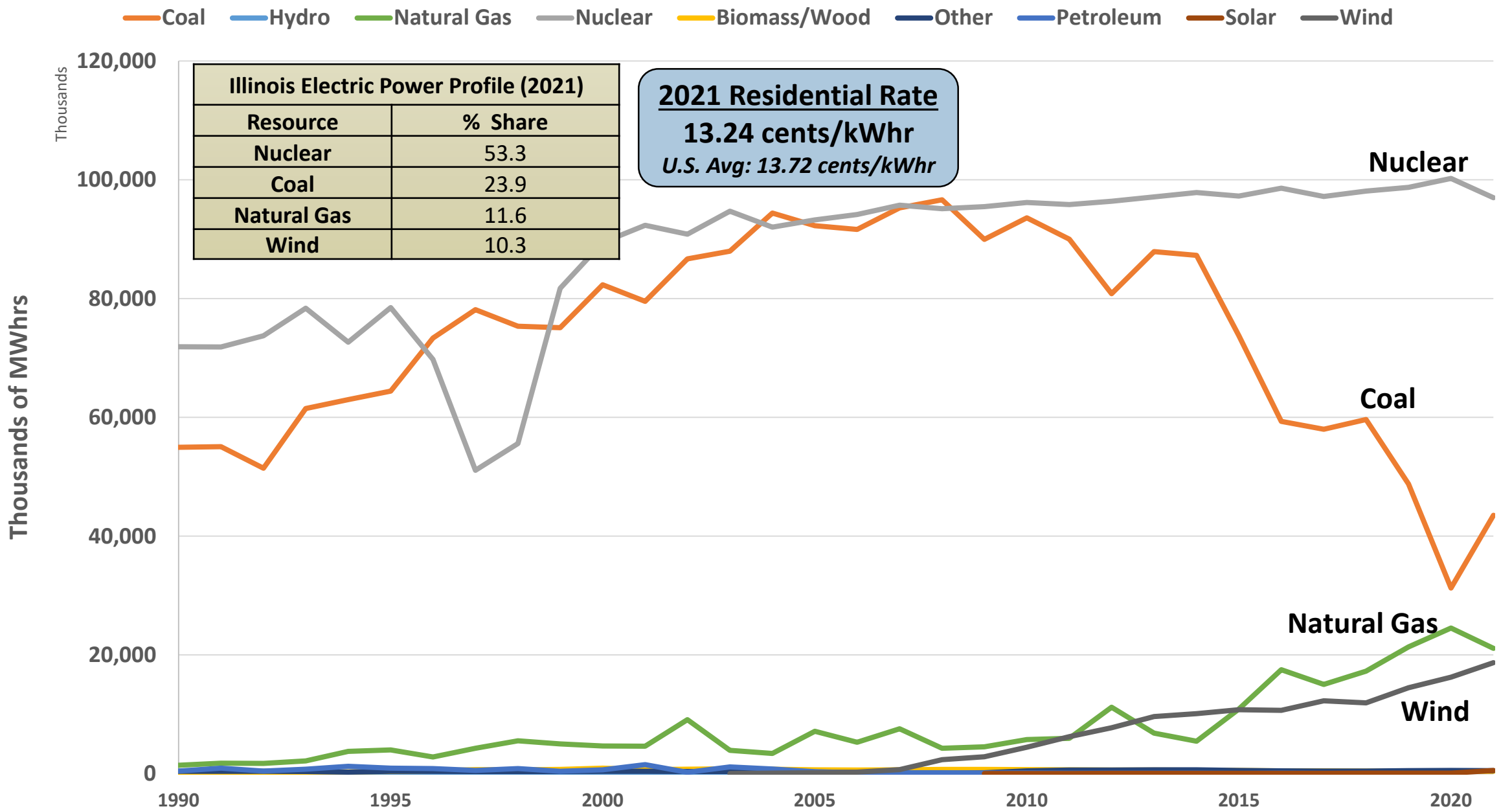
19.44 cents/kWhr

U.S. Avg: 13.72 cents/kWhr

Data Source: *US EIA*

Compiled By: David Gattie

Illinois Generation (Deregulated)



Illinois Electric Power Profile (2021)	
Resource	**% Share**
Nuclear	53.3
Coal	23.9
Natural Gas	11.6
Wind	10.3

2021 Residential Rate

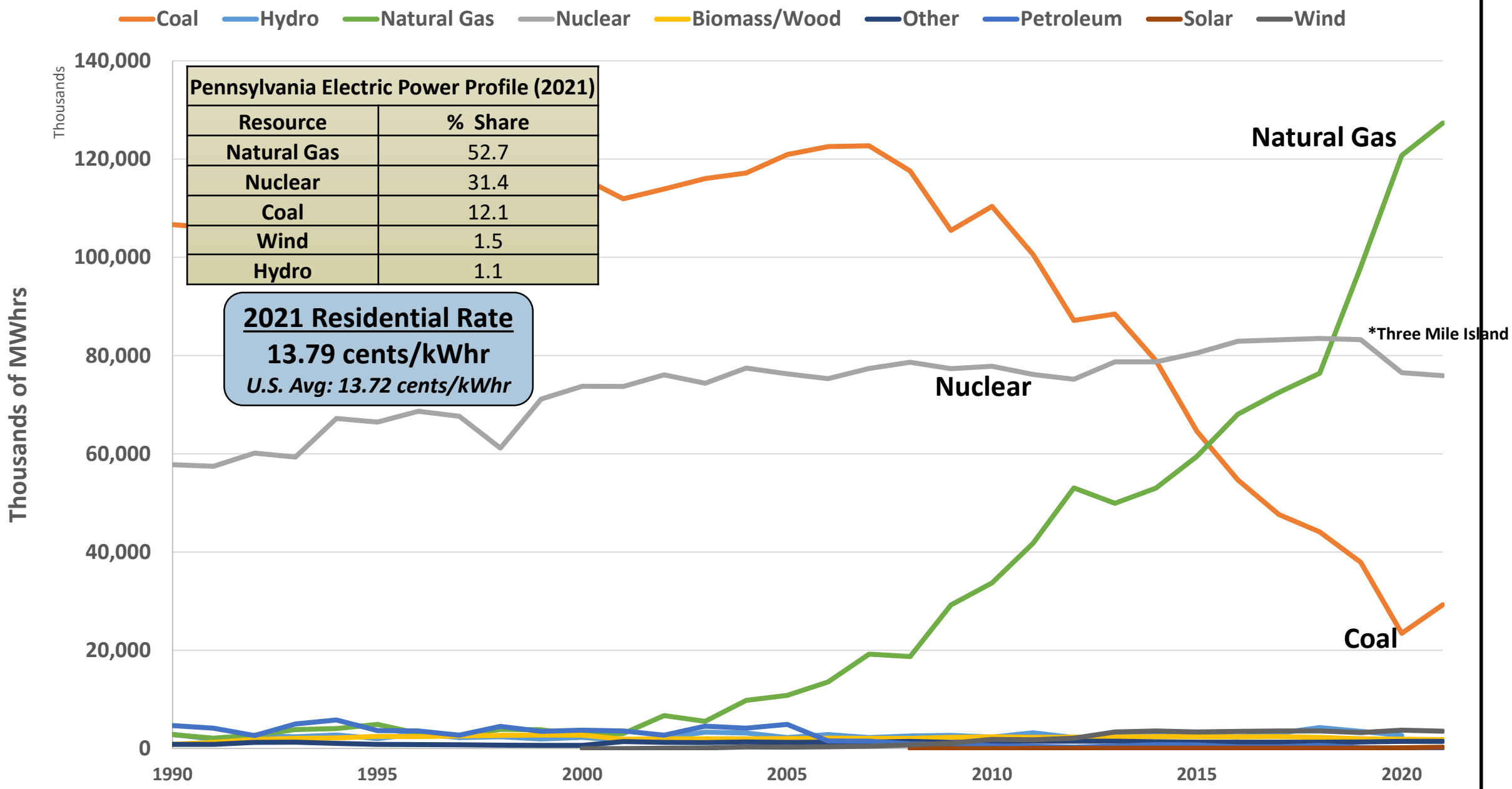
13.24 cents/kWhr

U.S. Avg: 13.72 cents/kWhr

Data Source: *US EIA*

Pennsylvania Generation (Deregulated)

Compiled By: David Gattie



Pennsylvania Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	52.7
Nuclear	31.4
Coal	12.1
Wind	1.5
Hydro	1.1

2021 Residential Rate

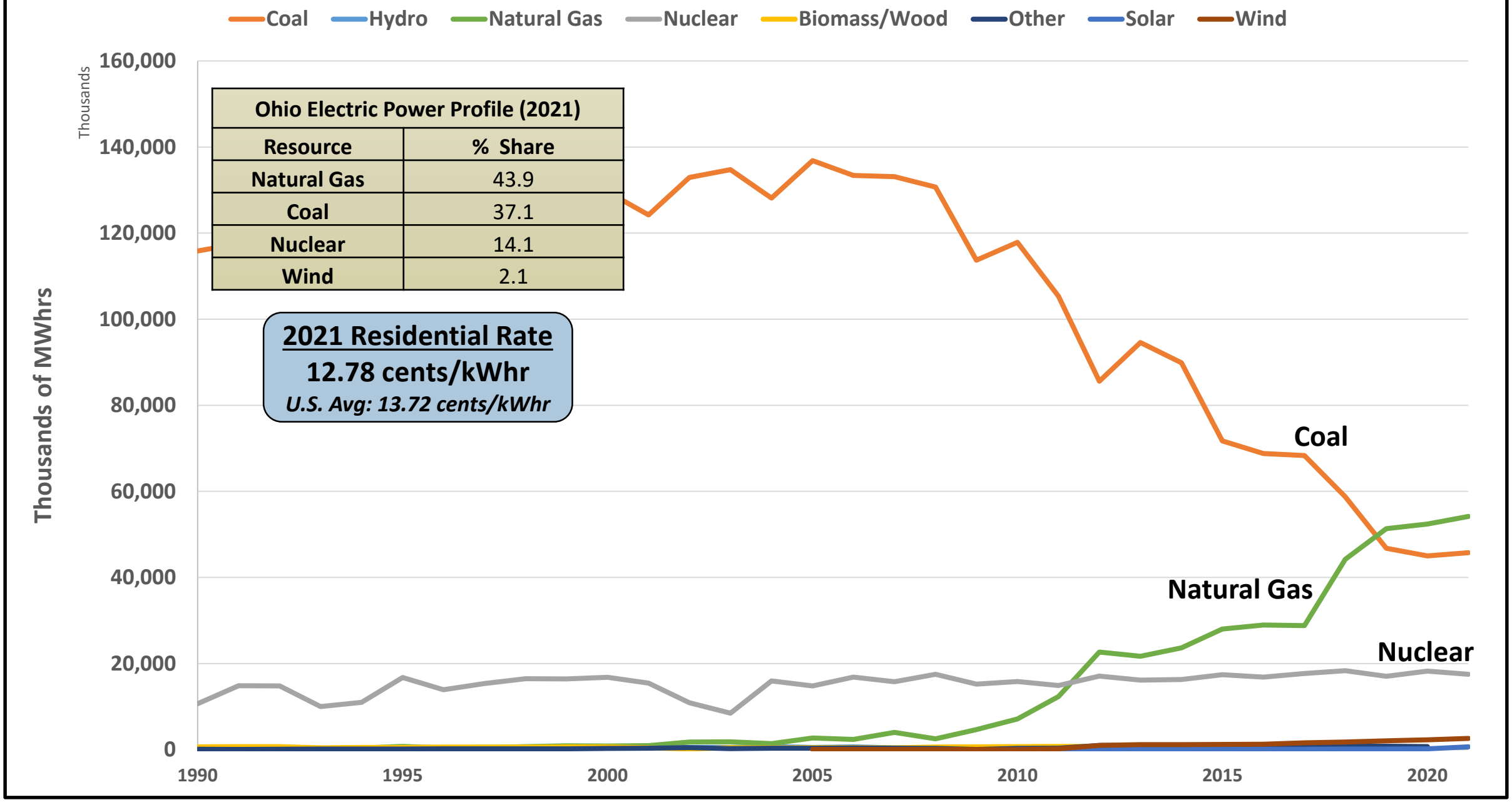
13.79 cents/kWhr

U.S. Avg: 13.72 cents/kWhr

Data Source: *US EIA*

Ohio Generation (Deregulated)

Compiled By: David Gattie



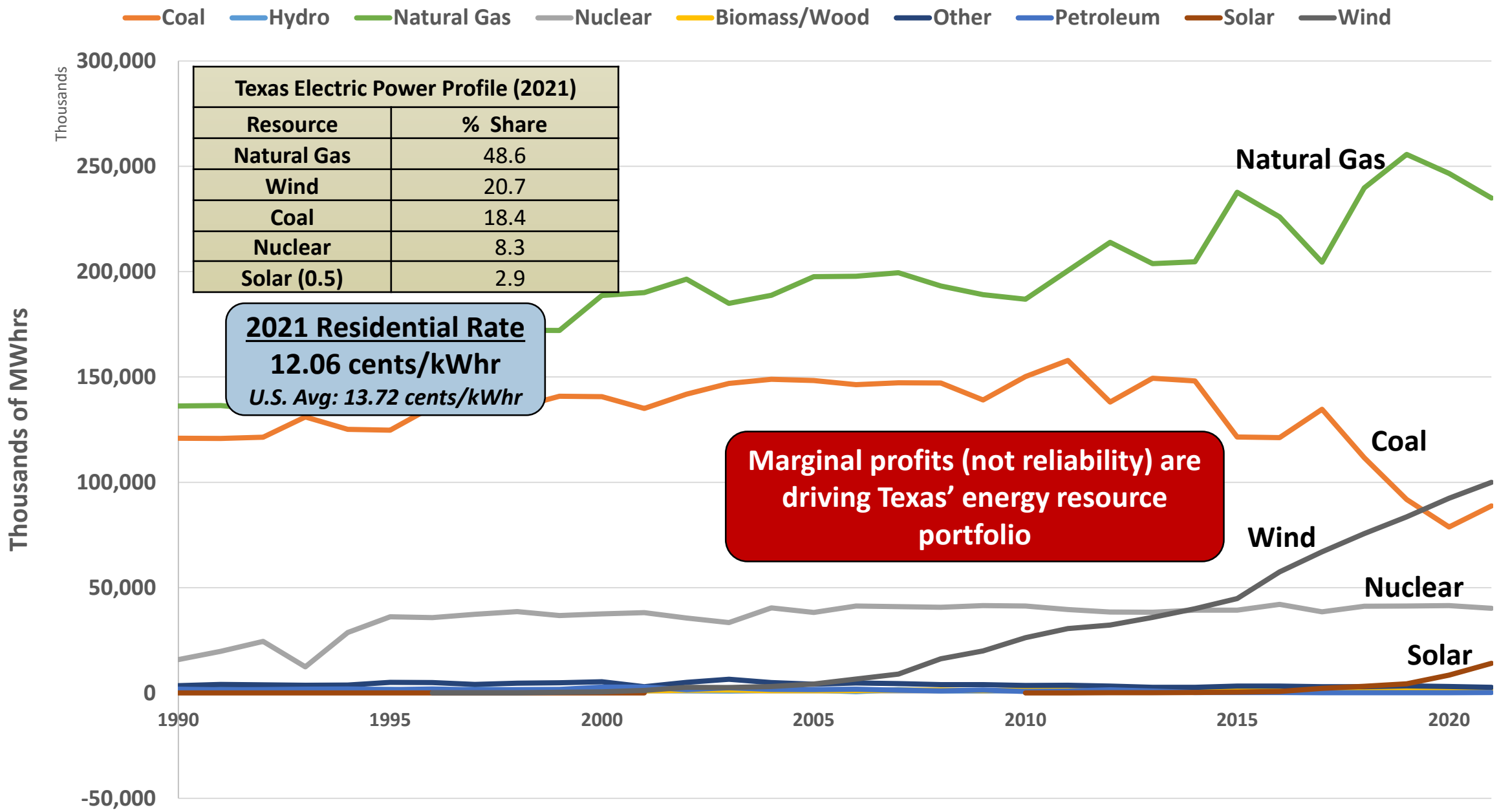
Ohio Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	43.9
Coal	37.1
Nuclear	14.1
Wind	2.1

2021 Residential Rate
12.78 cents/kWhr
U.S. Avg: 13.72 cents/kWhr

Data Source: *US EIA*

Compiled By: David Gattie

Texas Generation (Deregulated)



Texas Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	48.6
Wind	20.7
Coal	18.4
Nuclear	8.3
Solar (0.5)	2.9

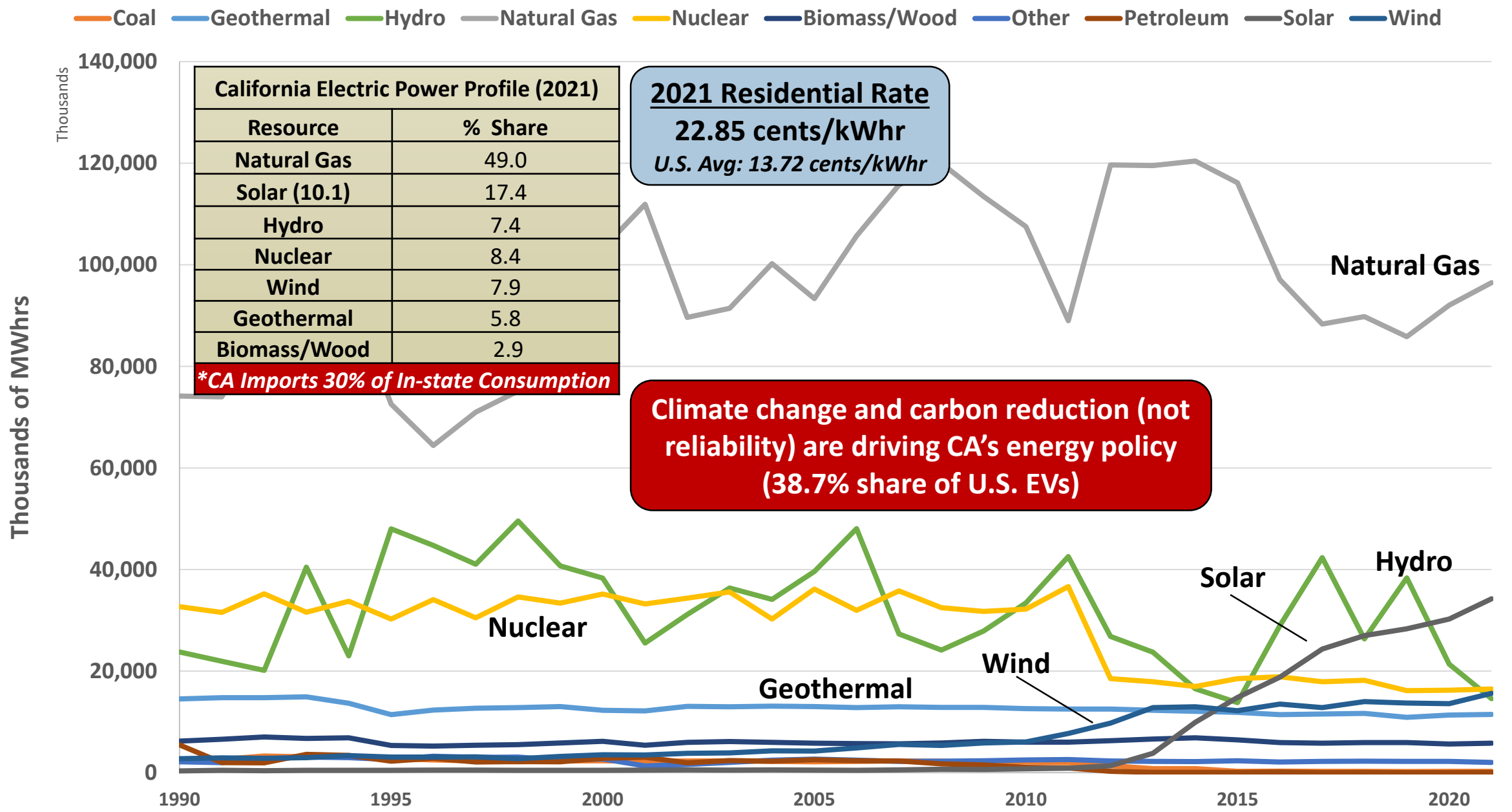
2021 Residential Rate
12.06 cents/kWhr
U.S. Avg: 13.72 cents/kWhr

Marginal profits (not reliability) are driving Texas' energy resource portfolio

Data Source: *US EIA*
*California Energy Commission

California Generation (Deregulated)

Compiled By: David Gattie



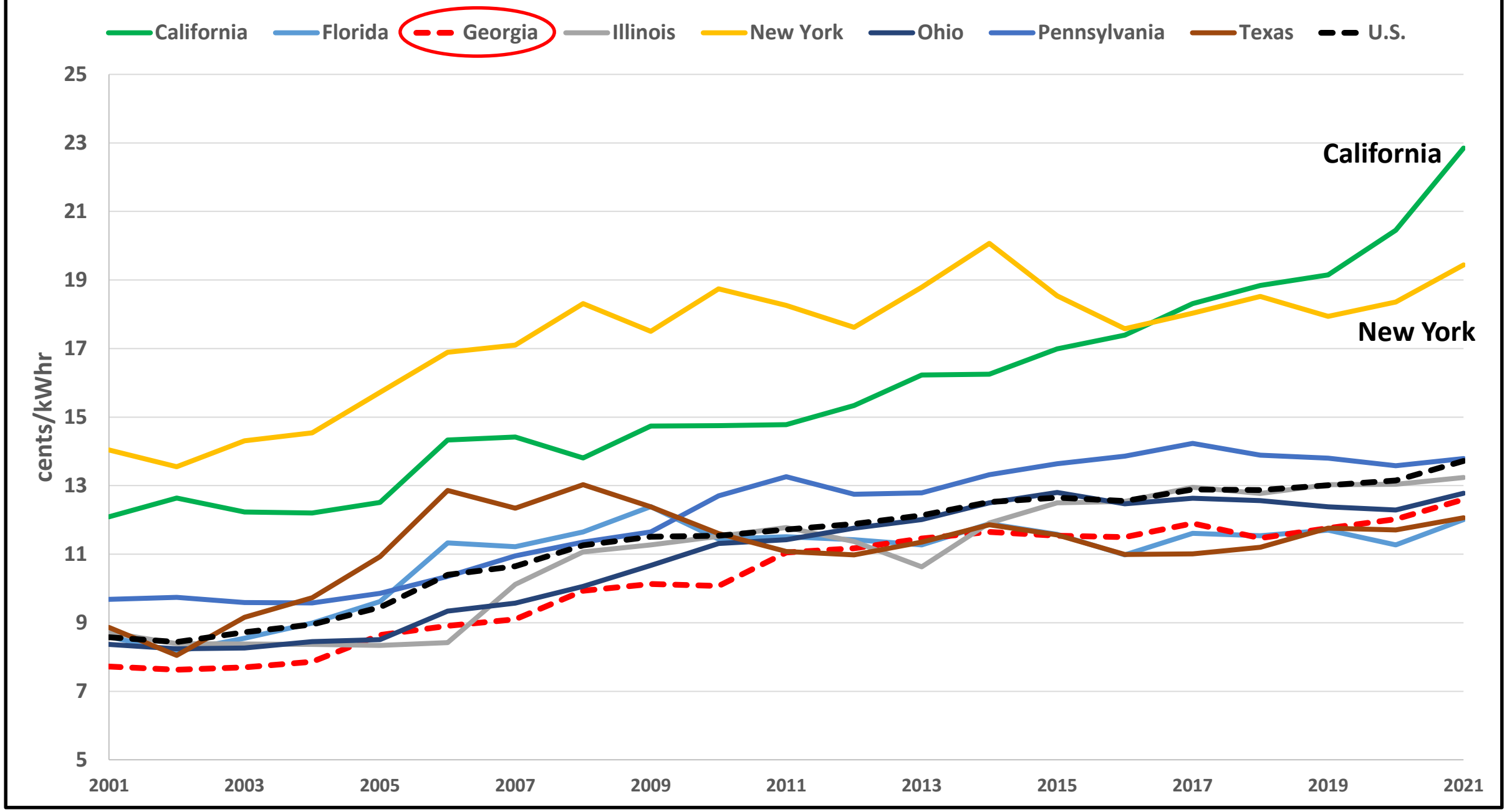
California Electric Power Profile (2021)	
Resource	**% Share**
Natural Gas	49.0
Solar (10.1)	17.4
Hydro	7.4
Nuclear	8.4
Wind	7.9
Geothermal	5.8
Biomass/Wood	2.9
**CA Imports 30% of In-state Consumption*	

2021 Residential Rate
22.85 cents/kWhr
U.S. Avg: 13.72 cents/kWhr

Climate change and carbon reduction (not reliability) are driving CA's energy policy (38.7% share of U.S. EVs)

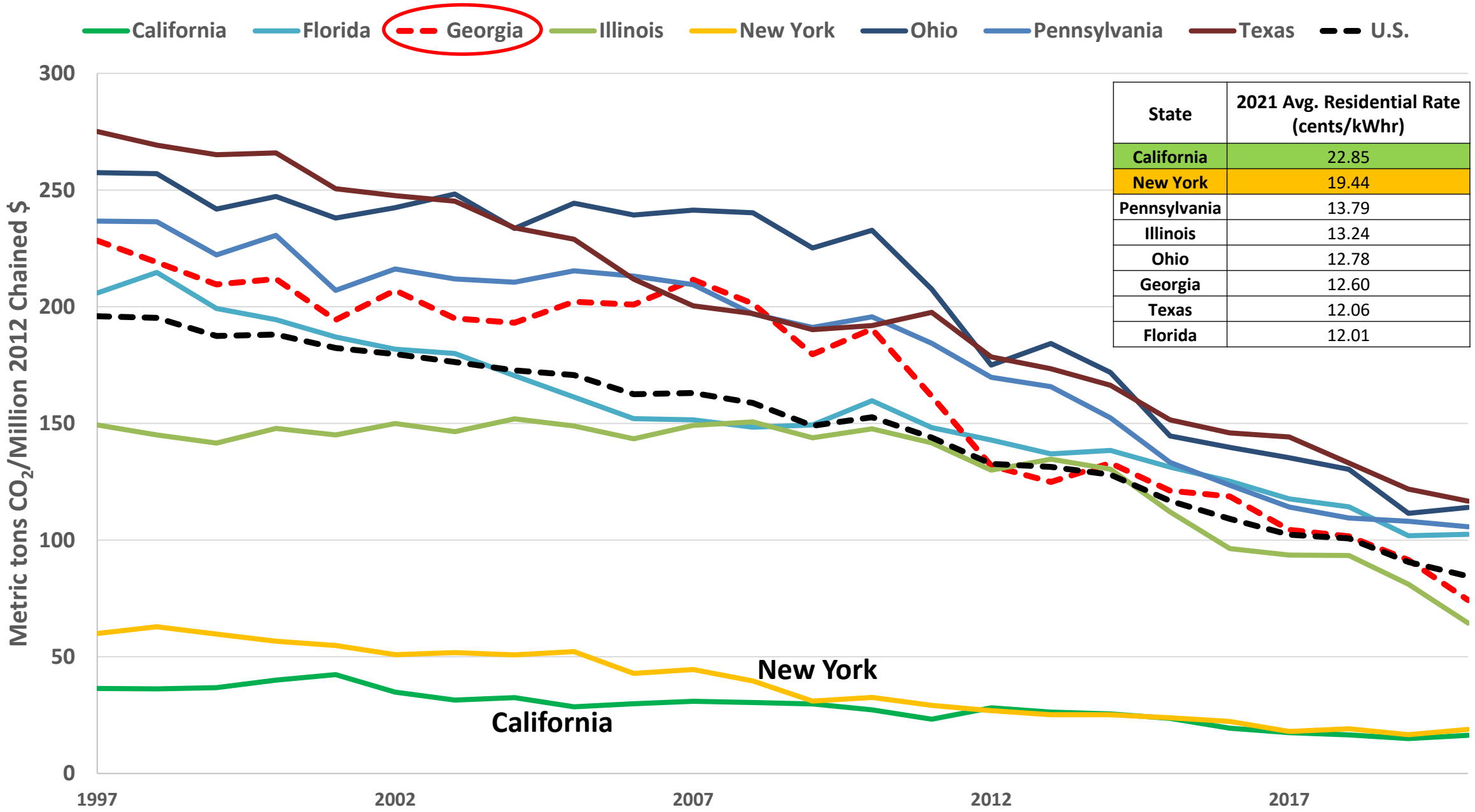
Data Source: U.S. EIA

Residential Electricity Rates: Top 8 GDPs



Data Sources:
U.S. EIA; U.S. Bureau Economic Analysis

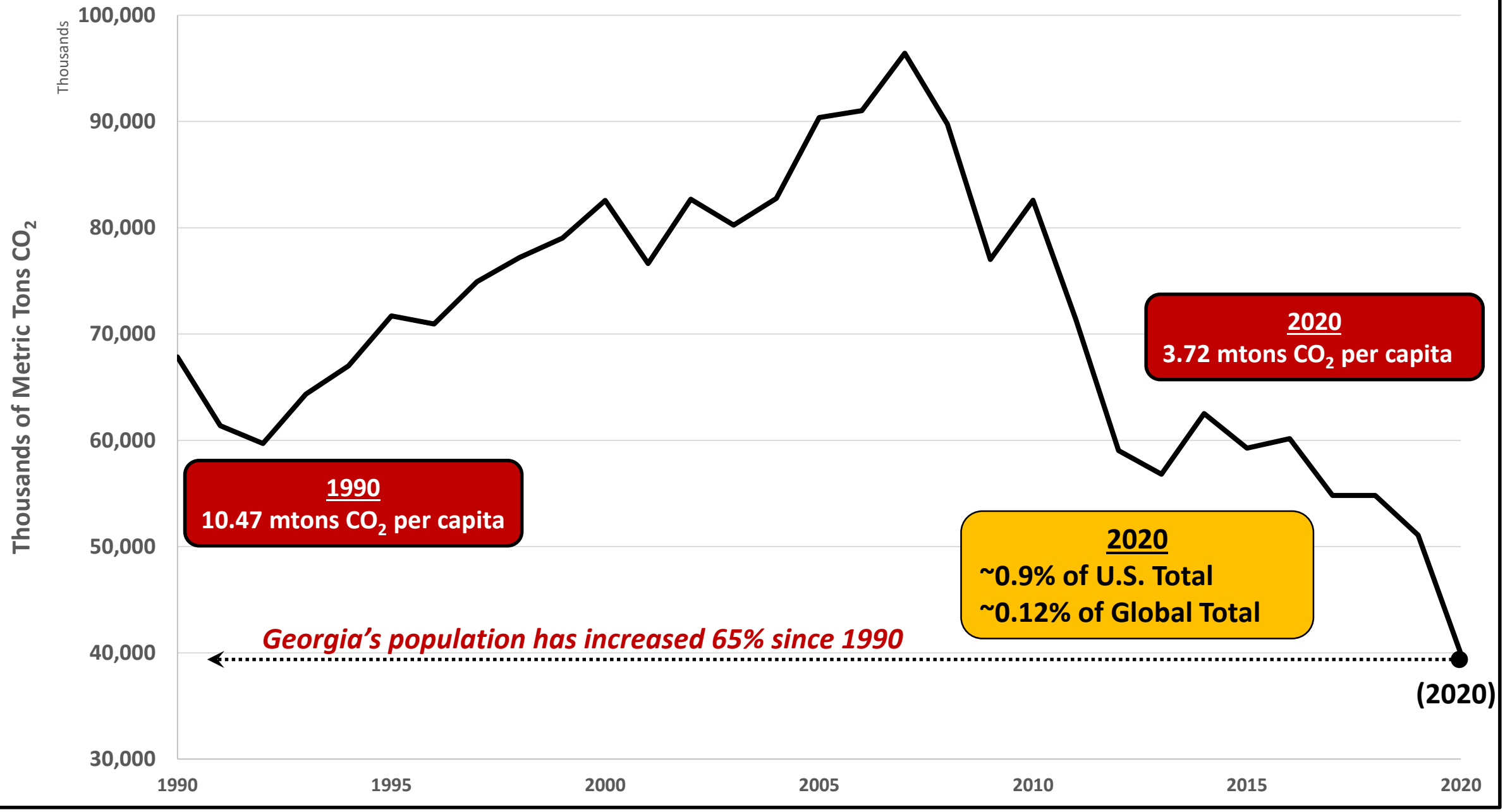
Electric Power Sector: CO_2 Intensity (GDP Basis)



State	2021 Avg. Residential Rate (cents/kWhr)
California	22.85
New York	19.44
Pennsylvania	13.79
Illinois	13.24
Ohio	12.78
Georgia	12.60
Texas	12.06
Florida	12.01

Data Source: U.S. EIA

GA CO_2 Emissions: Electric Power Sector



GEORGIA: THE ONLY STATE IN THE COUNTRY

OFFSETTING BASELOAD COAL WITH DISPATCHABLE NATURAL GAS, BASELOAD NUCLEAR, & RENEWABLES

<u>WHILE ALSO</u>

REDUCING CARBON EMISSIONS & PRIORITIZING/MAINTAINING RELIABILITY

Electrified Transportation in GA: Opportunities & Challenges

A reliability-focused, economic development opportunity with carbon reduction benefits—not the other way around as some states will approach it

Georgia's electric power sector is uniquely capable of meeting the challenges and helping develop the state's economic opportunities:

- *Public Service Commission, Georgia Power, Oglethorpe Power, EMCs, MEAGs*
- *Vertically-integrated, regulated market structure*
- *Pragmatic, realistic policymaking & long-range Integrated Resource Planning*
- *Maintaining diversity, prioritizing reliability*

Thank You

Additional References

- Inaugural UGA Energy Outlook Recap . Link to Outlook Presentation. January 12, 2022.
- Gattie, D, and Hewitt, M. 2022. Security-centric and climate-inclusive: Energy policy for an era of great power politics. *Force Distance Times*. June 23, 2022. Link to Article
- Gattie, D, and Hewitt, M. 2022. Energy Sovereignty Will Be the Westphalian Principle of the 21st Century. *The National Interest*. February 22, 2022. (Link to Article]
- McFarlane, R, and Gattie D. 2021. Nuclear Affairs. *The National Interest*, (176): 69-75. November/December Issue. Link to Article
- Gattie, DK. 2021. South Korea's Summit Solution Dreams and Zero Carbon Realities. *The National Interest*. March 30, 2021. [Link to article: https://nationalinterest.org/feature/south-korea%E2%80%99s-summit-solution-dreams-and-zero-carbon-realities-181517]
- Gattie, DK. 2021. *President Biden's Executive Order on Climate Change: Implications for the US Industrial Base. Expert Brief for* Global America Business Institute. February 24, 2021. [Link to Brief]
- Gattie DK and Massey JNK. 2020. 21st Century US Nuclear Power Policy: Standing at a Strategic Crossroads. Strategic Studies Quarterly [Link to Paper]
- Gattie, DK. 2020. US energy, climate and nuclear power policy in the 21st century: The primacy of national security. *The Electricity Journal*, 33(1) 106690. [Link to Paper]
- Gattie, DK. 2019. Testimony Before the Energy and Commerce Subcommittee on Environment and Climate Change—Building a 100% Clean Economy: Solutions for Economy-Wide Deep Decarbonization". [Link to Gattie Testimony[
- Gattie, DK. 2020. House climate plan needs global and national security context. *The Hill*. July 9, 2020. [Article Link]
- Gattie, DK. 2019. Will the US Lead? Or let China and Russia dominate nuclear energy. The Hill. May 22, 2019. [Article Link]
- Gattie, DK. 2019. The Green New Deal: Isolationist in scope and blind to geopolitical realities. *The Hill*. February 11, 2019. [Article Link]
- Gattie, DK. 2017. U.S. National Security and a Call for American Primacy in Civilian Nuclear Power. Forbes. Sept. 7, 2017. [Article Link]

*UGA Engineering and The †Center for International Trade & Security (CITS)

*†David Gattie—†Justin Conrad—†Josh Massey

Applied Energy Studies

Informing energy policy to better align with national security and geopolitical realities of the global energy sector

GEORGIA Engineering

GEORGIA CITS

Energy Systems ***National Security***

Appendix V

(Material from meeting #5, November 2, 2022)

THE EASTERN TRANSPORTATION COALITION

Exploring Mileage-Based User Fees as a Solution to Transportation Funding

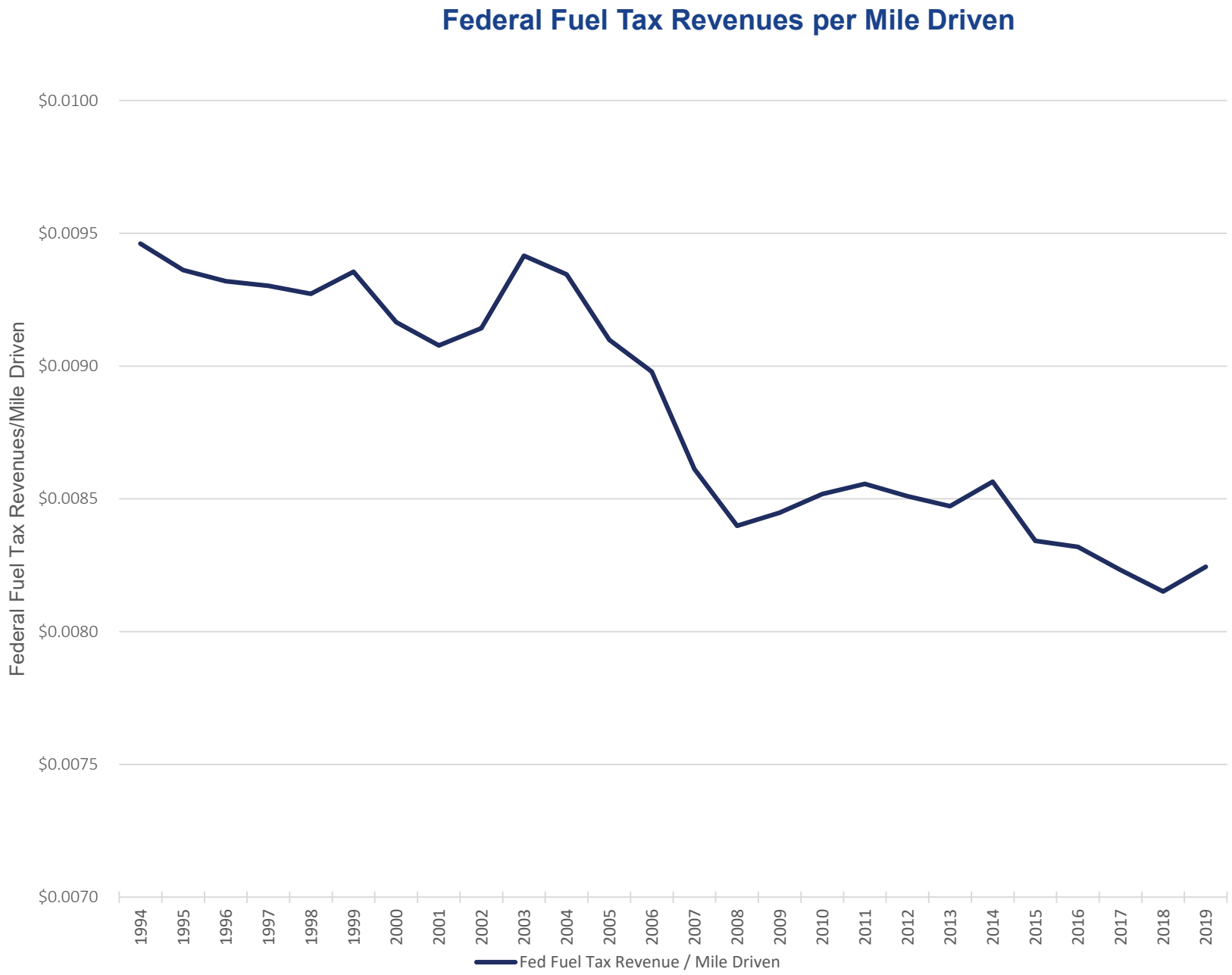
Georgia Joint Study Committee of Electrification on Transportation

November 2, 2022

Why are we talking about transportation funding?

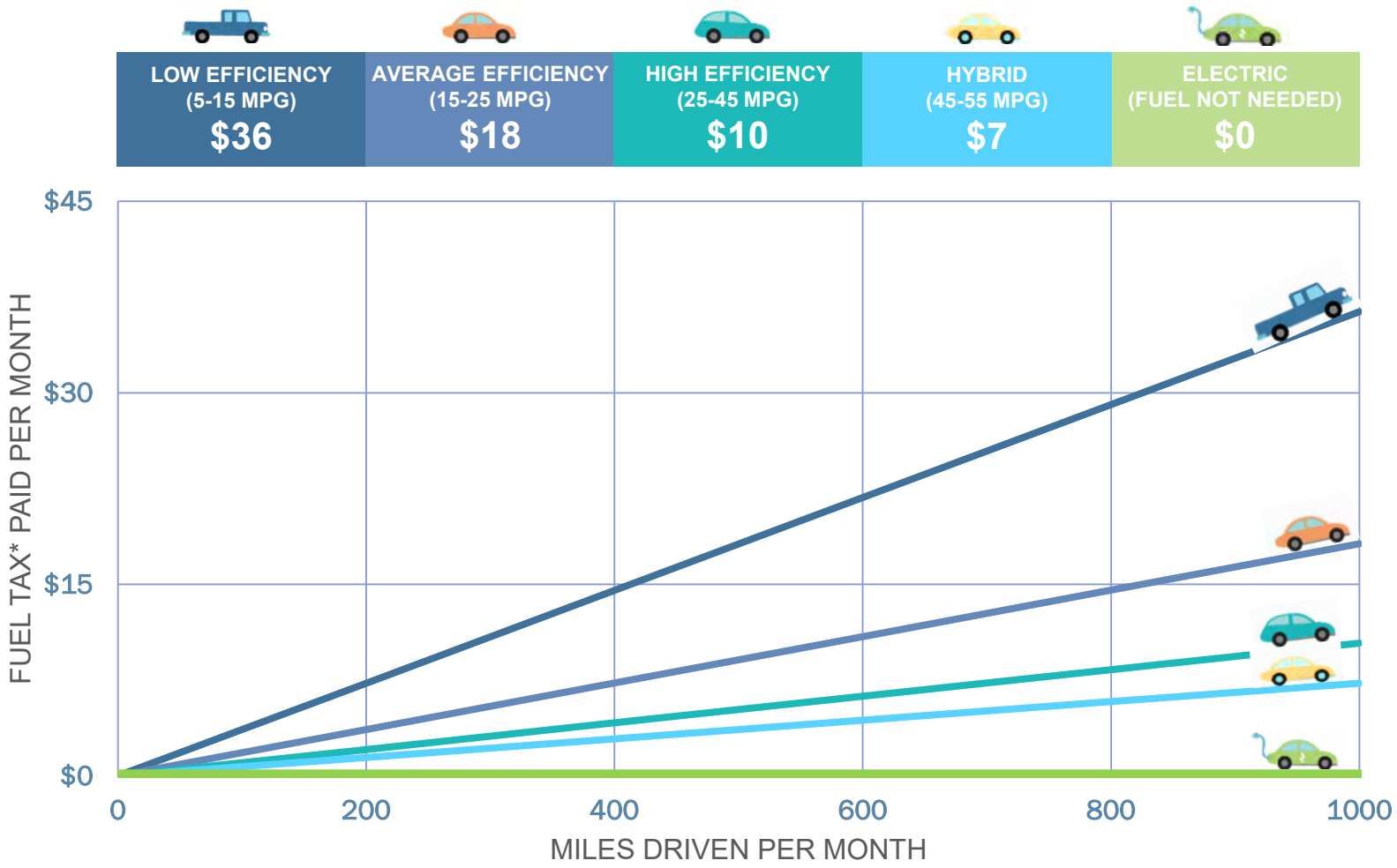
We need our roads.

Drivers are paying less fuel tax per mile driven.



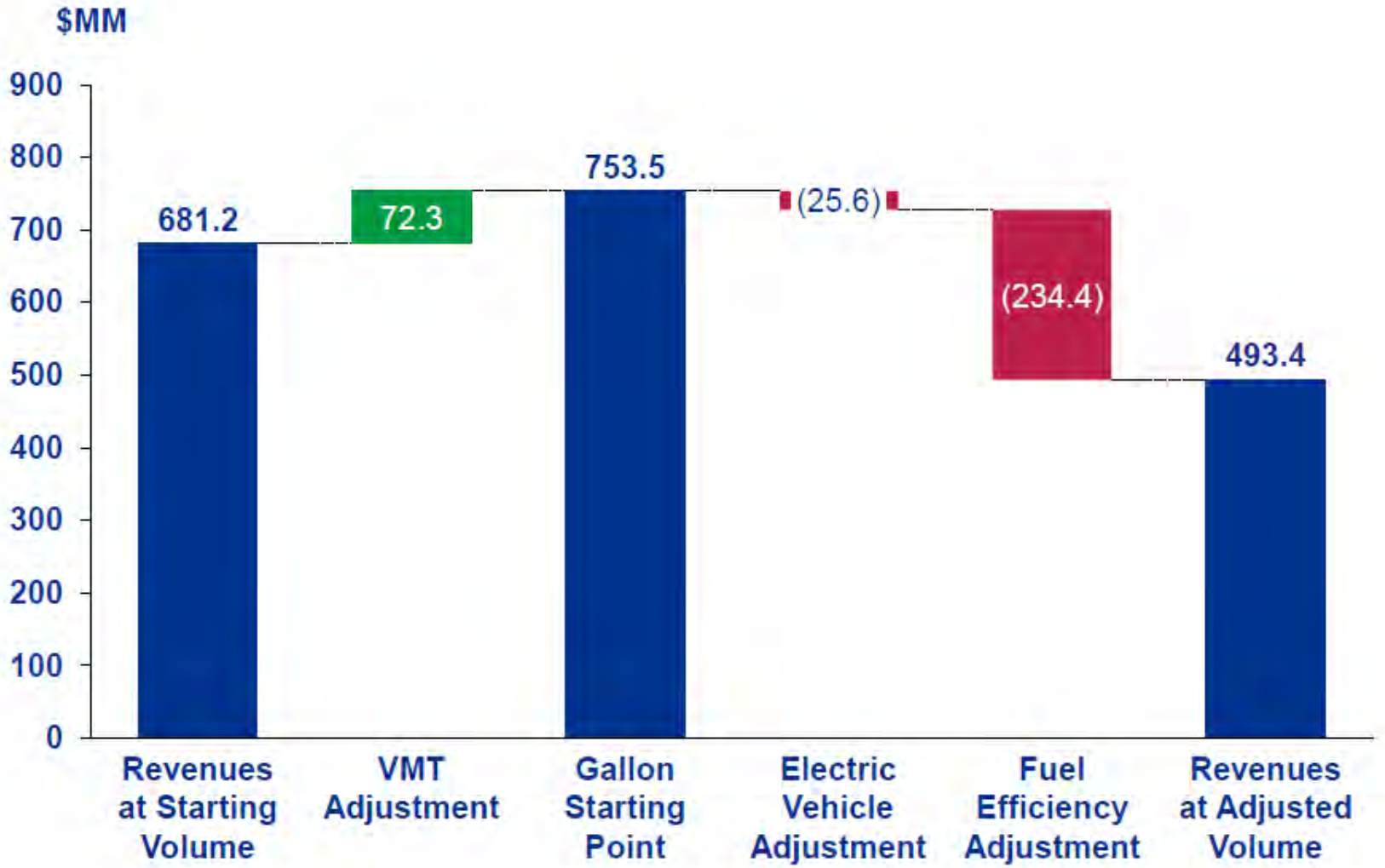
The transportation fleet is changing.

FUEL TAX PAID (AVERAGE MONTHLY BY VEHICLE TYPE)



*Calculations are based on state fuel tax rates for North Carolina.

Virginia: Fuel tax revenues projected to decline by 2040



~31%
reduction in gas tax collections due to increased fuel efficiency

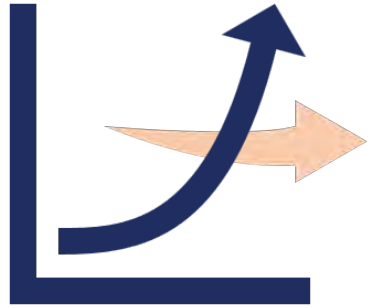
Source: KPMG Analysis

There is a gap in public understanding.

Example: Pennsylvania

61% OF PENNSYLVANIANS RATE STATE HIGHWAY QUALITY AS **GOOD** OR **EXCELLENT**

68% BELIEVE FUNDING IS **INCREASING** OR **STAYING THE SAME**



92% DON'T KNOW **HOW MUCH FUEL TAX THEY PAY**

We need a new & more sustainable way to fund transportation.

What is an MBUF?

Most states are looking at MBUF to **replace** the gas tax.

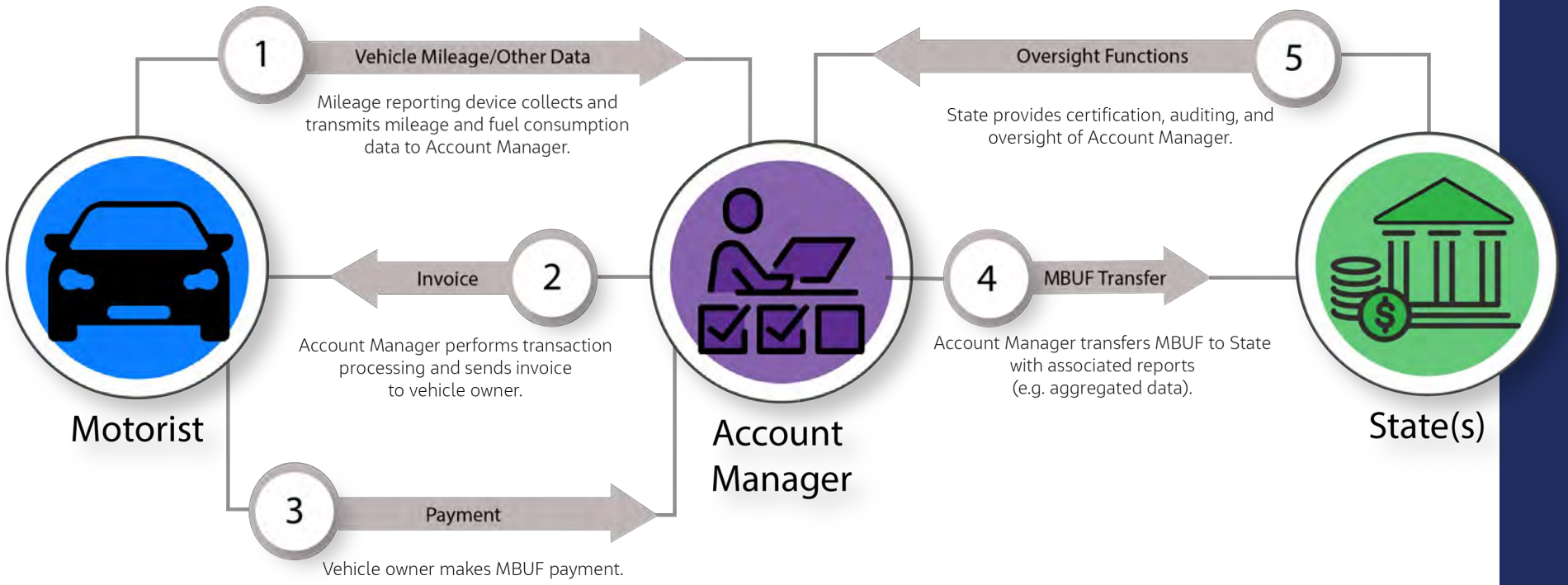
From this...

HOW MUCH GAS YOU USE

To this...

HOW MANY MILES YOU DRIVE

How MBUF (May) Work: **Account Managers**



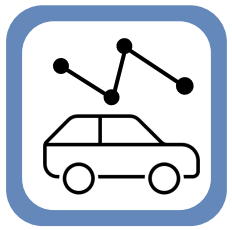
How MBUF (May) Work: **Mileage Reporting**

Plug-in device

Flat fee

GPS and non-GPS options

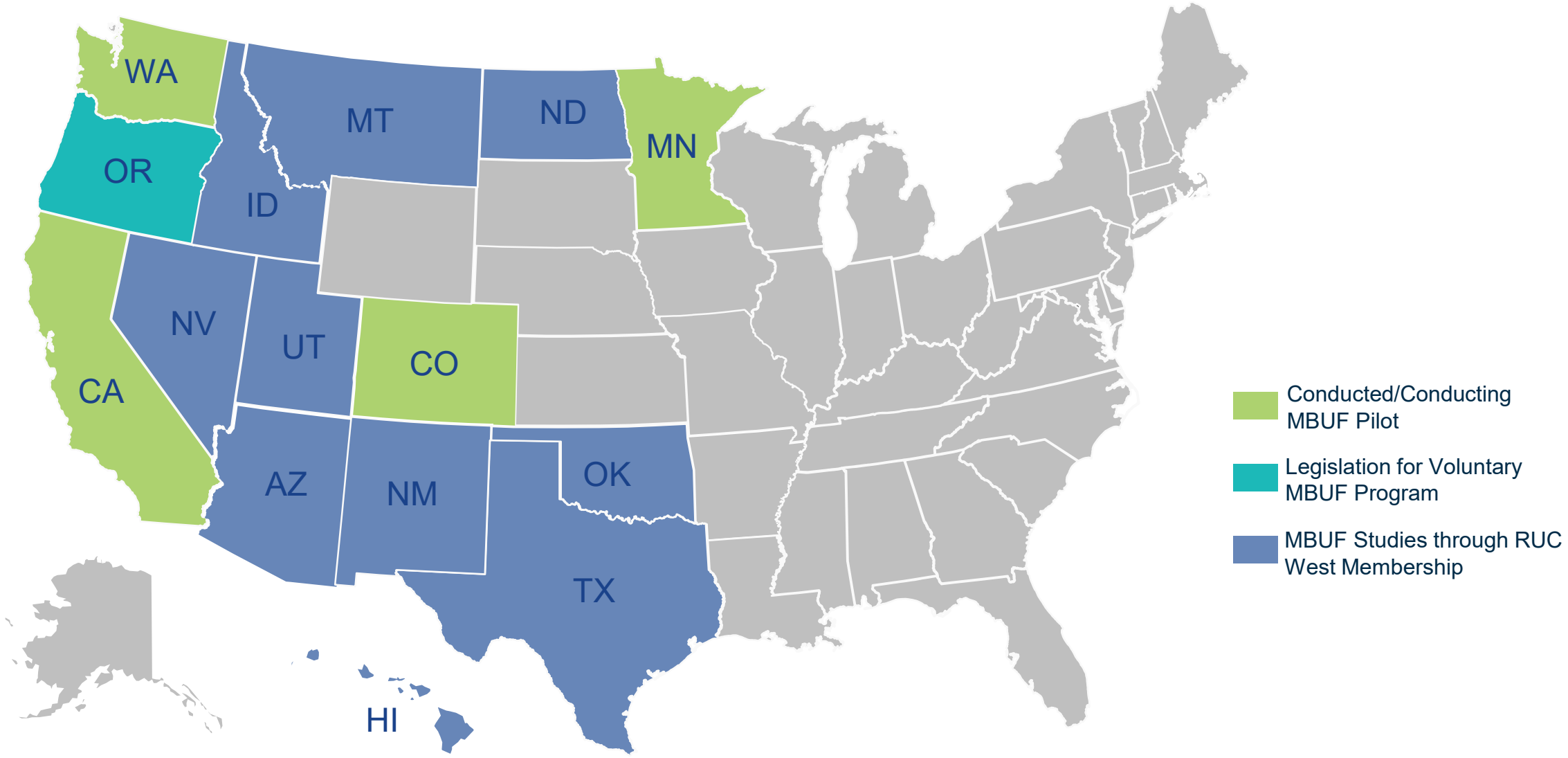
In-vehicle telematics



Odometer reading

Why Should We Pay Attention to MBUF?

2016: MBUF Exploration Looked Like This



Surface Transportation System Funding Alternatives Program

Section 6020 of the Fixing America's Surface Transportation Act

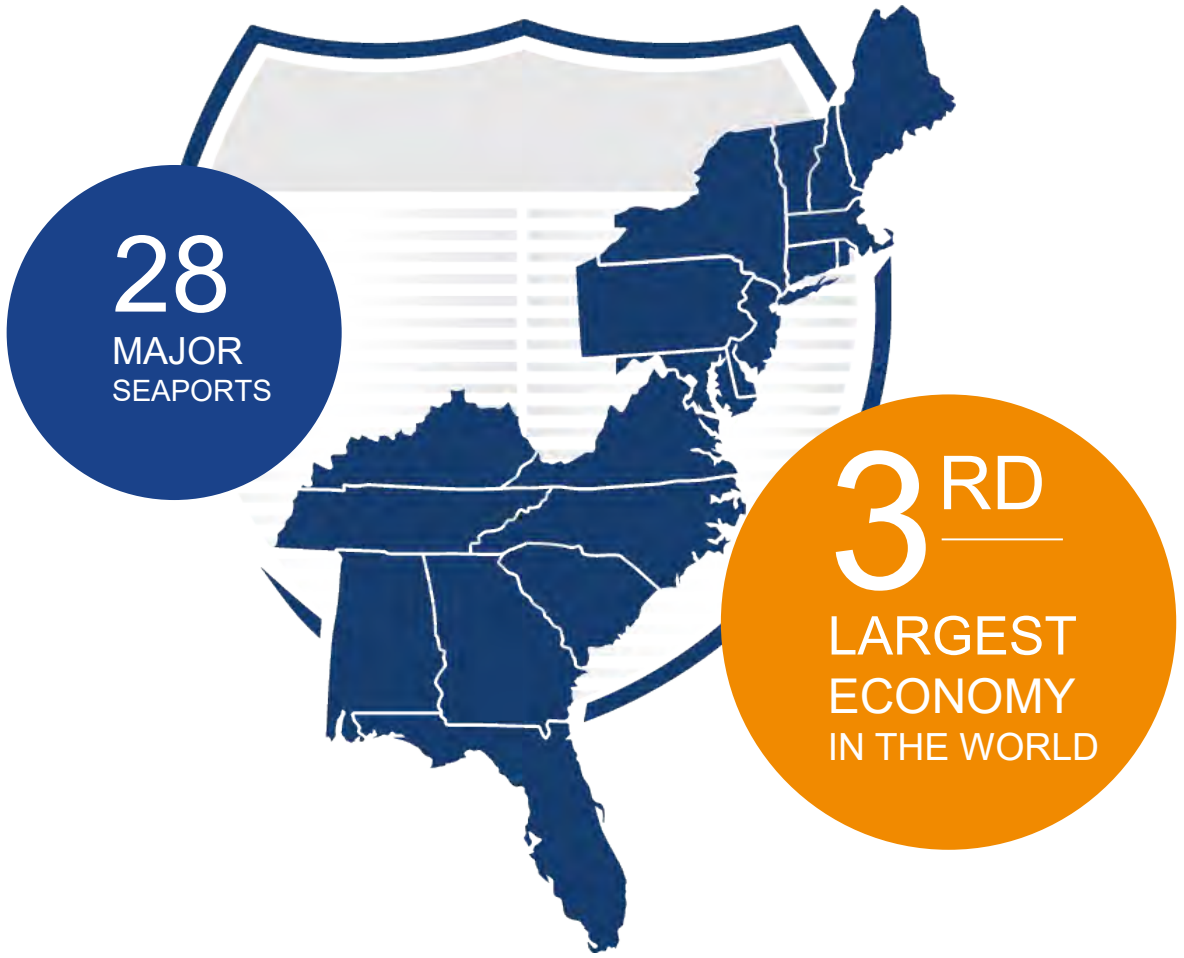
Authorized grants to states for demonstrating:

- ✓ User-based **alternative** revenue mechanisms
- ✓ Utilization of a **user-fee** structure
- ✓ A solution to maintain the **future long-term solvency** of the Federal Highway Trust Fund

50%
MATCH REQUIRED

Provides $95 million over 5 years

Who is the Eastern Transportation Coalition?



17 States + D.C.

and 200+ agencies

40%	OF THE U.S. POPULATION
38%	OF THE NATION'S JOBS
35%	U.S. VEHICLE MILES TRAVELED
21%	OF THE U.S. ROAD MILES

Connecting for Solutions

THE COALITION STRUCTURE

EXECUTIVE BOARD
DOT CEOs

COALITION STAFF

STEERING COMMITTEE & CO-CHAIRS

PROGRAM TRACK COMMITTEES

TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS

VPP MARKETPLACE

DATA TOOLS & USER GROUPS

TRAVELER INFORMATION

TRAFFIC INCIDENT / EVENT MANAGEMENT

OPERATIONS ACADEMY

FREIGHT

FREIGHT PLANNING

FREIGHT DATA

TRUCK PARKING

SUPPLY CHAIN PERFORMANCE

FREIGHT ACADEMY

INNOVATION IN TRANSPORTATION

CONNECTED & AUTONOMOUS VEHICLE

TOLLING RECIPROCITY

MILEAGE-BASED USER FEE

Coalition's STSFA Grant Work aims to bring the nation's understanding of MBUF forward.

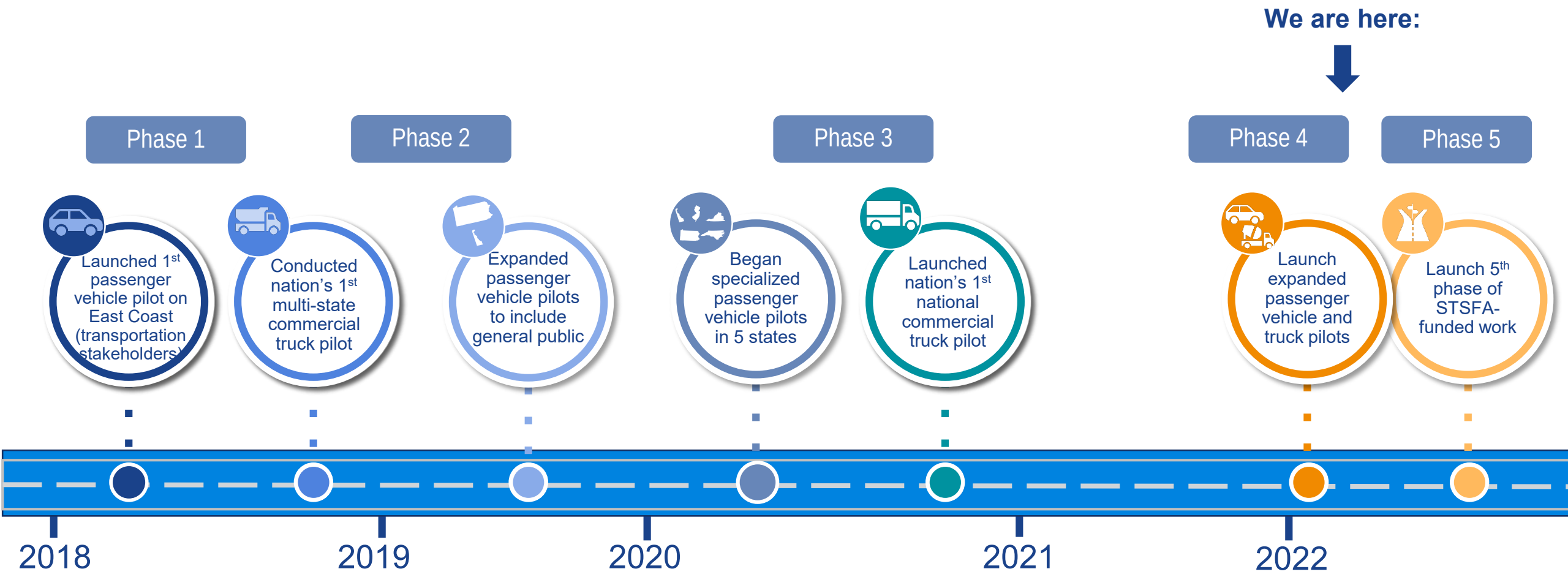
Topics explored in FIVE grants awarded to the Coalition:

- **Out-of-State Mileage**
  How will travel across boundaries be handled?
- **Tolling**
  How can lessons learned from tolling be applied to MBUF?
- **Public Acceptance**
  What is the best way to discuss and design an MBUF system?
- **Trucking**
  How does a user fee fit into current requirements?

Purpose:

Explore the feasibility of replacing the gas tax with an MBUF program in a multistate environment.

A Timeline of Our Work



Overview of TETC Pilot Work

NATION'S FIRST MULTI-STATE & NATIONAL TRUCK PILOTS

4 Passenger Vehicle Pilots

1,500+ Passenger Vehicles

14 States Represented Among Participants

3,000 Public Opinion Survey Respondents

Completed 3 of 5 awarded grants

2 Commercial Vehicle Pilots

270 Commercial Trucks

11M Miles traveled in 2020-2021

48 States Traveled + Canada

Participant Surveys & Focus Groups	Geographic Equity Analysis	Tolling, Congestion Mitigation & Rate-Setting Studies

Participant Surveys & Interviews	Motor Carrier Working Group	Rate-Setting Studies

TETC **Phase 4**

EQUITY ANALYSIS

- Geographic (ME)
- Socioeconimic (PA, NC, NJ)

EXPANDED CAR PILOT

- Adding General Public (NC and NJ)
- Telematics
- Manual Option
- Rate-Setting

SUBJECT MATTER EXPERT ENGAGEMENT

- Motor Carrier Working Group
- Steering Committee
- Peer Exchange Workshop

EDUCATION & OUTREACH

- External Stakeholder Engagement
- Public Opinion Surveys in ME and VA
- Outreach Campaign in VA
- Customized Material

EXPANDED TRUCK PILOT

- Fleet Diversity
- Rate-Setting Based on Weight
- Cross-Border Travel

SYNERGIES & APPROACHES

- Clearinghouse
- Examining Tolling Back Office Synergies

Voluntary MBUF Programs are Growing

Virginia has a live MBUF program as of July 1.

What:

- Voluntary MBUF program
- Option in lieu of Highway Use Fee (HUF)
- HUF=85% of lost fuel tax of high efficient vehicles

Who:

- Drivers of >25 MPG vehicles whose vehicle registration is up for renewal

So What:

- Links payment to miles driven for those driving less than average Virginians (11,600 miles per year)

VIRGINIA'S MILEAGE CHOICE PROGRAM

Oklahoma Driving on Road Infrastructure with Vehicles of Electricity (DRIVE) Act of 2021

What:

- Driving on Road Infrastructure with Vehicles of Electricity (DRIVE) Act of 2021

Who:

- Drivers of electric vehicles

How:

- Tax of $0.03 per kilowatt hour to charge an electric vehicle
- Revenue from taxes will support transportation funding

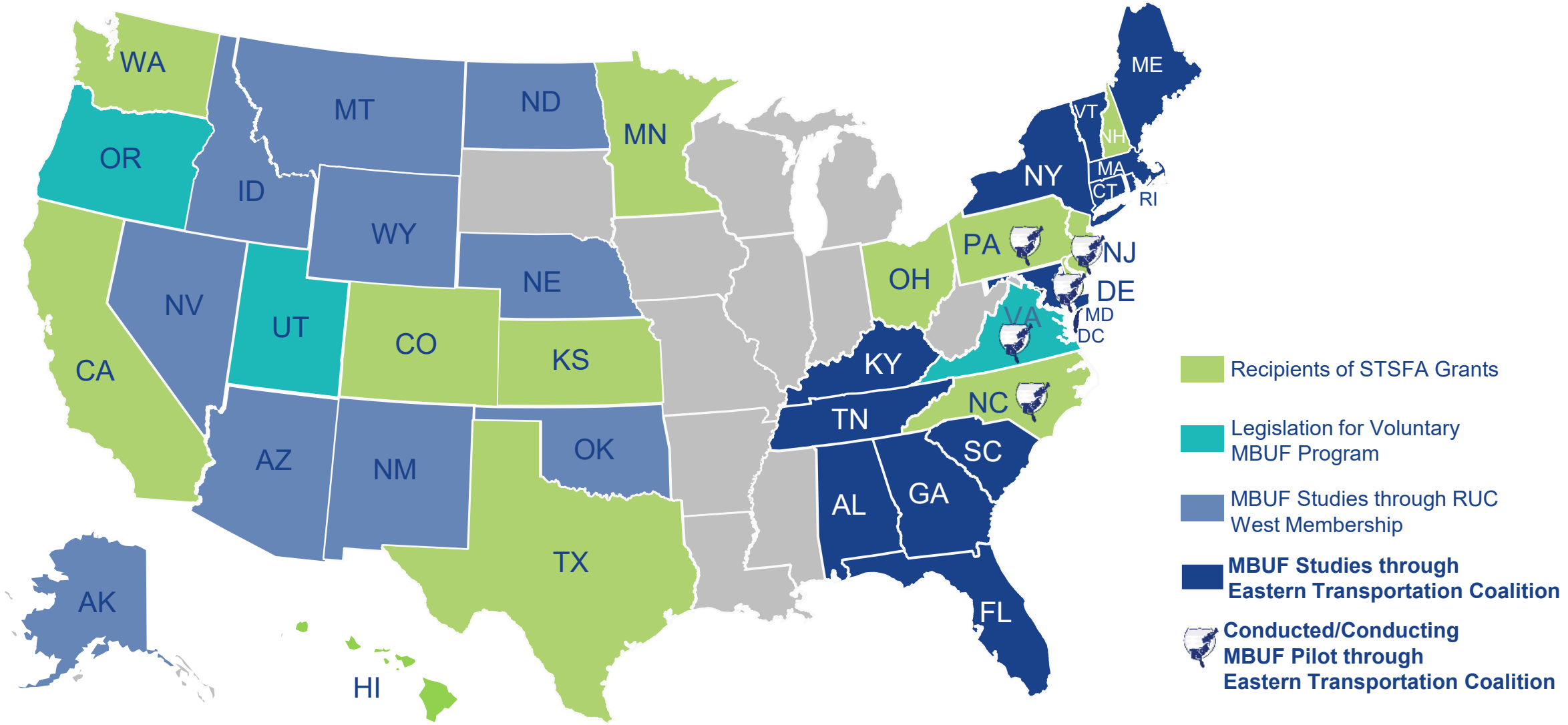
VT Road Usage Charge Concept Exploration

Applicability	Fee Mechanisms	Possible Eligible Vehicle Types

VT Registered Vehicles 	• Flat Fee alone or with
	• Mileage Based User Fee
	  • Odometer Based
	  • Wireless Automated Reporting
		• All Electric
		• Plug-in Electric Hybrid

Out of State Vehicles 	• Per Kil[illegible]att Hour F[illegible] at Public Charging	• A[illegible] Electric • Plu[illegible] Hybrid

2022: A Very Different MBUF Landscape



What Have We Learned About MBUF?

01 Real-world pilots reduce privacy concerns.

"You carry your cellphone everywhere you go. You use your GPS most all the time. You're being tracked regardless, so one more piece of data…put to some other useful function, I think, is a better way of promoting it."

— North Carolina Focus Group

"Even if you were tracking with GPS, my phone and other apps do that as well. I use E-Z Pass on toll roads and that tracks me."

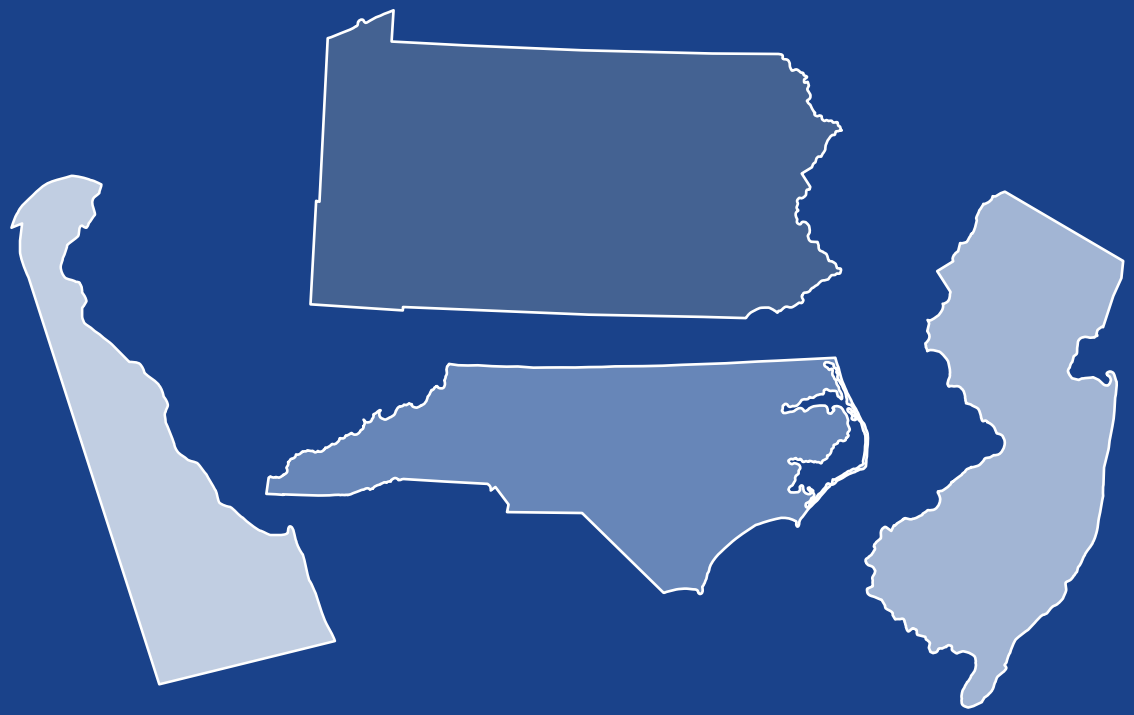
— New Jersey Focus Group

2020-2021
Transportation Stakeholders

02

For drivers, choice is key.

2020-2021 Pilot with Transportation Stakeholders



83% chose GPS-based mileage reporting

89% were satisfied with the device they chose

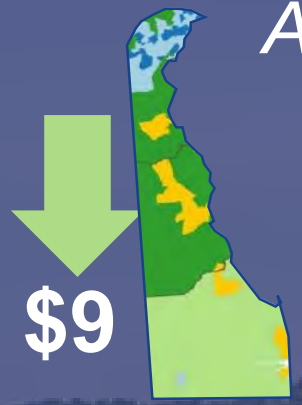
17% chose non-GPS mileage reporting

94% were satisfied with the device they chose

03

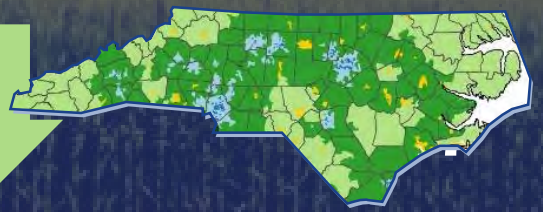
Rural drivers may fare better with MBUF.

Annual Decrease Under MBUF

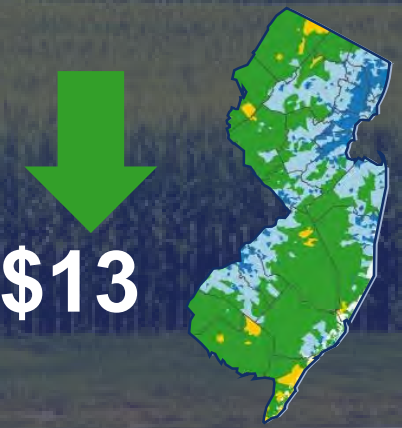


$9

$34



$17



$13

04

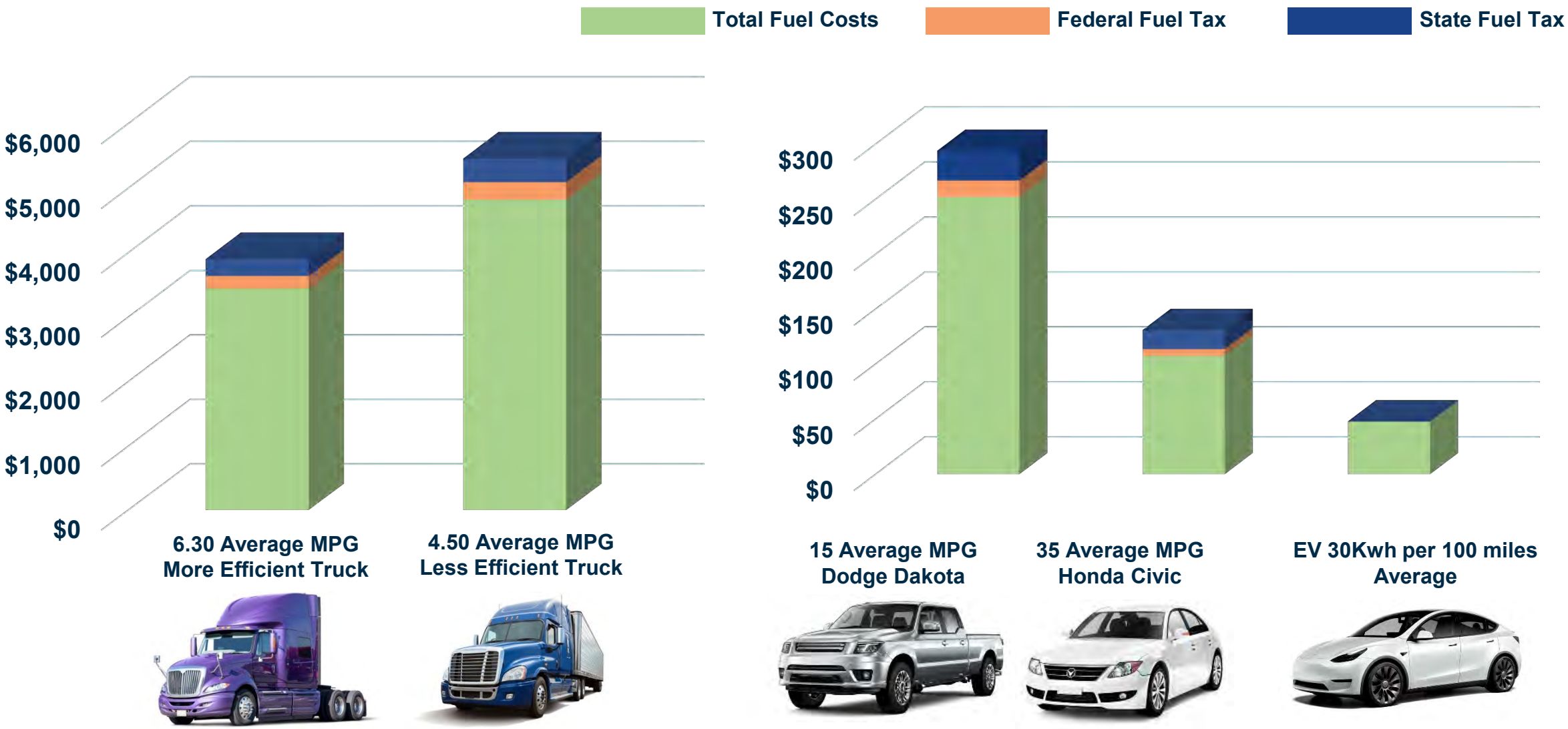
EV owners often support MBUF.

1/3 of Oregon's voluntary participants are **EV drivers**

> "Plug In America **supports** the eventual development of a **road usage charge program.**"

AAA Study: Drivers buy EVs primarily because of **environmental** impact.

Why? The biggest cost is fuel – not the fuel tax.



05

Fairness resonates.

A Tale of Two Cars

2009 Toyota Camry

25 MPG

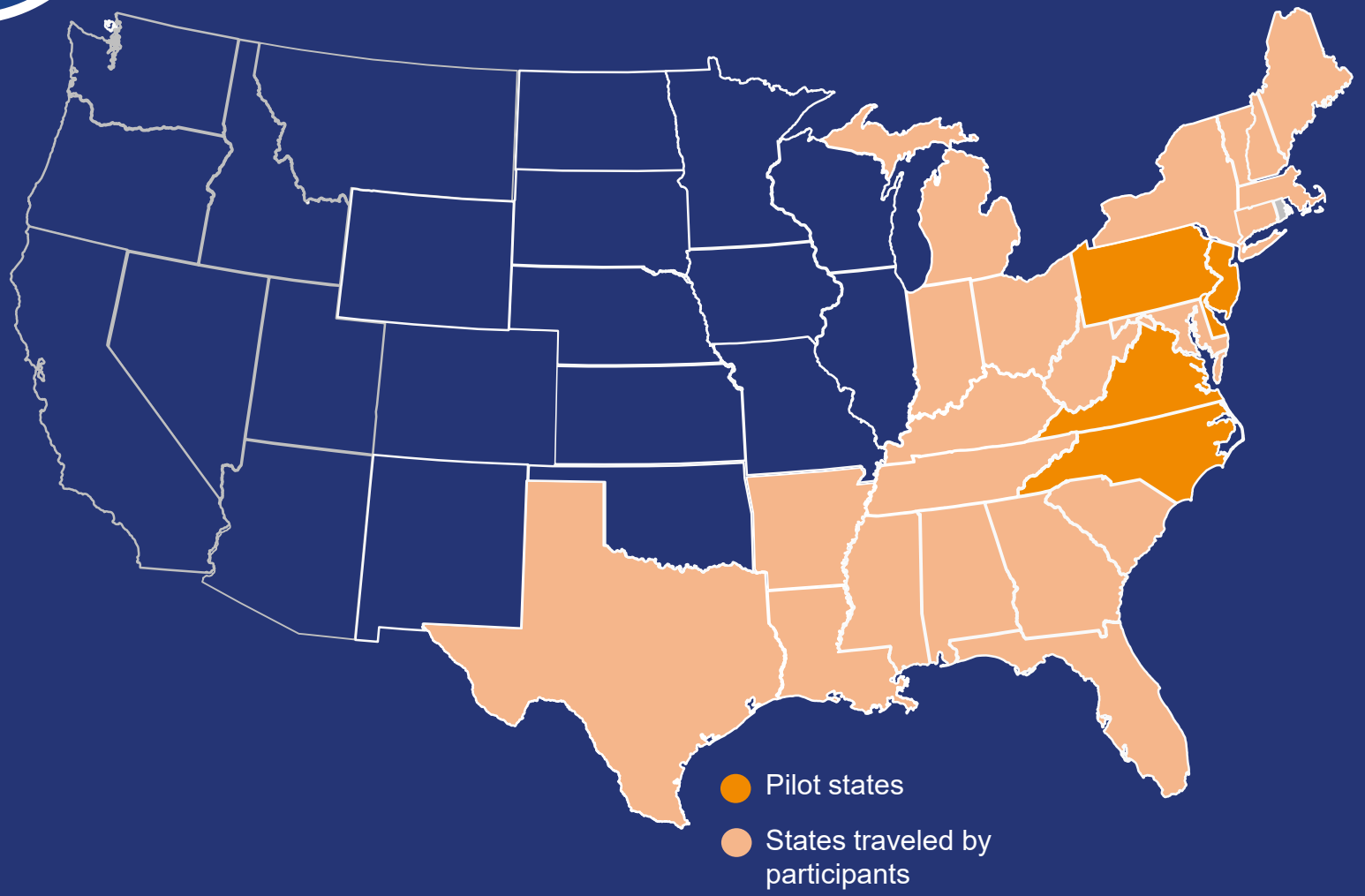
$173 Annual State Fuel Tax Paid

2019 Toyota Camry (Hybrid)

52 MPG

$83 Annual State Fuel Tax Paid

06 MBUF Technology can handle cross-state travel.



13%

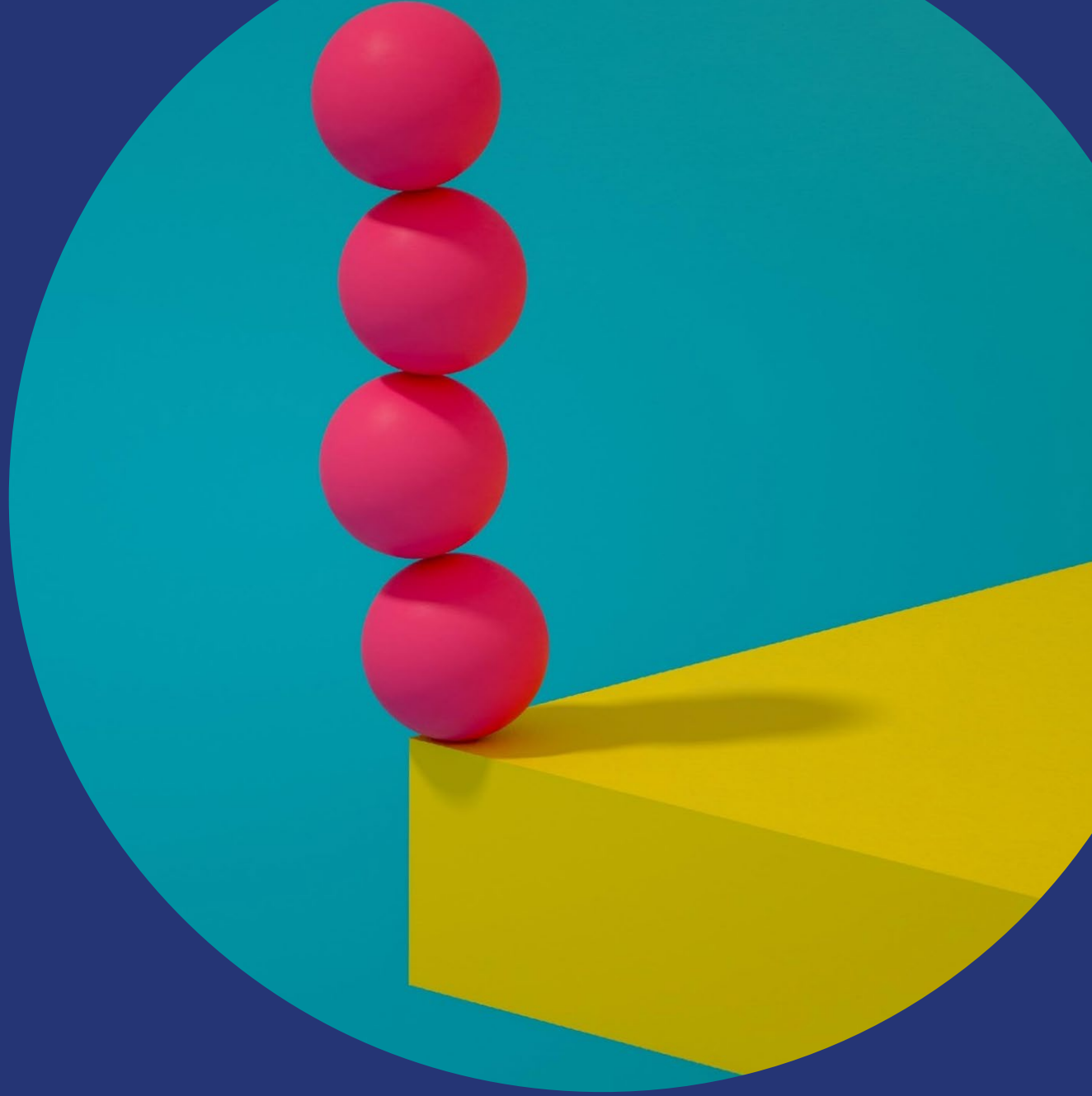
of 1.9 million miles traveled in our 2020-2021 pilots were accrued out of state.

Where Does This Leave Us?

Fuel Taxes are Teetering on the Edge

The fuel tax cannot sustain transportation budgets on its own.

MBUF isn’t the only answer, but now is the time to start searching for solutions.



We need pilots, focused outreach, and legislation.

+

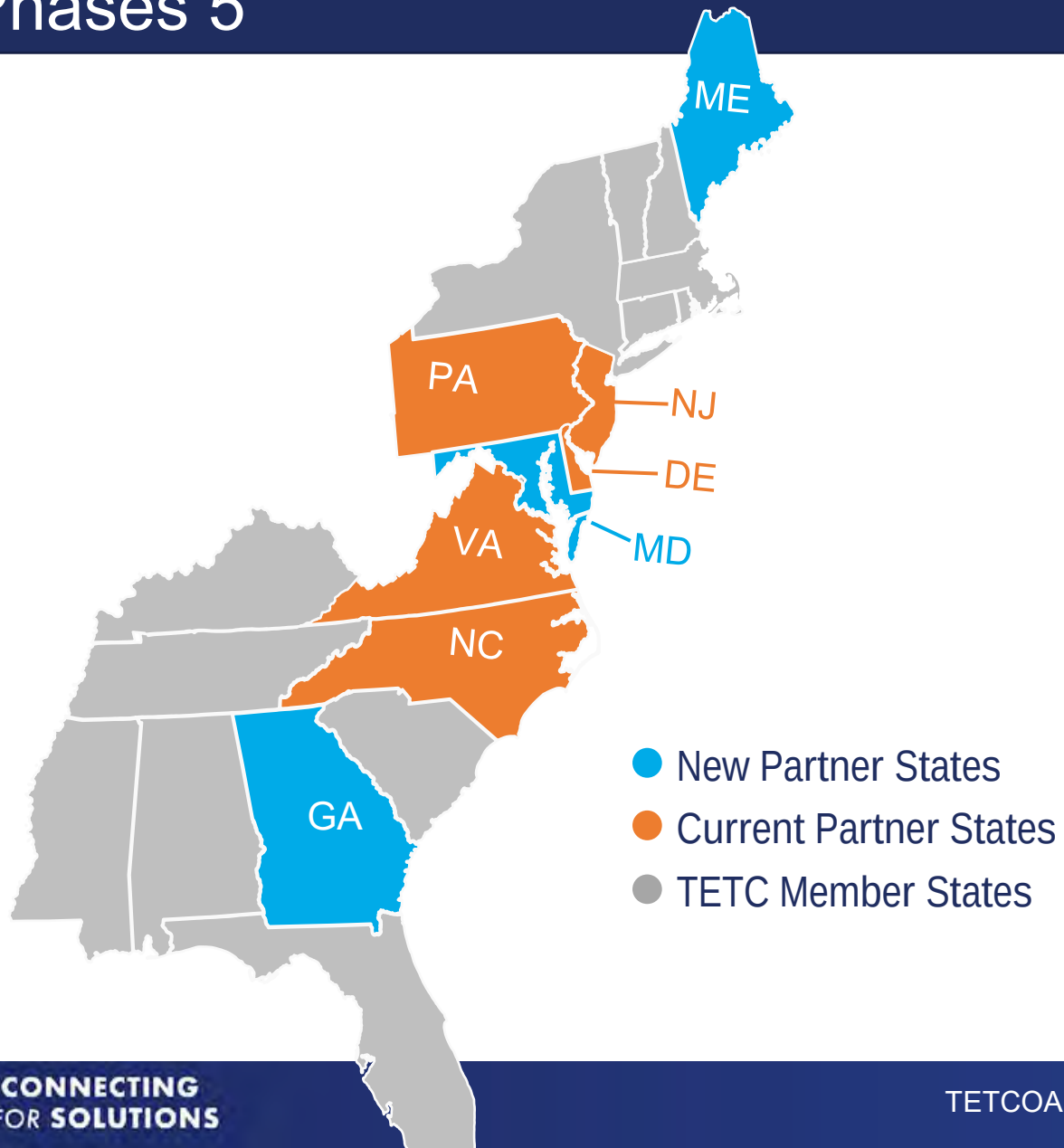
+

MBUF Exploratory Work

Phases 5

Potential Grant Activities

- Key stakeholder pilot
- Gather feedback
- Household equity analysis
- GA based carrier in truck pilot
- Education & outreach material



07 There are many ways to talk about MBUF

Save Money

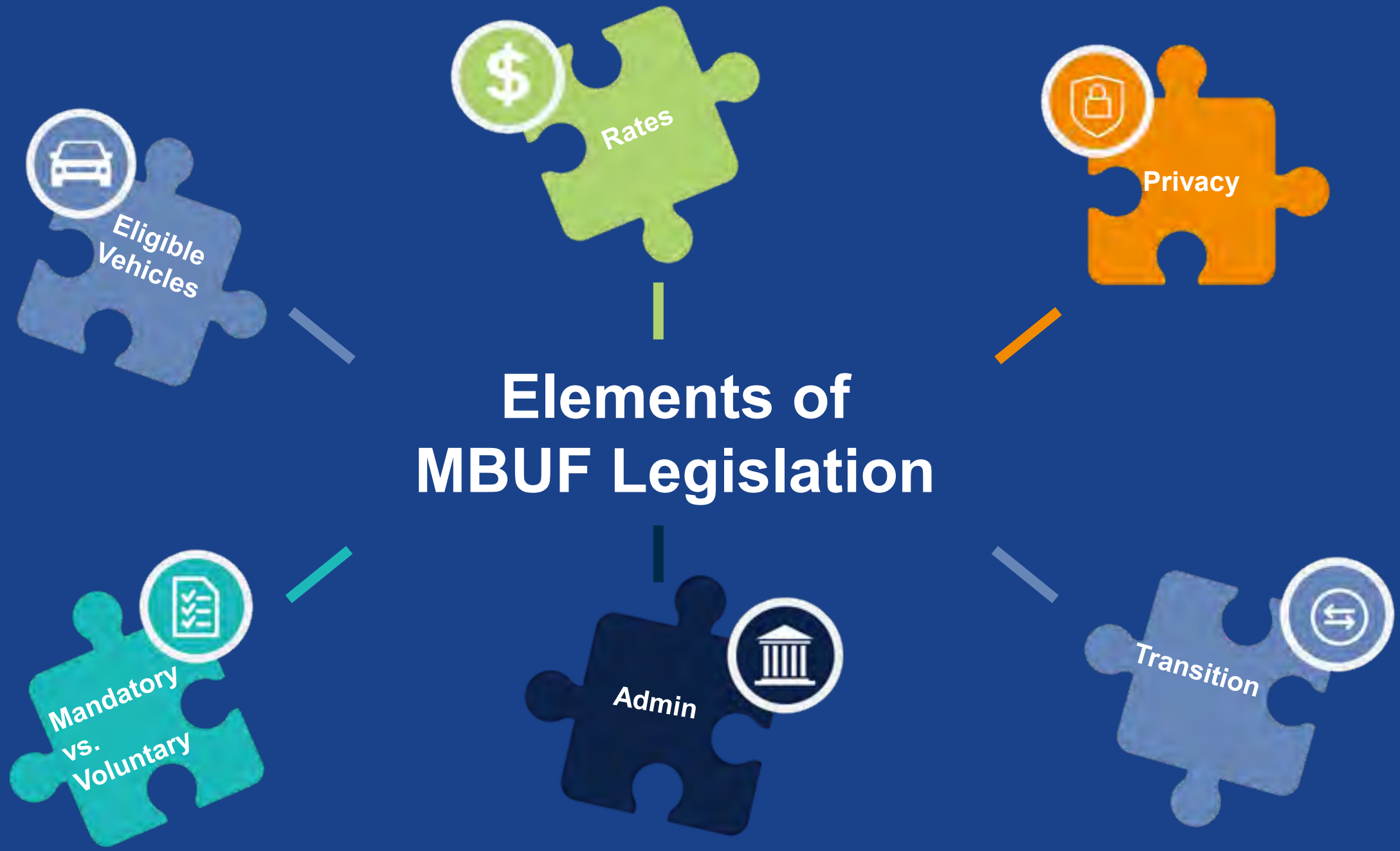
Innovation

Pay Your Fair Share/ Pro-Infrastructure

Climate Future

MESSAGE TESTING IN VIRGINIA

Elements of MBUF Legislation



Considerations for MBUF Legislation

Eligible Vehicles
- Start with EVs
- Consider including high efficiency vehicles
- Exclude vehicles that currently pay high fuel tax

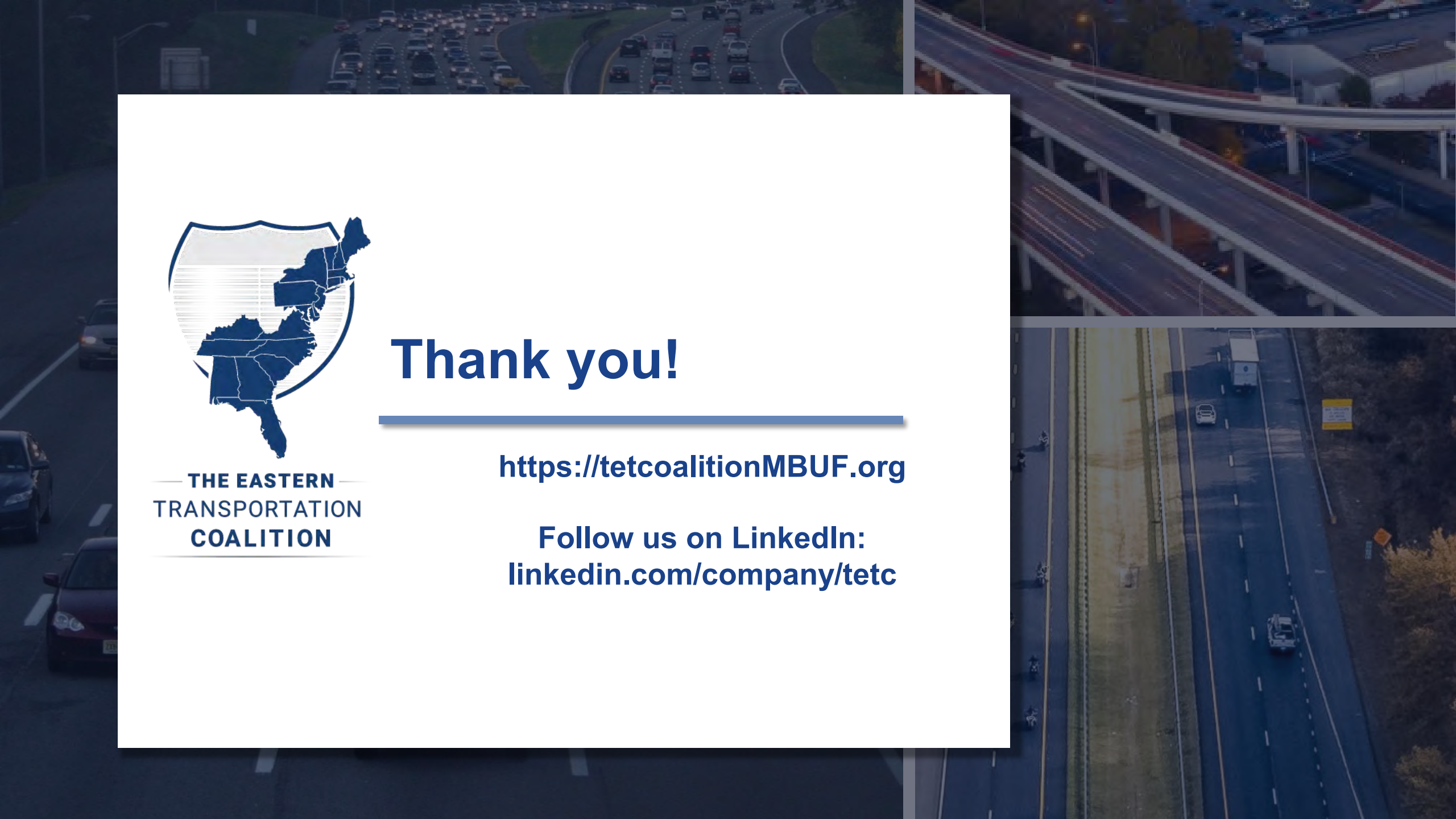
Mandatory vs. Voluntary
- Waive registration surcharges for volunteers
- Use a voluntary period to work through implementation details

Admin
- Link MBUF payment and compliance with vehicle registration
- Default to registration surcharge for those who avoid mileage reporting or payment

Rates
- Set initial rate to align with average vehicle fuel taxes
- Cap MBUF at amount of registration surcharges for volunteers, raise over time
- Credit fuel taxes paid toward MBUF but no refunds

Privacy
- Provide choices for miles reporting
- Enact requirements to minimize necessary data collection

Transition
- Require new vehicles to pay MBUF after a certain model year, after transition
- Avoid mandating MBUF on vehicles below a certain MPG



THE EASTERN
TRANSPORTATION
COALITION

Thank you!

https://tetcoalitionMBUF.org

Follow us on LinkedIn:
linkedin.com/company/tetc

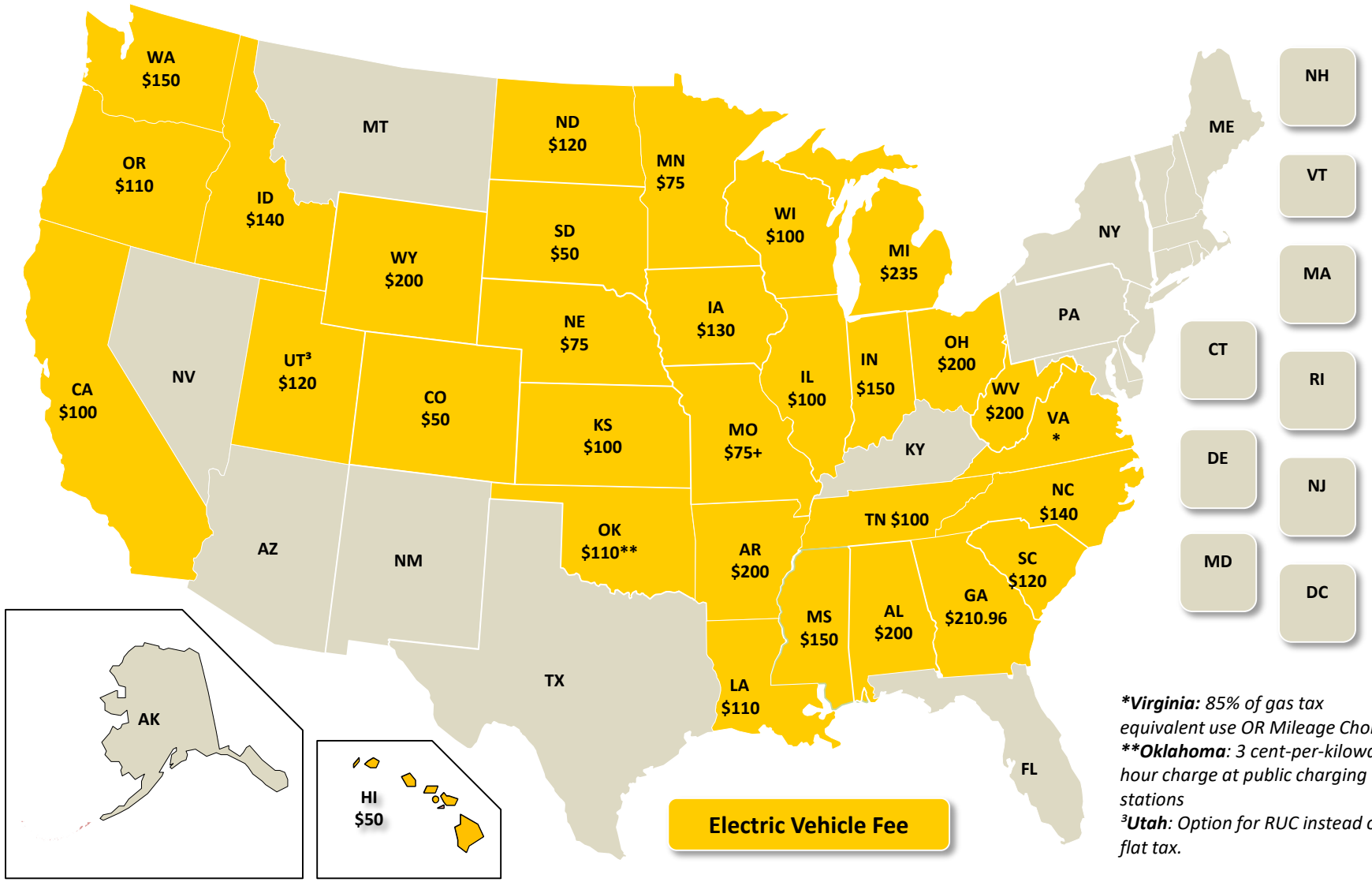
State & Local Funding Update

Carolyn Kramer Simons
Senior Director of State Funding Policy, ARTBA-TIAC

Georgia Joint Legislative Study Committee on the Electrification of Vehicles Meeting #4
November 2, 2022

www.transportationinvestment.org

31 States Have an Electric Vehicle Registration Fee



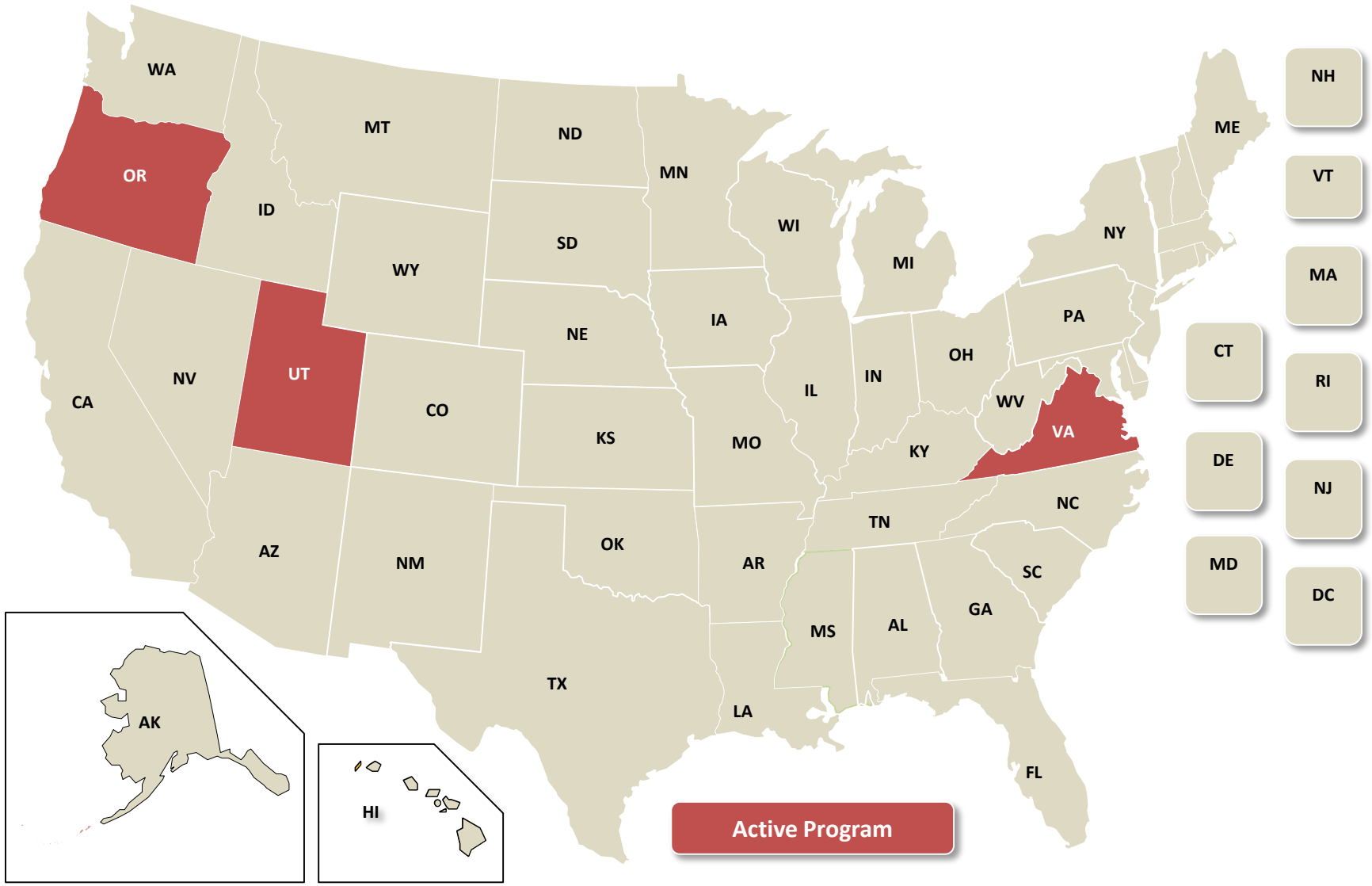
***Virginia:** 85% of gas tax equivalent use OR Mileage Choice*
****Oklahoma**: 3 cent-per-kilowatt hour charge at public charging stations*
*[3]**Utah**: Option for RUC instead of flat tax.*

***Source:** TIAC, "State Electric Vehicle Fees", Feb. 2022*

Electric Vehicle Registration Fees - Overview

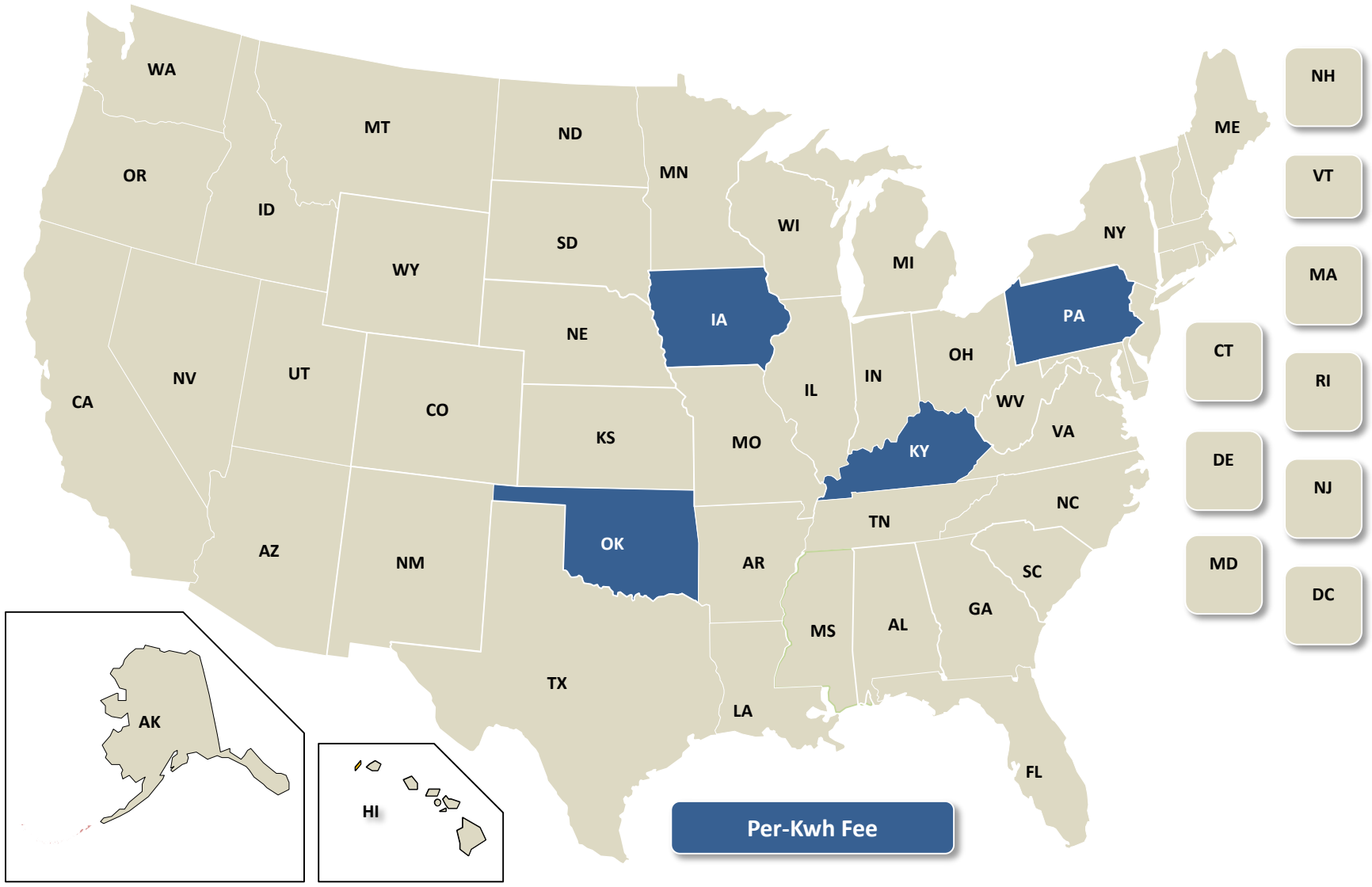
- 31 states have an electric vehicle fee
- Fees range $50 – $225 (passenger vehicles)
- Fees indexed in six states
- Additional hybrid vehicle fees in 15 states
- Most annual registration fees
  - South Carolina - biennial fee
  - Utah - road usage charge option
  - Virginia – Highway Use Fee OR Mileage Choice program

3 States Have a Road Usage Charge Program



Source: *TIAC, "ROAD USAGE CHARGE MODEL LANGUAGE ", July 2022*

4 States Have a Per-Kilowatt Hour Excise Tax



Source: *TIAC, "ELECTRIC VEHICLE EXCISE TAX MODEL LANGUAGE", May 2022*

TIAC Transportation Investment Advocacy Center
American Road & Transportation Builders Association

ARTBA American Road & Transportation Builders Association

Carolyn Kramer Simons

Senior Director, State Funding Policy

American Road & Transportation Builders Association

Transportation Investment Advocacy Center

ckramer@artba.org

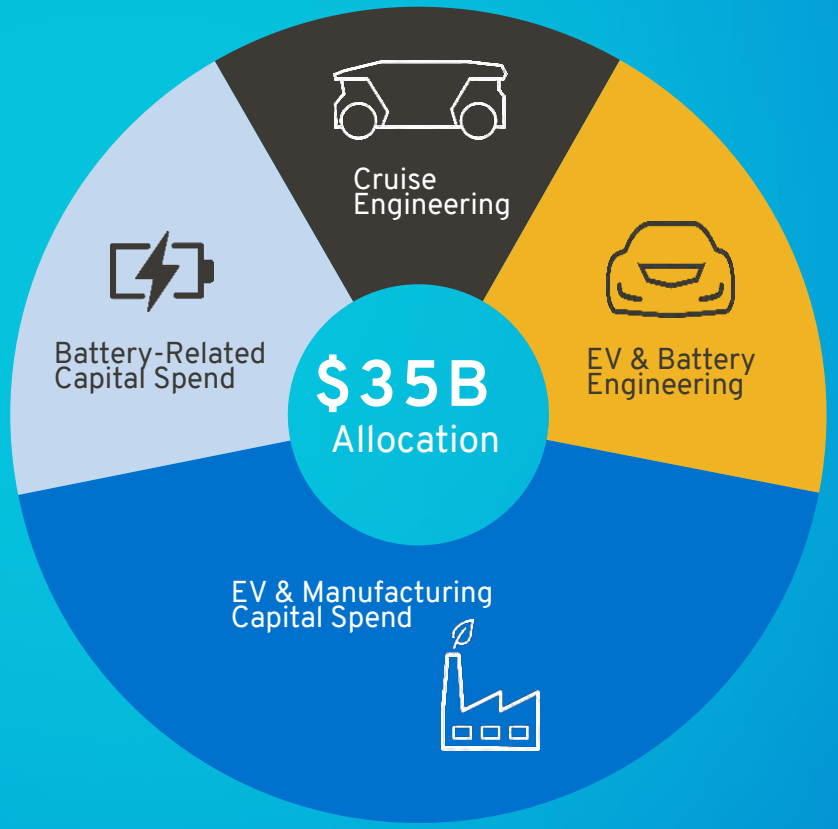
202-289-4434

An All-Electric Future

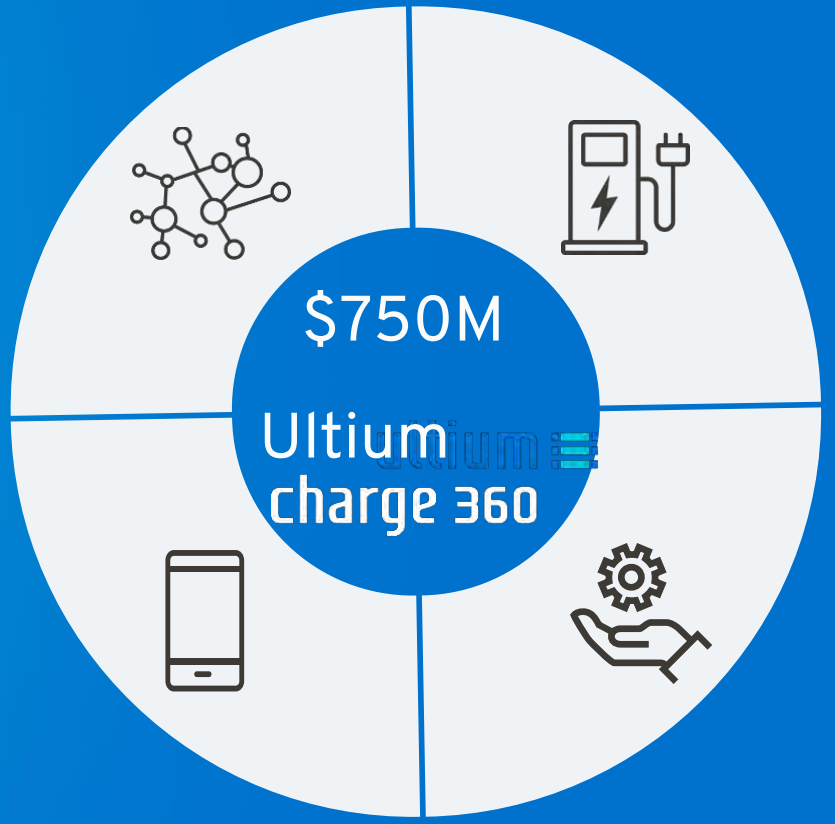
Michael Maten
Director, EV Policy and Regulatory Affairs

GM IS TRANSFORMING

INVESTMENT



CHARGING ECOSYSTEM



RAPIDLY ACCELERATING EV LAUNCHES

CURRENT EV PRODUCTION

CHEVROLET BOLT EV

CHEVROLET BOLT EUV

GMC HUMMER EV PICKUP

CADILLAC LYRIQ

2023 EV LAUNCHES

CHEVROLET SILVERADO EV

GMC HUMMER EV SUV

CHEVROLET BLAZER EV

CHEVROLET EQUINOX EV

Targeting 1 million units of annual EV capacity in North America in 2025

Building Momentum

HOW WE'RE ACCELERATING EV ADOPTION

EDUCATION & ENGAGEMENT

- Continuous, multi-channel EV education
- Demystifying EV ownership by addressing adoption barriers

CHARGING SOLUTIONS

- Expanding portfolio of intelligent charging products
- Turnkey installation services for retail & commercial customers

CHARGING INFRASTRUCTURE

- Creating the largest, open, integrated charging network
- Control the entire charging & energy experience from the app

ULTIUM CHARGE 360 EXPERIENCE:
Create a compelling membership program with a unified customer experience across all GM-integrated charging networks

EV LIVE

EV LIVE is an **on-demand, interactive platform** that launched in July 2022, to **accelerate EV adoption** and **enhance the experience** of first-time EV owners.

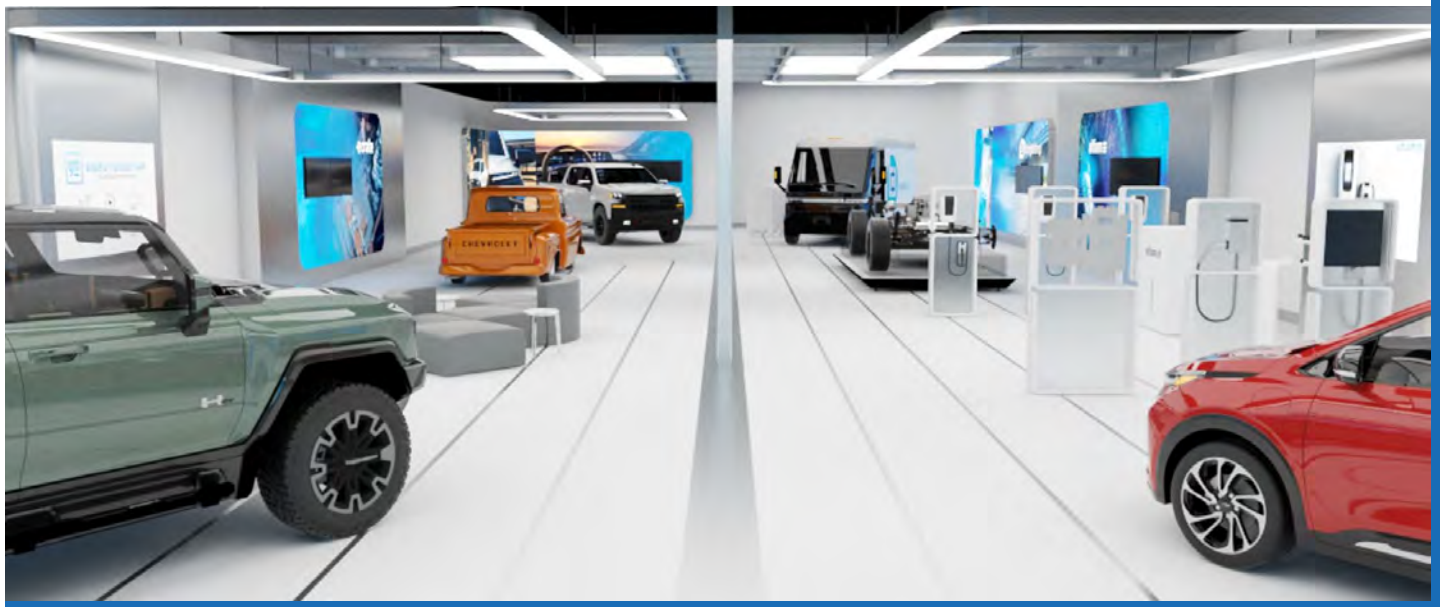
SESSIONS

DEALERS
- Non-Product Training

CUSTOMERS
- Utility Customers
- Home Installation Customers
- EV Owner Second Deliveries
- GM Energy Customers

FLEET
- GM FLEET
- BrightDrop
- eCrate/ePowered
- GM Energy

GM EMPLOYEES AND FAMILIES



EV LIVE STUDIO

The EV LIVE Studio is a versatile physical space, designed incorporating user insights to address any adoption barriers.

- **DESIGNED WITH CUSTOMER INSIGHTS IN MIND**
- **6 LED SCREENS**
- **8 EDUCATIONAL ZONES TO AUGMENT STORYTELLING**

For more information visit: **evlive.gm.com**

ULTIUM CHARGE 360: NETWORK INFRASTRUCTURE INVESTMENT

$0.75B

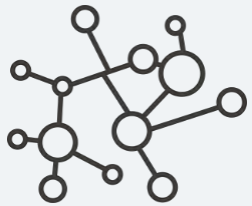
THROUGH 2025

PUBLIC CHARGING

HOME CHARGING

WORKPLACE CHARGING

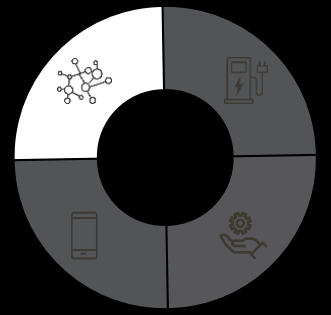
NETWORK



Ultium charge 360

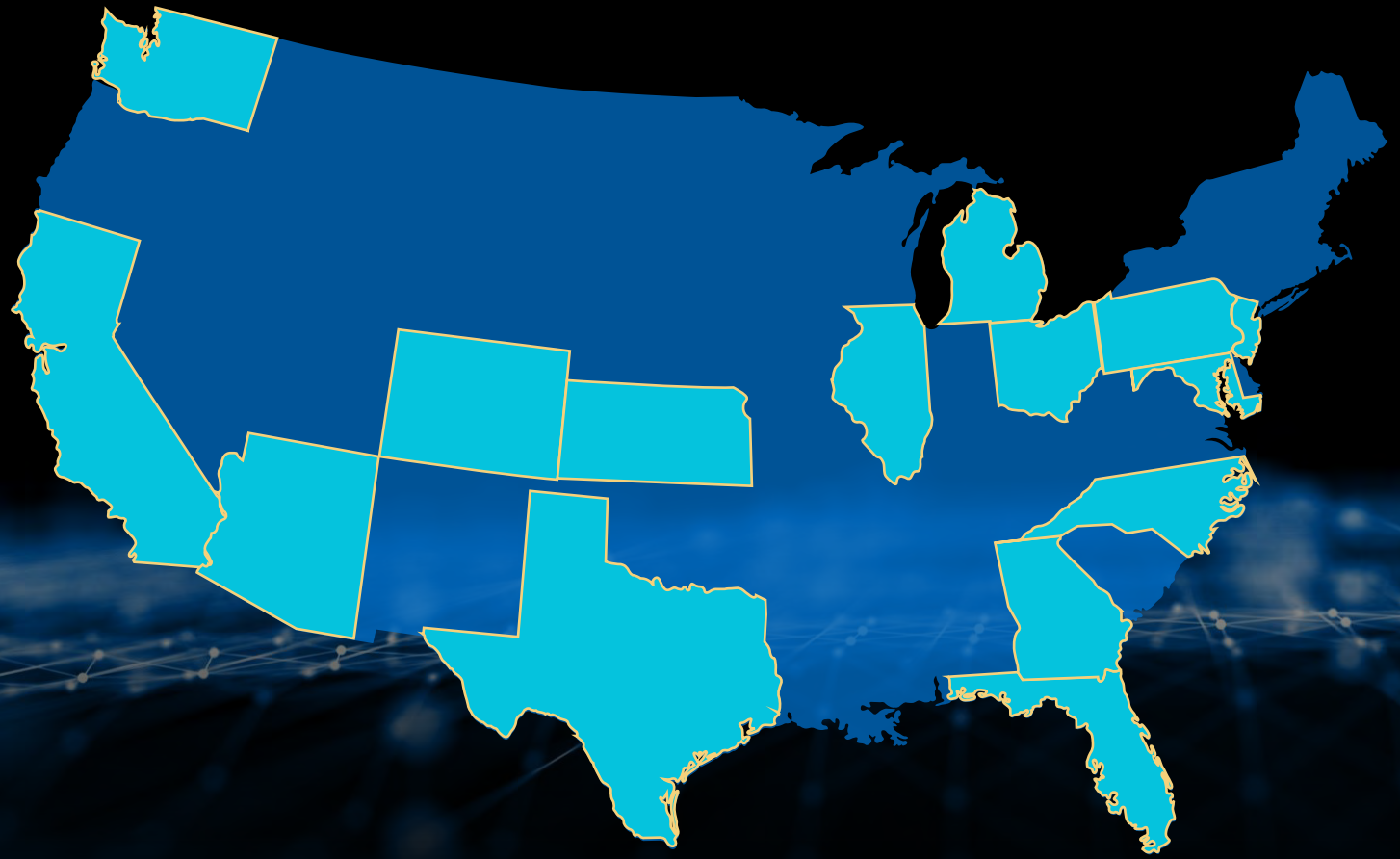
general motors

ULTIUM CHARGE 360: METRO DCFC NETWORK



gm + EVgo

- ACCELERATE INFRASTRUCTURE
- **3,250** DCFC IN 52 MARKETS
- 18 STATES **LIVE TODAY, 25 METRO AREAS**
- 350 KW CAPABILITY



GM and Pilot Company to build a coast-to-coast fast charging network.

- 2,000 EV charging stalls will be installed at up to 500 Pilot and Flying J travel centers
- Will help enable coast-to-coast EV travel and connect communities across America
- Initial Phase 1 EV charging stalls (shown in reference map) expected to be operational in 2023
- Chargers will be capable of delivering up to 350kW*

*Actual charge times will vary based on vehicle capabilities and settings. Locations intended to provide an approximation of future charging sites.

gm | Pilot FLYING J | EVgo FAST CHARGING

ULTIUM CHARGE 360: DEALER COMMUNITY CHARGING

UP TO

40,000

DESTINATION CHARGERS

- ACCELERATE EV ADOPTION ACROSS US & CANADA
- SUPERIOR EXPERIENCE FOR GM EV OWNERS
- THE STRENGTH OF THE GM DEALER NETWORK

general motors

ULTIUM CHARGE 360 : PRODUCTS

11.5 KW/48-AMP SMART CHARGER

11.5 KW/48-AMP PREMIUM SMART CHARGER

19.2KW/80-AMP PREMIUM SMART CHARGER

PROFESSIONAL GRADE

CUSTOMIZABLE SCREENS

EMBEDDED CAMERAS

National Electric Vehicle Infrastructure

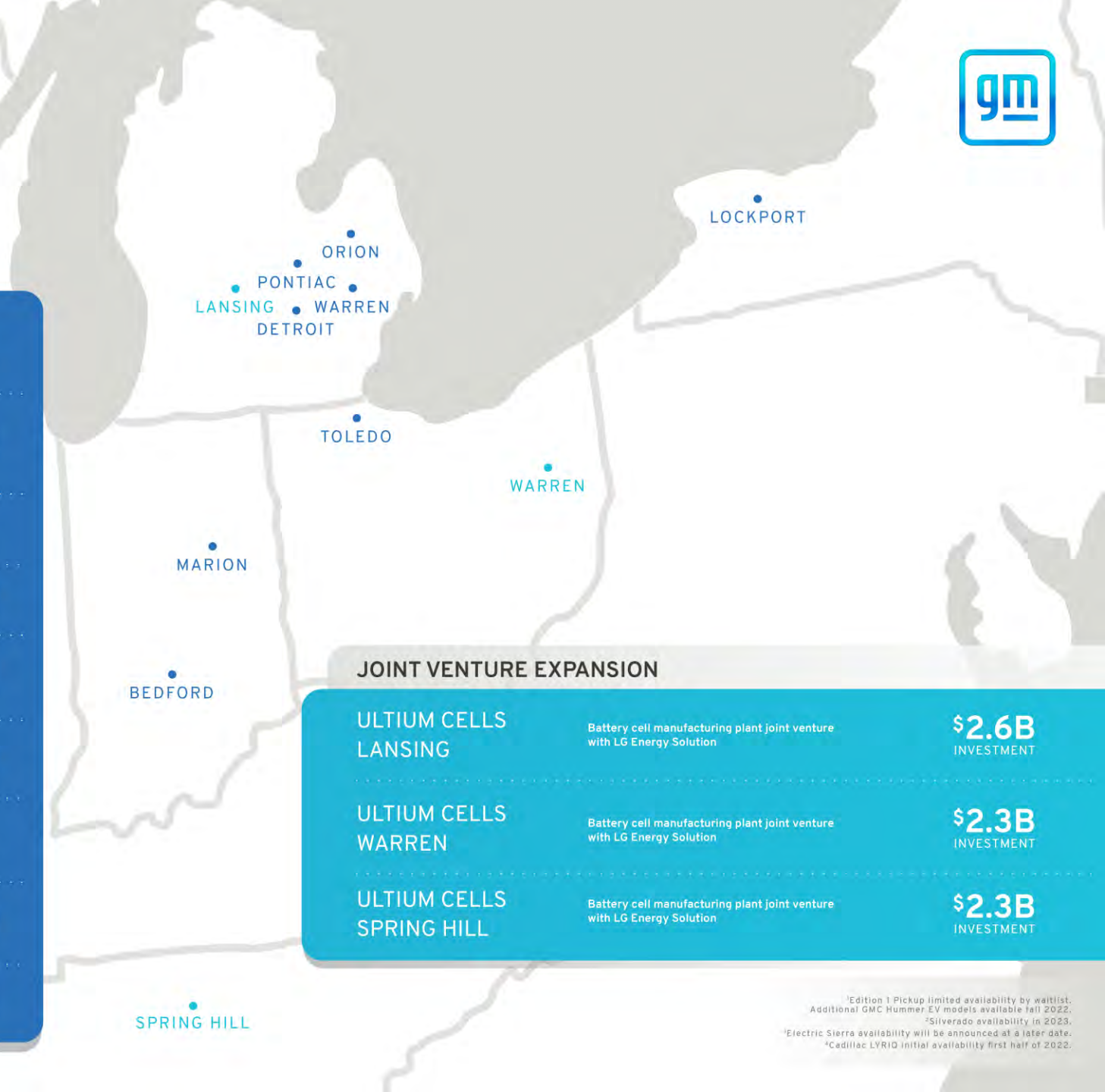
- Federal funding allocated to State DOTs
- Federal guidance continues to come out
- All state plans approved - solicitations to begin in late 2022
- Operational stations in late 2023-2024

It is important that we get this right!

A commitment to EVs for everyone.

GM and Ultium Cells are investing nearly $17B in electric vehicle manufacturing which is expected to create nearly 9,000 jobs across the U.S.

ORION ASSEMBLY	Chevrolet Bolt EV Chevrolet Bolt EUV Cruise AV test vehicles Chevrolet Silverado EV[2] GMC Electric Sierra[3]	$4B INVESTMENT
FACTORY ZERO, DETROIT HAMTRAMCK	GMC HUMMER EV Pickup[1] GMC HUMMER SUV[1] Chevrolet Silverado EV[2] GMC Electric Sierra[3] Cruise Origin	$2.2B INVESTMENT
SPRING HILL COMPLEX	Cadillac LYRIQ[4]	$2B INVESTMENT
TOLEDO PROPULSION SYSTEMS	Transform GM Toledo into the company's first EV propulsion plant in the United States	$760M INVESTMENT
MARION METAL CENTER	New press lines, upgrades and renovations to prepare the facility to produce a variety of steel and aluminum stamped parts for future products, including EVs	$491M INVESTMENT
LOCKPORT COMPONENTS	Renovation to facility and purchase/installation of new machinery and equipment	$154M INVESTMENT
GLOBAL TECHNICAL CENTER	Cadillac CELSTIQ production	$81M INVESTMENT
BEDFORD CASTING OPERATIONS	Upgrades to support drive unit castings for new Silverado EV	$51.7M INVESTMENT
PONTIAC STAMPING	Support future electric vehicle production	$40M INVESTMENT



JOINT VENTURE EXPANSION

ULTIUM CELLS LANSING	Battery cell manufacturing plant joint venture with LG Energy Solution	$2.6B INVESTMENT
ULTIUM CELLS WARREN	Battery cell manufacturing plant joint venture with LG Energy Solution	$2.3B INVESTMENT
ULTIUM CELLS SPRING HILL	Battery cell manufacturing plant joint venture with LG Energy Solution	$2.3B INVESTMENT

[1]Edition 1 Pickup limited availability by waitlist. Additional GMC Hummer EV models available fall 2022.
[2]Silverado availability in 2023.
[3]Electric Sierra availability will be announced at a later date.
[4]Cadillac LYRIQ initial availability first half of 2022.

Key Supply Chain Priorities

Identify and execute strategic long-term partnerships to secure each critical level of the complete value chain

EV Battery Recycling

"What happens to old batteries?"

Recycling

- Today we recycle 100% of batteries that are returned to us
- >95% of material can be recycled and re-inserted into supply chain
- A strong federal recycling program can augment the domestic raw material supply chain for Lithium, Cobalt, Nickel, etc.

Re-furbish / Re-use

- Old EV batteries retain up to 75% of their energy storage capacity
- Possible uses in stationary storage for redundancy, storage for wind/solar applications, or EV charging

Road Use Tax / VMT Discussion

- ICE vehicle efficiency versus EV adoption
- EV Registration Fees
- Long-term considerations


Thank You!

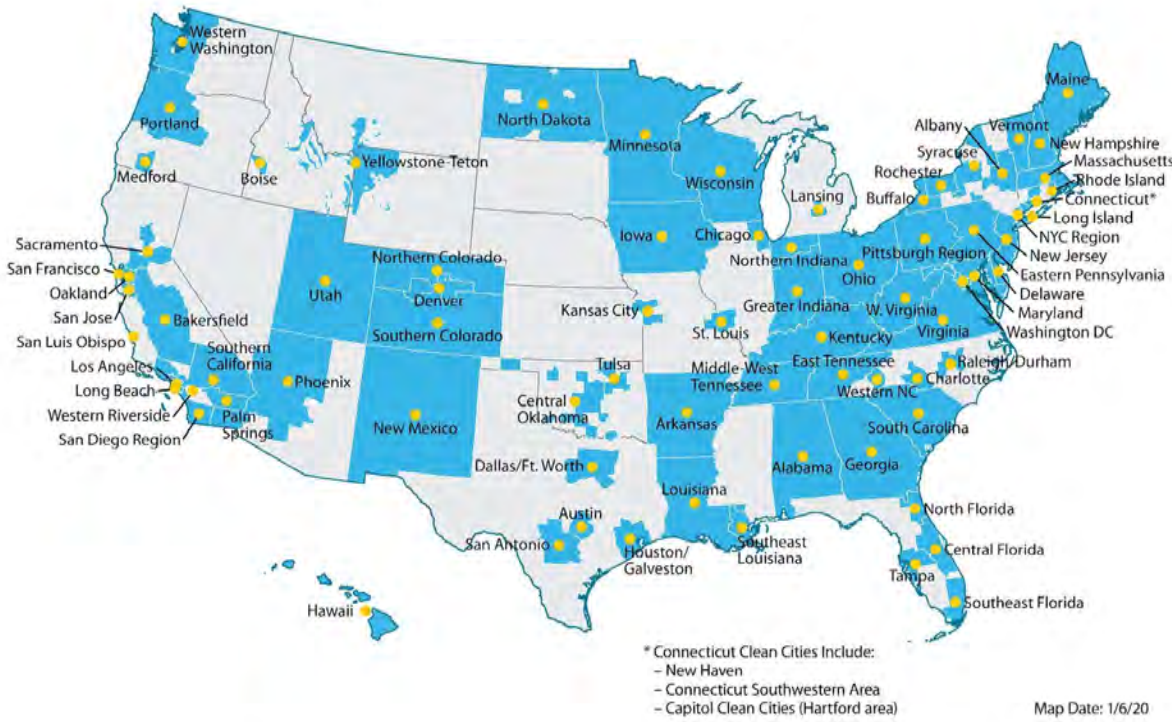
Clean Cities Georgia

Joint Study Committee on Electrification of Transportation

November 2, 2022

CLEAN CITIES COALITION NETWORK

WHO WE ARE

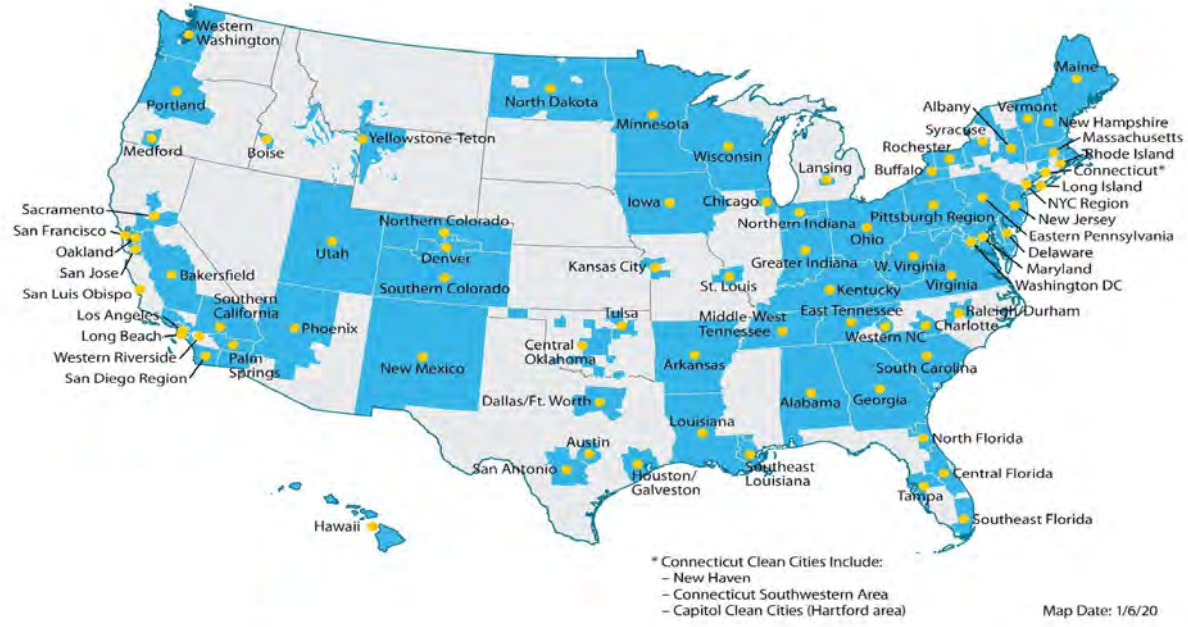


- Part of the national Clean Cities Coalition funded by the Department of Energy's (DOE) Vehicle Technologies Office (VTO) since 1993
- Serve as a central coordinator for alternative fuel vehicle (AFV) activities in Georgia
- Focused on reducing petroleum usage for individuals and fleets

Alternative Fuels and Vehicles Strengthen the Nation's Energy and Economic Security

More than 100 active coalitions covering nearly every state.

- Ethanol and biodiesel originate from U.S. feedstocks and are produced in U.S. plants.[5]
- Electric vehicles are powered almost entirely by domestic fuel sources, including renewables, nuclear, natural gas, and coal.[6]
- Diverse fueling options can help emergency fleets prepare for, react to, and recover from natural disasters.[7]
- Nearly all natural gas and propane is derived from U.S. sources.[8]



29 Years of Transportation Progress

The national network of Clean Cities coalitions is helping to ensure our nation's energy and economic security. Coalitions create significant and lasting change by building partnerships from coast to coast to advance affordable, domestic transportation fuels and technologies. Their efforts have yielded impressive results since the first Clean Cities coalition was designated in 1993.

Coalition projects have helped to put more than

1 million alternative fuel vehicles on the road.[2]

Full infographic: *cleancities.energy.gov/files/pdfs/29th_infographic.pdf*

119267

Coalitions contribute to the expansion of alternative fueling station infrastructure. More than 51,000 fueling stations nationwide now provide at least one of these fuel types:

Ethanol (E85)

Biodiesel

Compressed Natural Gas

Electric

Hydrogen

Liquefied Natural Gas

Renewable Natural Gas

Propane

Find alternative fueling stations near you at:
afdc.energy.gov/stations

Full infographic: *cleancities.energy.gov/files/pdfs/29th_infographic.pdf*

DOE VTO transportation projects are competitively awarded and cost-shared. Coalition-supported projects have historically leveraged almost 2:1 in matching funds and in-kind contributions from private and public sector partners.[3]

Full infographic: *cleancities.energy.gov/files/pdfs/29th_infographic.pdf*

Clean Cities coalitions have forged partnerships with more than **20,000 stakeholders** nationwide. Through their collective efforts, they are transforming local and regional transportation markets and offering consumers additional transportation choices.[2]

Full infographic: *cleancities.energy.gov/files/pdfs/29th_infographic.pdf*

Coalition projects have resulted in a cumulative impact in energy use equal to nearly **12 billion** gasoline gallon equivalents resulting from reduced fuel use and increased fuel diversity.[1]

Enough to drive the distance to the sun and back

1,540

times

Enough fuel to fill nearly

1.49 million

tanker trucks

Full infographic: *cleancities.energy.gov/files/pdfs/29th_infographic.pdf*

EV Tax Credits Are Changing: What's Ahead

Inflation Reduction Act Clean Vehicle Tax Credits

- EV, Hydrogen Fuel Cell, Plug-in Hybrid
- $7,500 EV New Vehicle Tax Credit
- $4,000 EV Used Vehicle (2 yrs. old) Tax Credit or 30% of price of vehicle
- EV Credit can apply as a discount at time of purchase
- Income limits apply
- Vehicle price and type matter
- SUV, Truck >$80k will not qualify
- Cars >$55k will not qualify
- Removed Manufacturer Car Cap
- North America Final Assembly to include Key Components
- Alternative Fuel Refueling Property Tax Credit to 2023

Bipartisan Infrastructure Law of 2021

Clean School Bus Rebate Funding Awards

Atlanta Public Schools	GA	25	$9,875,000.00
Charlton County	GA	4	$1,580,000.00
Chattahoochee County	GA	4	$1,580,000.00
Clarke County	GA	(10 propane)	$300,000.00
Clayton County	GA	25	$9,875,000.00
Cook County	GA	2	$790,000.00
Jeff Davis County	GA	3	$1,185,000.00
Long County	GA	10	$3,950,000.00
Macon County	GA	5	$1,975,000.00
Meriwether County	GA	8	$3,160,000.00
Savannah-Chatham County	GA	25	$9,875,000.00
Charter Schools II- Pataula Charter Academy	GA	2	$790,000.00
Tift County	GA	5	$1,975,000.00
Union County	GA	4	$1,580,000.00
Wilkes County	GA	17 (12 propane)	$2,335,000.00
15 Districts		149 Buses	$50.8M

Questions?

For more info…

cleancities.energy.gov

cleancitiesgeorgia.org

driveelectricgeorgia.org

Frank Morris
frank@cleancitiesgeorgia.org

Sumner Pomeroy
sumner@cleancitiesgeorgia.org

ELECTRIFY THE SOUTH

The Southern Alliance for Clean Energy's Electrify the South program leverages research, advocacy, and outreach to promote renewable energy and accelerate the equitable transition to electric transportation throughout the Southeast.

CONSUMER DESIRE

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

Source: CR nationally representative survey of 8,027 U.S. adults conducted Jan. 27 to Feb. 18, 2022. Includes "definitely buy" (14%) and "seriously consider" (22%) responses.

GEORGIA EV INDICATORS THROUGH JUNE, 2022

EMPLOYMENT

#1 in the Southeast per capita

- 18,350 jobs
- 606% growth from July 2021

INVESTMENT

#2 in the Southeast per capita

- $14.2 billion investment
- 446% growth from July 2021

SALES

#2 in the Southeast in market share

- 67,861 cumulative sales
- 34% growth since July 2021

CHARGING DEPLOYMENT

#1 in the Southeast per capita

- 3,926 total ports
- 22% growth from July 2021

UTILITY INVESTMENT

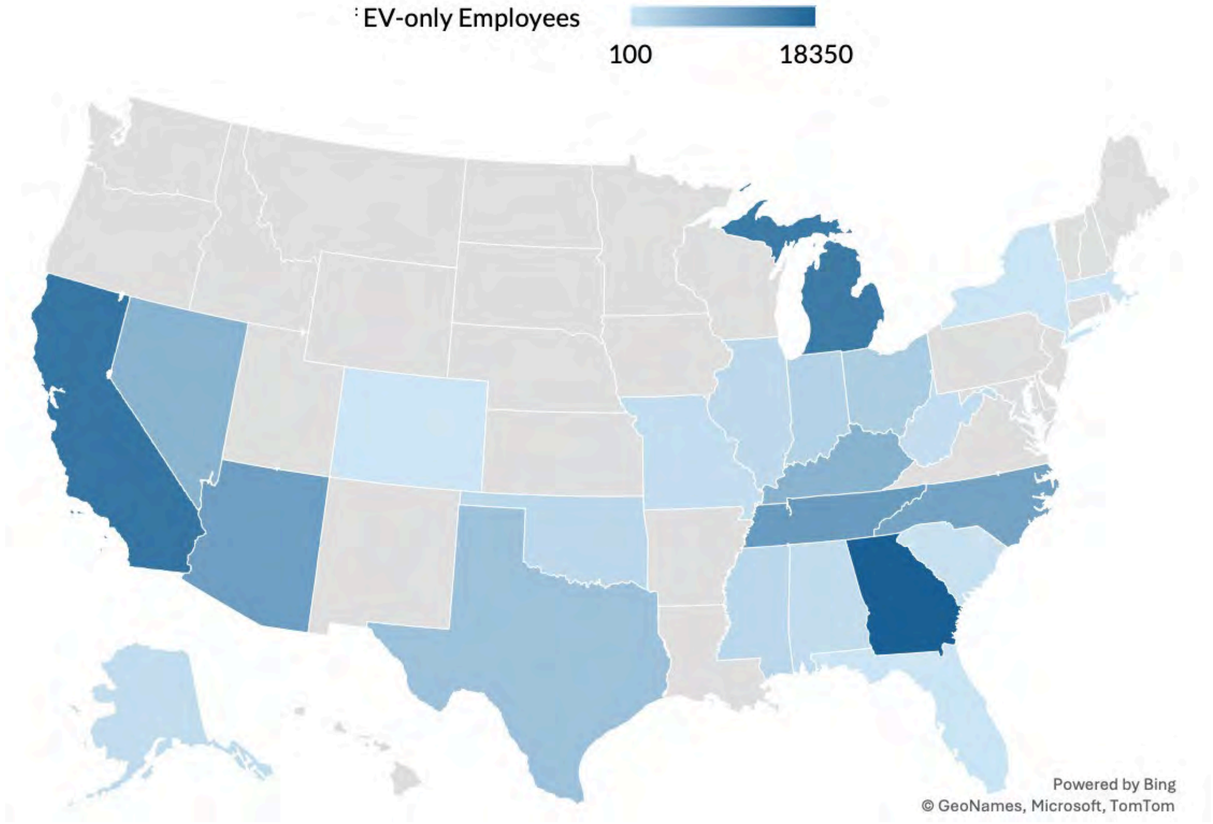
- $24 million approved
- No change from July 2021

PUBLIC FUNDING

#5 in the Southeast per capita

- $60.7 million approved funding
- $5.84 public funding per capita

JOBS AND INVESTMENTS



EMPLOYMENT

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- 18,350 jobs
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- $14.2 billion investment
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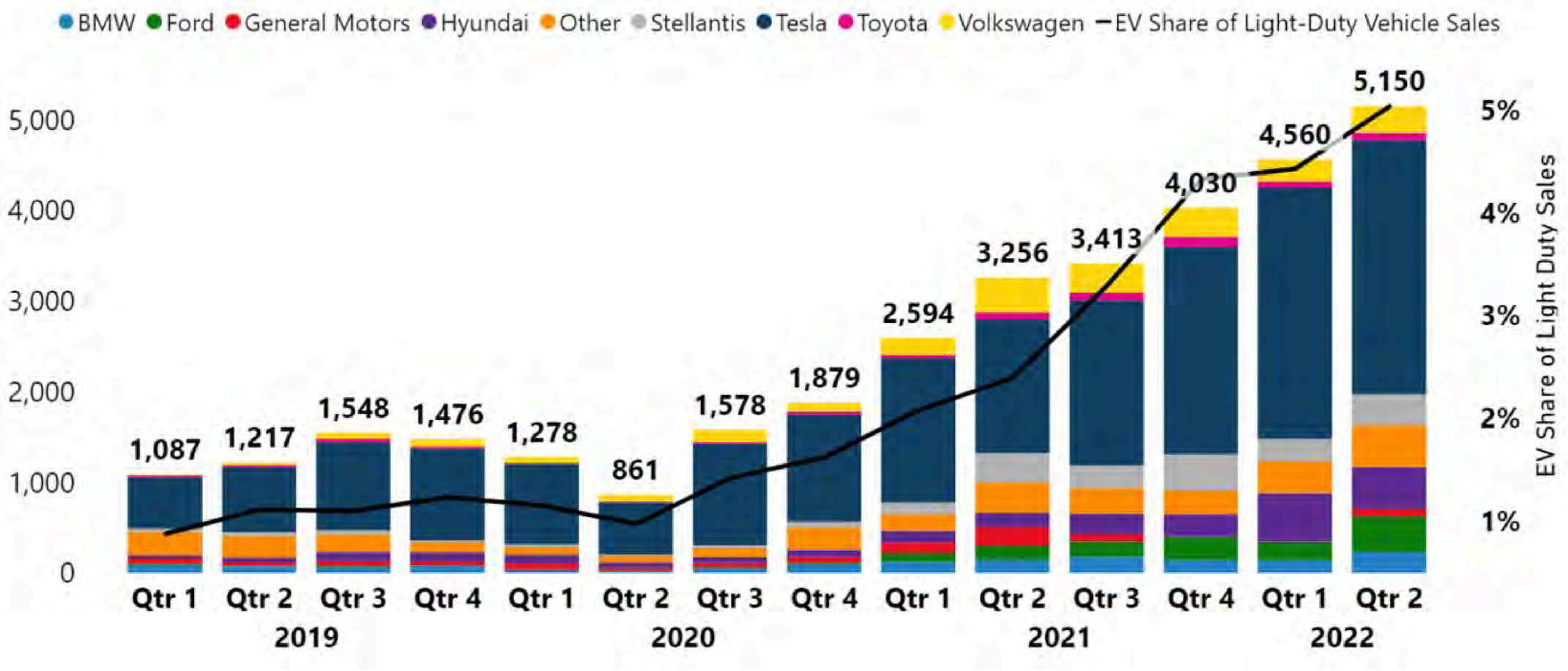
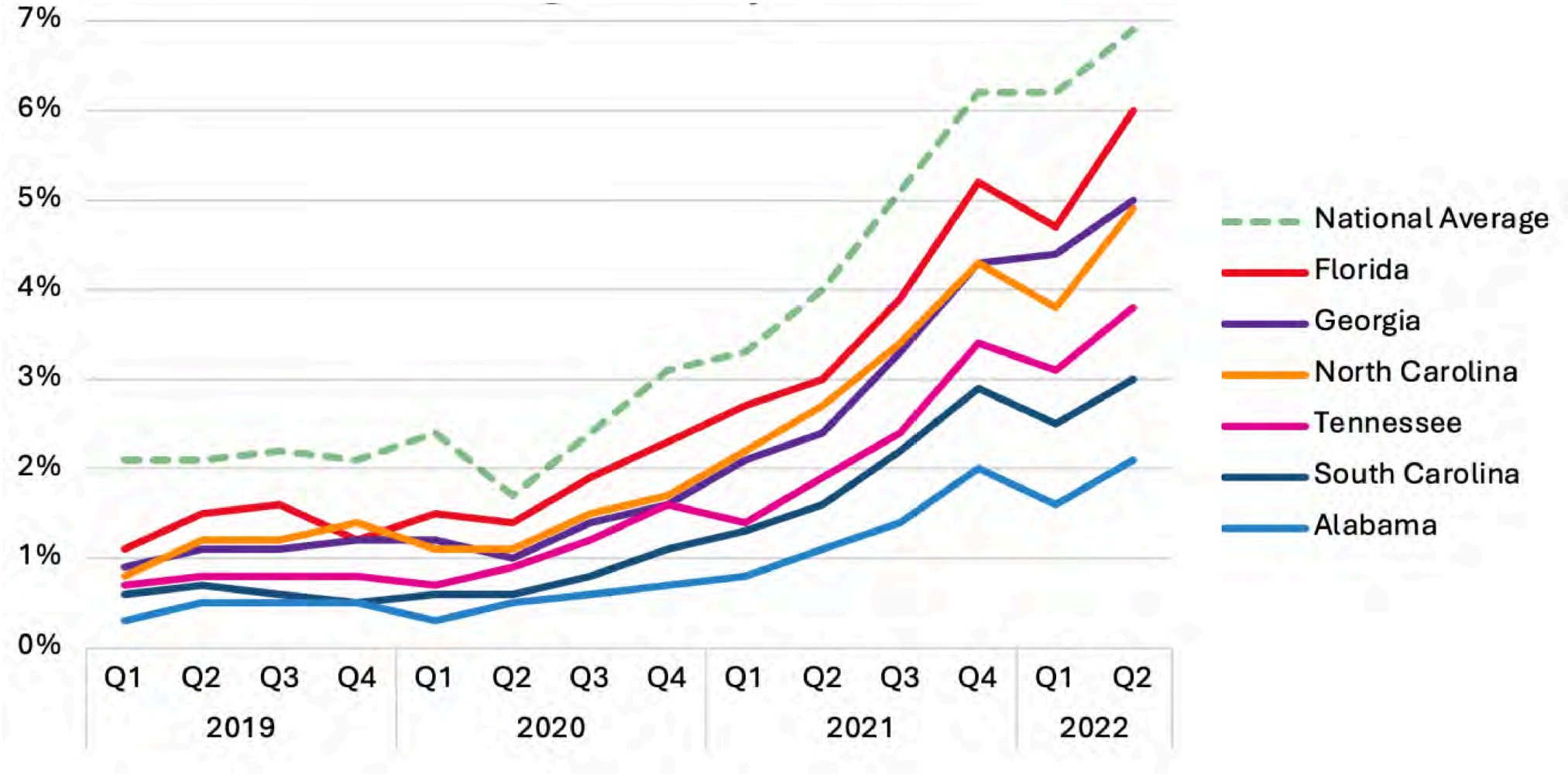
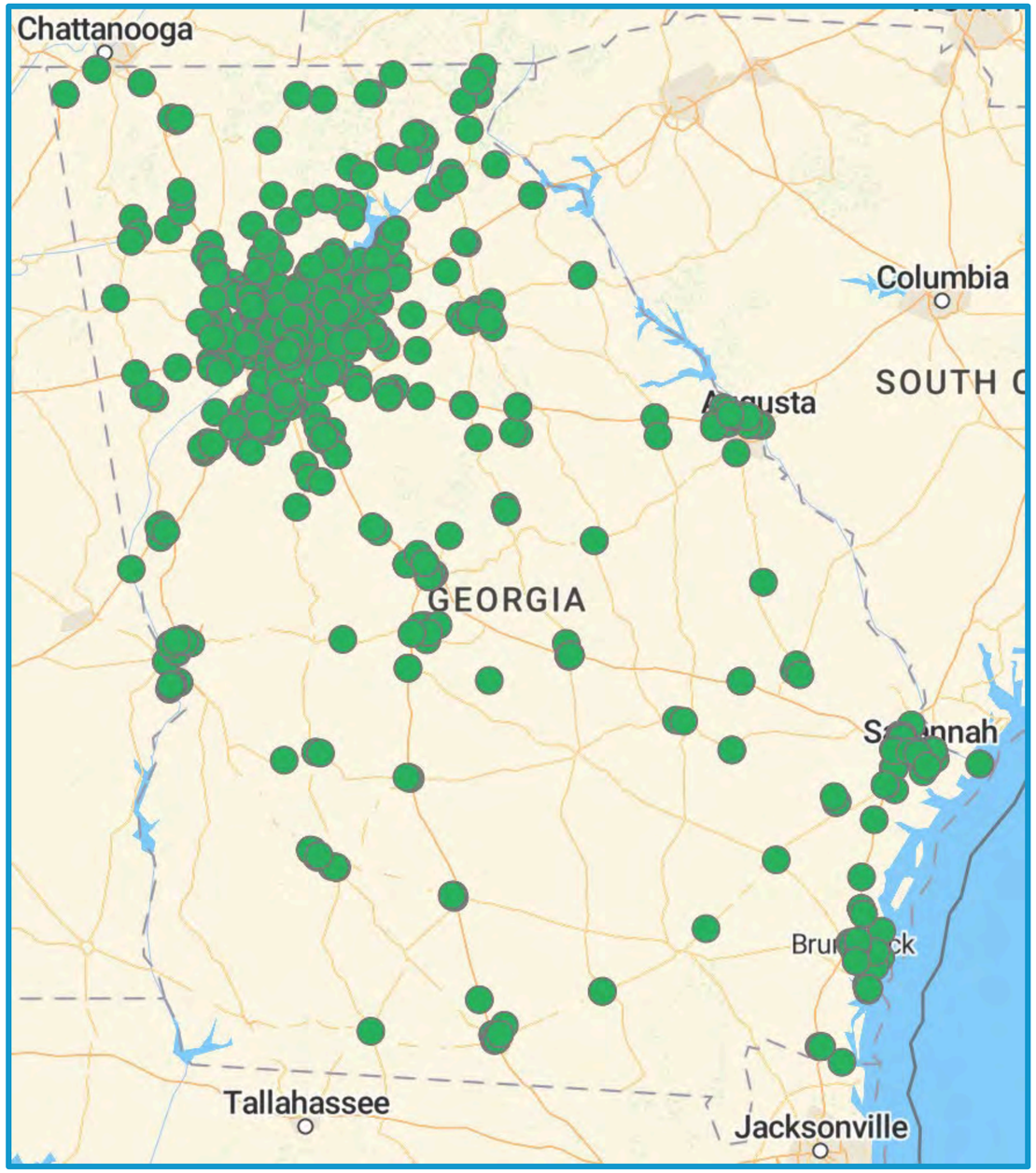
GEORGIA EV SALES AND MARKET SHARE



SOUTHEAST EV MARKET SHARE



EV Charger Locations



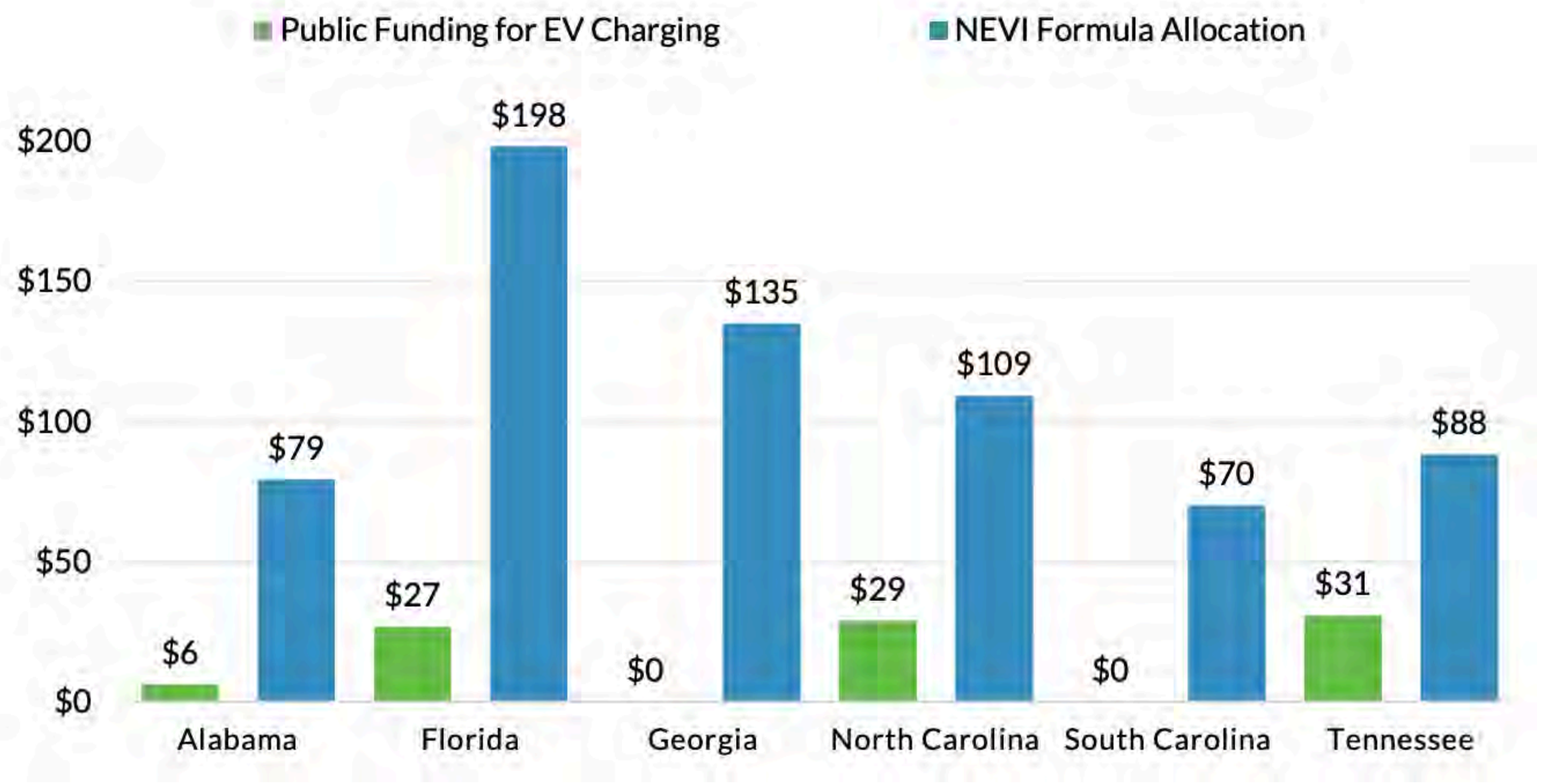
The state's small cities and rural communities lack access to public charging infrastructure and EV-ownership.

Multi-unit dwelling residents across the state lack access to home charging and EV-ownership.

SOUTHEAST UTILITY INVESTMENT

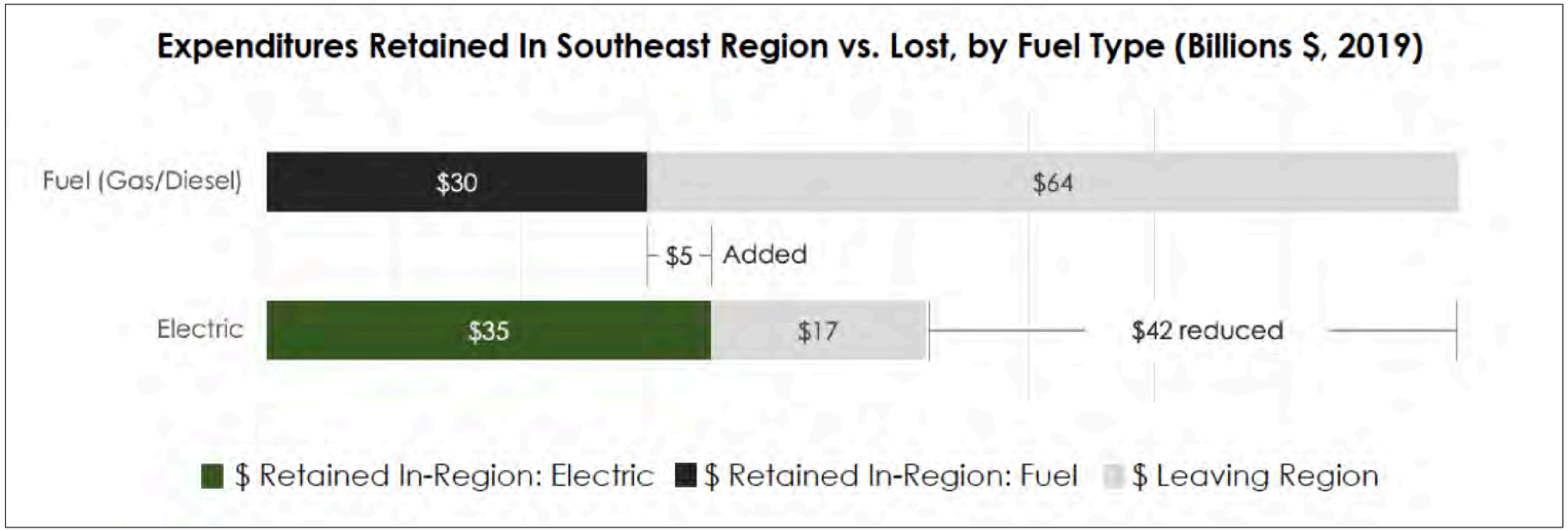
State	Operating Company	Investment	Customers	Investment by Customer
Florida	Florida Power & Light	$205,000,000	5,061,483	$41
Florida	Duke Energy	$70,900,000	1,832,871	$39
Georgia	Georgia Power	$24,000,000	2,572,624	$9
North Carolina	Duke Energy	$24,714,675	4,251,967	$6
Florida	Tampa Electric	$2,300,000	771,959	$3
South Carolina	Duke Energy	$8,830,000	4,251,967	$2
National		**$3,550,918,148**	**83,176,552**	**$43**

CHARGING INFRASTRUCTURE PUBLIC FUNDING



RETAINED FUEL SPENDING: ICE VS EV

The Southeast spends **$94 billion** annually on gas and diesel.
EVs can do the same work for **$52 billion**.



If all the cars, trucks, and buses in Georgia were electric today,
the state would retain **$1.1 billion** and save consumers **$6.8 billion** on fuel spending
delivering Georgians a $7.9 billion economic boost annually.

CONTACT

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Electric Transportation Policy Director
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linkedin.com/in/stanjcross/

Austin Hackney

Executive Vice President

Home Builders Association of Georgia

- 23 local home builders associations
- 1,450 builder members
- 3,500 member companies

- Advocacy, workforce development, member services

- Cindy Morley, Director of Public Affairs

Economic Impact of Housing in Georgia

- 2021 Single Family House permits: 53,419
- 1 year impact of 100 homes
  - $30.4M income for Georgia residents
  - $6.1M taxes and revenue for state and local governments
  - 419 jobs
- Annually recurring impact of 100 homes
  - $4.6M income for Georgia residents
  - $1.6M taxes and revenue for state and local governments
  - 78 jobs

Economic Impact of Housing in Georgia

- 2021 Single Family House permits: 53,419
- 1 year impact statewide
  - $16.2B income for Georgia residents
  - $3.3B taxes and revenue for state and local governments
  - 223,825 jobs
- Annually recurring impact statewide
  - $2.5B income for Georgia residents
  - $854.7M taxes and revenue for state and local governments
  - 41,666 jobs

The 5 L’s of Housing Supply

- Land
- Lumber
- Labor
- Lending
- Laws

Cost of Regulation in the Price of a New Home

- Georgia Public Policy Foundation
- Regulations imposed by government at all levels (federal, state, local) account for **26.9%** of the final price of a new single-family home built in **Georgia**.
  - Of this, **11.3%** of the final house price is attributable to regulation during development of the lot with **15.6%** due to regulation during construction of the single-family home.
- Notably, the aggregate cost of regulation was slightly higher in Georgia than the national survey conducted earlier in 2021 by NAHB.
- **Nationwide**, regulations accounted for **23.8%** of the final price of a new single-family home.
  - Of this, **10.5%** of the final house price is attributable to regulation during development of the lot with **13.3%** due to regulation during construction of the single-family home.

Cost of EV Ready Garage

- The **price to install an electrical circuit** for an L2 EV charging station is between **$400 to $1,700** for a single-port station and **$800 to $3,400** for a dual-port station. The cost of an L2 charger falls between **$500 to $700 for a single-port station** and approximately **$3,500 for a dual-port station**, not including the installation.
- Level 2 chargers give your EV approximately **12 to 80 miles per hour**, meaning an overnight charge typically fills a fully depleted battery. These charging stations require some electrical work. They plug into a 50-amp (minimum), 208-240-V dedicated circuit and need a costly and heavy supply line from the breaker box, accounting for the price increase.

- “I have seen no evidence at the residential real estate level that an EV charger increases home value,” said Craig Foley, founder of **Sustainable Real Estate Consulting Services** in Winchester, MA.
- In a 2021 survey by the National Association of Home Builders, about 3,200 likely home buyers were asked to rate their interest in 21 high-tech home features. An EV car charger came in dead last, with only **38%** saying they considered it an essential or even a desirable feature. By contrast, **77%** were eager to have smart thermostats.

Construction Code Mandates

- International Building Code, 2018 Edition, with Georgia Amendments (2020), (2022)
- International Residential Code, 2018 Edition, with Georgia Amendments (2020)
- International Fire Code, 2018 Edition (Contact State Fire Marshal)
- International Plumbing Code, 2018 Edition, with Georgia Amendments (2020), (2022)
- International Mechanical Code, 2018 Edition, with Georgia Amendments (2020)
- International Fuel Gas Code, 2018 Edition, with Georgia Amendments (2020), (2022)
- National Electrical Code, 2020 Edition, with Georgia Amendments (2021)
- International Energy Conservation Code, 2015 Edition, with Georgia Supplements and Amendments (2020), (2022)
- International Swimming Pool and Spa Code, 2018 Edition, with Georgia Amendments (2020)

Priced Out Models

- Median New Home Price: $412,505 – US
- Median New Home Price: $356,743 – GA

- Adding $1,000 prices out 117,932 US households

- 87 million US households cannot afford median price home
- 1.4 million GA households cannot afford median price home
- Adding $1,000 prices out 4,851 Georgia households

Austin Hackney

Executive Vice President

Incentivizing Private Investment in EV Charging

Joint Study Committee on the Electrification of Transportation

November 2, 2022

Jay Smith, Executive Director
Charge Ahead Partnership

3 barriers to getting in the EV charging business

1. Georgia treats EV charger retailers as a utility, forcing them to resell electricity based on time of use

3 barriers to getting in the EV charging business

1. Georgia treats EV charger retailers as a utility, forcing them to resell electricity based on time of use

2. Power companies can subsidize the cost of EV chargers and electricity to recharge with money from captive ratepayers – called “rate basing”

3 barriers to getting in the EV charging business

1. Georgia treats EV charger retailers as a utility, forcing them to resell electricity based on time of use

2. Power companies can subsidize the cost of EV chargers and electricity to recharge with money from ratepayers – called “rate basing”

3. The rate and fee structure the power company charges for electricity is not tenable for EV charging

Monopoly
vs.
Free Market with Multiple Competitors

Allow for the resale of electricity by the kilowatt hour, not based on time.

Prohibit the use of ratepayer funds from a regulated monopoly from competing with the private sector – by requiring EV charging to be a separate subsidiary.

Require that power companies in the EV charging business operate under the same rates, terms and conditions as private retailers.

Expand EV charging network

Retailers aren't afraid of competition and are not seeking special treatment; Public utilities and private retailers should have the same rates, terms and conditions

This will encourage private investment in EV chargers, reducing the need for tax dollars and ratepayer money

Results in the efficient and timely expansion of the EV charging network

CHARGE AHEAD

PARTNERSHIP

AJ SICCARDI

BEFORE THE

GEORGIA ELECTRIC VEHICLE STUDY COMMITTEE

November 2, 2022

RaceTrac®

“Our state [must be] positioned to continue leading the nation in the rapidly growing electric mobility industry.”

- Governor Brian Kemp

The Business Case for EV Charging

- Problems and Business Needs
- Benefits and Risks
- Economics/Return on Investment

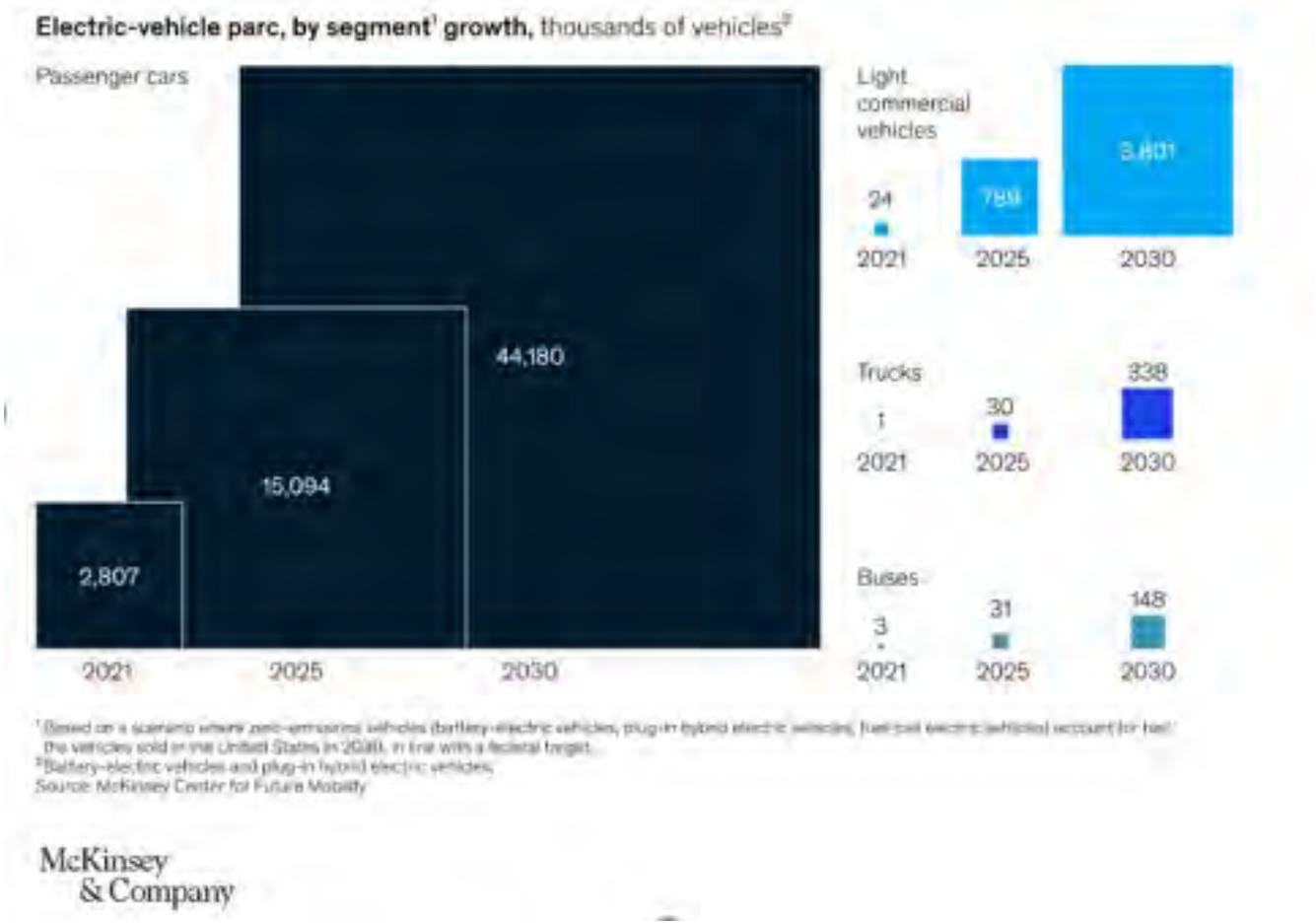
About RaceTrac: Georgia's Own

EV Business Case

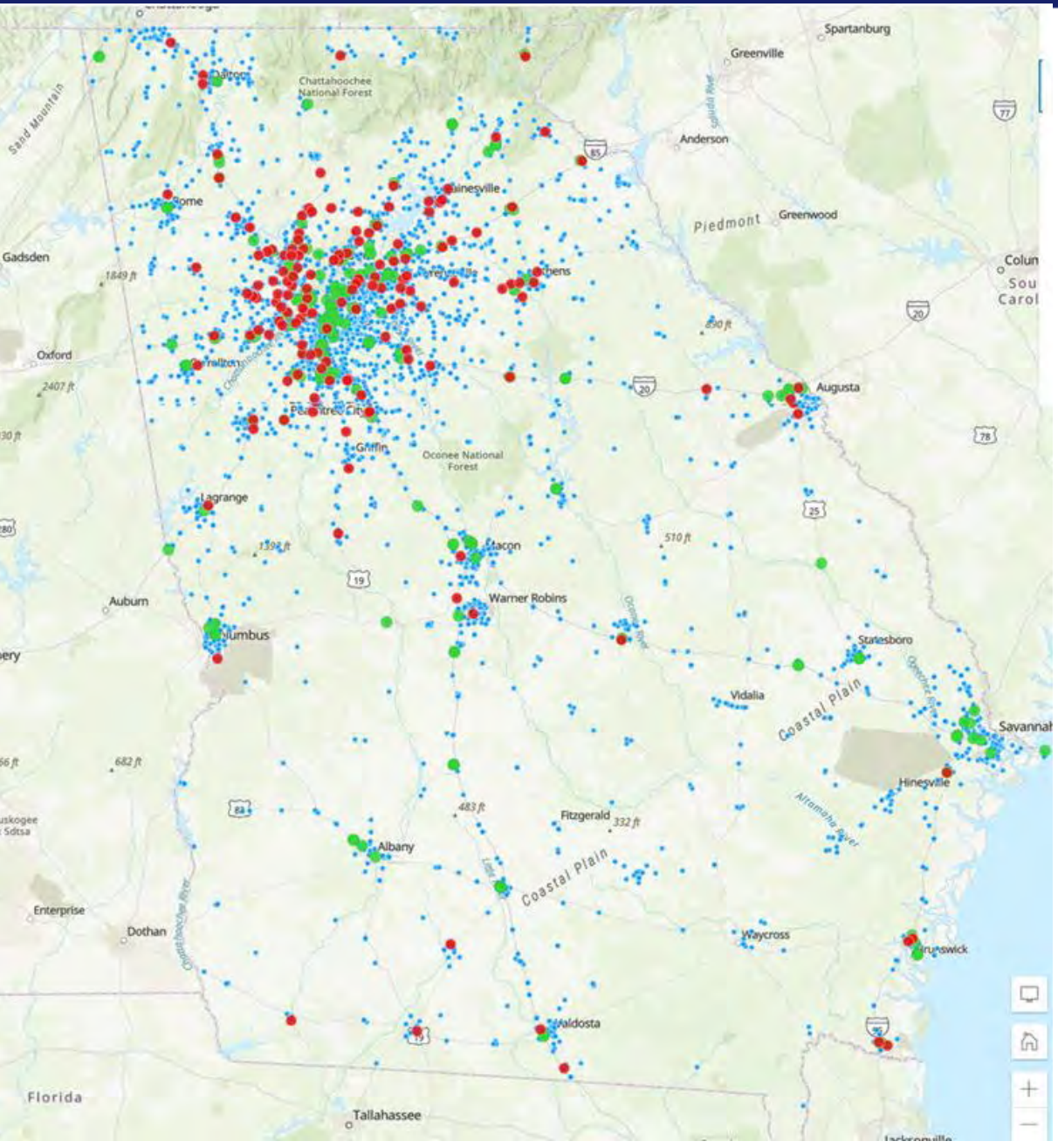
PROBLEMS AND BUSINESS NEEDS

EV Landscape - Growth & Vehicle Sales (USA)

2022 - 3 Million EVs on the road today
2030 - Expected 35-45M passenger EVs on the road
35-40% YoY Growth Rate through 2030



Refueling in Georgia



In Georgia:

1 DCFC port per 61 EVs

1 Fuel Nozzles per 32 vehicles

KEY

Fuel Retailers - BLUE
DC Fast Chargers - GREEN
RaceTracs - RED

Where Do YOU Want To Charge?

Where Do YOU Want To Charge?

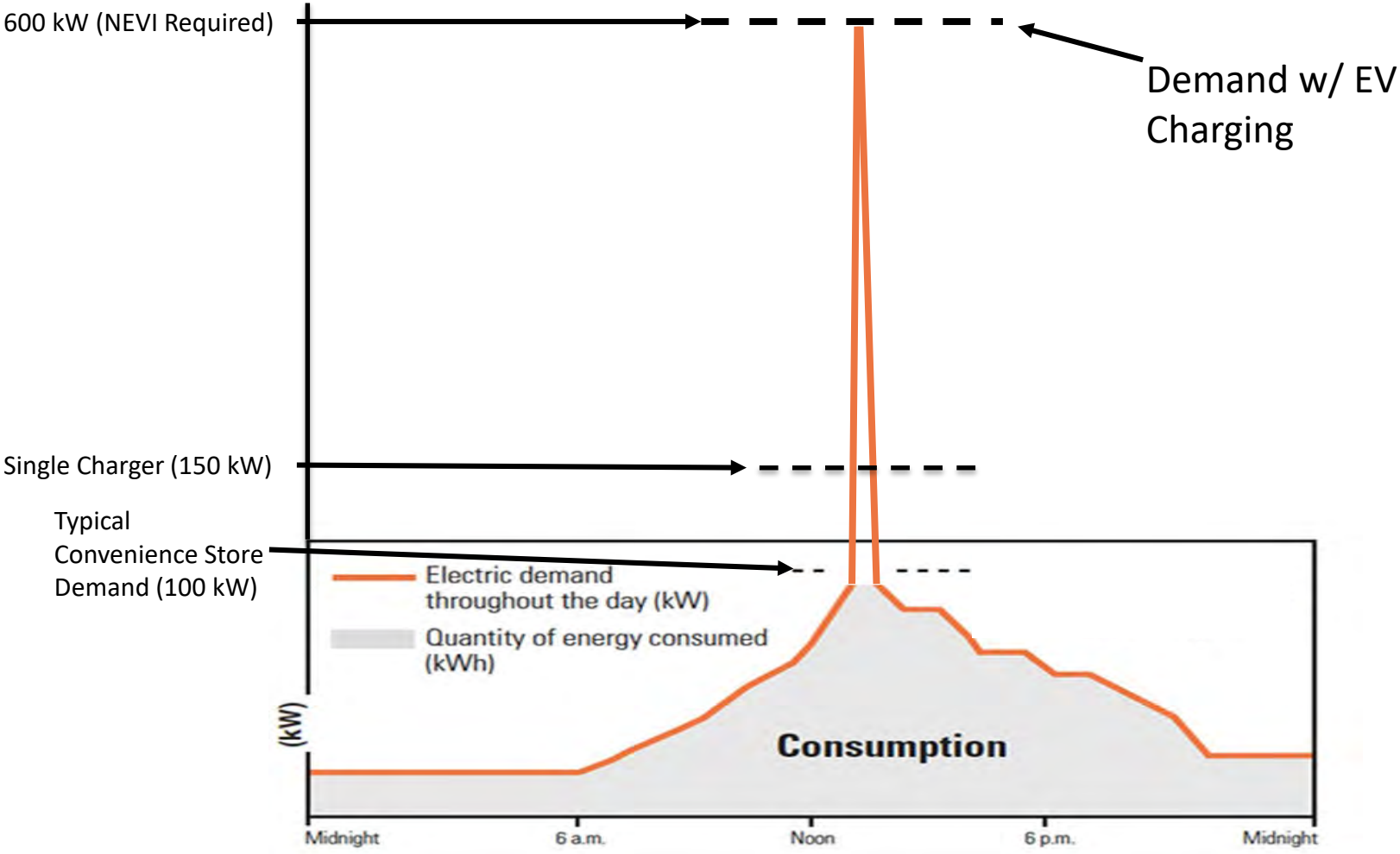
Where Do YOU Want To Charge?

Where Do YOU Want To Charge?

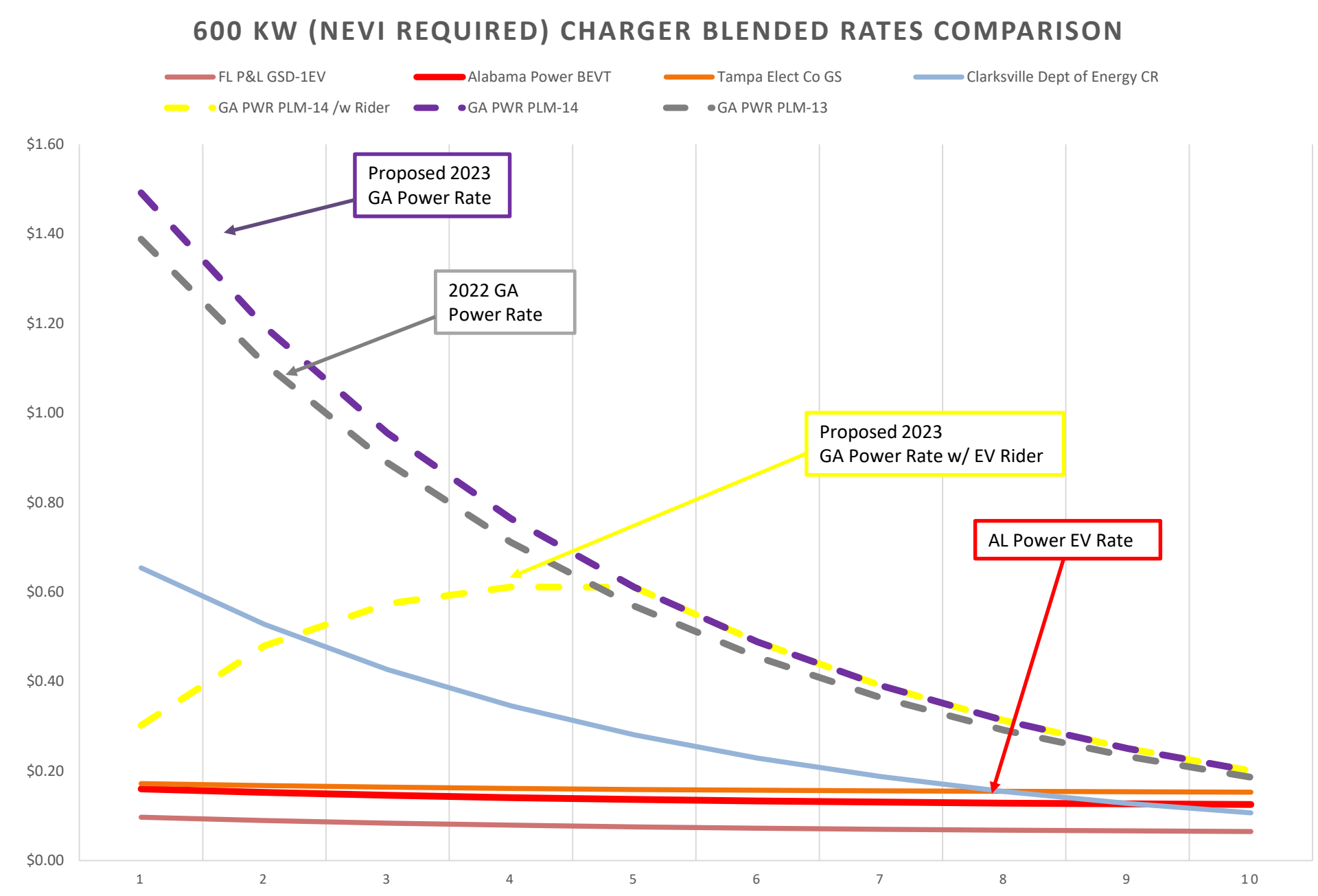
EV Business Case

BENEFITS AND RISKS

What Charging Does to Demand



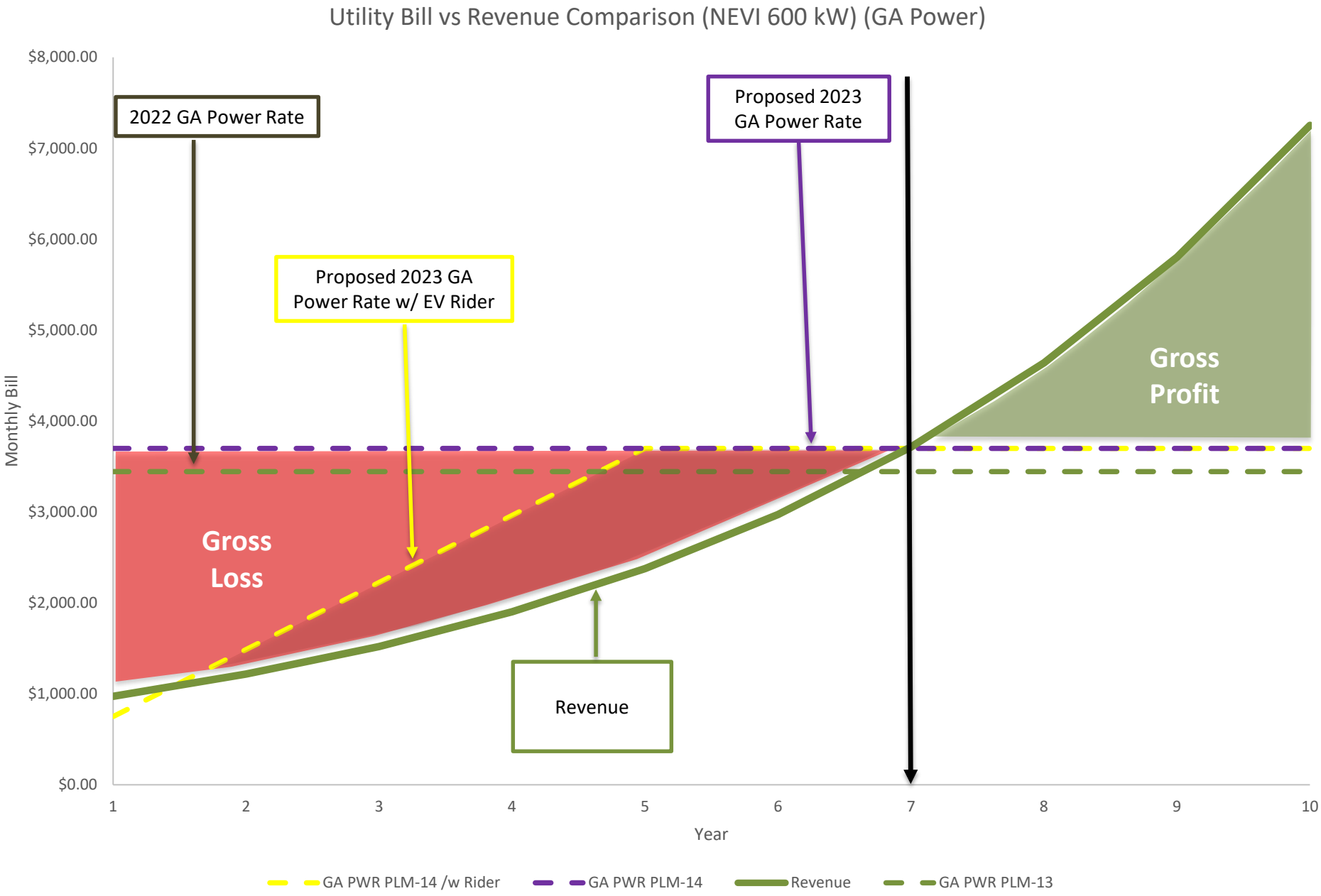
The Cost of Electricity for EV Charging



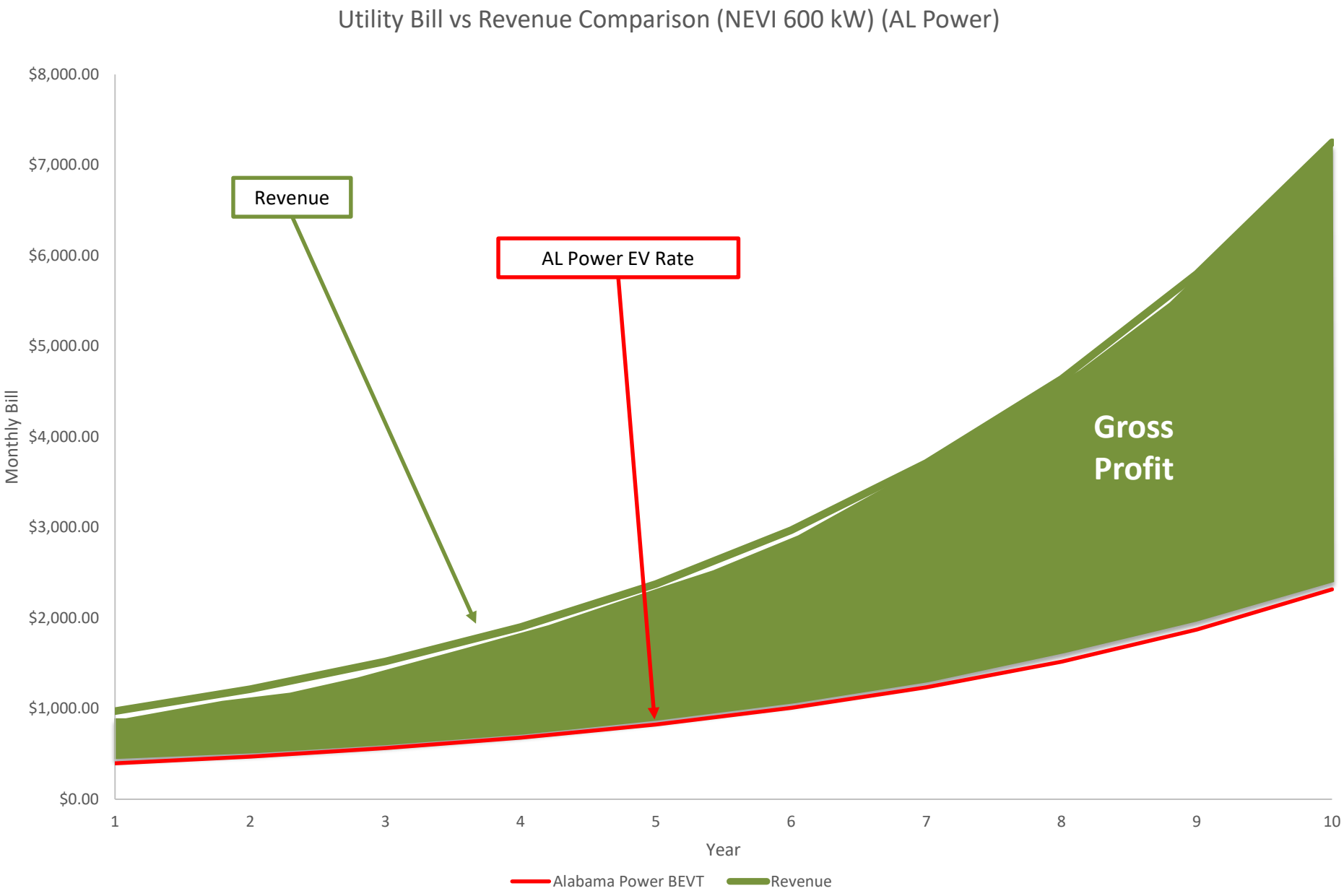
EV Business Case

ECONOMICS/RETURN ON INVESTMENT

Where is the Business Case?



Where is the Business Case?



“Our state [must be] positioned to continue leading the nation in the rapidly growing electric mobility industry.”

- Governor Brian Kemp

Create the Business Case

- Leverage NEVI Funds: GDOT Plan
- Create a Competitive Market
- Create an Effective Charging Tariff
- No Rate Basing → Use Private Capital

Thank You!

Appendix VI

(Material from meeting #6, November 30, 2022)

THE FOLLOWING RECOMMENDATIONS AND FINDINGS WERE *PRESENTED* TO THE STUDY COMMITTEE FOR VOTING ON NOVEMBER 30, 2022.

THIS IS NOT A LIST OF THE RECOMMENDATIONS THAT WERE ADOPTED.

NOT ADOPTED

SECTION V -

STUDY COMMITTEE RECOMMENDATIONS (Not Adopted)

kWh Pricing

1. *The Study Committee recommends legislative action to require EV charging to be metered by the kilowatt hour when sold.*[1] *
2. *The Study Committee recommends legislative action to allow EV charging to be sold by the kWh. **
3. *The Study Committee recommends legislative action to adopt language from HB 1322 introduced in the 2022 legislative session which clarifies current law to allow commercial EV service providers to bill for charging services based on the kWh. **
4. *The Study Committee finds that no alterations need to be made to the Territorial Act.**
5. *The Study Committee suggests that alterations to the Territorial Act be made in a prudent and judicious manner. **

GP/EMC Charging Stations

6. *The Study Committee recommends legislative action to restrict electric suppliers under the jurisdiction of the Public Service Commission for the purposes of setting rates from participating in the business of EV charging, except through a separate, deregulated subsidiary. **
7. *The Study Committee recommends legislative action to restrict electric suppliers from participating in the business of EV Charging, except through a separate, deregulated subsidiary.**
8. *The Study Committee recommends legislative action requiring electric suppliers to provide electricity to EV charging companies (including electric supplier subsidiaries) at the same rates, terms, and conditions.**
9. *The Study Committee recommends legislative action prohibiting an electric supplier from allocating to or recovering from the ratepayers of the electric supplier the cost to provide, own, operate, or maintain EV charging equipment.**
10. *The Study Committee recommends the preservation of all electric utilities ability to provide investment in charging stations as approved through their existing market structures, with a particular focus on underserved and rural communities. **

[1] Mandating a sale by the kWh would likely affect the Tesla subscription services whereby they provide charging services to motorists.

*Asterisks denote a conflicting recommendation or finding.

THE FOLLOWING RECOMMENDATIONS AND FINDINGS WERE *PRESENTED* TO THE STUDY COMMITTEE FOR VOTING ON NOVEMBER 30, 2022.

THIS IS NOT A LIST OF THE RECOMMENDATIONS THAT WERE ADOPTED.

11. *The Study Committee finds that Electric Cooperatives owning and operating EV chargers are continuing to serve in their historic role of selling electricity to the public and should be allowed to continue to do so. **

Inclusion of Alternative Fuels

12. *The Study Committee recommends that any legislative action taken concerning the electrification of vehicles, be done with an understanding and appreciation for the potential of future development in fuel sourcing for vehicles. Further, the Study Committee recommends that any legislative plan should include all alternative fuel types, so that the state has a mechanism in place for collecting revenue on all fuel sources.*

PSC Appeal / Demand Charges

13. *The Study Committee recommends legislative action requiring the Public Service Commission to establish a process for an appeal by EV charging station owners of unwarranted and excessive demand charges on electricity purchased from regulated electricity providers for the purpose of resell for EV charging.*
14. *The Study Committee recommends all electric suppliers offer an EV charging rate that collects electricity costs through a volumetric charge (kWh). The purpose of this legislation would be to address demand charges associated with EV charging. The Study Committee recognizes that electric utilities may need to vary their rates by time of day or real time pricing capability.*

EV Charging Rate / Rate Structure

15. *The Study Committee recommends legislative action requiring the Public Service Commission to determine an EV charging rate for electric suppliers under its jurisdiction. **
16. *The Study Committee finds that Georgia law should not prescribe a rate structure for commercial EV charging. **

GDOT Plan

17. *The Study Committee recommends the Georgia Department of Transportation consider the impact on free market providers of EV charging stations, either already in place, planned, or projected to be in place by 2035, when determining the placement of stations funded with federal grants.*

NOT ADOPTED

*Asterisks denote a conflicting recommendation or finding.

THE FOLLOWING RECOMMENDATIONS AND FINDINGS WERE *PRESENTED* TO THE STUDY COMMITTEE FOR VOTING ON NOVEMBER 30, 2022.

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18. *The Study Committee encourages the Georgia Department of Transportation to make every reasonable effort to partner with free market EV charging entities in the placement of federally funded stations.*

Motor Fuel Tax Recovery

19. *The Study Committee recommends either: (A.) the continued study and consideration, for at least a year, of a pay-per-mile mechanism to fund roads and bridges; or in the alternative, (B.) legislative action in 2023 supporting a pay-per-mile mechanism for funding road and bridges, which shall be either:*
    a. *a voluntary system requiring yearly mileage provided from the on-board computer of each registered vehicle; or*
    b. *a fixed registration fee set artificially high so as to incentivize option (1.).*
20. *The Study Committee recommends that any legislative action taken to recoup the shortfall in the collection of the gas tax be carefully constructed so that emerging technology and fuel sources can easily be incorporated into a formula or process.*
21. *The Study Committee supports the Georgia Department of Transportation's pilot program on taxing motorist based on vehicle miles traveled.*
22. *The Study Committee supports the creation of a fair methodology to replace the loss in revenue from motor fuel taxes.*

23. *The Study Committee supports the creation of a new EV tax existing independently and in addition to the current annual fee levied against all EVs registered in Georgia. The Study Committee recognizes that an excise tax on energy consumed by an EV motorist at public charging stations would not capture revenue from motorists charging at home.**
24. *The Study Committee supports a methodology whereby Georgia residents can choose to pay either:*
    (1) the current annual fee levied against EV owners; or
    (2) pay taxes based on the kWh consumed at home either:
        (a.) measured by an independent metering system installed at the homeowners expense, and reported by the electric supplier; or
        *(b.) estimated by receipts provided to the tax commissioner's office. **
25. *The Study Committee recommends legislative action requiring the Georgia Department of Transportation to conduct a study or analysis to determine a fair road usage charge for all EVs operating in Georgia.*

NOT ADOPTED

*Asterisks denote a conflicting recommendation or finding.

THE FOLLOWING RECOMMENDATIONS AND FINDINGS WERE *PRESENTED* TO THE STUDY COMMITTEE FOR VOTING ON NOVEMBER 30, 2022.

THIS IS NOT A LIST OF THE RECOMMENDATIONS THAT WERE ADOPTED.

a. *The Study Committee recommends legislation requiring the Georgia Department of Transportation to issue a request for proposal for the study to be conducted in calendar year 2023.*
b. *The Study Committee recommends legislative action requiring the study to be paid for from the state's general fund and appropriated by the Georgia General Assembly in the 2023 legislative session.*
c. *Further, the Study Committee recommends legislative action requiring the study to include typical methods of tracking and collecting road usage data and fees as are applied and utilized internationally including the United States.*

26. *The Study Committee finds that fees such as road usage charges or vehicle miles traveled should be comparable to the fuel tax paid by an equivalent conventional vehicle.*

Permitting/Licensing/Inspections

27. *The Study Committee recommends legislative action requiring commercial and other charging stations to be permitted or licensed by the state. Permitting, licensing, and inspection requirements should ensure (1.) accuracy of energy consumption measured by a meter; (2.) safety; and (3.) an accurate accounting of charging stations and their locations.*
28. *The Study Committee recommends legislative action requiring the licensing and inspection of charging stations be conducted by the Department of Agriculture, as this department currently inspects fuel pumps. Further, the Study Committee recommends adequate funding to support these inspections.*
29. *The Study Committee recommends that permitting and inspection intervals for paid public charging be differentiated from those chargers which are free for consumers to use.*
30. *The Study Committee recommends further discussion and study into the Department of Revenue's ability to collect state, local, and federal taxes from the sale of electricity or other sources of power for transportation. Further, the Study Committee supports the introduction of legislation to support the Department of Revenue in their efforts to collect taxes.*

Public Safety Training

31. *The Study Committee recommends that public safety officers and first responders be adequately trained in handling motor vehicle accidents involving electric vehicles and*

NOT ADOPTED

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THE FOLLOWING RECOMMENDATIONS AND FINDINGS WERE *PRESENTED* TO THE STUDY COMMITTEE FOR VOTING ON NOVEMBER 30, 2022.

THIS IS NOT A LIST OF THE RECOMMENDATIONS THAT WERE ADOPTED.

NOT ADOPTED

training materials be created and distributed statewide by our Public Safety Training Center.

Battery Recycling

32. *The Study Committee recommends legislative action mandating that electric vehicle batteries be recycled.*

GP/EMC Power Supply Reliability

33. *The Study Committee encourages power suppliers to keep a keen eye on the growing demand for EV charging and plan accordingly for future generation and power supply reliability.*

Freight and Logistics Expansion

34. *The Study Committee finds that a portion of the EV fee revenues paid by commercial vehicle operators should be dedicated to support freight and logistics expansion in Georgia.*

At-Home Charging Rates

35. *The Study Committee finds that rates established by HB 170 (2015 Legislative Session) remain unchanged. **

Charging Class Conceptualization

36. *The Study Committee finds that EV charging facilities can be divided into four classes based on the location of the chargers and the type of vehicle being charged. The Study Committee believes four classes exist: (1) home charging outlets; (2) public charging outlets; (3) destination charging outlets; and (4) fleet charging. The Study Committee believes this rubric can be used as a framework levy taxes against users who are both Georgians and non-Georgians.*

	Home Charging Outlet	*Public / Transient Charging Outlet*	*Destination Charging Outlet*	*Fleet Charging Outlet*
GA Resident	*X*	*X*	*X*	*-*
Non-Resident	*-*	*X*	*X*	*-*
GA Business	*-*	*X*	*X*	*X*
Non-GA Business	*-*	*X*	*X*	*X*

***Public/Transient Charging Outlets are charging sources used by transient customers who need long range charging for extended trips.*

*Asterisks denote a conflicting recommendation or finding.

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****Destination Charging Outlets are charging sources found at hotels, retails stores, and CIDs.*

Direct Sales

37. *The Study Committee finds that there is not sufficient cause, at this time, to overturn the longstanding automobile dealership franchise structure that dealers and consumers have come to depend upon. **
38. *The Study Committee recommends legislative action to eliminate the direct sales of EVs in the state of Georgia by placing a 1-year sunset date on the current carve out.**

NOT ADOPTED

*Asterisks denote a conflicting recommendation or finding.