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# TRANSPORTATION ELECTRIFICATION IN FLORIDA

| A DEEP DIVE INTO TRAVEL PATTERNS & STATISTICS ACROSS THE EV SECTOR

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## FLORIDA HIGHLIGHTS

### ELECTRIC PASSENGER VEHICLES

Florida has the second-largest number of passenger EVs and the third largest number of electric transit buses on the road in the United States.

Passenger vehicles account for 90 percent of passenger miles traveled across Florida's leading metro areas.



### ELECTRIC BUSES AND TRUCKS

Florida can leverage \$141 million from the Volkswagen Settlement to deploy electric buses and trucks.

Buses and trucks contribute higher per-vehicle miles traveled across Florida and their emissions disproportionately impact underserved communities.

### ELECTRIC TRANSPORTATION INFRASTRUCTURE

Less than one-half of one percent of the approved electric utility investment across the country is from Florida.

Florida accounts for just under five percent of the nation's charging ports and makes up seven percent of the population.

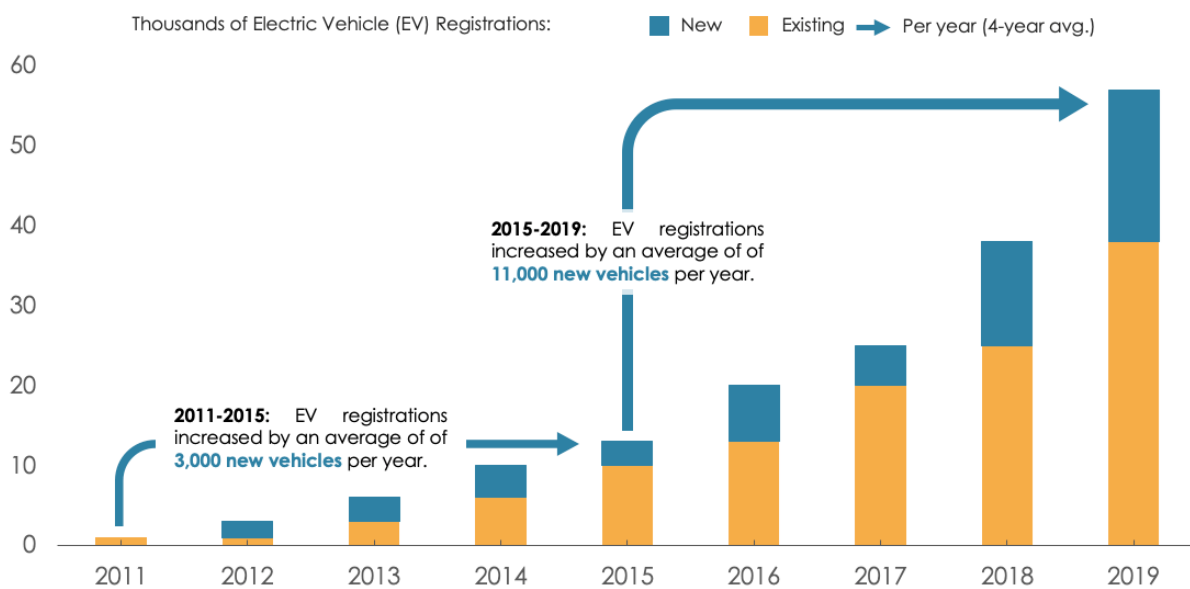
Florida can capitalize on policy momentum from the Essential State Infrastructure Bill, SB 7018, to implement additional policies supporting transportation electrification.



## EXECUTIVE SUMMARY

Florida is the second-largest passenger electric vehicle (EV)<sup>1</sup> market in the United States and transportation electrification has accelerated throughout the state in the last three years. There were roughly 62,000 EVs on the road in Florida as of June 2020 and the state accounts for more than four percent of EV sales nationwide. EV sales in Florida increased 20 percent between 2018 and 2019 while sales were down 12 percent nationwide. Figure 1 shows the electric vehicle market in Florida.

FIGURE 1: ELECTRIC VEHICLE MARKET IN FLORIDA



*This chart shows the increasing number of EV registrations in Florida. Average annual EV registrations increased by almost four times between 2015 and 2019 compared to the previous four years.*

Source: Southern Alliance for Clean Energy [1]

Growth in EV sales has not, however, translated to significant government or utility funding for transportation electrification and there are significant opportunities for Florida to invest in medium- and heavy-duty vehicles as well as increase support for charging for all vehicle types. Importantly, passenger vehicles are responsible for 50 percent of criteria air pollutant emissions in the state and make up more than 90 percent of the annual vehicle miles traveled in major metro areas.

<sup>1</sup> Both all-electric vehicles and plug-in hybrid electric vehicles are considered EVs in this brief.

## INTRODUCTION

Florida is home to over 21 million residents and is the third most populous state in the United States. The state is the second-largest passenger vehicle market and Florida has upwards of 15.6 million registered light-duty vehicles [2]. This brief provides an overview of Florida's EV market while also highlighting travel patterns and transit agency statistics for major metro regions. These data provide insights on where Florida can leverage government resources and public policy to accelerate the transition to EVs. On-road vehicles are the leading source of criteria pollutants in Florida, presenting an opportunity to make large emissions reductions and reach climate goals by advancing electrification.

EV adoption is on the rise in Florida and the state's EV market has remained resilient despite challenges posed by the COVID-19 pandemic. The onset of the pandemic in the United States in March 2020 led to significant production shutdowns that delayed the release of new EV models and reduced consumer demand across the auto industry [3]. Nationwide, passenger vehicle sales were down 24 percent for the first half of 2020 compared to a 29 percent decline for the EV market [4]. By contrast, EV sales in Florida through the first half of the year were almost flat compared to 2019 [5].

Sales declines throughout the passenger vehicle market have done little to dampen new private investments in the EV sector and more than 30 new passenger EV models are expected to be available in United States in 2021 [6]. At least \$8.5 billion in new private investment for passenger EVs was announced in July and August 2020 alone and more than \$64 billion is expected to be invested in the U.S. EV market across all light-, medium-, and heavy-duty vehicle segments [7].

Government agencies in Florida are also committing resources to promote transportation electrification. Increasing EV deployments have led to an expansion of the state's charging network and state legislators passed the Essential State Infrastructure Bill, SB 7018, in March 2020 requiring the Department of Transportation, the Public Service Commission, Office of Energy and other stakeholders in the state to develop a "Master Plan" to coordinate the roll out of charging stations across Florida [8]. Florida's Governor Ron DeSantis signed the bill into law in June 2020 [9]. This effort will be supported by Florida's VW Settlement funds and the state has committed the maximum allowable 15 percent of their \$166 million to support passenger EV charging [10].

Florida's EV market has room to grow. There has been little state funding or utility investment committed to transportation electrification to date and Florida was one of the last states to submit their plan for how they would use their Volkswagen (VW) Settlement funds. Medium- and heavy-duty EVs including transit buses, school buses, and trucks are eligible for the remaining \$141 million of the state's allocation [11]. Although counties like Miami-Dade have made commitments to transit bus electrification and EV deployment, Florida has not implemented statewide vehicle deployment targets.

Florida is positioned to benefit from EVs in multiple ways and transportation electrification stakeholders can draw on existing research to help inform policy and program implementation across the state. This brief is focused on highlighting key EV indicators and current opportunities in Florida, drawing on examples from around the country and Atlas Public Policy's own research. Table 1 summarizes additional research available to provide a deeper understanding on ways to maximize the value proposition of rapid transportation electrification by implementing some of the policy interventions referenced in this brief.

TABLE 1: ADDITIONAL RESOURCES ON THE BENEFITS OF TRANSPORTATION ELECTRIFICATION

TITLE	AUTHOR	SCOPE
<b>Update on electric vehicle adoption across U.S. cities</b>	International Council on Clean Transportation	This brief provides an overview of light-duty EV and EV charging uptake across metro areas throughout the country. It also provides policy recommendations and guidance. The authors found that rebates and tax credits remain important for reducing upfront cost barriers [11].
<b>Electric Vehicle Cost-Benefit Analysis: Florida</b>	MJ Bradley & Associates	This study conducted a cost-benefit analysis of increased EV deployment in Florida. It concluded that accelerated EV adoption could generate \$11.7 billion in benefits state-wide by 2050 [12].
<b>Vehicle-Grid Integration</b>	Atlas Public Policy, Alliance for Transportation Electrification	This brief identifies challenges and opportunities surrounding vehicle-grid integration (VGI) with a focus on how EVs can increase utilization of existing electrical grid assets and put downward pressure on rates by reducing grid operational costs [13].
<b>High Potential Regions for Electric Truck Deployments</b>	North American Council on Freight Efficiency	This report provides a framework for medium- and heavy-duty industry stakeholders to assess truck electrification markets in different regions. The report identifies electric truck hot spots and makes recommendations for policy support [14].
<b>Comparison of Medium- and Heavy-Duty Technologies in California</b>	ICF International, Inc.	This study assesses the emissions impact, total cost of ownership, and economic benefits of electrifying medium- and heavy-duty vehicles in California. It found that electric trucks are the most promising technology for the state to achieve long-term environmental and economic goals [15].
<b>Roadmap for Electric Transportation</b>	Regulatory Assistance Project	This resource provides a policy guide and model legislation related to transportation electrification. It is meant to guide states to implement policy that leads to economic savings, job creation, enhanced national security, and strengthened commitment to address public health and climate change [16].

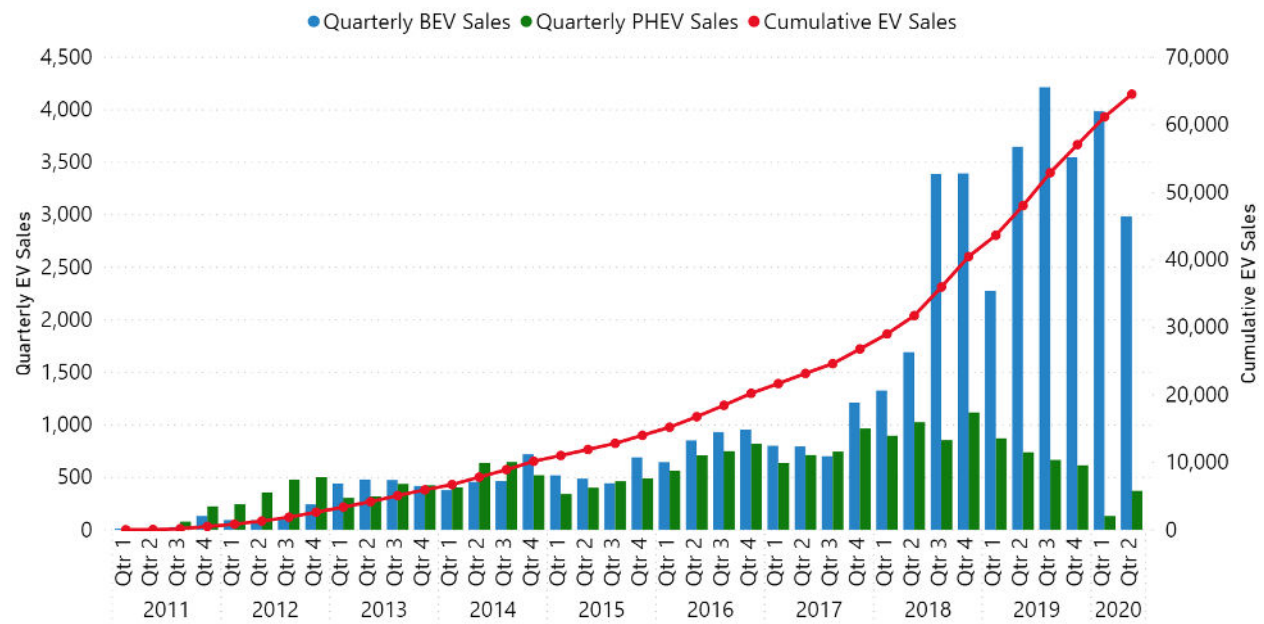
This brief, “Transportation Electrification in Florida”, produced by Atlas Public Policy with support from the Southern Alliance for Clean Energy (SACE), provides an overview of the state of the EV market and deployment in Florida while also highlighting travel patterns and transit agency statistics, along with snapshots of EV policy and program examples from other states. Recent policy adoption and awards through the VW Settlement have generated momentum in Florida and can be harnessed to accelerate the EV market across the state and position it as a regional and national leader.



## EV MARKET TRENDS IN FLORIDA

Florida's passenger EV market has outperformed the national market over the last year and a half. The state saw a 20 percent increase in EV sales between 2018 and 2019 while sales were down 10 percent nationwide [12]. While challenges posed by COVID-19 caused a decline in passenger vehicle sales nationwide, EV sales were not down significantly more than conventional vehicle sales. Florida's EV market performed particularly well with the state's EV sales down only one percent in the first and second quarters of 2020 compared to 2019. This points to a resiliency in the Florida EV market, as the impacts of COVID-19 led to a 29 percent decline in the national EV market through the first half of 2020. Florida accounts for over four percent of national EV sales, ranking third behind California and New York in total sales through June 2020 [5]. Just over one percent of new vehicle sales in Florida are EVs, slightly below the national average of two percent. Figure 2 shows the trend in EV sales over time in Florida through June 2020 and Table 2 ranks the top ten states based on all-time passenger EV sales numbers through June 2020.

**FIGURE 2: EV SALES IN FLORIDA THROUGH JUNE 2020**



EV sales have been growing steadily in Florida and saw a 20 percent increase between 2018 and 2019 compared to a 10 percent decrease nationwide. All-electric sales far outpace plug-in hybrid sales in 2020. Together, the top 10 states in terms of all-time passenger EV sales account for 75 percent of all U.S. passenger EV sales.

Source: Atlas EV Hub [12]

TABLE 2: TOP 10 STATES BY EV SALES THROUGH JUNE 2020

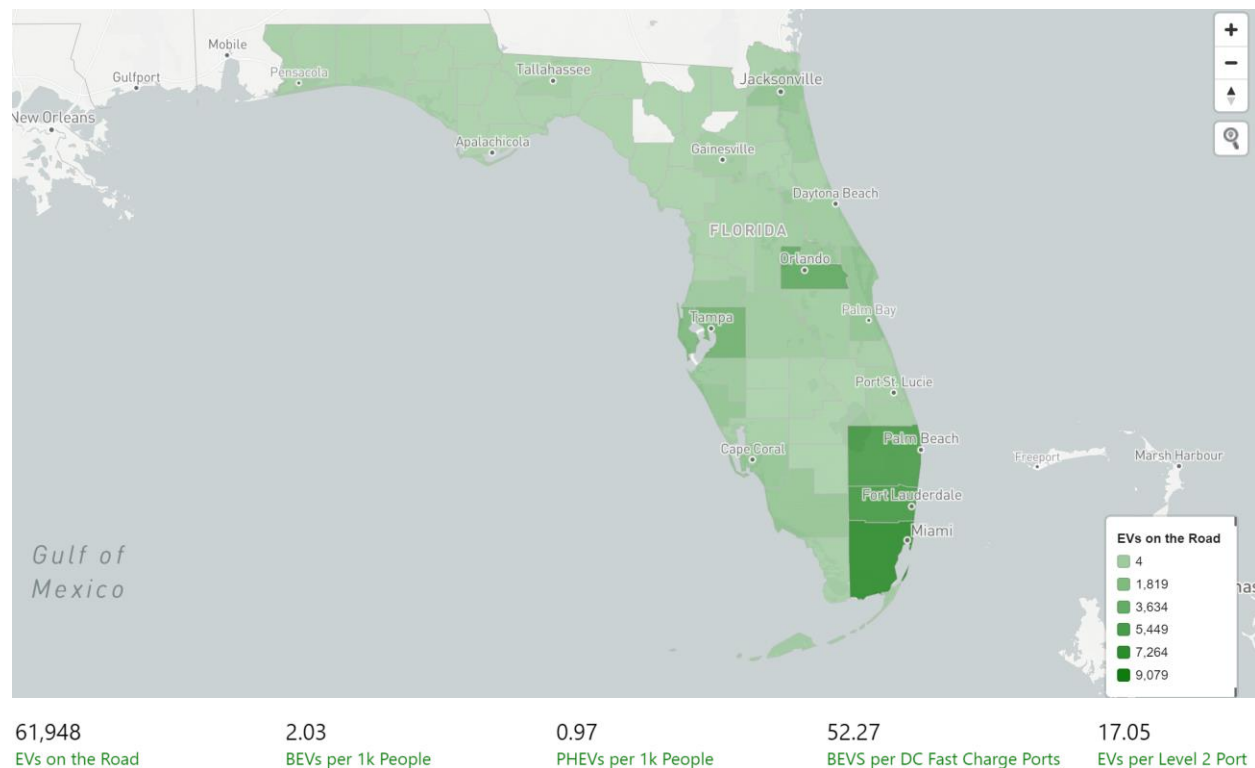
STATE	PASSENGER EV SALES THROUGH JUNE 2020	EV SALES SHARE OF NATIONAL TOTAL	POPULATION SHARE OF NATIONAL TOTAL
California	698,670	47%	12%
New York	64,962	4.4%	5.9%
Florida	64,535	4.4%	6.5%
Washington	57,995	3.9%	2.3%
Texas	54,818	3.7%	8.8%
Georgia	40,892	2.8%	3.2%
New Jersey	38,731	2.6%	2.7%
Massachusetts	32,692	2.2%	2.1%
Illinois	32,084	2.2%	3.9%
Colorado	30,548	2.1%	1.8%
<b>TOTAL</b>	<b>1,115,927</b>	<b>75%</b>	<b>47%</b>

*Together, the top 10 passenger EV markets in the country account for 75 percent of all passenger EV sales nationwide despite making up just 47 percent of the population.*

*Source: Atlas EV Hub [12]*

While Florida is behind New York and ranks third in terms of reported EV sales, it is ahead in total EV registrations and ranks second in the nation in this measure. Florida is behind only California in total number of registered EVs and is ahead of Washington, which ranks third. Based on data from the Florida Department of Motor Vehicles, there were almost 62,000 registered light-duty EVs in Florida as of June 2020. This places Florida ahead of Washington's 58,600 and New York's 53,600 registered EVs [13]. There is a heavy concentration of EVs in Palm Beach, Broward, and Miami-Dade counties with smaller concentrations seen in Tampa Bay and Orlando. Tesla accounts for 55 percent of all EV registrations in Florida, mirroring trends seen at the national level. Figure 3 shows the distribution of EV registrations throughout the state at the county level.

## FIGURE 3: EV REGISTRATIONS AT THE LOCAL LEVEL IN FLORIDA THROUGH JUNE 2020



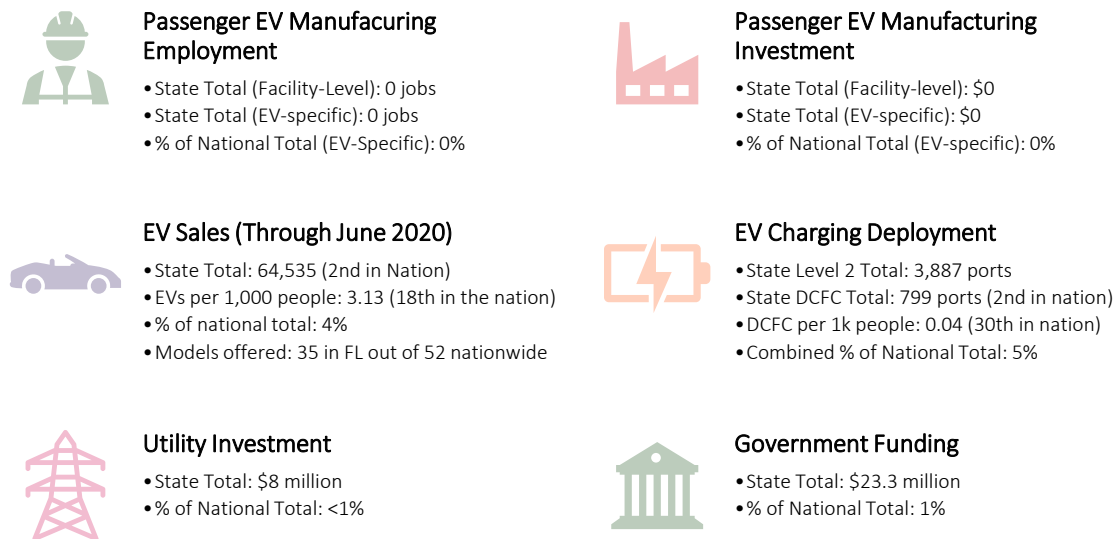
*EVs are concentrated in the major population centers of Florida with Miami-Dade, Broward, and Palm Beach counties accounting for almost 40 percent of the state's total registrations.*

*Source: Atlas Public Policy [13]*

Florida claims more than four percent of national EV sales and five percent of EV charging deployment since 2010 [12]. On a per person basis, Florida ranks 18<sup>th</sup> in terms of EV deployment per person with less populated states like Washington and Oregon among the top five. While Florida is ahead of much of the rest of the country in total numbers of EVs and EV charging, per person deployment as well as government and utility funding per person are much lower in part due to Florida's large population but also due to the low number of supportive policies encouraging EV or EV charging deployment. Figure 4 compares Florida to the nation as a whole on several state-level EV indicators.



## FIGURE 4: EV INDICATORS IN FLORIDA THROUGH AUGUST 2020



*Florida accounts for seven percent of the national population with 21,477,737 people. Florida is second in the nation in total EV sales and DCFC deployment, but on a per person basis, the state is behind on these important EV indicators compared to other states. The state has no reported direct investment or employment in EV manufacturing.*

*Source: Atlas EV Hub [14]*

Florida leads the passenger EV market in the Southeast region, which includes Alabama, Georgia, North Carolina, South Carolina, and Tennessee. Florida accounts for only 36 percent of the regional population but almost half of the EV sales. At 37 percent, Florida's share of the EV charging market in the region is roughly proportional to its share of the population. However, Florida lags their less populous neighbor Georgia on EV model offerings as well as EV and EV charging deployment per person. Georgia also leads Florida in terms of regional electric utility investment while North Carolina has almost matched Florida's share of government funding for EVs and EV charging [15].

From an employment and economic development perspective, Florida has not attracted significant passenger EV manufacturing investment or jobs. EV and EV charging expansion in leading states is a substantial economic opportunity and private companies have pledged more than \$64 billion in direct investment to transportation electrification in the United States. More than \$6.7 billion of this is being invested in passenger EV manufacturing in the Southeast, although none is currently planned for Florida [16]. Florida is the only state in the Southeast region without a major passenger vehicle production facility according to research compiled by both BlueGreen Alliance and the trade association Autos Drive America [17, 18]. In fact, the state only supports 550 direct auto manufacturing jobs, the lowest in the region [18]. Florida also does not have any large medium- and heavy-duty vehicle manufacturing operations [17].

The absence of auto and medium- and heavy-duty vehicle manufacturing plants does not mean that Florida will be left out of the economic benefits of transportation electrification. Dealership networks and

indirect suppliers employ more than 50,000 people in Florida, a number which could grow as EV startups and EV charging companies begin to expand their operations. More than 62 new passenger EVs are expected to reach the U.S. market by the end of 2022 including some of the first vehicles from companies including Rivian, Lordstown Motors, and Nikola [14]. Florida has the opportunity to attract investment from these companies as well as major automakers by implementing policies to further encourage transportation electrification in the region. Only 35 out of the 52 EVs on the market as of August 2020 were offered in Florida. States with fewer new passenger EV sales and total EV registrations including Virginia and New York each have more than 45 EVs on the market. Model offerings is one of the primary factors influencing EV adoption. Expanding the in-state market could prove beneficial not only for economic development and job creation associated with EVs, but also for increasing both EV and EV charging deployment per person in Florida.

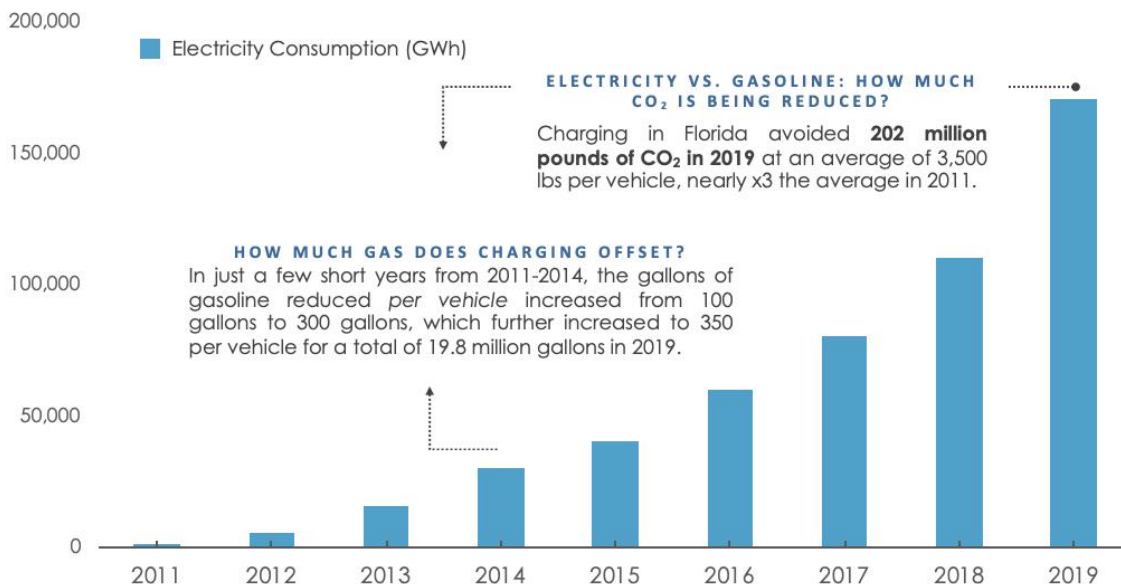
## EV CHARGING AND ELECTRIC UTILITY ENGAGEMENT

Florida's EV charging sector has a large potential to grow based on low levels of deployment per person and a limited amount of electric utility investment in the state. While it is unlikely to benefit from investment in direct passenger EV manufacturing under current conditions, Florida is a key player in other aspects of the U.S. EV market and has the potential to attract jobs and investment from the EV charging sector. Private companies have committed almost \$2.8 billion to the EV charging market in the United States although these companies do not publish job figures [7]. Independent reports found that unlike the auto sector, EV charging companies did not undertake mass layoffs despite a drop in utilization due to COVID-19. For example, EVgo, the largest fast charging network in the country outside of Tesla, did not furlough any of its 115-person staff through the pandemic [19]. Further demonstrating the strength of the EV market despite the pandemic, charging station deployment has increased by 20 percent in 2020 compared to the number of ports installed at the end of 2019.<sup>2</sup> In Florida, EV charging ports have increased by 16 percent in 2020 through September compared to the end of 2019. Figure 5 shows that electricity consumed from EV charging in Florida increased alongside the state's increase in installed charging ports and EV adoption.

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<sup>2</sup> Estimates for the growth in charging station deployment over time do not include a large batch of ChargePoint stations that were all reportedly opened on June 12<sup>th</sup>, 2020. It is unlikely all of these stations opened on this date.

FIGURE 5: ELECTRICITY CONSUMED FROM EV CHARGING IN FLORIDA

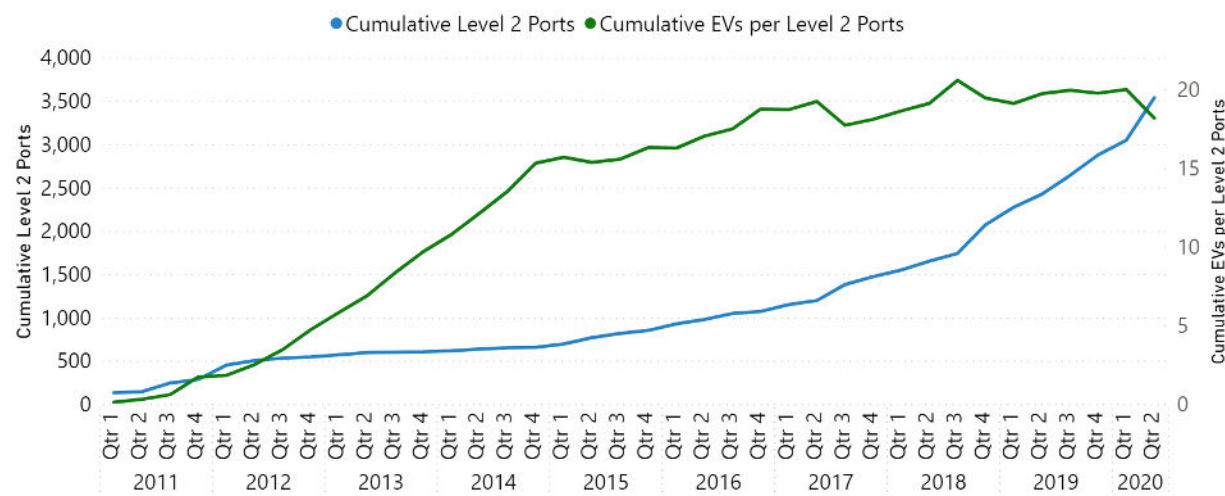


This chart shows the growth in electricity consumption because of increased EV adoption in Florida. EVs are reducing the carbon intensity of vehicles because using electricity to charge EVs produces less carbon dioxide than using gasoline to power conventional vehicles.

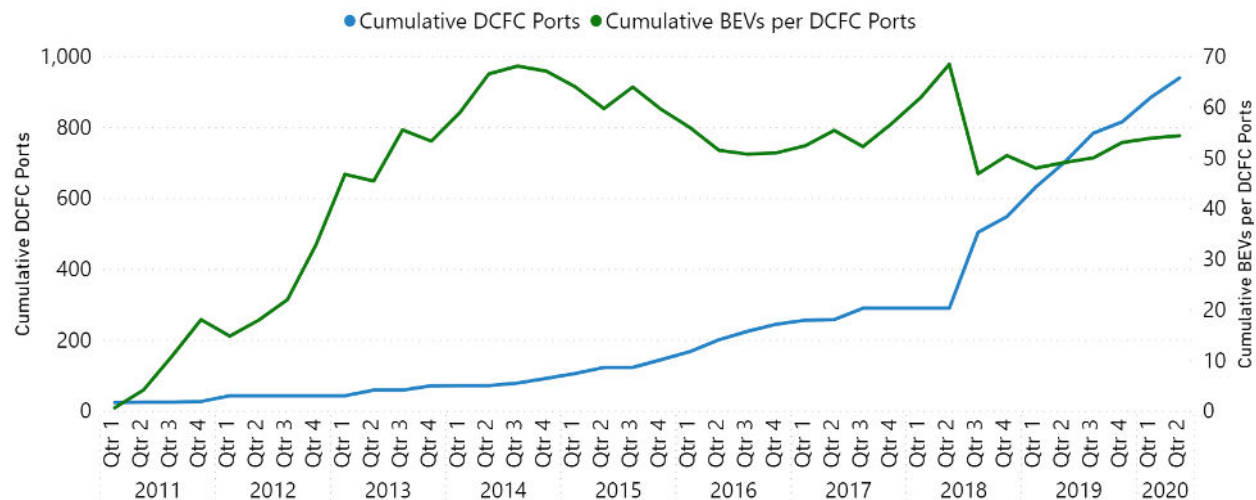
Source: Southern Alliance for Clean Energy [1]

Florida's EV adoption has been increasing faster than charging station deployment with a general rise in the ratio of EVs to charging ports for both Level 2 and DC fast charging stations. Figure 6 shows the growth in EV charging deployment over time in Florida.

FIGURE 6: EV CHARGING DEPLOYMENT OVER TIME IN FLORIDA



## TRANSPORTATION ELECTRIFICATION IN FLORIDA



*These charts compare cumulative EV charging deployment to charging ports per EV over time in Florida. EV deployment has been increasing faster than charging deployment with a growing number of EVs per charging port for both level 2 and DC fast charging stations. These charts include many ChargePoint stations that were added to the data source used on June 12th, 2020. It is unlikely all these stations were opened on this date.*

*Source: Atlas EV Hub [20]*

Florida's increasing EV charging sector has room to continue to grow as the state accounts for just under five percent of the nation's charging ports while making up seven percent of the population. As was the case in the vehicle sector, California dominates EV charging deployment with a third of the nation's 92,000 charging ports. The state also claims the highest level of utility engagement in transportation electrification, having approved more than \$1.5 billion in utility EV programs to make up almost 60 percent of the national total. These approvals could support more than 61,800 Level 2 and 550 DC fast charging stations in the state and include large investments supporting the electrification of medium- and heavy-duty vehicles [15]. Box 1 below highlights some of the economic benefits seen in states with high utility engagement in transportation electrification.

### BOX 1: ECONOMIC BENEFITS OF UTILITY INVESTMENT IN TRANSPORTATION ELECTRIFICATION

California, the leading state for utility investment in transportation electrification, has seen considerable benefits to electricity ratepayers from increasing passenger EV deployment. Research from Synapse Energy Economics updated in June 2020 found that EVs have generated more than \$800 million in revenue above costs for the state's two largest utilities, Pacific Gas & Electric and Southern California Edison [21].

Utility operating cost savings can be achieved when EV drivers charge their vehicles at off-peak times, increasing energy sales without requiring the utility to invest in new grid infrastructure. EV charging can also provide other vehicle-grid integration (VGI) services, defined in California as, "any method of altering the time, charging level, or location at which grid-connected electric vehicles charge or discharge, in a manner that optimizes plug-in electric vehicle interaction with the electrical grid and provides net benefits to ratepayers." EV rates are one method utilities use to capture the benefits of VGI. Other methods include employing managed charging technology where the utility can directly control charging station consumption. EVs can also provide bi-directional power flow (V2G) where EVs act as distributed energy resources for grid operators.

Utilities around the country are implementing VGI programs to maximize the cost savings potential of EVs. These savings are passed down to all utility customers in the form of lower rates and savings on the utility side can be used to cover costs associated with investing in further transportation electrification programs [22].

Outside of California, other electric utilities are working to accelerate transportation electrification and deploy EV charging in their service territories. New York utilities are the second-most active in terms of EV programs and in July 2020, six companies were approved to invest more than \$701 million in programs including make-ready investments required to ready the grid for rapid expansion of EV charging. These approvals also include investments designated for underserved communities to ensure the benefits of transportation electrification projects are distributed equitably. The approvals also include programs designed to ensure that emissions reductions are geared towards communities bearing the heaviest burden of transportation emissions [15]. Specially, because these communities suffer disproportionately from bus and truck pollution, several programs focus on advancing fleet electrification for medium- and heavy-duty vehicles [23]. The most comprehensive programs, such as those in California, New York, and other states include elements focused on transit bus electrification and support for medium- and heavy-duty vehicle charging. Dominion Energy in Virginia, for example, has applied this approach and was approved in April 2020 to invest \$20 million in a variety of programs including transit bus electrification pilots and charging stations for ride-hail vehicles. Electric utilities are also in a position to provide charging services to their customers through different pilot programs tied to EV rates. Xcel Energy has taken this approach in their \$26 million program which includes residential, public and fleet EV charging services combining EV rates, make-ready investment, and educational programs. The utility also filed a program in June 2020 with the Commission to invest \$156 million in rebates for electric transit buses and passenger EVs. Table 3 provides information on the leading utility programs by total potential investment.



TABLE 3: TOP 10 UTILITY PROGRAMS BY HIGHEST POTENTIAL INVESTMENT THROUGH AUGUST 2020

UTILITY (STATE)	DOCKET	PROGRAM STATUS	DATE OF LATEST UPDATE	POTENTIAL INVESTMENT	PRIMARY FOCUS AREA
<b>Southern California Edison (CA)</b>	A1806015	Approved	8/27/2020	\$436 million	Make-Ready EV Charging for Residential and Non-residential Level 2 Charging
<b>Consolidated Edison (NY)</b>	18-E-0138	Approved	7/16/2020	\$396 million	Make-Ready EV Charging for Non-residential Level 2 Charging, Public DCFC
<b>Southern California Edison (CA)</b>	A1701021	Approved	5/31/2018	\$372 million	Make-Ready EV Charging for Medium- and Heavy-Duty Fleets
<b>Public Service Electric and Gas Company (NJ)</b>	EO18101111	Filed	9/26/2018	\$364 million	EV Charging Rebates for Residential Level 2 Charging, Public Fast Charging
<b>Pacific Gas &amp; Electric (CA)</b>	A1701022	Approved	5/31/2018	\$267 million	Make-Ready EV Charging for Medium- and Heavy-Duty Fleets
<b>National Grid (NY)</b>	18-E-0138	Approved	7/16/2020	\$251 million	Make-Ready EV Charging for Non-residential Level 2 Charging, Public DCFC
<b>New York State Electric &amp; Gas Corporation (NY)</b>	18-E-0138	Approved	7/16/2020	\$183 million	Make-Ready EV Charging for Non-residential Level 2 Charging, Public DCFC
<b>Xcel Energy (MN)</b>	M-20-492	Filed	6/17/2020	\$156 million	Vehicle Rebates for Transit Buses, Fleet EVs
<b>Rochester Gas &amp; Electric Corporation (NY)</b>	18-E-0138	Approved	7/16/2020	\$144 million	Make-Ready EV Charging for Non-residential Level 2 Charging, Public DCFC
<b>Central Hudson Gas &amp; Electric (NY)</b>	18-E-0138	Approved	7/16/2020	\$130 million	Make-Ready EV Charging for Non-residential Level 2 Charging, Public DCFC

*This table shows the top utility programs in the country in terms of highest potential investment. Most of these include approvals for utilities in New York and California issued since July 2020. Make-ready investments are the leading business model and most of these programs include a focus on EV charging for non-residential and fleet vehicles.*

*Source: Atlas EV Hub [15]*

None of the largest approved or proposed utility programs in the country are from Florida utilities and most of the largest programs are concentrated in California and New York. However, Florida utilities are picking up on the opportunity to invest in transportation electrification and, as Box 1 details, both utilities and ratepayers stand to benefit from increased EV adoption in Florida. Currently, the state accounts for less than half of a percent of the approved utility investment across the country. The state's only recorded approval comes from a Duke Energy pilot program in 2017 to invest \$8 million in 500 Level 2 and 30 DC fast charging stations [15]. According to the utility, they have installed more than 450 charging stations and plan to install the approved total of 530 charging stations through the project [24]. Duke Energy has also incorporated EV deployment growth projections and anticipated charging needs into their load forecasts [25]. New York, which has a comparable population and level of EV sales to Florida, dwarfs the Sunshine State in terms of utility investment. After the approval of the Make-Ready Program in July 2020, New York's approvals total \$782 million in programs supporting up to 53,700 Level 2 and 2,606 DC fast charging stations [15].

More recently, Florida Power & Light (FPL) filed a new program in June 2020 seeking to provide increased access to DC fast charging on highway corridors in the state. The program does not propose any direct investment in the EV charging sector, however, and instead lays the groundwork for new EV charging rates and regulations supporting the implementation of a statewide network [15]. In addition, the utility has established goals to deploy 1,000 charging stations through their EVolution program. This program is being conducted outside the regulatory process and the investments associated with the effort are not included in the state's total utility approvals mentioned in this brief. As of September 2020, FPL has installed dual-port Level 2 chargers at more than 40 locations [26]. Several other efforts have been undertaken by utilities in Florida to prepare the grid for increasing numbers of EVs and reduce barriers to EV charging deployment faced by private companies and other investors.

At the request of TECO Energy, the Florida Public Service Commission made it easier for charging service providers to deploy equipment by temporarily lowering a fee tied to the construction and installation of DC fast charging stations in January 2020. Reducing this fee, referred to as a Contribution in Aid of Construction (CAIC) tariff, lowers the upfront cost for infrastructure providers thereby improving the business case for deploying EV charging today ahead of expected increases in demand in the future [27]. On September 25<sup>th</sup>, 2020 TECO filed their first EV charging pilot program, which proposed to invest \$2 million to own and operate 200 charging stations. If approved, stations installed through the program will serve a variety of customer groups including government fleets, retail customers, and workplaces [28]. TECO has also included EV charging in their Integrated Renewable Energy System (Pilot) Program and intends to utilize charging infrastructure for demand side management across the grid [29].

While FPL setting EV rates is an important first step to supporting the statewide rollout of charging infrastructure, Florida utilities have the opportunity to invest much more in EV charging to support adoption and achieve savings for drivers and ratepayers. Georgia, whose population is less than half of the size of Florida's, has three times as much approved utility EV investment. Duke Energy, the only utility currently investing in the Florida EV market, has also proposed much larger programs in other states. Their \$76 million proposal in North Carolina has the potential to support more than 4,000 Level 2 and 240 DC fast charging stations, a level of deployment that would more than double Florida's Level 2 charging ports and increase the state's fast charging network by 30 percent [15]. Furthermore, this program includes \$8 million for transit bus electrification and \$18 million for electric school buses, a category of EVs that has no recorded government funding in Florida [30]. Box 2 below highlights Dominion Energy's electric school bus program in Virginia as an example of utility and state partnership to increase EV deployment.

### BOX 2: DOMINION ENERGY ELECTRIFYING SCHOOL BUSES IN VIRGINIA

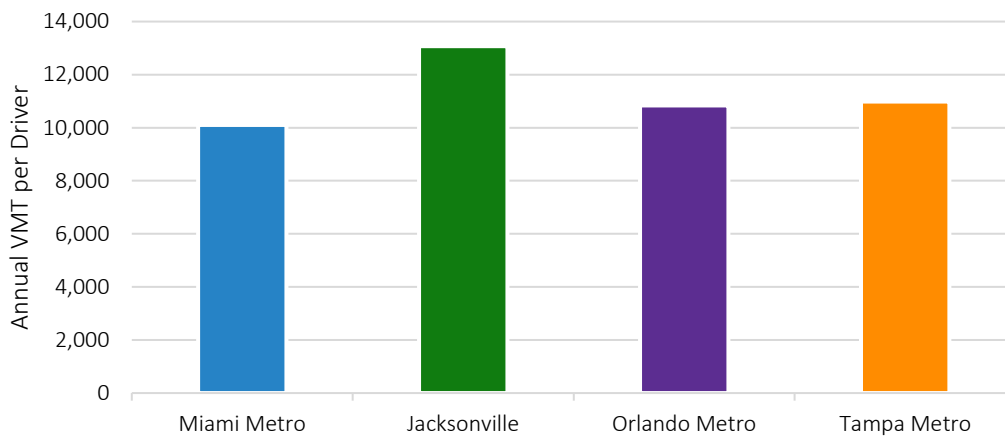
In August 2019, Dominion Energy announced a plan to electrify all school buses in its Virginia service territory by the end of 2025. In a June 2020 update to the program, the utility announced it will deploy at least 50 buses by the end of the year. As a part of this deployment, Dominion will be exploring bi-directional power flow (V2G) applications where the bus batteries act as energy storage resources for the grid [31]. The utility has committed to working with the state and school districts as they procure buses using a \$20 million VW Settlement grant awarded in August 2019 [32]. Dominion has been approved separately to invest \$20 million in a range of EV charging programs including transit bus electrification pilots [15].

Duke Energy and other utilities in Florida could model this approach and design EV programs to maximize collaboration with public agencies. A similar pilot to the Dominion program exploring V2G electric school bus applications is being conducted by FPL and the Parks and Recreation department of West Palm Beach. Five buses will be tested throughout the course of the program, which began in 2019 [33]. Duke Energy is leading by example and electrifying their own vehicles. On September 9, 2020, Duke committed to electrify all of their company-owned light-duty vehicles and half of their medium- and heavy-duty vehicles by 2030 [34].

Florida utilities and ratepayers stand to benefit from increased investment in transportation electrification. Utility programs can help fill infrastructure gaps and guide the rollout of new policies and government funding programs to ensure electrification reaches all vehicle sectors and that all customers, even non-EV drivers, see the benefits of transportation electrification through lower rates and cleaner air [35].

## TRAVEL PATTERNS AND EMISSIONS IN FLORIDA

Transportation accounts for 46 percent of Florida's carbon dioxide (CO<sub>2</sub>) emissions, the highest of any sector [36]. As is the case throughout the nation, transportation emissions in Florida are being driven by passenger vehicles. As of August 2002, Florida had over 15 million registered passenger vehicles on its roads. According to the Federal Highway Administration, passenger vehicles accounted for more than 70 percent of the 222 billion annual vehicle miles traveled in Florida in 2018 [37]. Passenger vehicles made up more than 90 percent of annual passenger miles traveled across the state's four largest metro areas (Jacksonville, Miami, Orlando, and Tampa) according to responses recorded in the 2017 National Household Travel Survey. Florida drivers average anywhere from 10,100 annual miles driven a year in Miami to 13,000 in Jacksonville [38]. Figure 7 shows the breakdown of annual vehicle miles traveled per person across these regions.

**FIGURE 7: ANNUAL VEHICLE MILES TRAVELED IN PASSENGER VEHICLES PER DRIVER**

*Jacksonville accounts for the highest average annual miles traveled in passenger vehicles on a per capita basis. Miami, which has the highest annual public transit usage of these metro areas, has the lowest.*

*Source: National Household Travel Survey [38]*

Based on findings from a report by the Union of Concerned Scientists, driving an all-electric passenger vehicle in Florida with today's electricity fuel mix is equivalent to driving a conventional vehicle with a fuel economy of 66 miles per gallon on an emissions basis [39]. Passenger vehicles dominate the total annual vehicle miles in every metro region in Florida, making electrification of the light-duty sector a particularly important opportunity to reduce emissions.

Florida also has an opportunity to reduce transportation emissions by accelerating EV uptake among medium- and heavy-duty vehicles. These vehicles account for a disproportionate share of both vehicle miles traveled (VMT) and emissions relative to the number of vehicles on the road. Bus travel across these same four major metro areas in Florida accounted for 81 million revenue miles traveled in 2018, meaning the bus was carrying passengers at the time of the trip. Based on the total number of buses operated in full service by transit agencies in Florida, each transit bus averaged more than 48,000 miles traveled in 2018 [40]. This is more than 6.5 times the average 7,400 miles traveled by a passenger vehicle across the four major metro regions in Florida [38]. Florida transit bus annual VMT is slightly higher than the national average of 45,000 miles per year reported by the Federal Highway Administration [41]. Based on data from the Federal Highway Administration, buses throughout the state accounted for less than 0.5 percent of all VMT in Florida in 2018, or roughly one billion miles [37].

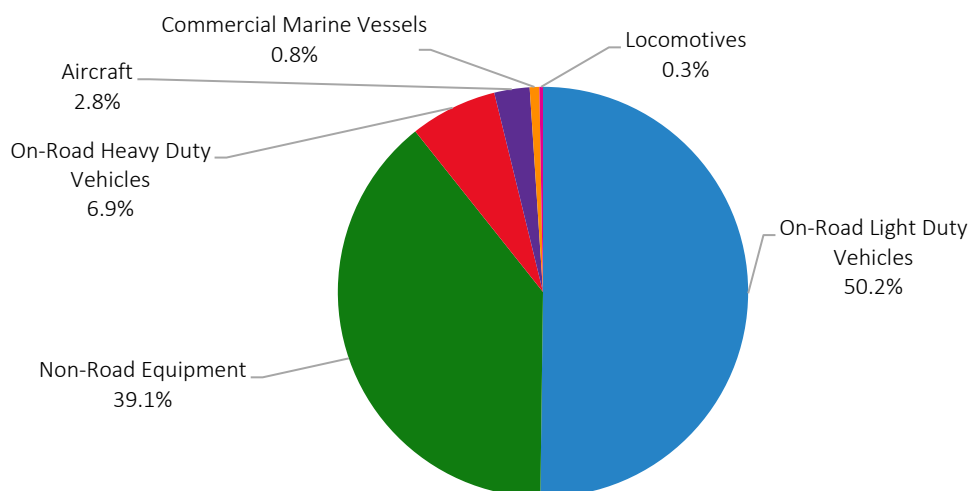
The contribution of on-road trucks to the state's total VMT is significantly higher than buses, as trucks average the highest amount of annual VMT of any vehicle type nationwide with more than 62,500 miles of yearly travel. Trucks made up a majority of the non-passenger VMT in Florida, accounting for 26 percent of the state's total VMT in 2018 [37].

High annual mileage contributes to the outsized portions of emissions from these vehicles. While light-duty passenger vehicles contribute 50 percent of the criteria air pollutant emissions in the state, heavy-duty trucks account for seven percent of criteria emissions and almost 30 percent of the nitrogen oxide (NO<sub>x</sub>) emissions in the state. The share of emissions from trucks and buses is disproportionate compared to the number of these vehicles, which account for seven percent of all registered vehicles on the road in

## TRANSPORTATION ELECTRIFICATION IN FLORIDA

Florida [2]. Nationwide, trucks and buses account for roughly 10 percent of the on-road vehicle fleet [42]. Medium- and heavy-duty vehicles contribute 23 percent of the nationwide greenhouse gas emissions [43]. Figure 8 shows the breakdown of criteria air pollutant emissions by mobile source in Florida based on 2014 data.

**FIGURE 8: CRITERIA AIR POLLUTANT EMISSIONS BY MOBILE SOURCE IN FLORIDA**



*Light-duty vehicles account for half of criteria air pollutants in Florida, leading all other sectors. Non-road equipment, such as forklifts and yard tractors, accounts for the second-largest proportion.*

*Source: Environmental Protection Agency [44]*

Electrifying trucks and buses is also a priority because underserved communities are exposed to a disproportionate share of emissions caused by these vehicles. Exposure to on-road vehicle emissions exacerbate public health issues such as asthma in underserved communities and has been shown to increase community vulnerability to COVID-19 [23]. Utility and government funding programs in California and New York, the two leading states in terms of support for medium- and heavy-duty electrification, include dedicated investment in electrification for vehicles operating in underserved communities [15, 30]. Regulations like the Zero Emission Vehicle (ZEV) Truck Memorandum of Understanding and the Advanced Clean Trucks Rule requiring 100 percent ZEV truck sales by 2050 specifically address underserved communities in their language [45].

Transit agencies also have an opportunity to reduce their emissions by adopting EVs. According to the 2020 American Public Transportation Association (APTA)'s Public Transportation Vehicle Database update, there were at least 31 electric transit buses in operation throughout Florida [46]. This number is likely underreporting the actual value as there has not been an update from transit agencies in Miami since 2016 and other cities have also not provided updates. CALSTART estimates there are now 142 electric transit buses in Florida including some of the recent deployments in Miami [47]. Using this figure, electric transit buses make up just three percent of the state's fleet of transit vehicles.



## POLICY OPTIONS TO ACCELERATE TRANSPORTATION ELECTRIFICATION IN FLORIDA

Florida is a national leader in passenger EV deployment but it risks falling behind rapidly growing markets like New York and Colorado if it does not implement a wider range of policies supporting transportation electrification. As is true in other states, increasing EV adoption requires planning and coordination between key stakeholders including legislators, government agencies, electric utilities, and private companies. Florida has taken some initial steps toward developing this coordination, but more has to be done to ensure the benefits of a growing EV sector are captured. Planning is also required to address challenges EVs may pose, including increased demand on the power grid and road network funding shortfalls. Box 3 below addresses the latter issue while the EV Charging and Electric Utility Engagement section discussed the cost savings potential associated with vehicle-grid integration.

### BOX 3. ROAD NETWORK FUNDING CHALLENGES IN FLORIDA AND THE ECONOMIC OPPORTUNITY OF EVS

The average fuel economy of vehicles is slowly increasing across the nation. Between 2000 and 2017, the average fuel economy of light-duty vehicles in the United States rose from 20 to 22.4 miles per gallon and existing federal vehicle standards are expected to result in increased fuel economy in the near future [48]. This trend poses a challenge for road network funding since Florida, like all states, relies to some degree on motor fuel taxes to finance highways, bridges, and other essential transportation infrastructure. In 2017, these taxes accounted for 38 percent of all of Florida's road network revenue, the single largest source [49].

In 2018, gasoline consumption in Florida was lower than the peak consumption level, which occurred in 2006, by only one percent [50]. As of July 2020, the Florida Department of Revenue reported \$299 million in revenue collection from the state fuel tax, the lowest July reporting in three years [51].

As EVs and other advanced, efficient vehicles enter the market in Florida, the state must weigh the importance of encouraging innovation and the need to fund the road network. To ensure EV drivers are contributing to funding for roads, 29 states have implemented annual registration fees. Research from Consumer Reports in September 2019 found that at least 11 of these states were charging fees higher than a driver of a comparable conventional car would pay in gas taxes [52]. Florida has not implemented any EV-specific revenue collection mechanism.

Utility investment is just one source of support for EVs and investment is often also supported by policy implementation and regulatory requirements. Since May 2019, Colorado has emerged as a leader in transportation electrification and has directly implemented multiple supporting policies. The state is one of several that have adopted legislation requiring utilities to file transportation electrification plans and invest in the EV and EV charging market. This led to the filing of two utility plans in May 2020 worth more than \$103 million. Before this legislation, Colorado had only \$4 million in proposed utility investment in transportation electrification. The state now has the third highest amount of proposed utility EV investment in the country [15].

Colorado also participates in a multi-state effort known as the Regional Electric Vehicle West Plan (“REV West Plan”), which aims to install sufficient EV charging to allow seamless travel across the participating states. In addition, Colorado has set their own specific transportation electrification targets through the 2020 Colorado EV Plan. The latter established goals to deploy 940,000 EVs by 2030, electrify all transit buses, and rapidly expand EV charging [53]. The state backed the plan up by requiring all remaining VW Settlement funds be spent on EVs and by implementing state rebates for the purchase of EVs of all class types including heavy-duty trucks [54]. In addition to state-specific policies, Colorado was one of 16 states to sign the ZEV Truck Memorandum of Understanding (MOU) following the enactment of the California Clean Trucks Rule, committing to 100 percent ZEV truck sales by 2050. The MOU was signed by California and the each of the 11 other states that have adopted the ZEV program [45].<sup>3</sup> The top 10 states in terms of passenger EV deployment per person are all MOU states, and each is now taking steps to lead the electric truck market as well.

Colorado is just one example of states that have developed comprehensive policy packages to address transportation electrification from all sides. Florida has taken the first steps towards this type of policy adoption with the passage in March 2020 of SB 7018 requiring public agencies to develop a statewide EV infrastructure plan, which was signed into effect by Governor DeSantis’ Essential State Infrastructure Bill in June 2020 [55]. This legislation lays the foundation for increased coordination between EV stakeholders in the state and prepares for the rollout of VW Settlement funds [8]. Florida’s award of \$8.6 million for EV charging in July 2020 was the state’s first use of their \$166 million allocation.

Another area where Florida can expand their existing support for EVs is the right-to-charge policy. The Northeast States for Coordinated Air Use Management (NESCAUM) defined “right to charge” laws as laws that provide residents of properties the right to install charging infrastructure assuming the resident will cover the associated costs of the infrastructure. As of July 2020, seven states including California, Colorado, Florida, Hawaii, New York Oregon, and Virginia had implemented statewide right-to-charge laws [56]. California and Oregon have expanded these laws so that they apply to renters as well as owners [57]. California expanded their support for right-to-charge laws in August 2020 when state legislators passed Assembly Bill 841 requiring utilities to invest in the distribution infrastructure and utility-side upgrades required to provide charging services to customers throughout the state. This significantly reduces the upfront costs faced by public agencies, businesses, and other groups looking to install EV charging and eliminates the need for regulatory approval for each investment in grid upgrades to service EV charging stations [58]. Florida could adopt a similar approach and expand existing right-to-charge legislation to renters as well as homeowners while engaging electric utilities in the growth of the charging network.

The right-to-charge legislation in California also extends to fleet operators and California utility EV programs all offer financial support for medium- and heavy-duty vehicle charging infrastructure. As evidenced in Colorado, Executive Orders and legislation could be leveraged in Florida to require that the remaining \$141 million of the state’s VW Settlement funds go towards transportation electrification [53]. Electric buses and trucks are eligible for all of this funding. Outside of the settlement, Florida transit agencies have received \$14.7 million for electric transit buses between 2016 and 2020 through the Federal Low- or No Emission (Low-No) Bus Program for electric transit bus purchases [30]. This funding has led to the deployment of more than 142 electric transit buses in the state through October 2019, the third-highest deployment in the country [47]. The state has no reported funding awards for electric school buses or trucks, two vehicle categories which could see funding through the VW Settlement if the state chooses to invest in those technologies as opposed to conventional models.

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<sup>3</sup> ZEV states include California, Colorado, Connecticut, Massachusetts, Maryland, Maine, New York, New Jersey, Rhode Island, Oregon, Vermont, and Washington.

## TRANSPORTATION ELECTRIFICATION IN FLORIDA

Local and regional governments in Florida have taken the lead on transportation electrification commitments in years passed. In 2019, Miami-Dade County pledged to electrify 50 percent of its transit bus fleet by 2035. The Department of Transportation and Public Works made the first strides toward fulfilling this commitment in November 2019 with the purchase of 33 electric buses for their fleet [59]. The West Palm Beach pilot supporting 5 electric school buses is the only example of this deployment in the state.

The North American Council for Freight Efficiency (NACFE) does not consider Florida's market to be optimal in terms of its support for truck electrification. This is according to the findings of their August 2020 report, which considers factors such as policy support to assess how supportive a region is of truck electrification [60]. Florida was not considered a favorable market for truck electrification due to lack of financial support for medium- and heavy-duty EV deployment. States like North Carolina that signed the ZEV truck MOU and others like New York that have dedicated programs to finance electric trucks are considered more favorable markets than Florida for truck electrification. Florida has the opportunity to allocate up to \$141 million of their VW Settlement funds to support medium- and heavy-duty vehicle electrification and expand the market across the state [32]. State legislators can look to local pilots and programs like the ones in Miami-Dade and West Palm Beach mentioned above to model programs and strategies at the state level.

Policymakers in Florida can look to several policies across the United States that have been used to advance EVs. These are described below.

### LIGHT-DUTY EV AND EV CHARGING INCENTIVES

State-administered tax credits or rebates or utility-administered rebates to reduce the upfront cost of EVs and/or charging. Vehicle rebates have been implemented in 15 states and charging rebates are active in 29. Incentives maximize driver savings with EVs and can increase spending power [61].

Example Programs	Florida Application
<p>Oregon Clean Vehicle Rebate Program [62]:</p> <ul style="list-style-type: none"><li>• \$2,500 Standard Rebate</li><li>• Doubles if driver is low-income</li><li>• Applies to used vehicles</li></ul>	<p>Florida has not implemented an incentive program for EVs. Georgia had a \$5,000 tax credit between 2013 and 2015. EV sales in Georgia fell 65% throughout 2015 when the program ended.</p>

## MEDIUM- AND HEAVY-DUTY VEHICLE AND CHARGING INCENTIVES

State or utility-administered vouchers covering the part or all of the cost differential between electric trucks and buses and conventional models. Five states have implemented these programs. EV truck deployment can lead to fleet savings and free up investment [63].

Example Programs	Florida Application
<p>California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program [64]:</p> <ul style="list-style-type: none"> <li>• 2,750 vouchers for ZEVs awarded</li> <li>• More than \$324 million disbursed since 2010</li> <li>• 57% of vehicles funded operating in underserved communities</li> </ul>	<p>Florida is not considered a favorable market for electric trucks under current conditions. No fleets have reported purchases of electric trucks. The state can leverage VW Settlement funds to launch a program.</p>

## TRANSPORTATION ELECTRIFICATION TARGETS

State- or city-level goals setting EV or EV charging deployment commitments. Targets can apply to one stakeholder (e.g., a transit agency) or create multi-stakeholder partnerships between utilities, governments, and companies. 21 states have adopted some form of targets. Executive orders and legislation can also be leveraged to require utilities or other stakeholders to create plans [61].

Example Programs	Florida Application
<p>New Jersey Transportation Electrification Targets [65]:</p> <ul style="list-style-type: none"> <li>• Enacted in January 2020</li> <li>• 100% ZEV transit bus sales by 2032</li> <li>• 85% ZEV light-duty sales by 2040</li> </ul>	<p>Florida does not have any targets in place. The state can leverage charging infrastructure strategies outlined in the 2020 Essential State Infrastructure Act to establish clear deployment targets. It could extend multi-agency planning to develop EV deployment targets as well. Florida could also enact legislation similar to what was done in Colorado requiring utilities in the state to develop transportation electrification plans.</p>

### ZEV PROGRAM

Twelve states led by California have implemented regulations requiring automakers to make available for sale an increasing proportion of passenger EVs relative to their overall vehicle sales in a given state [66].

Example Programs	Florida Application
<p>Washington Adoption of ZEV Program [67]:</p> <ul style="list-style-type: none"> <li>• Enacted in March 2020</li> <li>• Expected 10% reduction in transportation emissions by 2035</li> </ul>	<p>Florida would be the first state in the Southeast to adopt these standards, which are mostly in place in the Northeast and West Coast. This foundational policy could be complemented by other incentives and signal Florida's interest in being a market leader to automakers and attract investment.</p>

### TRUCK REGULATIONS

On June 25, 2020, California adopted the first-of-its kind Advanced Clean Trucks Rule requiring all truck sales in the state to be zero emission by 2045 [68].

In July 2020, California joined 15 other states in signing a ZEV Truck Memorandum of Understanding (MOU) establishing multi-state coordination around electric truck deployment [45].

Example Programs	Florida Application
<p>Advanced Clean Trucks Rule in California:</p> <ul style="list-style-type: none"> <li>• 100% ZEV short-haul drayage trucks by 2035</li> <li>• 100% ZEV last-mile delivery vans by 2040</li> <li>• 100% ZEV truck sales by 2045</li> </ul>	<p>Florida's market is not currently considered a highly supportive of truck electrification according to NACFE [60]. North Carolina is the only state in the Southeast to have signed the MOU. Florida could expand its EV truck market and establish regional coordination that could bring jobs and investment to the region.</p>



## RIGHT-TO-CHARGE AND BUILDING CODES

Right-to-Charge laws refers to legislation that provides residents of properties the right to install charging infrastructure assuming the resident will cover the associated costs of the infrastructure. In some cases, these laws apply to both renters and owners. Seven states have implemented right-to-charge codes [69]. Building codes can also be established that require new buildings to be prepared for EV charging infrastructure in parking spots.

Example Programs	Florida Application
<p>California Policy Package [70, 58]:</p> <ul style="list-style-type: none"> <li>• Requires construction of EV charging at multi-family dwellings</li> <li>• Allows residents of leased property to install EV charging stations at their own expense</li> <li>• Requires utilities to invest in make-ready infrastructure to reduce construction and installation costs</li> </ul>	<p>Florida already has right-to-charge laws established for owners subject to condo and homeowners' associations. The state can expand this to renters at all properties and require utilities to invest in the required infrastructure and develop transportation electrification plans.</p>

## DIRECT SALES OF PASSENGER VEHICLES

Formal legislation that allows EV manufacturers that do not have franchised dealers to sell directly to consumers [69, 71].

Example Programs	Florida Application
<p>Colorado Direct Sales Law [71]:</p> <ul style="list-style-type: none"> <li>• Allows all EV manufacturers to sell directly to customers</li> <li>• Goes further than other states that only make this exception for Tesla</li> </ul>	<p>Florida currently has fewer EV offerings than neighboring states like Georgia. Allowing automakers and EV startups to sell directly to consumers will increase the options Floridians can choose from and could lead to greater startup investment in the state.</p>

## TIME OF USE (TOU) OR SPECIAL EV RATES

TOU rates encourage EV drivers to charge during off-peak hours when electricity demand is low. Special EV rates can also result in electricity bill savings and encourage EV adoption. These programs can offer reduced rates during defined periods and can generate savings for the utility that could be passed on to ratepayers. These rates are available in at least 21 states. Lower fuel costs encourage EV adoption and lead to a greater proportion of transportation fuel consumption from in-state sources.

Example Programs	Florida Application
<p>California Utility Savings [21]:</p> <ul style="list-style-type: none"> <li>\$800 million more revenue than costs generated from EVs than for PG&amp;E and SCE between 2012 and 2019</li> </ul>	<p>Florida Power &amp; Light has already established a special EV rate for DC fast charging. This is not a TOU rate and only sets optional, fixed tariffs for EV drivers to purchase charging directly from the utility. As the second largest passenger EV market, EV rates could be adopted by all Florida utilities.</p>

## MULTI-STATE COORDINATION

This typically entails formal parentship between multiple state agencies to develop multi-state transportation electrification targets or infrastructure networks.

Example Programs	Florida Application
<p>Regional Electric Vehicle (REV) West Plan [69]:</p> <ul style="list-style-type: none"> <li>A memorandum of understanding signed by AZ, CO, ID, MT, NV, NM, UT, and WY</li> <li>Plan to deploy corridor EV charging stations making it possible to drive an EV through region</li> </ul>	<p>Florida could leverage existing momentum under its 2020 Essential State Infrastructure Act to expand Florida infrastructure planning beyond the state. North Carolina, Tennessee, and Alabama already have infrastructure plans in place. Allowing regional travel could attract further tourism to the state and create jobs in the growing EV charging sector.</p>

## EV PLANNING FOR THE FUTURE IN FLORIDA

Florida has begun to address funding and charging infrastructure gaps by coordinating the efforts of the state's electric utilities and public agencies. The state is also beginning to justify EV investment in the context of natural disasters and climate change. Florida is facing steep costs due to the impacts of climate change and state policymakers are beginning to rally behind clean energy and transportation as tools to both create jobs and reduce the state's emissions. According to a report from the Center for Climate Integrity, the state could face up to \$74 billion in climate change costs by 2040 [72]. Increasing extreme weather events and sea level rise are among the threats facing Floridians and SB 7018, a law requiring planning for EV charging corridors, directly references climate change as a justification for the need to speed up transportation electrification [73]. EV charging is defined as "essential infrastructure" in the bill, which includes planning for EV charging deployment along the state's critical evacuation routes [74].

EVs are a core component of the state's plans to reduce emissions and combat climate change in the Florida Energy and Climate Plan as well. The plan was initially published in 2008 and updated in 2019 to address the most pressing issues posed by climate change and identify solutions to promote sustainability. The Plan also calls for the siting of DC fast charging along evacuation routes as a critical step in the state's infrastructure planning [75]. Additional opportunities to enhance the job creation potential of the clean energy and clean vehicle sectors are also highlighted in the plan, which references Tesla's training program at Miami-Dade college as one example of how a growing EV market can benefit the state's workforce. Nationwide, the clean vehicles sector supports around 250,000 employees throughout the supply chain [76]. Only 42,000 of these are in direct vehicle and battery manufacturing, indicating potential for states like Florida that do not have auto manufacturing to capture jobs throughout the supply chain [16].

The Energy and Climate Plan also notes the potential of EVs to support Florida's economy by shifting fuel consumption to in-state electricity production. EVs can tap into unused electricity generation capacity during off peak periods, which can benefit electricity ratepayers from increased electricity sales at lower average costs [22, 75, 77]. EV market growth in California has generated \$800 million in surplus utility revenue between 2012 and 2019 [21]. Electric utilities have also been able to leverage the market-based carbon credit Low Carbon Fuel Standard program in California to invest directly in providing their customers with EVs and EV charging [35].

Leadership in transportation electrification can also increase a state's economy by attracting both private sector and federal government investment [77]. Washington, a state with only 35 percent of the population of Florida, has attracted \$10 million more than Florida from the Federal Low- or No Emission (Low-No) Bus Program, which provides grants for electric transit buses [30]. States that have successfully attracted grant money for EVs and EV charging are making an impression on companies looking to invest in local and regional markets. California and Colorado are two states identified by the North American Council for Freight Efficiency as more promising markets for newer technologies such as electric freight trucks compared to Florida [60].

Bloomberg New Energy Finance expects passenger EVs to make up 60 percent of new vehicle sales in the United States by 2040, a 30-fold increase over current levels. Electric truck sales are also expected to increase from negligible levels in 2020 to 10, 20, and 30 percent of light-, medium-, and heavy-duty new commercial vehicle sales by 2040, respectively [78]. States with more favorable markets for rapid deployment of newer technologies like electric trucks are also more likely to benefit from private and government investment in new sectors of transportation electrification. This includes new waves of



## TRANSPORTATION ELECTRIFICATION IN FLORIDA

technology development including the deployment of autonomous vehicles. Autonomous EV startups like Canoo have already generated billions of dollars in investment from major automakers and projects a revenue of \$1.4 billion by 2024 [79].

Transportation electrification can position Florida to lead on emissions reductions. Electrifying an increasing share of Florida's passenger vehicles would drastically reduce greenhouse gas emissions and improve the state's chances of meeting its climate goals. Passenger vehicles contribute to more than 90 percent of the vehicle miles traveled in major metro areas across the state, and the light-duty sector, including commercial and fleet vehicles, contributes 50 percent of the state's criteria air pollutant emissions [44]. Florida already has \$141 million in unspent funding that can be used to accelerate transit bus electrification and kickstart the procurement of electric trucks, which contribute a disproportionate share of NO<sub>x</sub> emissions that contribute to poor air quality, especially in underserved communities.

The ongoing COVID-19 pandemic has made clear that underserved and otherwise vulnerable communities are more susceptible to health issues as a result of higher exposure to air pollutants [23]. As Florida continues to battle COVID-19 and plan for potential future health epidemics and the worsening effects of climate change, transportation electrification provides an opportunity to significantly reduce air pollution and support public health while benefiting the state's economy.

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