

Electric Vehicle Infrastructure Deployment Recommendations

Florida Electric Vehicle Roadmap

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Introduction

This is the third report to be submitted for FDACS OOE's *Florida Electric Vehicle Roadmap* (FEVR) project. The project and these reports address the Electric Vehicle (EV) infrastructure that is specific to light-duty electric passenger vehicles. Workplace charging and infrastructure to support heavy-duty vehicles and fleets is typically specific to their needs and is not included in the analysis. The need for particular policy or regulatory attention will be noted but not addressed in these reports. These are "Business-as-Usual" evaluations; impacts from COVID-19 have not been considered.

This report is a compilation of previously reported information, new research, and additional input from stakeholders. A series of webinars and a state-wide survey conducted by FDACS OOE and CFLCCC were used to collect valuable input from a broad range of interested parties.

Stakeholder Input

Gathering information from end users is crucial to understanding the performance of the existing infrastructure, and the planning needed for future infrastructure. FDACS OOE and CFLCCC conducted six webinars between April 28 and June 16 to discuss future infrastructure considerations with stakeholders. Individual webinars addressed the considerations with stakeholders representing power service providers, infrastructure network providers, advocacy groups, planners, and state agencies. A total of 15 industry representatives from all of the stakeholder groups participated as facilitators for the webinars. More than 500 stakeholders attended over eight hours of webinars. Discussions during the webinars were very productive and useful. Feedback from participants was very positive. Recordings of the webinars and other information is available on the project website at, fdacs.gov/Energy/Florida-Electric-Vehicle-Roadmap

Topics of discussion during the webinars included:

- Increase in battery efficiency, resulting in 400+ mile range
- Increase in EVSE output of 600kW+
- Requirements for thermal management of higher EVSE outputs
- Increased grid demands at EVSE locations
- Broad introduction of EV passenger shuttles, taxis, and Transportation Network Companies (TNCs)
- Initial deployment of autonomous vehicles
- Inductive charging
- Networking and internetworking of EVSE
- Siting and upgrade capabilities
- Uptime, Resiliency, Backup Power
- Obsolescence and upgrade of EVSE
- Social equity and underserved communities
- Outreach, education, and training
- Energy consumption
- Environmental
- Site Safety
- Zoning, building codes, and permitting
- Signage

Following the webinars, FDACS OOE and CFLCCC decided to conduct a survey of interested parties as an additional means of gathering stakeholder input through an online questionnaire addressing Florida's EV infrastructure. Conducted in August of 2020, the survey sought feedback on the existing infrastructure, but it also posed other questions about reliability and availability, as well as equitable EV fees in-lieu-of gasoline taxes. The results of this survey are discussed in the recommendations section of this report.

Policy

Specific policy recommendations are outside the scope of this report. However, sound policy for EVs and EV infrastructure are crucial for their adoption and success in our state. Therefore, we have included recommendations for areas in need of policy development in the Recommendations Section.

Planning

EV infrastructure planning continues to advance in its sophistication and application. The planning is largely carried out by four major entities, the providers of network-based infrastructure, municipalities, counties, and power service providers. Additional planning, on a smaller scale, takes place at airports and destination locations, such as Florida's theme parks. As the EV population and technology advance, additional attention and coordination will be needed for infrastructure development.

EVs are mechanically much simpler than traditional internal combustion engines that use gasoline. EVs do not require radiators, belts, or engine and transmission overhauls,

or the petroleum products needed for these devices. Auto manufacturers are fully committed to electric transportation, and customers such as Amazon and UPS are prepared to purchase over 100,000 electric delivery vehicles as soon as they can be manufactured.

There are now EVs for every imaginable transportation need, from street sweepers to heavy duty delivery vehicles and police motorcycles. Regional short-haul trucking firms are converting to electric, and long-haul carriers are also committing to the EV segment, powered by hydrogen fuel cells.

The lower Total Cost of Ownership (TCO) and longer life of these vehicles will have profound positive impacts on all segments of transportation, especially disadvantaged and mobility starved communities as these communities are effected more by transportation-related pollution and spend a disproportionate amount of their income on gas and public transit costs.

Florida's Department of Environment Protection (FDEP) administers the state's share of the EPA's law suit against Volkswagen for actively falsifying emissions test results for their diesel vehicles.

The first round of awards will do much to close charging location gaps on Interstates 4, 75, and 95. Interstate 10 was not included in the in the first round of awards, but it is expected to be addressed in the next award cycle.

Installation Permitting

Webinar participants, and others, noted that installation permitting requirements are subject to local jurisdictional requirements that vary from jurisdiction to jurisdiction. Significant amounts of time can be required to educate authorities about EV infrastructure technology, resulting in delays to deployment. The development of EV ordinances addressing requirements and considerations by local jurisdictions for EV infrastructure would benefit the jurisdiction, the infrastructure developer, and the general public.

Although there is a healthy infrastructure development environment in Florida, there has been little coordination of efforts and no established standards for performance and availability.

Transportation Network Companies (TNCs), Taxis and Shuttles

Florida businesses providing transportation services are beginning to convert to electric transportation using vehicles designed to address their needs. Services such as Lyft and Uber have already impacted parking, and arrival and departure services at airports, convention centers, hotels and other high transit areas. The shift to more electric taxis and shuttles will accelerate as prices for these vehicles decrease and the lower TCO becomes clearer.

These services are fuel intensive operations, regardless of what fuel is use. Demand for high-powered EV charging in close proximity to previously mentioned travel destinations will increase substantially. There are significant health and environmental advantages that can be realized by investing in these high-traffic environments.

Many hotels and vacation destinations now offer some level of EV charging for their guest, typically Level 2. Direct current fast chargers (DCFC) in the urban core and at convention and hotel clusters will be required to support business and vacation travel. Additional Level 2 charging in parking garages and lots will be required to support multi-day business and vacation travel.

Disadvantaged Communities

Historically economically disadvantaged communities are areas which have been disproportionately impacted from a combination of economic, health, and energy related burdens. These burdens include high energy costs, poverty, high unemployment, air and water pollution, presence of hazardous wastes as well as high incidence of asthma and heart disease. These areas include low-income communities and communities of people of color.

Disadvantaged communities are disproportionately harmed because of their proximity to multiple sources of pollution, including industrial facilities, bus depots, and truck corridors. They have been an unwilling victim of transportation planning, typically through permanent disruption of their neighborhoods. As well as adverse health and occupational impacts related to transportation disproportionately affecting these communities.

Low-income communities and communities of people of color bear disproportionate climate change and pollution burdens, and therefore, these communities must be among the first to receive investment relating to new technologies and infrastructure that address the climate crisis and mitigate localized environmental pollution.

Electric transportation's significantly lower TCO present a real opportunity to improve disadvantaged communities transportation access, allowing them to commute to better jobs, health care and other services that cannot be accessed through public transportation; all while enjoying a quieter and cleaner community.

Rural Communities

Drivers in rural communities have different travel behaviors and vehicle preferences than their urban counterparts. It is precisely these differences that give drivers in rural communities the greatest economic potential for gain by purchasing an EV. Drivers living outside of urban areas often have farther to travel to work, shop, and visit a doctor. They have to repair their vehicles more frequently, they produce more carbon emissions per capita, and they spend more money on gasoline.

There are three main barriers preventing rural drivers from switching to EVs: vehicle range, limited vehicle choices, and lack of charging infrastructure. EVs manufacturers

are addressing the first two concerns by providing vehicles with travel ranges in excess of 100 miles as well as promising to provide more vehicle choices including pickup trucks. However, more EV charging infrastructure is needed to address the third concern.

One reason EV charging infrastructure is not prevalent in rural communities is because it is more difficult to find optimal areas for public charging infrastructure as these areas are more remote with a low population density. Collaboration between local and regional transportation agencies along with the local electric utility provider will guarantee a connected network with higher utilization. Placed appropriately, EV charging infrastructure in rural areas would also ensure evacuation routes are complete for EV drivers when a natural or man-made disaster occurs.

Financing and Incentives

Securing financing for EV infrastructure is particularly challenging, due largely in part to the low return on investment and lack of supporting policy decisions. The business case for capital intensive infrastructure is not particularly attractive, owing to the relatively low adoption rate for EVs and the revenue they generate. Fortunately, private companies are providing infrastructure, accepting the risk, and counting on the rapidly growing EV population.

Counties, municipalities and other governmental or quasi-governmental agencies largely depended on federal grants to support the installation of infrastructure. There are several methods of financing the installation of EV infrastructure in Florida. Established providers can access private financing from financial institutions, internal sources, and grants and awards provided by federal sources such as the US Departments of Energy, Transportation, and Environmental Protection. Philanthropic foundations can also be a source of funding.

State of Florida

The State of Florida currently provides funding for the installation of EV infrastructure through funding from Florida's [Volkswagen Settlement](#). FDEP manages the state's share of the EPA's law suit against Volkswagen for actively falsifying emissions test results for their diesel vehicles. The State allocated the maximum amount allowable for EV infrastructure under the \$167 Settlement, \$25 million (15 percent). The Settlement funds for infrastructure are largely targeted for the installation of DCFC units to close existing charging gaps on Florida's Interstates and other major roads.

Volkswagen funding for infrastructure purchased with *electric school busses* is available under a program managed by FDEP. Volkswagen funding supporting infrastructure for *electric medium and heavy-duty vehicles* is also available through the FDEP, under the federal Diesel Emissions Reduction Act (DERA). See the FDEP's Volkswagen Settlement website for details.

The first, of three rounds of awards, was in July, providing up to \$6.8 million for the installation of 74 new DCFC units. Awardees have up to two years to complete their

installations. Another award cycle is expected late 2020 or early 2021. Information on the awards can also be found at on FDEP's Volkswagen Settlement website.

Federal Highway Administration (FHWA)/USDOT

Congestion Mitigation and Air Quality Improvement (CMAQ) Program

A State may obligate funds apportioned under section 104(b)(4) for a project or program to establish electric vehicle charging stations or natural gas vehicle refueling stations for the use of battery powered or natural gas fueled trucks or other motor vehicles at any location in the State except that such stations may not be established or supported where commercial establishments serving motor vehicle users are prohibited by section 111 of title 23, United States Code. <https://www.fhwa.dot.gov/map21/docs/title23usc.pdf>

Highway Infrastructure Program (HIP)

A recent [apportionment memo](#) issued by FHWA as part of the FY20 US Department of Transportation Appropriations Act. The memo apportions FY20 [Highway Infrastructure Program](#) (HIP) funding, and includes a *new* eligibility **“to provide necessary charging infrastructure along corridor-ready or corridor-pending alternative fuel corridors designated pursuant to 23 U.S.C. 151.”**

The HIP funds are sub-allocated in the same manner as the Surface Transportation Block Grant (STBG) Program funds, which is explained [here](#).

The funding is sub-allocated to areas based on their relative share of the total State 2010 Census population ([Table 1](#)) of apportionment memo. The sub-allocated funds are divided into three categories and must be used in the areas described below by the following categories:

1. Areas with a population of 5,000 or fewer.
2. Urban areas with a population of 5,001 to 200,000.
3. Urbanized areas with a population over 200,000.

The percentage to be sub-allocated is 55 percent in FY 20. The remaining percentage (45 percent) of the State's apportionment is available for use in any area of the State.

For Urbanized areas with a population over 200,000 (category #3 above), FHWA provides an additional level of sub-allocation, by specific urban areas – see ([Table 2](#)) of the apportionment memo. The other categories (1 and 2) are only sub-allocated at the State level.

“Corridor funding” is another eligible activity among many for HIP funding; this funding can be used for EV infrastructure along designated corridors, but it is a state/local decision to do so.

Additional Incentives

Several Florida power service providers provide incentives and programs for businesses and individuals, they are almost exclusively for the installation of home charging and workplace charging.

For more information on incentives and programs, contact your local government or power service provider. Additional information specific to Florida (outlined below) can be found at on the USDOE's [Alternative Fuels Data Center](#).

State Incentives

- [Electric Vehicle Supply Equipment \(EVSE\) Financing Authorization](#)
- [Excise Tax Exemption for Biodiesel Produced by Schools](#)
- [Idle Reduction and Natural Gas Vehicle \(NGV\) Weight Exemption](#)
- [Ethanol Production Credit](#)

Utility/Private Incentives

- [Plug-in Electric Vehicle \(PEV\) Rebate - JEA](#)
- [All-Electric Vehicle \(EV\) and Electric Vehicle Supply Equipment \(EVSE\) Rebates - KUA](#)
- [Plug-In Electric Vehicle \(PEV\) Rebate - OUC](#)
- [Electric Vehicle Supply Equipment \(EVSE\) Incentives - Brickell Energy](#)
- [Electric Vehicle Supply Equipment \(EVSE\) Pilot Program - Duke Energy](#)

Laws and Regulations

- [State Highway Electrification Plan](#) added 7/13/2020
- [State Highway Transportation Plan](#)
- [Autonomous Vehicle \(AV\) Testing and Operation](#)
- [Charging Electric Vehicle Supply Equipment \(EVSE\) Regulation Exemption](#)
- [Electric Vehicle Supply Equipment \(EVSE\) Policies for Condominiums](#)
- [Electric Vehicle Supply Equipment \(EVSE\) Rules](#)
- [Authorization for Alternative Fuel Infrastructure Incentives](#)
- [Electric Vehicle \(EV\) Insurance Regulation](#)
- [Alternative Fuel Economic Development](#)
- [Fuel-Efficient Vehicle Acquisition and Alternative Fuel Use Requirements](#)
- [Provision for Renewable Fuels Investment](#)

EV Adoption, and Forecasting Infrastructure Needs

The rate of EV adoption is key to determining the required infrastructure, the ability to do so has been difficult but is improving. Additional elements that contributed to an understanding of infrastructure need, such as user behavior, are also becoming better understood. The introduction of temporary, solar powered charging stations can be a valuable tool to confirm the analytical analysis of a potential location. The independently powered units can be easily deployed to measure actual utilization of a proposed site.

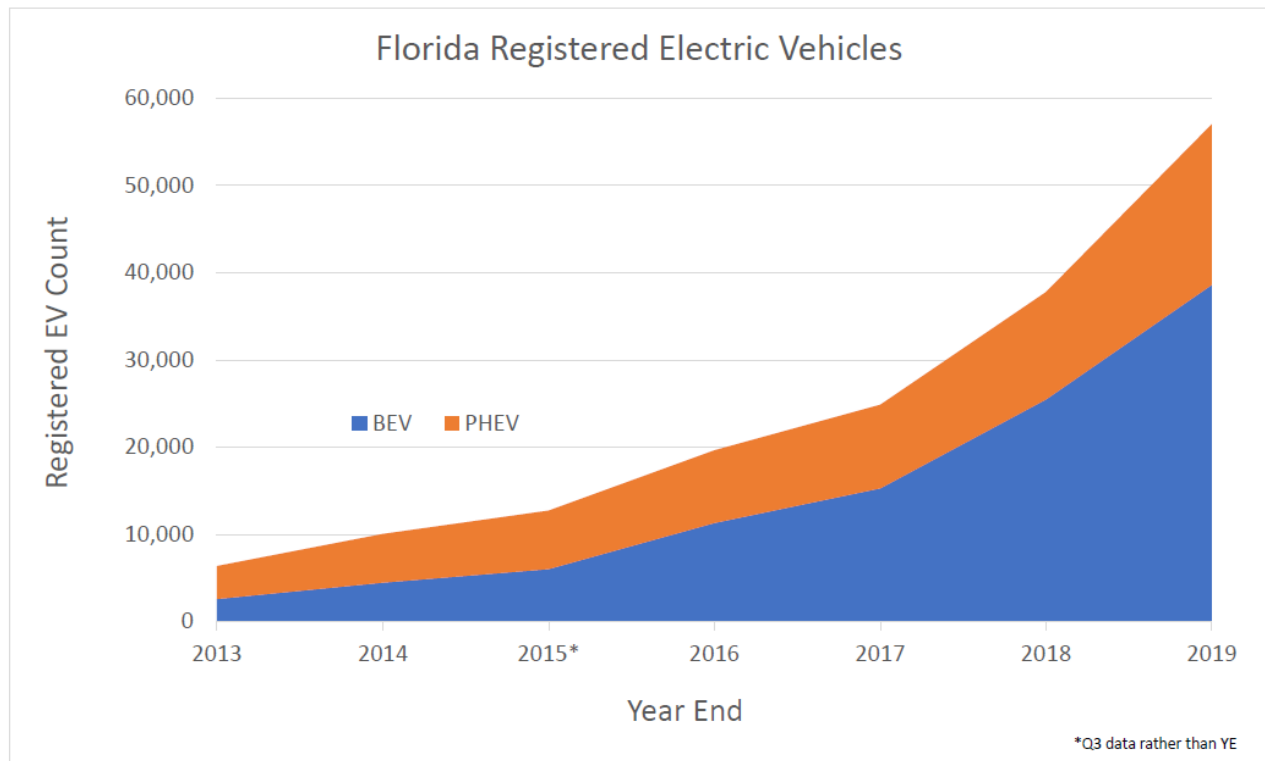
Determining actual EV sales in Florida has also been difficult for a variety of reasons, including low initial sales and difficulty in interpreting data provided by Florida's Department of Motor Vehicles (FDMV). A significant amount of filtering, cross checking and other efforts are currently needed to arrive at accurate data. The data has become more visible and accurate, but there appears to be a need to refocus on data input; specifically, the criteria used, input accuracy, its usability, and available reporting. Improvements in these areas will provide a better understanding of the impact of these transportation technologies in our state.

Several Florida power service providers continue to invest the time in this process and share very accurate and valuable information. Information provide by Florida Power & Light has been instrumental in developing this report.

EV Adoption

The growth of the Florida EV population has been steadily accelerating over the last decade, there are over 60,000 light-duty EVs registered in Florida in 2020. The light-duty EV population grew by an average of 1600 vehicles per month in 2019, an adoption rate 32 percent higher than 2018, and more than four times the monthly adoption rate of 2017.¹ The rate of adoption will increase rapidly as the prices for EVs continue to decline. This report will include data and information for all EV manufacturer's and infrastructure providers currently doing business in the state.

¹ Florida Power & Light, Q2 2020 Analysis



Source: Florida Power & Light

Registered BEV and PHEV Drivers State of Florida	
Year	Vehicles
Q2 2020	63,750
YE 2019	56,980
YE 2018	37,776
YE 2017	24,852
YE 2016	19,627
Q3 2015	12,749
YE 2014	10,068
YE 2013	6,377

Source: Florida Power & Light

The CFLCCC recently worked with our partners at Argonne National Laboratory to produce a report specific to Florida. The report², based on the data above, provides timely information for our state. Conclusions from the report are excerpted below, a full copy of the report is included as an appendix. The nation-wide assessment contains additional valuable information on driver behavior, energy efficiency and other topics, it can be found at, <https://publications.anl.gov/anlpubs/2020/06/158307.pdf>

Conclusions: “Since the latest generation of light-duty plug-in electric vehicles have been available in the United States, nearly 60,000 PEVs have been registered in Florida, driving nearly 1.5 billion miles on electricity. These 1.5 billion eVMT consumed more than 500 gigawatt-hours of electricity while reducing gasoline consumption statewide by nearly 60 million gallons. From 2011 to 2019, mileage driven by PEVs and electricity consumption has grown, which has offset gasoline consumption and CO₂ emissions from ICE vehicles. Further information about assumptions and calculation methodology can be found in a previous report (Gohlke and Zhou, 2020).”

Time has allowed for the development of methodologies that provide more accurate accounting for EV adoption in Florida, how to apply that information as a forecast becomes more complex and impactful over the ten-year horizon of this project.

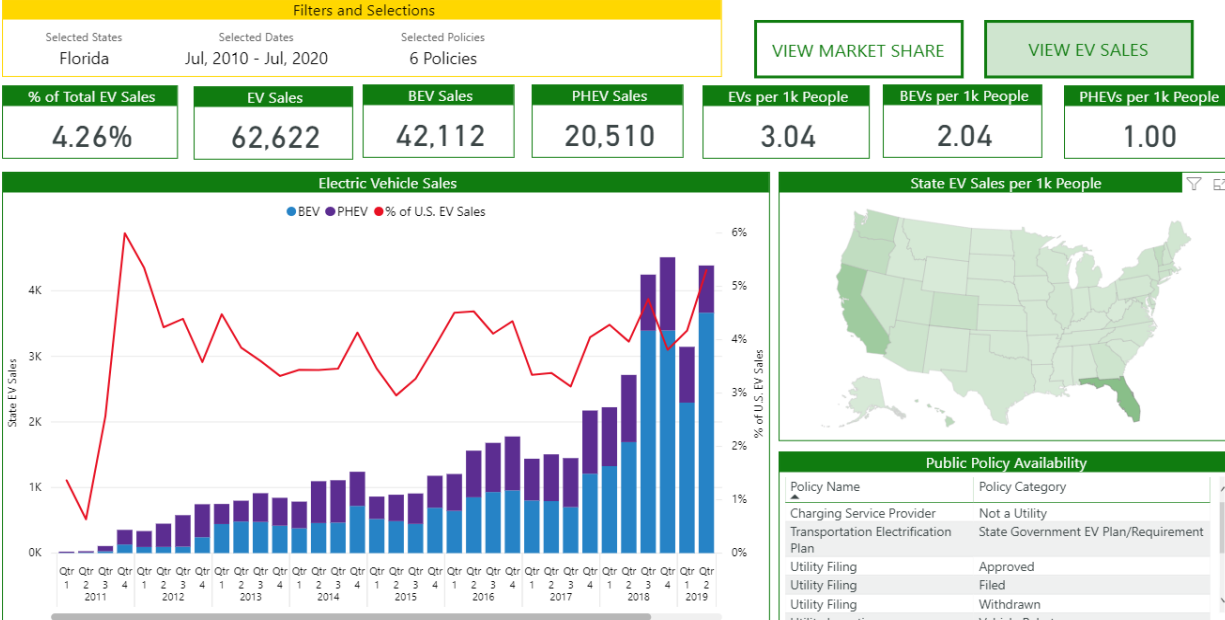
There are several agencies, and private organizations that routinely forecast the adoption of electric vehicles, among them are the International Energy Commission, Bloomberg, L.P., and private consultation groups. Most of these forecasts are on a national scale, which is insightful but not very useful at the state level. Below are excerpts from reports from [Atlas EV Hub](#), a Clean Cities national partner, and the Brattle Group’s June 2020 report, [Getting to 20 million EVs by 2030](#).

² Summary Statistics for Light-Duty Plug-in Electric Vehicles in Florida, 2011 – 2019, David Gohlke, Argonne National Laboratory, Energy Systems Division, Systems Assessment Group, August 6, 2020

State EV Sales

This dashboard show state EV sales by vehicle technology (make/model not available).

Reset to Default | Help | BACK | NEXT



Source: Atlas EV Hub

2030 projections ranging from 10–35 million EVs imply significant uncertainty for system planners

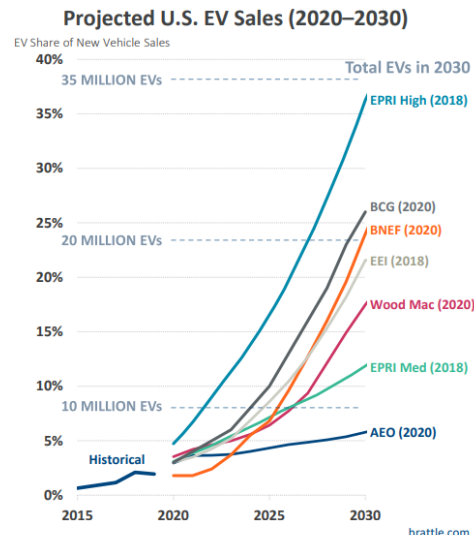
EV sales forecasts for the U.S. provide **limited insight into local adoption rates** for system planning purposes

- Most projections simply extend recent trends to a future year
- Or are based on “black-box” models that can be challenging to understand and lack insights on drivers of EV adoption

Planners will have to **develop location-specific EV forecasts** and identify key drivers of EV sales to inform system planning

- Forecasts should account for local considerations, such as state and utility incentives, ZEV goals, HOV lanes, EV sales trends, fuel prices, and charging infrastructure availability
- EV forecasts can also provide insights into effectiveness of incentives to accelerate EV adoption in their market

Sources & Notes: EPRI, PEV Market Projection Assumptions: June 2018 Update, June 2018. (EPRI Low forecast not shown because its 2030 forecast is below the levels already obtained.); BCG, *Who Will Drive Electric Cars to the Tipping Point?*, January 2020; BNEF, *Electric Vehicle Outlook*, 2020; IEI/EEI, *Electric Vehicle Sales Forecast and the Charging Infrastructure Required through 2030*, November 2018; Wood Mackenzie, *Electric car forecast to 2040*, accessed May 2020; EIA, *Annual Energy Outlook*; Light-duty vehicle sales by technology type and Census Division: United States, 2020.



Source: [The Brattle Group, Inc.](https://www.brattle.com)

EVI Tool

The U.S. Department of Energy's National Renewable Energy Laboratory's (NREL) [EVI-Pro Lite](https://afdc.energy.gov/evi-pro-lite)³ tool will be used to calculate estimated infrastructure demand. The tool allows projections based on geographic area, using the region's current and anticipated EV population. There are other methodologies for estimating required infrastructure; however, this tool provides backend support from NREL and other national labs, and a more accurate ability to compare results with other leading EV states, such as California and New York.

NREL, in conjunction with the California Air Resources Board (CARB), developed the EVI-Pro Lite tool to estimate how much EV infrastructure a city or state may need. The states of California and New York use this tool for their projections and planning. As has been mentioned, this tool has been developed and evaluated by other states and will provide a basis for more accurate comparisons.

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Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite

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

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

State | Vehicles | Results | Start Over

Your Results

In Florida, to support 60,000 plug-in electric vehicles you would need:

- 260** Workplace Level 2 Charging Plugs
- 195** Public Level 2 Charging Plugs
There are currently 3,304 plugs with an average of 2.6 plugs per charging station per the Department of Energy's [Alternative Fuels Data Center Station Locator](#).
- 258** Public DC Fast Charging Plugs
There are currently 718 plugs with an average of 3.9 plugs per charging station per the Department of Energy's [Alternative Fuels Data Center Station Locator](#).

Where Do I Start?

Planners may want to prioritize installation of fast charging infrastructure above Level 2 charging.

Build DC Fast First: Establishing fast charging networks that enable long-distance travel, serve as charging safety nets, and provide charging for drivers without home charging is critical to support all-electric vehicles that have no other alternative for quickly extending their driving range.

Build Level 2 Second: EVI-Pro typically simulates the majority of Level 2 charging demand coming from plug-in hybrid electric vehicles, which have the ability to use gasoline as necessary for quickly extending driving range.

Change Assumptions

Plug-in Electric Vehicles (as of 2016): 20,200
Light Duty Vehicles (as of 2016): 16,175,500
Number of vehicles to support:

Vehicle Mix	
Plug-in Hybrids 20-mile electric range	15 %
Plug-in Hybrids 50-mile electric range	15 %
All-Electric Vehicles 100-mile electric range	20 %
All-Electric Vehicles 250-mile electric range	50 %
Total	100%

How much support do you want to provide for plug-in hybrid electric vehicles (PHEVs)?

☐ Full Support
Most PHEV drivers wouldn't need to use gasoline on a typical day.

☐ Partial Support
Calculate using half of full support assumption.

☒ Do not count PHEVs in charging demand estimates.

Percent of drivers with access to home charging: %

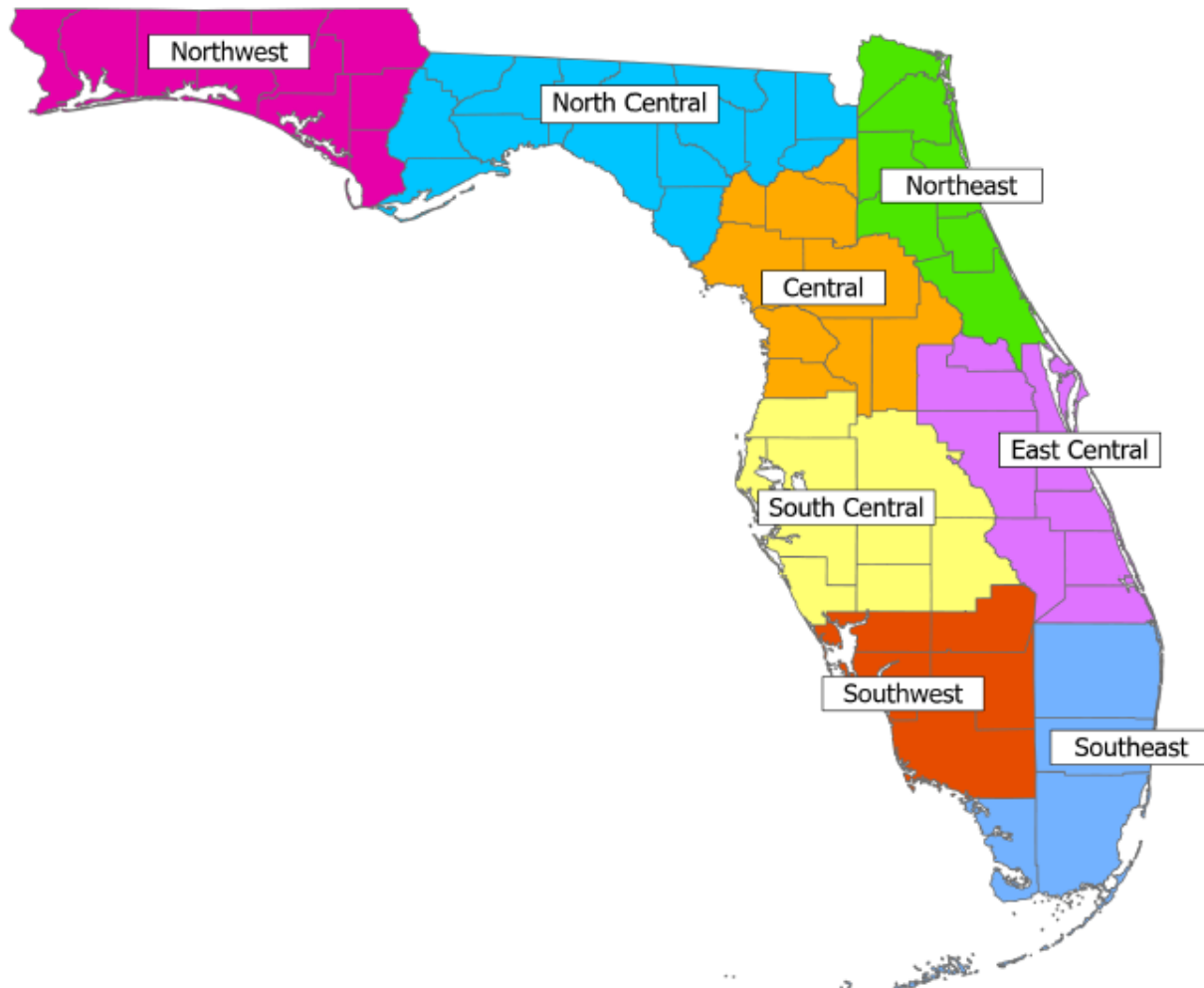
[Recalculate](#)

[See all assumptions.](#)

Sample values used for illustration purposes only.

³ <https://afdc.energy.gov/evi-pro-lite>

This infrastructure analysis will extend through 2030 and will be based on the geographic regional areas of the state used in the recent EV Survey that was distributed to registered EV users, enthusiast and other interested parties within the state.



Roadmap EV Growth and Infrastructure Forecasts Methodology

Working directly with EIA, NREL and several others will allow us to develop forecasts that reflect Florida's specific needs. These forecasts will be based on the latest Florida specific data, and the growth rate projections used by several leading organizations for their individual forecasts. We will blend growth rates provided by these organizations to produce customized estimates of Florida's infrastructure needs. Please revisit the Battle Group graphic on page 12 in this report for an appreciation of the variability of several lead forecasts.

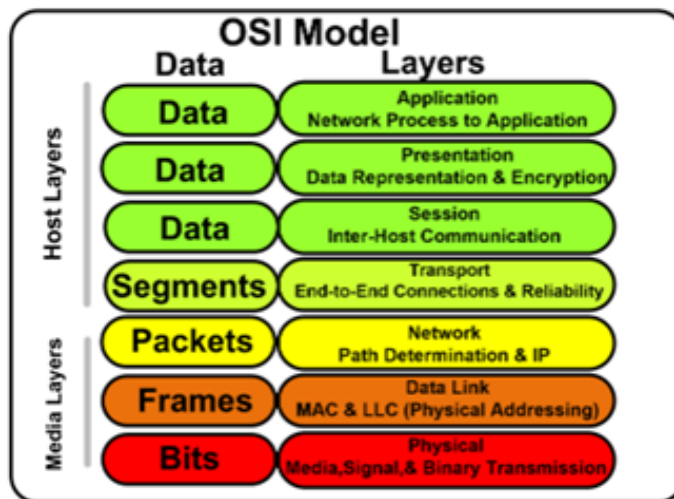
Estimates of location specific infrastructure needs for 2021, 2022 and 2023, will be provided in the final report near the end of this year; annual estimates for additional infrastructure needs and capital investment estimates for 2024-2030 will also be provided at that time.

Infrastructure Interoperability, Performance and Monitoring

Transportation is undergoing profound changes driven by new technologies in propulsion, fuels, engineering, planning, and many other segments. Near-term expectations for autonomous vehicles and connected infrastructure are revolutionizing transportation planning. There is promise in how these technologies will provide cleaner, more efficient transportation that can serve a disadvantaged and aging population, while expanding the capabilities of vehicles and infrastructure.

Interoperability

“Smart Technologies” have the ability to analyze data from devices in near real-time and make adjustments to the device or support infrastructure to improve efficiency and throughput. Data networks have thrived in an environment of standards that allow



connections and hand-offs between devices, back-offices, and networks. An example of data network interoperability is the Open Systems Interconnection model (OSI), adopted as a standard by International Organization for Standards (ISO 7498) and the International Telecommunications Union (ITU-T X.200). OSI is based on a seven-layer Reference Model and a set of specific protocols.⁴ The development and adoption of data network standards has allowed the ubiquitous availability of high-speed

data and video, dramatic reductions in equipment cost, and the development of specialized applications and tools.

Work continues on the development of standards for EV charging, general recognized as the Open Charge Point Protocol (OCPP). OCPP is an application protocol enabling communications between EV charging stations and central management systems, it has not been widely adopted and is currently available as [OCPP 2.0](https://openchargealliance.org/ocpp/). The latest version has the following use cases.

⁴ <https://electricalacademia.com/computer/osi-model-layers-functions/>

	Functional 'blocks'	# Use cases	Δ with 1.6
A	Security	4	New
B	Provisioning	12	Plus 5 use cases
C	Authorization	16	Plus 6 use cases
D	Local Authorization list management	2	-
E	Transactions	15	Plus 2
F	Remote control	6	Plus 1
G	Availability	4	Plus 1
H	Reservation	4	-
I	Tariff & Cost	6	New
J	Meter values	3	Plus 1
K	Smart charging	20	Plus 10
L	Firmware management	6	Plus 2
M	15118 Certificate management	6	New
N	Diagnostics	8	Plus 7
O	Display message	6	New
P	Data Transfer	2	-

The U.S. Department of Energy is involved in the development of standards and technologies for EV charging and EV to-Grid interface at its Argonne National Laboratory. Argonne provides research to support the EV industry and electric utilities. The goals of the EV-Smart Grid Interoperability Center are:⁵

- Enabling technology development to support EV-Grid integration,
- Enabling communication to manage vehicle charging loads,
- Reducing the cost of electric vehicle charging infrastructure,
- Enhancing the viability of fast/consumer-friendly charging, and
- Harmonization of global connectivity standards.

Adoption of standards could also provide more uniform reporting on network performance and utilization, allow faster restoration, and provide user information on availability. Many infrastructure providers have developed smartphone apps that provide availability information directly to their users; these apps could be a source of information on charging network performance and other metrics during the formal development of standards and metrics.

Network Monitoring and Performance

EV charging availability and reliability is becoming more important as the use, reliance and range of these vehicles increases. Conventionally fueled vehicles and the refueling network they rely on have had over a century to develop into robust and reliable systems. Standards have been developed, and requirements have been put in place to support the availability of liquid fuels. Additional requirements are also in place to require availability during emergencies.

⁵ <https://www.anl.gov/es/evsmart-grid-interoperability-center>

The need for similar standards and requirements to support electric transportation are needed. EV charging infrastructure is growing rapidly, and both the users and owners of these systems would benefit from the establishment of performance standards and requirements. New infrastructure providers are introducing their systems and equipment in Florida, the current absence of standards and performance provides a very low bar for the deployment of this critical infrastructure.

The availability and reliability of EV charging is an important consideration, but so are the resources to support that availability. Consideration needs to be given to the support and field staff that provides network maintenance and restoration, as well as the inventory and availability of spare equipment. Emergency restoration plans also need to be periodically reviewed.

Finally, adequate network monitoring can document infrastructure utilization and provide a basis for forecasting infrastructure growth, the needed replacement of obsolete and defective equipment and the performance of software and network upgrades. More sophisticated monitoring in the future could provide additional enhancements for notifications of network elements degradation and predictive failures.

Infrastructure Signage and Information

Signage requirements for Florida's road system is a combination of FHWA requirements, Florida Department of Transportation (FDOT) requirements, and local jurisdictional requirements. Highway signage to support electric transportation is currently being reviewed by Clean Cities Coalitions, DOTs and the FHWA in the southeast region of the U.S. The goal of the discussions is to bring as much consistency to signage use in the Southeast as possible. FDOT also has an initiative to develop signage requirements for Florida.

Additional specific information on signage can be found on the USDOE's [Alternative Fuel Data Center](#).

Training and Safety

There is an ongoing need for safety training of first and second responders in alternative fuel vehicles and their infrastructure. CFLCCC has facilitated this type of training for firefighters and tow operators, primarily on the topic of vehicles. Due to the dynamic growth of EVs and their charging infrastructure, training updates and resources must be readily available. Coordinating these efforts with established first responder training organizations like the National Fire Protection Association should be continued.

Recommended Guidance for EV Infrastructure Development

Based on information contained in this and previous interim reports as well as feedback from stakeholders, the following recommendations are offered for consideration.

Legislative funding to support the investigation and development these recommendations is critical to supporting the deployment of clean transportation and realizing the inherent benefits.

Action on these recommendations should be undertaken in conjunction with industry and stakeholder representation.

Planning

1. Information regarding EV sales in Florida is difficult to collect, analyze and report; it is recommended that the **Florida Department of Motor Vehicles** develop and publish quarterly standardized reporting for all classes of electric vehicles.
2. Permitting requirements for EV infrastructure installation is highly variable in Florida; it is recommended that the **Florida Building Commission** develop a standardized process for reviewing and permitting infrastructure installations.
3. Multi-family developments represent an untapped source for the expansion of EV use and infrastructure, they also present unique challenges to deployment; it is recommended that the **Florida Building Commission** develop guidance, policies and incentives to maximize this opportunity.
4. Florida municipalities, county governments and state agencies purchase products and services from vendors included on the State Contract and Agreements List; it is recommended that **Florida Department of Management Services** encourages vendors to provide more EVs options under the state term contract.
5. Florida Statutes require state agencies to select the vehicle with the greatest fuel efficiency within a given class; it is recommended that the **Florida Legislature** remove this outdated language and instead require agencies to perform an analysis on the total cost of ownership of a vehicle prior to its purchase.
6. Florida has critical gaps in charging infrastructure as it relates to emergency evacuation; it is recommended that the **State** purchase portable, solar powered EV chargers with battery storage as a means of addressing this immediate need.
7. EVs and the associated infrastructure offer substantial advantages in mitigating impacts from fossil fuels; it is recommended that the use of solar power and battery storage be investigated by **FDACS OOE** as a means of extending these benefits and reducing operating expense.

Financing and Incentives

1. Florida has allocated the maximum allowable funding under the Volkswagen Settlement for infrastructure installation, which will be used primarily for the installation of capital intensive DCFC; it is recommended that existing federal funding be reviewed by the **FDOT** to support EV infrastructure installation by local governments, underserved communities, and rural areas.
2. Workplace charging has been proven to increase EV adoption and expand its benefits; it is recommended that the **FDACS OOE** develop state incentives that can be made available to support workplace charging.
3. The Florida Legislature previously provided incentives that supported the deployment of alternative fuel vehicles that use natural gas; it is recommended that the **Florida Legislature** authorize similar incentives for the deployment of electric transportation and infrastructure with priority given to disadvantaged and rural communities.

Education

1. Lack of education is one of the biggest barriers to EV adoption; it is recommendation the **Florida Legislature** provide funding to the **FDACS OOE** to develop a statewide EV educational campaign that can rebranded locally.

Forecasting EV Adoption and Infrastructure Needs

1. The rate of EV adoption is key to determining the required infrastructure, the ability to do so has been difficult; it is recommended that that the **FDACS OOE**, the **FDOT** and the **Florida Public Service Commission (FPSC)** develop methodologies to track and forecast EV sales and infrastructure requirements.

Infrastructure Interoperability, Performance, and Monitoring

1. State standards for EV infrastructure interoperability, monitoring, availability, reliability and reporting have not been established; it is recommended that the **FDACS OOE**, the **FDOT**, and the **FPSC** develop these standards.
2. State standards for emergency response to restore EV infrastructure have not been established; it is recommended that the **FDACS OOE**, the **FDOT**, the **FPSC**, and the **Florida Department of Emergency Management** develop standards for restoration of this critical infrastructure, in conjunction with industry and stakeholder input. Standards should include provider staffing and spares inventory.

Appendix

Argonne Laboratory Florida EV Analysis