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## ACES Vehicles for Transit Study Update

(Automated, Connected, Electric, and Shared-Use)



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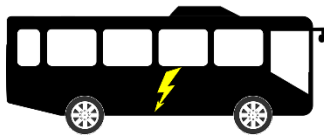
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# ACES Vehicles for Transit Study Update

## INTRODUCTION

Automated, Connected, Electric and Shared-Use (ACES) vehicles are transforming the urban landscape. Due to the swiftness of change, transit agencies must collaborate with a broad range of transportation partners to encourage the safe development, testing and deployment of ACES vehicles.

In 2019, the St. Lucie TPO conducted an ACES Vehicles for Transit Study. One of the purposes of the Study was to assist St. Lucie County in preparing its transit system for ACES by developing recommendations to be incorporated into the County's strategic plans.



Several recommendations in the 2019 ACES Vehicles for Transit Study called for electrifying the County's bus fleet. Buses are considered good candidates because they have fixed routes and the buses spend the rest of their day in locations where they are able to charge. The purpose of this update to the 2019 study is to keep abreast of changes in the rapidly evolving electric vehicle industry and to make specific recommendations on the electrification of the County's public transportation fleet.

## WHAT IS AN ELECTRIC VEHICLE (EV)?

There are three basic types of EVs: All-electric vehicles (AEVs), hybrid-electric vehicles (HEVs), and plug-in hybrid electric vehicles (PHEVs).

AEVs run only on electricity; when the battery becomes depleted, it must be recharged. EVs always operate in all-electric mode and currently have typical driving ranges of about 200+ miles.

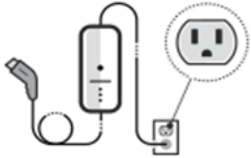
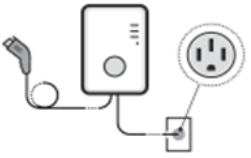
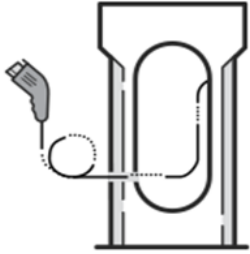
HEVs are powered by an internal combustion engine and an electric motor that uses energy stored in a battery. The battery pack and electric motor provide supplemental power. The vehicle is fueled with gasoline to operate the internal combustion engine, and the battery is charged through regenerative braking, not by plugging in.

PHEVs use both gasoline and electricity as fuel sources, so they have a battery, an electric motor, a gasoline tank, and an internal combustion engine. This allows drivers to use electricity as often as possible while also being able to rely on gasoline-powered propulsion when needed. Most PHEVs can travel a specific range of mileage on electricity alone, and then will operate solely on gasoline.



## ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Although the majority of EV owners charge their vehicles at home or at the workplace, public charging stations can increase the daily useful range of EVs and reduce the amount of gasoline consumed by hybrids.

	Level 1 (120v)	Level 2 (240v)	Direct-current (DC) Fast Charging
Charging Options			
How fast do they charge?	2-5 miles per 1 hour of charging	10-20 miles per 1 hour of charging	At least 60 miles per 20 minutes of charging. Charging time may be shorter depending on station power.
Where can I find them?	<ul style="list-style-type: none"> <li>In your house/garage</li> <li>Possibly at your apartment/condo and workplace</li> <li>No need to install anything; most automakers provide charger cords</li> </ul>	<ul style="list-style-type: none"> <li>In your house/garage (You will need additional equipment)</li> <li>Possibly at your apartment/condo and workplace</li> <li>At public charging stations</li> </ul>	<ul style="list-style-type: none"> <li>At public charging stations</li> <li>Limited availability, though becoming more common</li> </ul> <p>Source: epa.gov</p>

Charging equipment is classified by the rate at which the batteries are charged. Charging times vary based on how depleted the battery is, how much energy it holds, the type of battery, and the type of charging equipment (e.g., charging level and power output). The charging time can range from less than 20 minutes to several hours or more, depending on these factors. Charging options are defined as Level 1 (120v), Level 2 (240v), and Direct Current (DC) Fast Charging.

### Inductive Charging

Inductive charging equipment, which uses an electromagnetic field to transfer electricity to an EV without a cord, has been introduced commercially. Currently wireless charging stations are available for transit or other fleet operations.

### In-Road Charging

According to the Florida Department of Transportation (FDOT) Electric Vehicle Charging Station Master Plan (EVMP), Florida's managed lanes provide an excellent opportunity to facilitate in-lane charging. This would allow vehicles to charge while in motion or stationary over specially equipped roadways without the need to plug in. EVs must have on-board equipment to facilitate this type of charging.

## **EXISTING CONDITIONS – ST. LUCIE COUNTY**

St. Lucie County's bus system is called Area Regional Transit (ART). The County contracts out the transportation program to MV Transportation. The County is responsible for the creation and major maintenance of the facilities used by transit. MV's management and daily operations headquarters is located in Fort Pierce. MV uses intermodal bus transfer stations located in Fort Pierce and in Port St. Lucie.

The Fort Pierce Intermodal facility is mostly an open-air structure. The site includes parking spaces for cars, bike racks, a drivers' lounge, a staffed ticket sales booth, and handicapped accessible public restrooms. The facility has a waiting area lined with benches that could seat up to 150 people. There are five bus bays. Fort Pierce Intermodal staff monitors the facility to maintain a clean safe environment for the passengers and staff using the facility.

The Port St. Lucie Intermodal features a covered canopy with picnic tables owned and maintained by the City of Port St. Lucie. The site includes numerous parking spaces for cars, bike racks, and four bus bays. The facility is located across the street from the Port St. Lucie Community Center where

restrooms are available for passengers and drivers. St. Lucie County is collaborating with the City of Port St. Lucie to redesign the Port St. Lucie Intermodal Station.

St. Lucie County is at the concept-planning stage for a new Transit Operations and Maintenance Center along Selvitz Road north of Midway Road. Currently, transit services are spread across multiple facilities such that transit operations, administration, vehicle parking, and privately operated fleet maintenance are all conducted at different sites. The new facility would consolidate all of these transit functions at one site. Construction of the facility will depend on when the County can secure additional funding.

Currently, St. Lucie County's bus and support vehicles fleet contain no EVs, HEVs, or PHEVs. According to the County's Transit Asset Management (TAM) Plan, the ART has a fleet of approximately 40 buses and maintains a spare ratio of vehicles adequate for the transportation program. As service demand increases and funding is available, the ART will expand its fleet size to accommodate service needs and replace existing vehicles as indicated by the TAM plan.



## **TRANSITIONING TO ELECTRIC VEHICLES**

EVs have an advantage over internal combustion vehicles in terms of energy and fuel efficiency as well as maintenance costs. St. Lucie County could benefit from transitioning its existing fleet to electric vehicles.

Once the fleet electrification process begins, the County must ensure that EV charging infrastructure is in place. There are numerous factors to consider when deciding on the right infrastructure. Determining how much energy is needed, when the vehicles will be charged and how often, and how quickly the vehicles need to be charged, are all part of the decision-making process. Consultant services could be sought to obtain detailed advice on how to best select, install and maintain the right charging solutions for fleet electrification.

## **FEDERAL RESPONSE**

Funding is available through the federal government and other sources to support the electrification of St. Lucie County's public transportation fleet.

The federal Bipartisan Infrastructure Law (BIL) was passed in 2021. According to a press release issued by the U.S. Department of Transportation (DOT), under the BIL, Florida would expect to receive about \$198 million over five years to support the expansion of an EV charging network in the state. Florida will also have the opportunity to apply for grants out of the \$2.5 billion available for EV charging.



In February 2022, U.S. DOT published guidance for States and cities to strategically deploy EV charging stations to build out a national network along the nation's highway system.

## STATE RESPONSE

Florida law required the Florida Department of Transportation (FDOT) to coordinate, develop, and recommend a Master Plan for the development of electric vehicle charging station infrastructure along the State Highway System. FDOT's Electric Vehicle Infrastructure Master Plan (EVMP) provides a comprehensive course of action for transit agencies to realize cost savings by switching to EVs. Acknowledging that fleet managers need to evaluate where and how to charge their vehicles, the EVMP provides the following considerations to support decision-making:



- The majority of vehicles will be light-duty (LD), but some may be medium-duty (MD) vehicles, charging infrastructure is the same
- Primary charging demands will be met with on-premise (i.e., depot, yard) using Level 2 chargers
- Secondary charging demands may be met using off-site publicly accessible DCFC as needed
- Charging is primarily conducted within the bus depot, but en-route charging can extend daily operations
- When en-route charging is not feasible, multiple buses may be needed to cover longer routes traditionally served by one diesel bus
- Battery size and charging strategy are critical to ensure maximum en-route time
- Transit fleet fuel sources have evolved from petroleum (diesel) to natural gas and now electricity, requiring substantial investment to deliver energy to their vehicles

## STUDY CONSIDERATIONS

The following considerations are provided with regard to the future electrification of the public transportation fleet:

- Amend the County's Transit Asset Management (TAM) plan to provide for the gradual procurement of electric buses in coordination with steps taken to determine how and where to charge the buses.
- Apply for grant programs that may offset the purchase cost of electric buses such as the federal Low or No Emission Program and programs related to the Bipartisan Infrastructure Law.
- Work with federal agencies and private industry experts to identify core training needs to begin preparing for workforce changes that may accompany the fleet electrification process.
- Ensure that planning for fleet electrification includes considering the need for accessibility for persons with disabilities and environmental justice communities.
- Develop appropriate messaging as well as public engagement and education activities to promote awareness, understanding, and acceptance of fleet electrification.
- Obtain resolutions of support from local governing bodies and other stakeholder agencies.
- Install electric vehicle charging stations at the Fort Pierce and Port St. Lucie Intermodal Stations.
- Install electric vehicle charging stations at the County's fleet maintenance facilities.
- Initiate electrification of the fleet by starting with the procurement of support vehicles.
- Seek consultant services to obtain detailed advice on how to best select, install and maintain the right charging solutions to support fleet electrification.
- Enhance the proposed Treasure Coast Transit Center operations/maintenance facility by incorporating operations/maintenance infrastructure and charging infrastructure for electric vehicles.