



## CENTRAL FLORIDA TSM&O CONSORTIUM MEETING SUMMARY

---

**Meeting Date:** December 9, 2021 (Thursday) **Time:** 10:00 AM – 12:00 PM

**Subject:** TSM&O Consortium Meeting

**Meeting Location:** Teleconference  
FDOT RTMC 4975 Wilson Rd. Sanford, FL 32771

---

### I. OVERVIEW

The purpose of this recurring meeting is to provide an opportunity for District Five FDOT staff and local/regional agency partners to collaborate on the state of the TSM&O Program and ongoing efforts in Central Florida. Jeremy Dilmore gave a short introduction and outlined the meeting agenda.

### I. INTRODUCTIONS AND STAFFING CHANGES

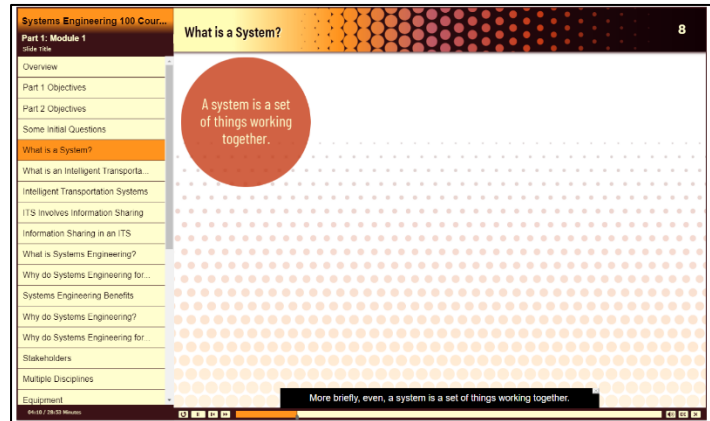
Jeremy Dilmore gave a brief introduction of the TSM&O Consortium Meeting and then discussed recent changes to District staffing.

- **Jay Williams** has transitioned to *Assistant County Traffic Engineer* for Volusia County
- **Tricia Labud** is now the *District TSM&O Engineer – Arterials*, filling Jay's previous role
- **Patrick White** is now the *District FMS/AMS Engineer*, filling Tricia's previous role
- **Noemi Rodriguez Bonilla** has shifted to Roadway Design, institutionalizing Smart Signals within the District's Design group
- **Heidi Trivett** is now supporting the Traffic Operations group as a PM, filling Noemi's previous role
- **Jim Miller** has left the Department for another opportunity
- Jim's position is currently VACANT, but the District is in the process of filling that position
  - In the interim, **Swan Duncan** has been filling Jim's role, engaging with contractors and construction on the District's behalf
- **Shellby Rivas** is now supporting the Traffic Operations group as a PM, taking on some of the responsibilities that Katie King has been leading
- Corridor Management
  - **Sheryl Bradley** is leading the AECOM team, now responsible for I-75 operations
  - **Dale Cody** is leading the Metric team, now responsible for I-4 and I-95 operations

## II. FLEX PORTAL TRAINING

David Williams briefly discussed the recently published TSM&O Focused Learning Education and Experiences (FLEX) Portal for on-demand TSM&O training. David also provided a quick walkthrough of the FLEX Portal website.

- The FLEX Portal was established to improve TSM&O staff development and training for FDOT and its partner agencies
- Topics vary from broad, beginner-friendly conceptual courses to device-specific trainings
  - TSM&O Concepts and Strategies
    - Systems Engineering 101, Transit Signal Priority
  - FDOT TSM&O applications
    - For example: Maintenance Inventory Management System (MIMS)
  - Basic field equipment training
    - Signal Infrastructure, Cabinets, Network Switches, etc.
  - How-to for advanced hardware (BlueToad devices) and systems (R-ICMS)
    - Specific device trainings provided by vendor representatives
- Some courses/trainings include a syllabus and other useful documentation
- The FLEX Portal is currently **free** with a valid user account
- If anyone has issues with the site, or would like to suggest additional content/courses, they are asked to click the *Request Support* button and fill out the appropriate information relating to their issue



### Discussion:

- **Q:** Jon Cheney – Is there a time limit for students to complete the course?
  - **A:** Jeremy – No.
- **Q:** Eric Hill – Is there a certificate?
  - **A:** Jeremy – For certain courses, yes a certificate is available upon completion.
- Steven Bostel – I’ve taken several signal introductory courses; they were very helpful.

## III. TECHNOLOGY APPLICATION PARTNERSHIPS WITH LOCAL AGENCIES (TAPS-LA)

David Williams briefly discussed the TAPS-LA grant program made available by FDOT Central Office. The projects submitted by Altamonte Springs and by Lake County were also briefly outlined.

- The TAPS-LA program provides grants for CAV deployments that meet the program’s requirements.
  - \$2,000,000 is allocated per Fiscal Year (FY), from FY2021 through FY2025.
    - Up to \$500,000 per project

- TAPs-LA funds can be used for deployments on state roadways, though local facilities can still be included in the proposed project.
- City, County, Port, and Transit agencies are all eligible for the grant program
- Altamonte Springs – SR 436 PedSafe Project
  - Project would build off the lessons learned and best practices derived from the UCF PedSafe deployment
  - the SR 436 PedSafe Project would also include LiDAR and other cameras for pedestrian detection, with roadside infrastructure generating PSM, BSM, and SPaT data for users
  - Project would be deployed along SR 436 from Northlake Blvd to Boston Ave, covering a heavy pedestrian traffic area in the City, near Cranes Roost Park, the Altamonte Springs Mall, and AdventHealth
  - There is an ongoing Complete Streets project within the same limits, so the project will wait until construction completion
- Lake County – CV Smart Signal
  - The CV Smart Signal project will upgrade intersections along SR 50 (from Grand Hwy to the Orange County Line) to be compliant with the *Smart Signal* standard established by the Department
  - As part of the deployment:
    - improved detection will enable future object detection, trajectory information, and location information
    - detection and RSU equipment will enable BSM and SPaT messaging
    - ATC controllers will be installed at all intersections
  - Building on top of the Smart Signal standard, the CV Smart Signal project will leverage other detection and RSU deployments in the region
  - The goal of the project is to reduce rear-end crashes through better coordination and reduced congestion while building on the Smart Signal standard package

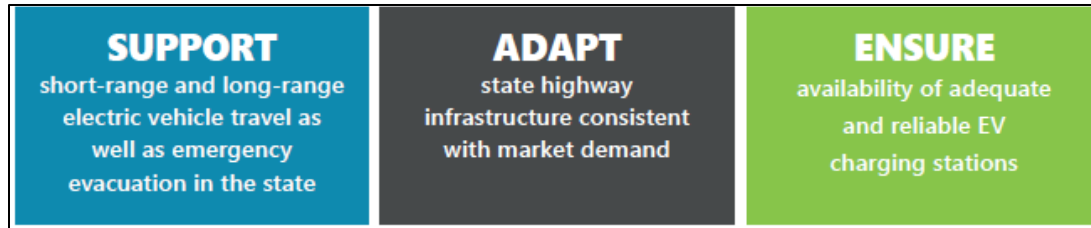
#### Discussion:

- **Q:** Jon Cheney – Are these federal funds?
  - **A:** No, these are state funds only. If the local match includes federal funds, applicants may need to provide additional documentation for the TAPs-LA program.

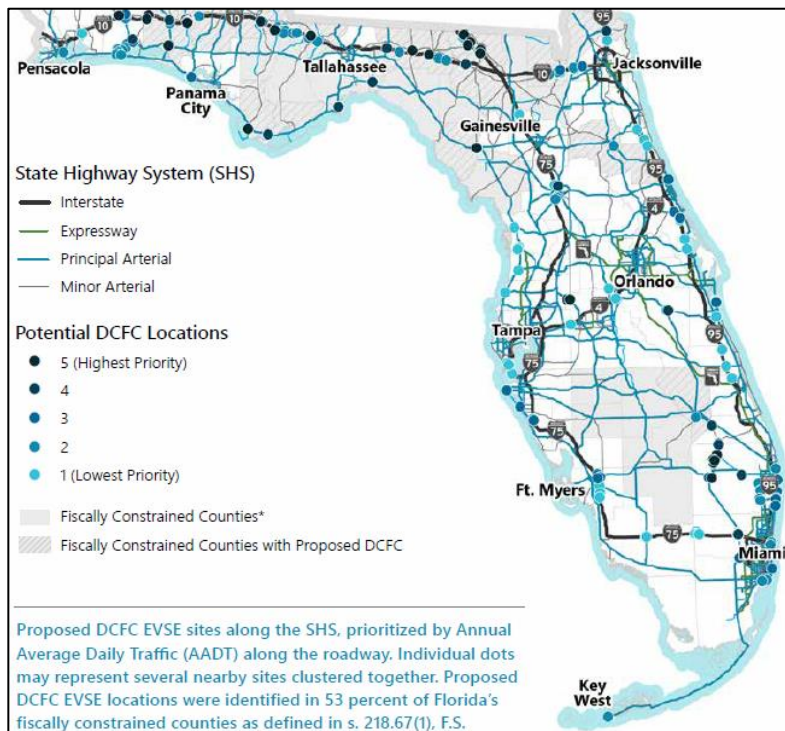
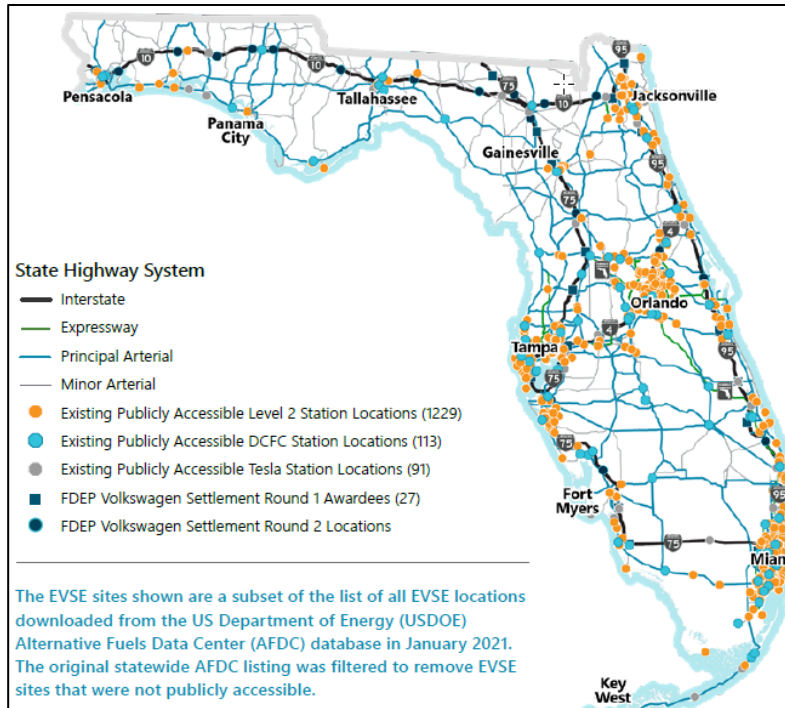
#### IV. FLORIDA EV INFRASTRUCTURE MASTER PLAN

David Williams provided an overview of the Florida Electric Vehicle Infrastructure Master Plan (EVMP) published in July 2021.

- The EVMP was created pursuant to F.S. 339.287, which required the FDOT to develop, coordinate, and recommend a master plan for current and future plans relating to the development of EV charging station infrastructure along the State Highway System
- Developed in coordination with a number of State and partner agencies
- EVMP Primary Objectives:



- Stakeholder engagement included 7 stakeholder meetings and 2 public webinars, in coordination with FDOT, FDEP, FPSC, and other State agencies
- The EVMP includes a variety of infographics providing detailed background information for EVs and their charging stations
- EV Charging Stations generally come in three levels:
  - Level 1 – foundational technology that is aging out, with slower charging speed of 8 hours to full charge
    - used at home predominantly
  - Level 2 – improved but still slow charging speed (2 hours to full charge)
    - supports short-range travel (commuting, intra-regional)
    - accounts for ~80% of all charging demand
  - Direct Current Fast Charger (DCFC)
    - fastest charging speed (30 minutes to full charge)
    - supports long-range travel
      - target EV charger for evacuation scenarios and inter-regional travel
    - expected to become the standard in the future
- As of 2020, the saturation of EVs in the US market is approximately 1.75%
- By 2025, four OEMs (Volvo, GM, Ford, VW) anticipate a cumulative 81 Battery Electric Vehicle (BEV) models will be available for consumers
  - there were 17 BEV models in by the end of 2020
- By 2030, EV sales are estimated to comprise 8 to 30% of all vehicle sales, and 30 to 50% of all sales by 2035
- The EVMP discusses the public-private partnership opportunities available with property owners and utility companies
- The EVMP identifies existing public EV supply equipment (EVSE) locations and recommended locations
- Considerations for Long-Range Travel (DCFC)
  - proximity to existing DCFC sites
  - high-traffic intersections along SHS are rated higher
  - proximity to SHS intersections along evacuation routes (1-, 5-, and 10-minute drives)
- Considerations for Short-Range Travel (Level 2)
  - within walking distance to multi-family developments (<0.25mi have priority)
  - Median household income (priority to lowest 20% income group)
  - proximity to existing Level 2 sites
  - Land uses

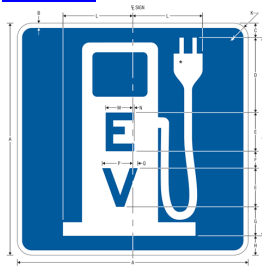


- Recommended Objectives
  - Initiative 1 ADAPT:
    - Anticipated Market & Industry Trends
    - Adapt Transportation Policy Framework
    - Expand EVSE Network along Transportation Infrastructure
    - Support Municipal & Local Agencies with Implementation of EVMP
    - Support Research & Testing for Future EVSE

- Initiative 2 FACILITATE:
  - Promote EVSE infrastructure to support Long-Range travel and evacuation
  - Identify and pursue a variety of funding options with partners to install EVSE
  - Promote installation of community charging (Level 2) infrastructure
- Initiative 3 EDUCATE:
  - Support EVSE-focused education and outreach
  - Support local jurisdictions and agencies
  - Increase public awareness of publicly available EVSE locations
- Initiative 4 COORDINATE:
  - Advance a regional and comprehensive approach to EV infrastructure
  - Continuously coordinate stakeholders to support EVSE planning and implementation
  - Coordinate the utility roles and rates to support the EVMP goals
- For more information on the EVMP, visit: <https://www.fdot.gov/planning/policy/ev/default>

#### Discussion:

- **Q:** Jon Cheney – is there a universal sign for charging locations?
  - **A:** FDOT has not developed criteria for a symbol at this time. FHWA has a symbol in interim approval now.
    - [https://mutcd.fhwa.dot.gov/resources/interim\\_approval/ia13/figia13img1\\_longd\\_esc.htm](https://mutcd.fhwa.dot.gov/resources/interim_approval/ia13/figia13img1_longd_esc.htm)



#### V. FAV SUMMIT – TAKEAWAYS

Jeremy Dilmore opened the floor for anyone who attended the FAV Summit to share their thoughts and takeaways.

- Legislation – “readiness” based on 8 points
  - Florida was the only state that met all 8 points
- Lack of national AV policy
  - Connectwise → QR signs for AVs to read
- Automated Workforce – not removing workers; retraining workers
- AV implementation/policy – moving from hope to reality
  - improving discipline; not pushing too fast at the expense of public safety
- Panel identified infrastructure as supportive of AVs and helpful in reducing probability of crashes
- Eric Hill – expressed concern about EV relating to supply of EV; do we have the electricity infrastructure to meet increased demand

- there was also a Road Ranger type of service for a mobile charging station that could be requested via mobile app
- there needs to be more AV demos that illustrate the safety of AV technologies
- Ryan Fetchko – cities/counties are putting in the work in permitting and identifying gaps to enable private developers to deploy EVSE as quickly as possible

## VI. TSMCA AT CENTRAL OFFICE

Jeremy Dilmore gave a brief overview of ongoing discussions at Central Office relating to the TSMCA update.

- District Five started TSMCA update conversations with Maintaining Agency partners in 2021
- While Central Office was developing the draft TSMCA documentation, District Five provided lessons learned and best practice material for their consideration
  - District Five identified 5 categories of Maintaining Agency based on O&M roles
    1. **MA maintains**; FDOT acts as a resource
    2. **MA maintains**; FDOT troubleshoots/configures as needed
    3. **MA maintains signals and some end devices**; FDOT handles advanced end devices and potentially network
    4. **MA maintains signal infrastructure and ATMS**; FDOT maintains end devices and network
    5. **MA maintains signal infrastructure**; FDOT maintains ATMS and everything else
- Central Office has shared draft TSMCA documentation for Districts to provide feedback
  - can't share yet; will share the documentation as soon as it's available
  - District Five provided feedback on documentation

### Discussion:

- **Q:** Jon Cheney – Does the draft include a termination clause?
  - **A:** Jeremy – most likely yes; it is a legal clause that's required.

## VII. CURRENT INITIATIVES

Jeremy Dilmore briefly provided an update on the District Five ITS Master Plan IT Standards.

- RICMS – current detection along I4U is not performing well
  - bad data feeds into RICMS model which then outputs a bad recommendation
    - at best, current data feeds catch 70% of volumes
  - hoping to relaunch RICMS deployment in February/March 2022
- Eric Hill – will managed lanes open soon?
  - yes, the concessionaire is still working diligently to meet the existing schedule
  - officially opened on February 26, 2022
  - currently verifying that tolling/pricing software is working correctly at RTMC
- Jon Cheney – for testing, have you identified toll pricing yet?
  - looking to open at a minimum toll amount (\$0.50 per gantry)

- based on usage after start date, then the pricing will start to be reconsidered and adjusted
- CV Equipment
  - RSUs – Iteris modified firmware/hardware
    - working much better now
    - Over-the-air (OTA) update can brick device when trying to access any website
  - BlueToad – deployment/replacement coming in 2022
  - OBU – Brandmotion giving us 4 test units
    - will be having conversations with first responders in several counties to deploy OBUs
    - timeline – about a year away from coding
- Express Lanes – when we open express lanes, there will still be cleanup and other work to be done
  - please let FDOT know if you see any issues
- TSP Cellular Modems
  - Why? used when fiber gets cut; alternative to waiting for construction to conclude so repairs can be made
  - 4G LTE will allow for data from 1-2 cameras to feed back to central software

#### **VIII. NEXT MEETING**

- March 3, 2022

#### **IX. ATTACHMENTS**

- A – Presentation Slides
- B – Meeting agenda

#### **END OF SUMMARY**

*This summary was prepared by David Williams and is provided as a summary (not verbatim) for use by the Consortium Members. The comments do not reflect FDOT's concurrence. Please review and send comments via e-mail to [dwilliams@vhb.com](mailto:dwilliams@vhb.com) so the meeting summary can be finalized.*



# Welcome to the TSM&O Consortium Meeting December 9, 2021



# Meeting Agenda

1. Welcome
2. FLEX Portal Training
3. TAPs-LA
4. Florida EV Infrastructure Master Plan
5. FAV Summit 2021 – Takeaways
6. TSMCA – Central Office Update
7. Current Initiatives



# FLEX Portal Training

David Williams, VHB



Transportation Systems Management & Operations



# TSM&O Focused Learning Education and Experiences (FLEX)

- TSM&O onboarding
- Staff development and training
- How-to for advanced hardware and systems





# TSM&O Focused Learning Education and Experiences (FLEX)

- Types of training
  - TSM&O concepts
  - TSM&O applications
  - Field equipment
  - How-to videos



- Overview
- Part 1 Objectives
- Part 2 Objectives
- Some Initial Questions
- What is a System?**
- What is an Intelligent Transporta...
- Intelligent Transportation Systems
- ITS Involves Information Sharing
- Information Sharing in an ITS
- What is Systems Engineering?
- Why do Systems Engineering for...
- Systems Engineering Benefits
- Why do Systems Engineering?
- Why do Systems Engineering for...
- Stakeholders
- Multiple Disciplines
- Equipment

A system is a set of things working together.

More briefly, even, a system is a set of things working together.

<b>Course Title:</b>	<b>Basic Traffic Signal Cabinet and Field Equipment</b>
<b>Duration:</b>	One Day (6 hours of contact time)
<b>Format:</b>	Traffic Signal Lab To Be Video Recorded for Future Playback
<b>Objectives:</b>	To familiarize participants with the key components and functions of field located traffic signal equipment – including the controller, cabinet, detectors, preemption and priority devices, and other ancillary equipment. The focus will be on equipment currently in use within District Five.
<b>Outline:</b>	<ol style="list-style-type: none"> <li>1. Introduction and Housekeeping – 15 Minutes</li> <li>2. Overview – Signalized Intersection Components – 35 Minutes             <ol style="list-style-type: none"> <li>a. Control Equipment and Cabinet</li> <li>b. Signal Displays</li> <li>c. Detection</li> <li>d. Communications</li> <li>e. Preemption and Priority</li> <li>f. Cabling</li> <li>g. Service Equipment</li> <li>h. Grounding</li> </ol> </li> <li>BREAK – 10 Minutes</li> <li>3. Traffic Signal Controllers – 60 Minutes             <ol style="list-style-type: none"> <li>a. Standards Overview                 <ol style="list-style-type: none"> <li>i. NEMA</li> <li>ii. Caltrans (2070)</li> <li>iii. Advanced Traffic Controller (ATC)</li> </ol> </li> <li>b. User Interface                 <ol style="list-style-type: none"> <li>i. Front Panel</li> <li>ii. Upload / Download</li> <li>iii. Data Keys</li> </ol> </li> <li>c. Models in use in District Five                 <ol style="list-style-type: none"> <li>i. Intelight</li> <li>ii. Trafficware                     <ol style="list-style-type: none"> <li>1. Naztec 980 ATC</li> <li>2. Commander ATC</li> </ol> </li> <li>iii. Econolite                     <ol style="list-style-type: none"> <li>1. ASC-3</li> <li>2. Cobalt</li> </ol> </li> </ol> </li> </ol> </li> </ol>



# TSM&O Focused Learning Education and Experiences (FLEX)

- FLEX Portal is available with a **free** account
  - All courses are currently free
- Troubleshooting – *Request Support* button
- For more information, visit: <https://elearning.cflsmartroads.com/>
  - Search: “FDOT FLEX Portal”
- Quick walkthrough...



# Technology Application Partnerships with Local Agencies (TAPs-LA)

David Williams, VHB

# TAPs-LA Program

- Grant for CAV Deployments
- \$2,000,000 per FY (FY2021-25)
  - Up to \$500,000 per project
- Funds available for state roads
- Eligible Agencies
  - City, County, Port, Transit Agencies

*Table 1: TAPs-LA Application Volumes and Sections*

Volume	Section	Page Limitations/Formatting
I. Technical Proposal	1. Cover Page and Work Program Supplemental Information	One file in PDF format; 10-page limit
	2. Project Narrative	Arial/Calibri font, text size – 12 or above, 1-inch margin on all sides
	3. Management Structure	
II. Budget Detail	4. Budget Detail	One file in PDF format; 5-page limit
III. Schedule	5. Schedule	PDF of MS Project Gantt Chart (No more than 2 years)
IV. Project Funding Agreement	6. FDOT State Highway System Project Funding Agreement	Draft agreement with from local agency or lead agency

*Table 4: Project Selection Criteria and Scoring Matrix*

Categories	Criteria	Maximum Points
Accelerate the CAV Program	Does this project accelerate the deployment and implementation of CAV technologies in Florida?	6
Safety	Does this project directly reduce or have the potential to reduce fatal, serious injury, and/or secondary crashes?	20
Mobility	From a mobility perspective, does this project directly benefit at least one mode, ie, vehicles, pedestrians, bicyclists, disabled, economically disadvantaged, and aging road users?	15
Efficiency and Reliability	Does this project directly benefit (or have the potential to impact) efficiency and/or reliability for travelers, freight, transit riders, aging road users, pedestrians, and/or bicyclists?	5
Feasibility	Do proposed technologies comply with or have the potential to comply with relevant state and federal safety laws?	10
	Is the proposed project interoperable and/or does it have the potential to become interoperable with the existing or programmed CAV Projects?	
Funds	Does this project leverage local funds If the project will involve industry partners, in addition to FDOT and the local agency, will there be a structured memorandum of understanding (MOU) spelling out the roles and responsibilities of all partners?	10
Benefit/Cost	Does this project offer benefits with a high B/C ratio and a good return on investment?	6
Data and Security	Explain how the project will safeguard data privacy and deploy a cybersecurity platform.	10
Operations and Maintenance	Does this project address staffing, funding, and procedures for operations, maintenance, and replacement of CAV infrastructure, technologies, and applications?	8
Project Evaluation	Does this project have pre-defined performance measures? What are the expected outcomes and how are these outcomes measured?	5
	Is there a systems validation and verification process in place? Explain how this will be performed.	
Management Structure	Does the project offer a management structure to deliver the outputs with safety and mobility goals?	5
<b>Maximum Total Points</b>		<b>100</b>

# TAPs-LA Schedule

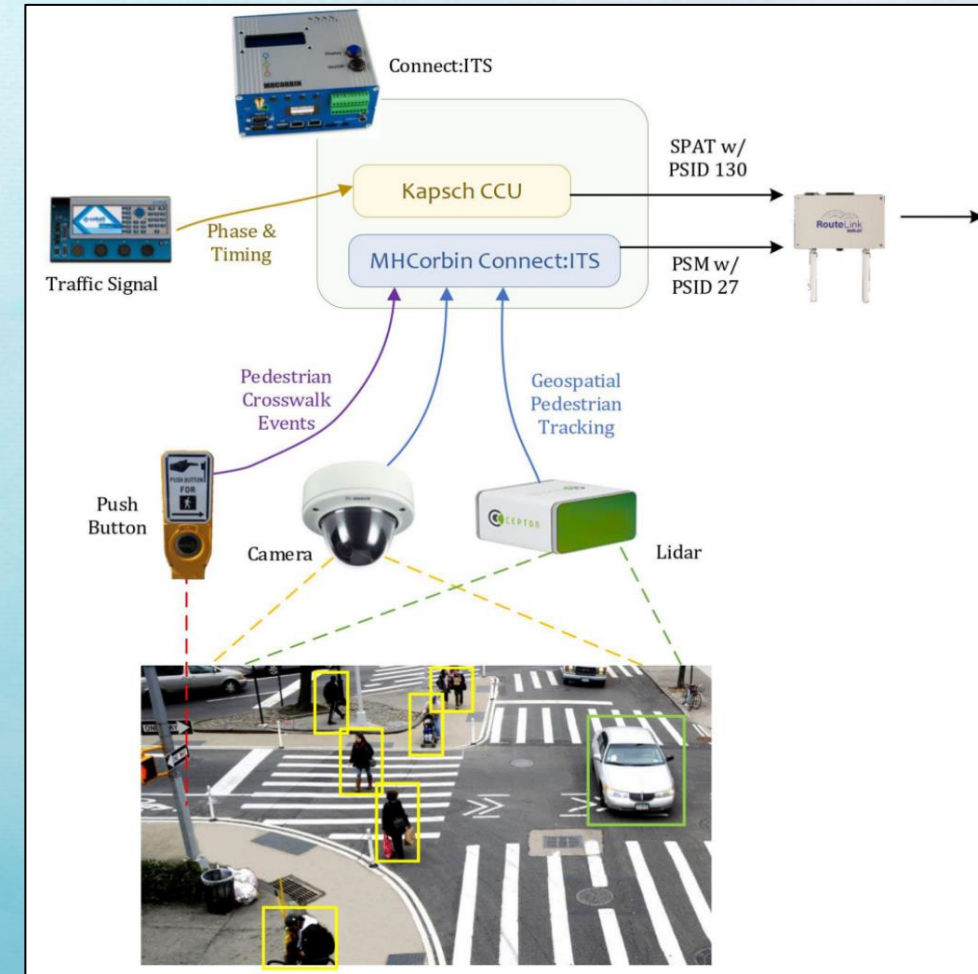
*Table 5: TAPs-LA Implementation and Project Selection Schedule*

Item	Due Date
Districts receive TAPs-LA document	September 7, 2021
Districts begin TAPs-LA local agency engagement	September 7, 2021
DTOEs receive proposals	December 15, 2021
DTOEs send recommended proposals to Central Office	January 5, 2022
Central Office selects project proposals	Jan/February, 2022
Brief TSM&O L-team	Feb/March 2022
Districts and Central Office work on getting the funds into the Work Program for state roads; local agency secures funding for local roads	April/May 2022
Districts and local agencies implement projects	July 2022 - onwards



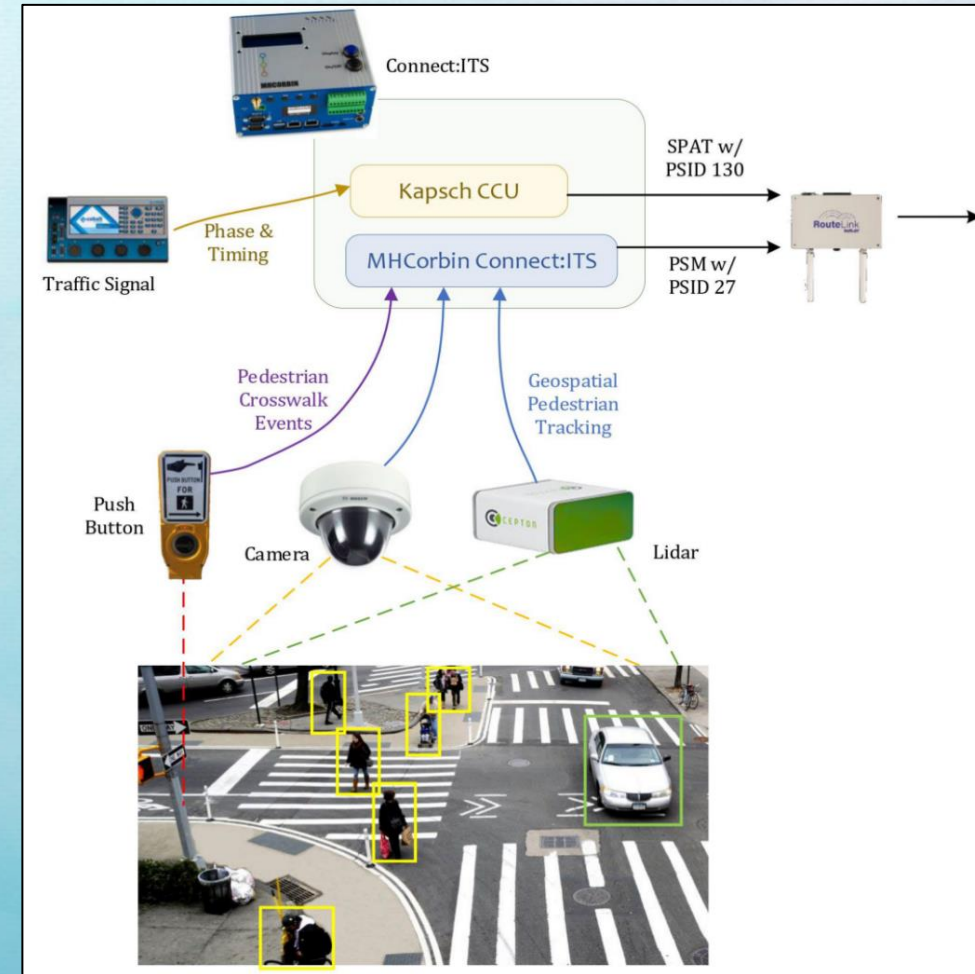
# Altamonte Springs

- PedSafe Phase II
  - Building on ATTAIn deployment
- SR 436
  - Northlake Blvd to Boston Ave
    - Cranes Roost, Altamonte Mall, AdventHealth
- Heavy pedestrian traffic
- Ongoing Complete Street project within same limits



# Altamonte Springs

- PedSafe Phase II
  - Pedestrian detection via LiDAR and cameras
  - Generate Personal Safety Messages (PSM) and Basic Safety Messages (BSM)
  - Generate Signal Phase and Timing (SPaT)





# Lake County

- Smart Signal Detection and CV Upgrades
  - Building on *Smart Signal* standard
  - Building on detection and RSU deployments in the region
- SR 50 (Clermont)
  - Grand Highway to Orange County Line
    - Commercial area; near Orlando Health South Lake Hospital
- Major commuter corridor
  - 52,000-62,000 AADT
- 700+ crashes from January 2019 – November 2021
  - 54% were rear-ends

# Lake County

- Smart Signal Detection and CV Upgrades
  - Improve detection to allow for future object detection, trajectory information, and location information
  - Enable BSM generation
  - Upgrade to ATC controllers
  - Broadcast SPaT via RSUs (CV2X/DSRC)
  - Potentially reduce rear-end crashes through better coordination and reduced congestion
  - Continue to build on the Smart Signal standard

# Questions



# Florida EV Infrastructure Master Plan

David Williams, VHB

# Florida EV Infrastructure Master Plan (EVMP)

- EVMP created pursuant to F.S. 339.287
- EV infrastructure along SHS
- EVMP developed with multiple agencies and extensive public engagement
- EVMP's Primary Objectives:

## **SUPPORT**

short-range and long-range electric vehicle travel as well as emergency evacuation in the state

## **ADAPT**

state highway infrastructure consistent with market demand

## **ENSURE**

availability of adequate and reliable EV charging stations



# Stakeholder Engagement

- 7 stakeholder meetings; 2 public webinars
- FDOT, FDEP, FPSC, Other State agencies





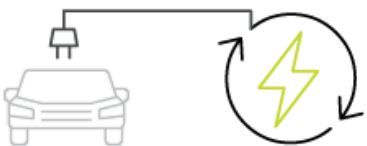
# Florida EV Infrastructure Master Plan (EVMP)

EVMP provides an overview of EVs and charging stations

## INTRODUCTION

### Types of EVs

Electric vehicles are a rapidly evolving technology. They are fueled and propelled differently from Internal Combustion Engine (ICE) vehicles. This section provides an overview of EV types and associated infrastructure.



### 1 Battery Electric Vehicle (BEV)

- Battery-only propulsion, no ICE backup
- Up to 400 mile range, depending on make and model
- Primary user considerations are long-range travel and evacuations

### 2 Plug-In Hybrid Electric Vehicle (PHEV)

- Relatively short range on full battery (~40 miles), then the ICE automatically starts
- Not limited in range by electricity

## ICE vs. EV

ICE



Gallons (Energy)

X



Miles / Gallon (Efficiency)

=



Miles (Distance)

EV



kWh (Energy)

X



Miles / kWh (Efficiency)

=



Miles (Distance)

Battery Capacity Size



kW (Power)

X



Hours (Time)

=



kWh (Energy)

## Conversions



1 Gal

=



33.4 kWh



1 hp

=



.75kW

.03 Gal

←

1 kWh

1.34 hp

←

1 kW

# Florida EV Infrastructure Master Plan (EVMP)

## EV Infrastructure

EV Infrastructure is also referred to as EVSE and charging stations. There are three types of EV technologies currently available in the market for passenger vehicles.

### Level 1 Charger

- Standard equipment for most electric vehicles
- Slower charging speed >eight hours - (full charge)
- Foundational technology that is aging out

### Level 2 Charger

- Slower charging speed >two hours - (full charge)
- Short-range travel (commuting, intra-regional)
- Currently accounts for ~80% of all charging demand






### Direct Current Fast Charger (DCFC)

- Fast charging speed ~30 minutes - (full charge)
- Long-range travel (evacuation, inter-regional)
- Future-oriented

# EV Supply Equipment (EVSE)

## Existing EVSE Types and Use Cases

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

# Benefits of EV Mobility

## ENERGY SECTOR

### REDUCTION IN GHG EMISSIONS



- ✓ Positive impact for the environment
- ✓ Net fuel efficiency improvements
- ✓ Potential for future vehicle-to-grid applications

## TRANSPORTATION SECTOR

### ZERO TAILPIPE EMISSIONS



- ✓ Improvement in local air quality
- ✓ Reduction in noise pollution
- ✓ Significantly improved vehicle efficiency

### ENERGY DIVERSITY AND INDEPENDENCE



- ✓ Mobility is no longer tied to petroleum
- ✓ Renewable energy sources are advancing
- ✓ Resiliency during natural disasters

### LOWER TOTAL COST OF OWNERSHIP FOR HOUSEHOLDS



- ✓ Less moving parts = less maintenance
- ✓ Lower fuel costs
- ✓ Responsible stewardship of tax payer money by public agency fleets



# BARRIERS TO ADOPTION AND INDUSTRY TRENDS

Emerging technologies often face barriers to market acceptance. Some barriers are easily overcome through innovation and market forces while other barriers are persistent. Some major barriers are highlighted below.

## EV Adoption Barriers



EV cost parity with ICE vehicles – expected to occur short-term (2025 - 2030)



No secondary market (limited amount of used EV inventory)



Lack of charging stations; long-distance travel; and multi-family housing



Lack of dealership knowledge / willingness to suggest EVs; lack of EVs available at Florida dealerships

## EVSE Adoption Barriers



Low EV customer base



Lack of public awareness regarding EVSE locations



EVSE charging speed – function of power delivery of EVSE and how much power an EV can accept



Service providers locate EVSE where EV adoption is highest; EVSE gaps exist in low-utilization, rural and under-represented communities



Utility demand charges



Lack of site-specific back-end utility infrastructure for DCFC stations, especially in rural and critical emergency evacuation areas



Additional costs when providing back-up power at EVSE locations for emergency evacuation



Limited public funding

## Perceived Barriers



Range anxiety during longer trips



Lack of truck, SUV/ crossover EV models available on the market



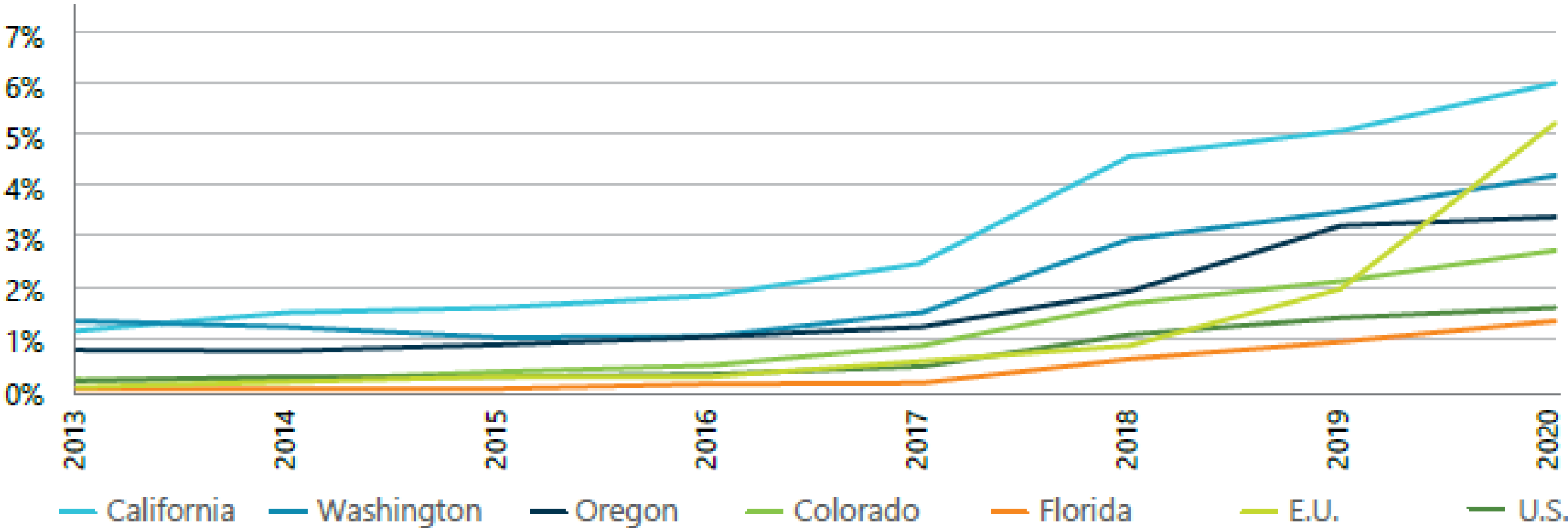
Long recharging times



Perception that gasoline is inexpensive



# EV Market Trends (% of all vehicles sold)



# Battery Electric Vehicle Manufacturing

## Automobile Manufacturers are Going Electric
















**VOLVO**  
has pledged that  
50% of its vehicle  
offerings will be  
EV by 2025.

**GENERAL MOTORS**  
has pledged that  
all light-duty cars  
and SUVs will be  
EV by 2035.

**FORD**  
expects that  
40% of global  
sales will be  
EV by 2030.

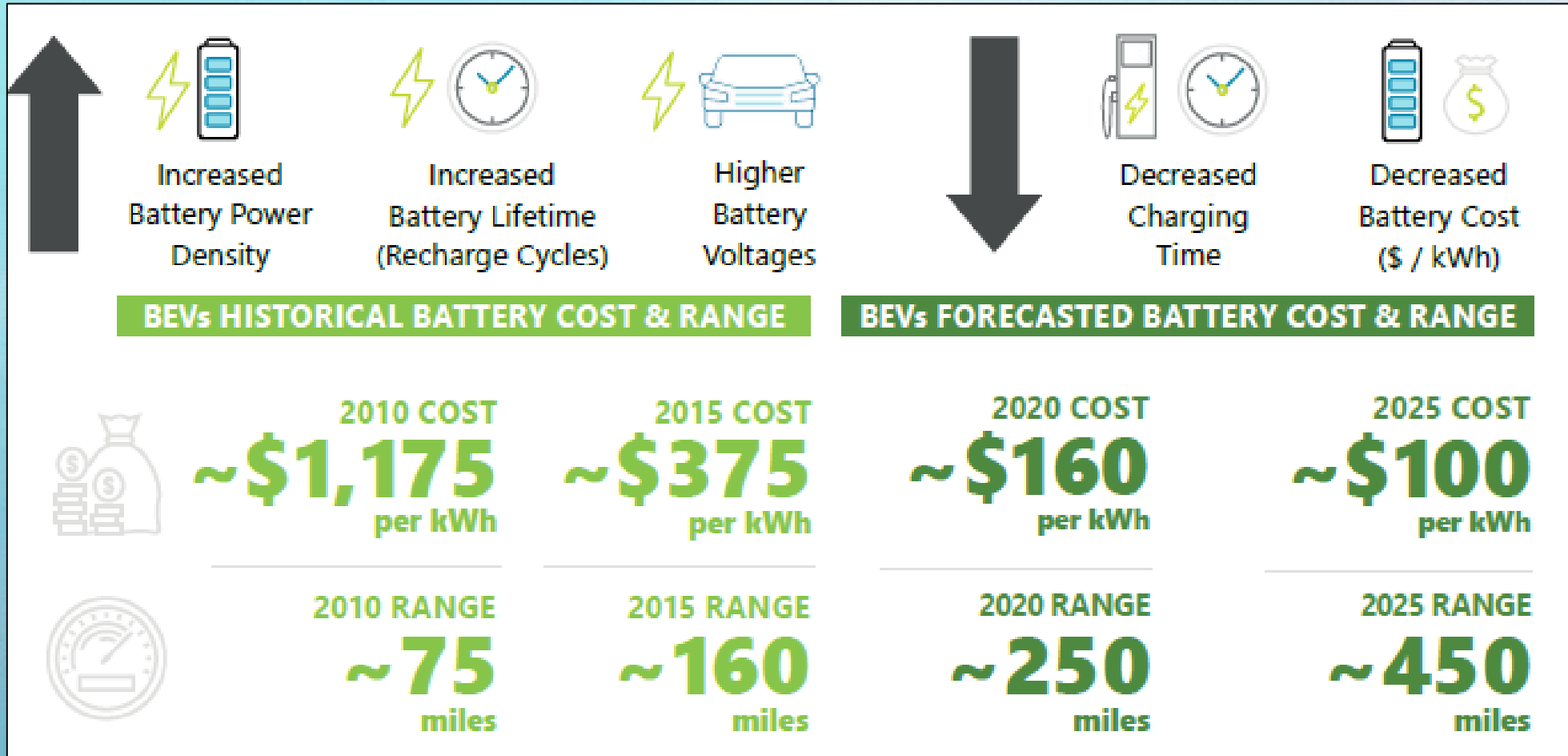
**VOLKSWAGEN**  
expects that  
50% of US sales  
will be EV  
by 2030.

## Cumulative BEV Offerings by Vehicle Type

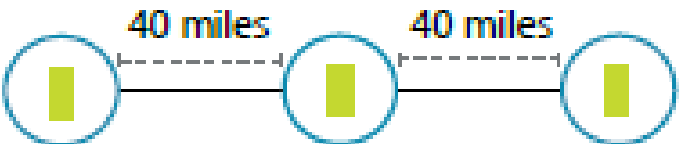
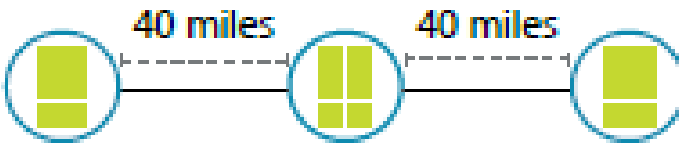
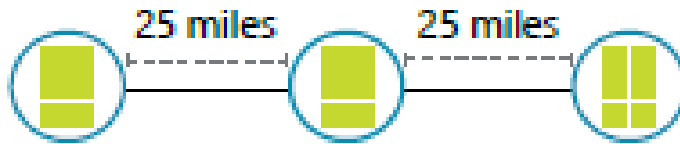
2021	2022	2023	2024	2025
20 	38 	44 	46 	50 
3 	10 	13 	15 	18 
1 	9 	11 	13 	13 
<b>24</b> MODELS	<b>57</b> MODELS	<b>68</b> MODELS	<b>74</b> MODELS	<b>81</b> MODELS

By the end of 2020, there were 17 BEV models on the market.  
Cumulatively, by 2025, there will be at least 81 additional BEV models available to consumers.

# BEV Cost and Range Projections



# Plan over Time to Expand EVSE Network

	2020	2025	2030	2035
	2% - 8% Annual EV Sales		8% - 30% Annual EV Sales	30% - 50% Annual EV Sales
PHASE	EARLY PHASE		MIDDLE PHASE	LATER PHASE
OBJECTIVE	Build Out the Network		Grow and Density	Density and Maintain
ACTION	Fill in the Gaps Between Locations (New Locations)		Increase Number of Chargers at Each Location	Decrease Intervals Between Stations
METRIC	40 Mile Spacing Between EVSE Locations Along the SHS		Approximately 1MW of Peak Charging Demand at Each Location (6 DCFC Stations per Location)	25 Mile Spacing Between EVSE Locations Along the SHS
	 <p>At least 2 EVSE at each location</p>		 <p>At least 6 EVSE at Each Location</p>	
			 <p>6+ EVSE at each location</p>	



# Installation Considerations



DCFC Installation Site (Long-range travel)



Level 2 Installation Site (Community Charging)

# EVSE Pre-Deployment Planning

- Considerations for every location prior to developing EVSE
  - Power Supply
  - Space Requirements
  - Future Growth Considerations
- Provides other installation concepts for Rental Car lot, rest/truck stop, and transit fleet sites



# Utility Pilot Program

- Current EVSE Pilot by Duke Energy
  - Five-year “Park & Plug” pilot program
  - Minimum deployment of 530 EVSE ports; up to \$8M allotted to Duke
  - At least 10% of EVSE ports in low-income areas
  - Level 2 or DCFC chargers
  - Provision of equipment, install, warranty, and network connection services free of charge to site hosts through 2022
  - \$400,000 available for consumer education
  - Site host responsible for cost of electricity used by EVSE

# Utility Pilot Program

- EVolution Pilot by Florida Power & Light
  - Three-year pilot program
  - Installation of 1,000 ports
  - Focus on gathering information such as EV use, adoption, power quality
  - Looking at potential new rate structures
  - Aims to increase public charging stations in Florida by 50%



# Utility Pilot Program

- Charging Pilot Program by Tampa Electric Company
  - Four-year \$2M pilot program
  - Installation of 200 Level 2 ports and 4 DCFC ports
  - TECO will own, operate, maintain (using a turnkey vendor)
  - Located in 5 market segments
    - Workplaces, Retail, Multi-family, Income-Qualified, Government
  - Will contribute up to \$5,000 towards installs in workplace, retail, and multi-family segments

# Utility Pilot Program

- **Municipal and Cooperative Utility EV Charging by OUC**
  - OUC has been offering Level 2 and DCFC charging services with two ownership options:
    - **Charge-It** – OUC owns, installs, maintains the station. Host obtains EV charging services from OUC for monthly fee over contract period
    - **Own-It** – OUC designs, procures, installs station. Host pays for equipment and installation, immediately takes ownership.



# Utility Pilot Program

- Municipal and Cooperative Utility EV Charging by **Sumter Electric Company**
  - Started in January 2021
  - 50kW or greater fast charging tariff
  - Billed directly to end user (via SECO user account and mobile app)
  - Energy charge
    - 1-129 kW = \$0.31/kWh
    - 130+ kW = \$0.44/kWh



# Utility Pilot Program

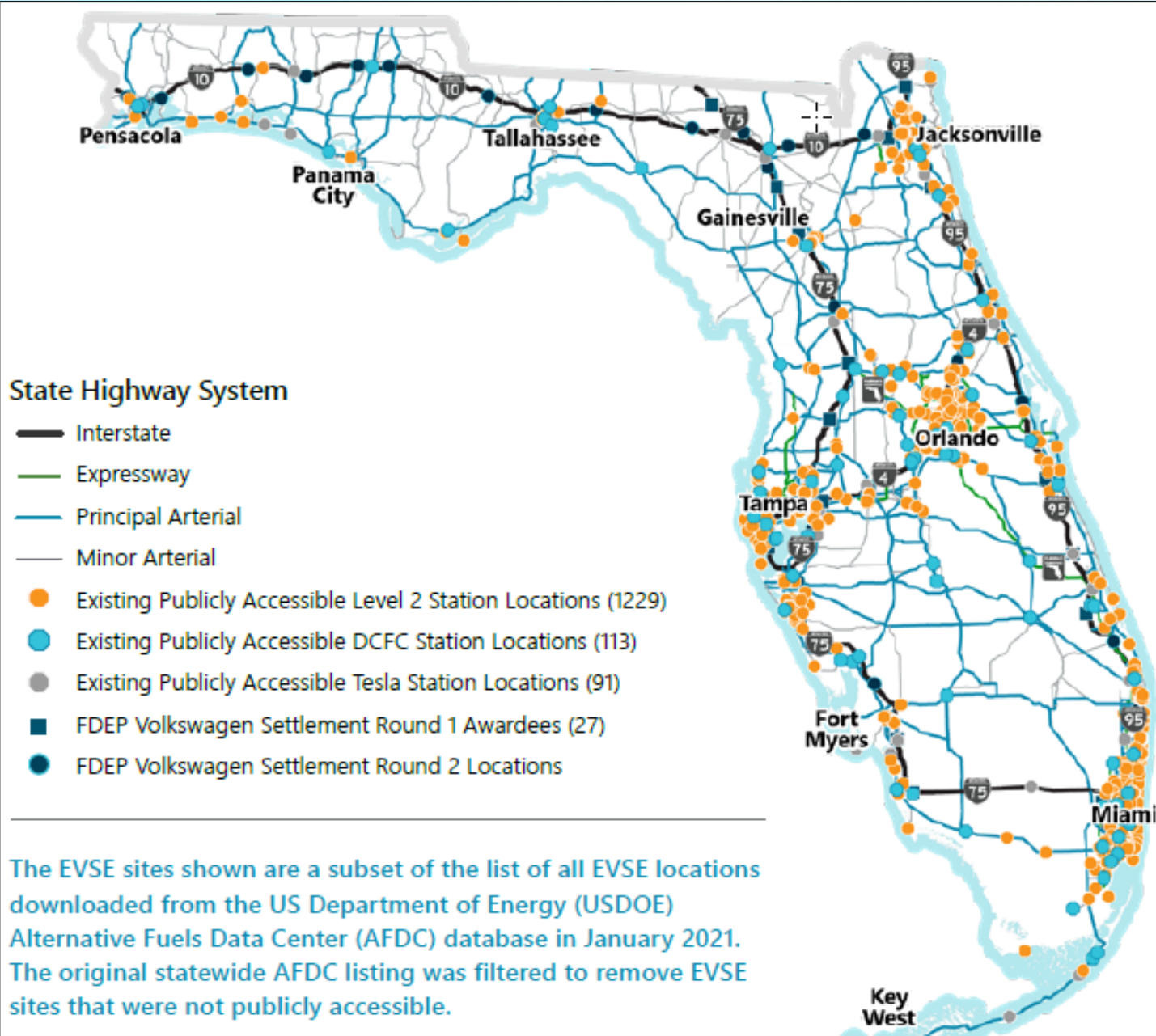
- Municipal and Cooperative Utility EV Charging by **Sumter Electric Company**
  - Started in January 2021
  - 50kW or greater fast charging tariff
  - Billed directly to end user (via SECO user account and mobile app)
  - Energy charge
    - 1-129 kW = \$0.31/kWh
    - 130+ kW = \$0.44/kWh

# Identification of Potential New EVSE Locations

- Long-Range Travel (DCFC) Consideration Factors
  - Proximity to existing DCFC sites
  - High-traffic intersections along SHS rated higher
  - Proximity to SHS intersections along evac routes (1-, 5-, 10-minute drives)
  - Higher traffic facilities benefit the most EV drivers
- Short-Range Travel (Level2) Consideration Factors
  - Within walking distance to multi-family development (<0.25mi priority)
  - Median HH income (priority to lowest 20% income group)
  - Proximity to existing Level 2 sites
  - Land Uses

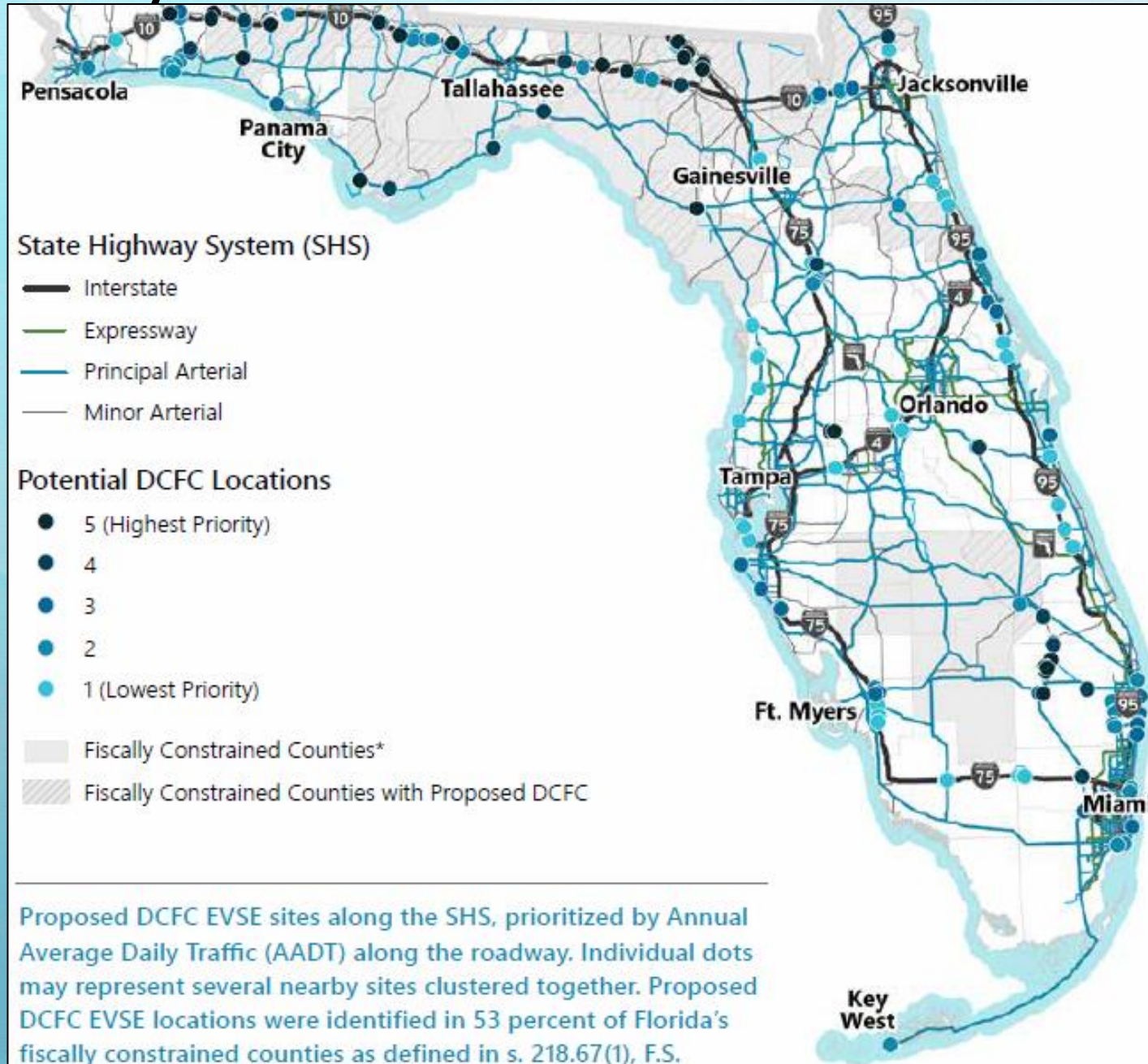


# Existing Publicly Accessible EVSE Locations

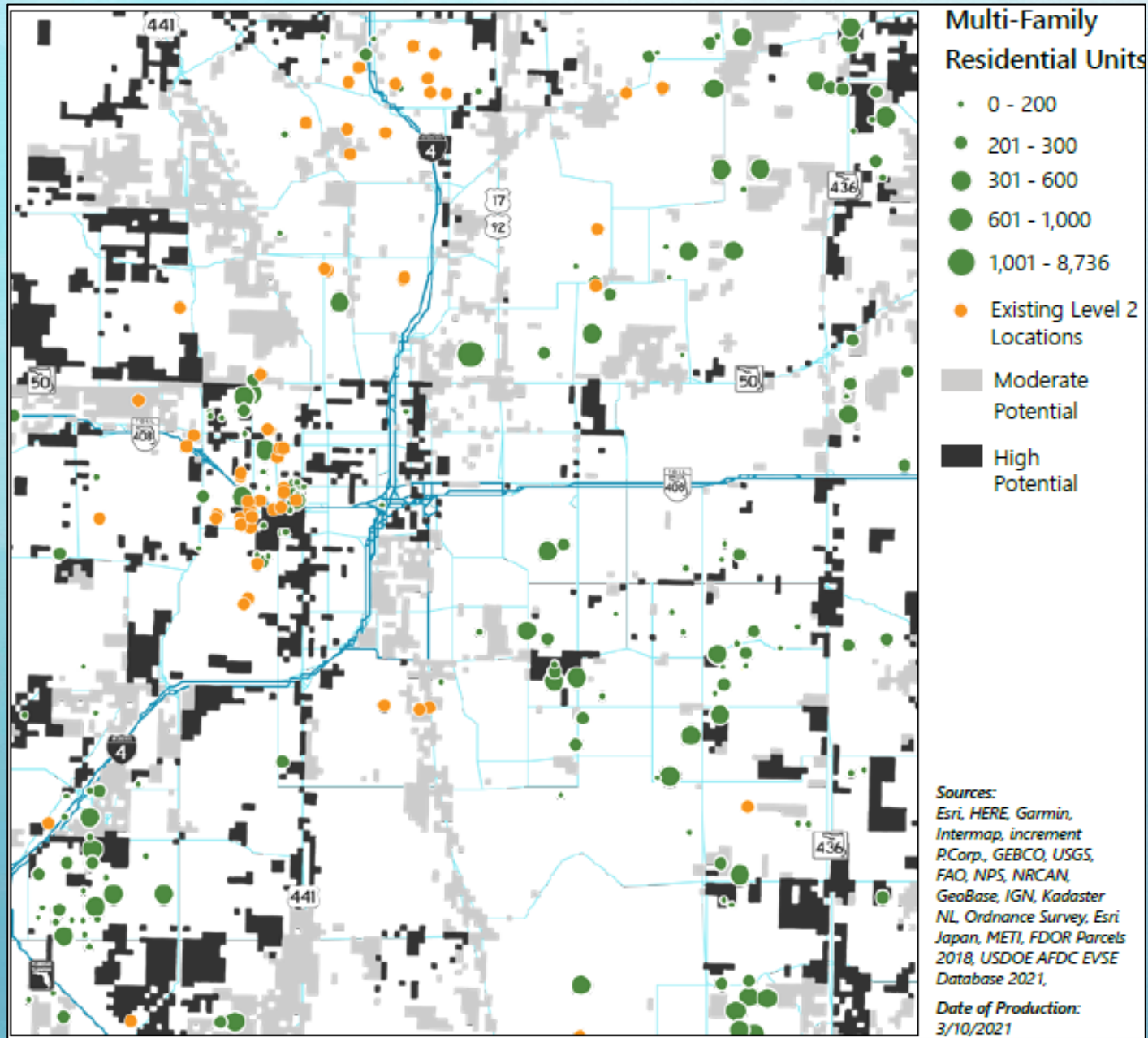




# Gap Analysis Results – Potential DCFC Locations



# Potential Level 2 Footprints – Orlando example





# Recommendations

- Long-Range Travel (DCFC) Consideration Factors
  - Proximity to existing DCFC sites
  - High-traffic intersections along SHS rated higher
  - Proximity to SHS intersections along evac routes (1-, 5-, 10-minute drives)
  - Higher traffic facilities benefit the most EV drivers
- Short-Range Travel (Level2) Consideration Factors
  - Within walking distance to multi-family development (<0.25mi priority)
  - Median HH income (priority to lowest 20% income group)
  - Proximity to existing Level 2 sites
  - Land Uses



# Recommendations

- Goals
  - **Promote** variety of energy sources
  - **Position** Florida as national leader in EVSE implementation
  - **Expand** EVSE access in Florida
  - **Anticipate** changes in travel choice and transportation technologies
  - **Enhance** Florida's overall transportation system
  - **Support** emergency evacuation
- Initiatives



# Recommendations – Initiative 1: ADAPT

## Objectives

1. Anticipate Market & Industry Trends
2. Adapt Transportation Policy Framework
3. Expand EVSE Network along Transportation Infrastructure
4. Support Municipal & Local Agencies with Implementation of EVMP
5. Support Research & Testing of future EVSE

# Recommendations – Initiative 2: FACILITATE

## Objectives

1. Promote EVSE infrastructure to support Long-Range travel and evacuation
2. Identify and pursue a variety of funding options with partners to install EVSE
3. Promote installation of community charging (Level 2) infrastructure



# Recommendations – Initiative 3: EDUCATE

## Objectives

1. Support EVSE-focused education and outreach
2. Support local jurisdictions and agencies
3. Increase public awareness of publicly available EVSE locations

# Recommendations – Initiative 4: COORDINATE

## Objectives

1. Advance a regional and comprehensive approach to EV infrastructure
2. Continuously coordinate stakeholders to support EVSE planning and implementation
3. Coordinate the utility roles and rates to support the EVMP goals

# Florida EV Infrastructure Master Plan

- For more info, visit: <https://www.fdot.gov/planning/fto/ev/default>
- Google: “FDOT EV Master Plan”



# Questions?

# Florida Automated Vehicle Summit

## Takeaways

Jeremy Dilmore, District Five TSM&O

# FAV Summit Takeaways

- Hosted in Orlando by CFX
- Over 500 attendees
- Variety of topics
  - Electric Vehicles
  - ACES
  - Agriculture
  - AV Policy
- OEMs and Freight heavily engaged





# Emphasis on Electric Vehicles

- Public agencies
  - Florida EV Infrastructure Master Plan
  - Orlando is EV Ready
  - LYNX Electric Buses
  - CFX EV Roadmap
- EV vendors and private sector



# AV and Other Discussions

- Public Transportation
  - LYNX Orlando AV Shuttle
- AV Policy (National and State)
- Future of ACES
- Demonstrations by ConnectWise, AcroMoto Group, 3M
- Unmanned Aerial Systems (UAS) for Public Safety and Emergency Management
- Automated Workforce



# Questions / Comments?



# TSMCA at Central Office

Jeremy Dilmore, District Five TSM&O

# TSMCA at Central Office

- Current TSMCA is limited in detail and scope; little nuance across wide range of agencies
- In 2021, D5 began meeting with maintaining agencies to discuss amending/updating TSMCA
- Open 1-on-1 discussion about roles and responsibilities between FDOT and MA

Traffic Signals and Devices is defined as follows: all signals, interconnected and monitored traffic signals systems (defined as central computer, cameras, message signs, communication devices, interconnect/network, vehicle, bicycle & pedestrian detections devices, traffic signal hardware and software, preemption devices, and uninterruptible power supplies (“UPS”)), control devices (defined as intersection control beacons, pedestrian crossing beacons, illuminated street name signs, pedestrian flashing beacons (i.e., school zone flashing beacons, pedestrian crossing beacons, and Rectangular Rapid Flashing Beacons)), blank out signs, travel time detectors, emergency/fire department signals, speed activated warning displays, and other types of traffic signals and devices specifically identified with Exhibit A.

The Maintaining Agency shall be responsible for the maintenance and continued operation of the Traffic Signals and Devices. Pay for the electricity...

Category	Preventative Maintenance	Frequency of Inspection / Preventative Maintenance	Updated Frequency of Inspection/Preventative Maintenance	Break/Fix (Routine / Emergency Repairs)	Targeted Downtime (max. period between issue identification and repair)	Responsible Agency (FDOT or LOCAL AGENCY)	Review Notes
ATMS	Verify all detection equipment (e.g., pedestrian push buttons, vehicle detection systems) is communicating health status information to the central control software. Ensure devices report alarms and failures in real-time.	Weekly	Weekly	Configure the device and the management software to provide alerts and alarms to DOT.	48 Hours	Local Agency	

# TSMCA at Central Office

- Maintenance Tasks identified during D5 discussions:
  - ATMS
  - Bluetooth Reader
  - Cabinet
  - CCTV Camera
  - CV RSU
  - Detection
  - DMS
  - End Devices
  - Preemption
  - Metadata
  - Midblock Detection (MVDS)
  - Network
  - Pedestrian
  - Signal Infrastructure
  - Signing



# TSMCA at Central Office

- Central Office now engaging with all Districts to potentially update TSMCA
- D5 provided best practices/lessons from meetings with MAs
  - Identified 5 categories of Maintaining Agency based on O&M
    1. **MA maintains;** FDOT is a resource
    2. **MA maintains;** FDOT troubleshoots/configures as needed
    3. **MA maintains signals & some end devices;**  
FDOT handles advanced end devices and potentially network
    4. **MA maintains signal infrastructure and ATMS;**  
FDOT maintains end devices and network
    5. **MA maintains signal infrastructure;** FDOT maintains ATMS and everything else

# TSMCA at Central Office

- District 5 has provided feedback on draft documentation from Central Office
- Timeline?

# Questions



# Current Initiatives

Jeremy Dilmore, District Five TSM&O

# Regional Integrated Corridor Management System (R-ICMS)

## *Project Update – December 2021*

### *Project Scope Recap:*

- Real-time continuous turning movement counts (TMC)
- Traffic signal status and control interfaces (TMDD)
- Mesoscopic model scenario forecasting
- Decision Support System
- Signal Optimization Tool



# R-ICMS – Congestion identification challenges

- Problem: R-ICMS unable to recommend some diversion routes
- Causes: Multiple Issues impacting traffic conditions data:
  - Reliability of HERE.com data feed
  - I-4 Ultimate impacted MVDS data quality
- Specific Impacts to R-ICMS:
  - Ability to determine Congestion head and tail of events on I-4
  - Ability to select specific diversion route candidates for response workflow



# R-ICMS – Traffic Conditions Delivery Solutions

- Initial solutions improved traffic conditions data delivery:
  - Prioritize use of HERE.com data rather than MVDS data – *completed*
  - Improve reliability of HERE.com data – get from SunStore – *completed*
  - Holding data values for at least 10 min. instead of reporting no-data – *completed*

# R-ICMS – Operator Entered Congestion

- Solution Opportunity:
  - TMC Operators enter congestion head/tail into SunGuide event already
  - R-ICMS to use SunGuide event congestion head/tail
  - *February 2022*

*Leverages operator validation already being performed!*



# R-ICMS Minor Operational Improvements

- Display event details and response plans on same screen – *February 2022*
- Display Active response plans on main R-ICMS map – *March 2022*



# R-ICMS expansion beyond current model

- Response plan activation prior to simulation – *March 2022*
- Unmodelled response plan activation – *April 2022*

# Connected Vehicle Equipment

- RSUs
  - Deployment ongoing
    - Receiving last shipment shortly
  - Testing out other RSUs as well
- OBU Procurement
  - ITB awarded
    - Development/lead time TBD

# CAV Showcase

- Quick Reference Guide
  - Why OEMs and CAV companies should test/deploy in region
    - Number of units deployed; provide general map of deployments
    - Region's data capabilities (safety, traffic, signal data)
    - Smart Signals
    - Surrogate Safety Measures data available
    - SCMS
    - SunGuide



# Express Lanes

- Wrapping up; still some cleanup to be done
- Please let us know if you have identified any issues

# Temporary Signal Connections

- TSP developed for cellular modems

## SECTION T684 NETWORK DEVICES

### T684-1 Cellular Communications

**T684-1.1 Description:** Furnish and install a broadband cellular modem and antenna, as shown in the Plans. Provide a system that allows cellular-based communication between signalized intersections, the existing network, and central management system of the maintaining agency.

Cellular communication shall be deployed at signalized intersections to maintain active communications for traffic signal controllers and closed-circuit television (CCTV) cameras for the duration of construction projects.

### T684-1.2 Materials:

**T684-1.2.1 General:** Provide a broadband cellular modem and antenna capable of establishing reliable communications between the QD system and the Insert Maintaining Agency Here Regional Traffic Management Center (RTMC).

**T684-1.2.2 Cellular Modem:** Use a cellular modem capable of providing 5G+ communications and also backwards compatible with 4G LTE and 3G communications. Ensure cellular modems are able to provide cellular communications through the FirstNet network via a removable subscriber identity module (SIM) card. SIM card shall be furnished and configured by the Department. Each cellular modem shall be equipped with redundant SIM card slots for multiple carriers in the event of a cellular provider failure or loss of signal.

Furnish and install all cabling and mounting accessories required to provide power and communication to the modem, including all cabling required to power the antenna. Ensure all cables comply with the National Electric Code (NEC) sizing requirements and meet all other applicable standards, specifications, and local code requirements. Power consumption of the unit shall not exceed 12W maximum.

**T684-1.2.2.1 Network Interface:** Ensure the cellular modem includes a minimum of two Ethernet ports, which must provide 10/100 Base connections. Verify that all copper-based network interface ports utilized registered jack (RJ)-45 connectors.

# THANK YOU!

Next Consortium – February 10, 2021



# Questions



# TSM&O Consortium Meeting

---

## MEETING AGENDA

Teleconference or  
FDOT District 5 RTMC (4975 Wilson Rd, Sanford, FL 32771)

*December 9, 2021*  
*10:00 AM-12:00 PM*

- 1) WELCOME
- 2) FLEX PORTAL TRAINING
  - David Williams, VHB
- 3) TECHNOLOGY APPLICATION PARTNERSHIPS WITH LOCAL AGENCIES (TAPS-LA)
  - David Williams, VHB
- 4) FLORIDA AUTOMATED VEHICLE (FAV) SUMMIT – TAKEAWAYS
  - Jeremy Dilmore, District Five TSM&O
- 5) TSMCA – CENTRAL OFFICE
  - Jeremy Dilmore, District Five TSM&O
- 6) CURRENT INITIATIVES
  - Jeremy Dilmore, District Five TSM&O