

# Planning for the Future(s)

**Guidance on ACES  
Considerations into Long  
Range Transportation Plans**



# Agenda

- Definitions
- Purpose & Approach
- Guide Overview
- Key Findings
- Questions



Source: [www.tmcnet.com](http://www.tmcnet.com)

# ACES Defined



**A** Automated  
Vehicle capable of  
guiding itself with  
little or no human  
input



**C** Connected  
Vehicle linked to  
other devices to  
improve safety or  
efficiency



**E** Electric  
Vehicle using one  
or more electric  
motors for  
propulsion



**S** Shared-use  
Vehicles used (not  
necessarily  
owned) by more  
than one person  
or organization



# Purpose & Approach

Volkswagen expects first self driving cars on the market by 2019

GM: Autonomous cars could be deployed by 2020 or sooner

BMW to launch autonomous iNext in 2021

First autonomous Toyota to be available in 2020

NVIDIA to introduce level-4 enabling system by 2018

Ford CEO announces fully autonomous vehicles for mobility service by 2021

Audi to introduce a self-driving car by 2020

NuTonomy to provide self driving taxi service in Singapore by 2018, expand to 10 cities around the world by 2020

Delphi and MobilEye to provide off the shelf driving system by 2019

Uber fleet to be driverless by 2030.

Source: [http://www.driverless-future.com/?page\\_id=384](http://www.driverless-future.com/?page_id=384)

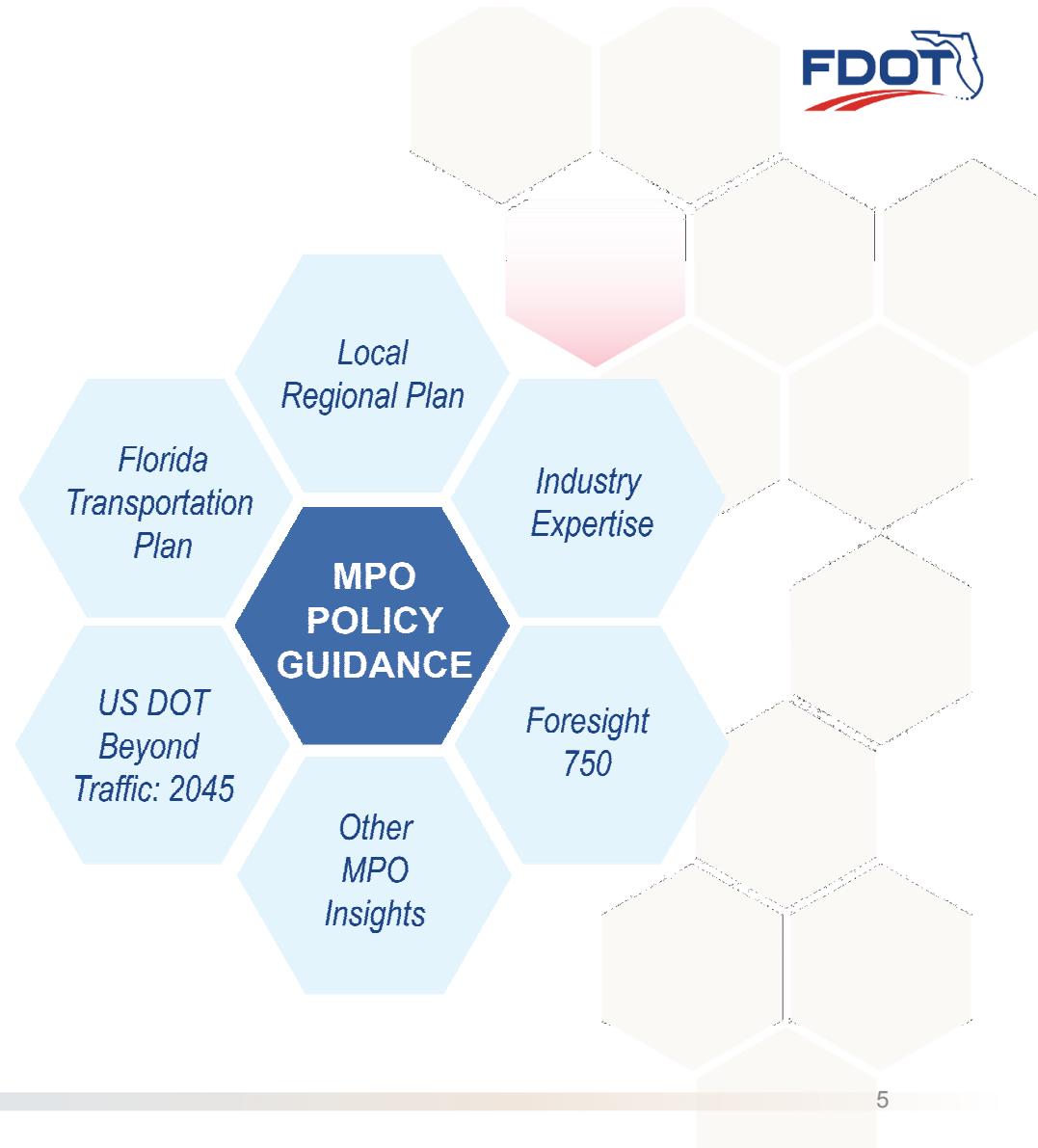
# Purpose & Approach

Literature Review

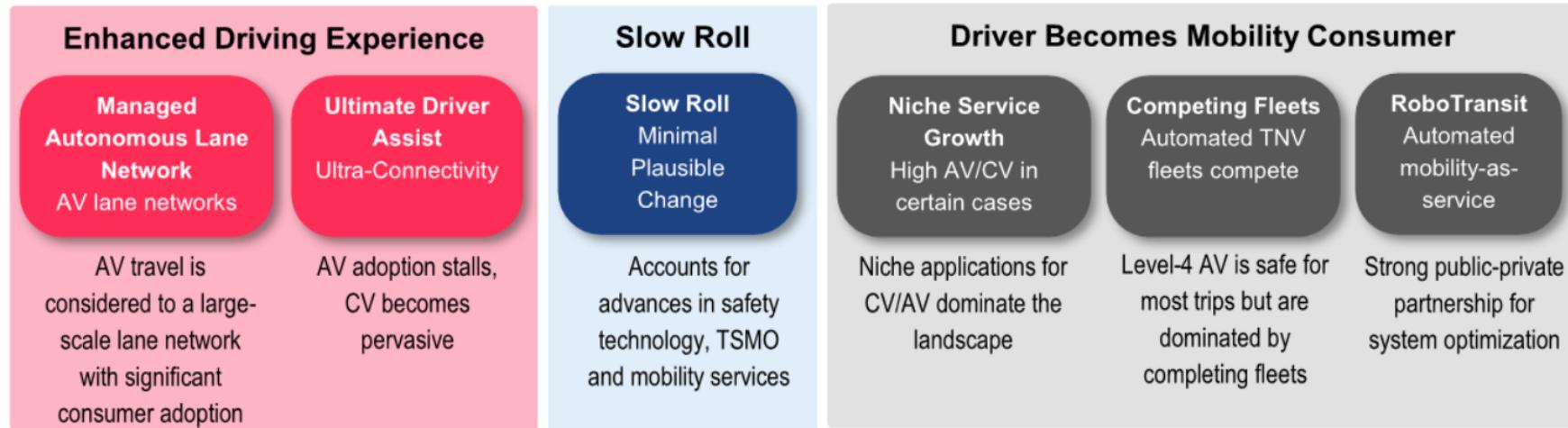
MPO Survey and Interviews

FHWA scenarios

4-step Travel Demand Modeling



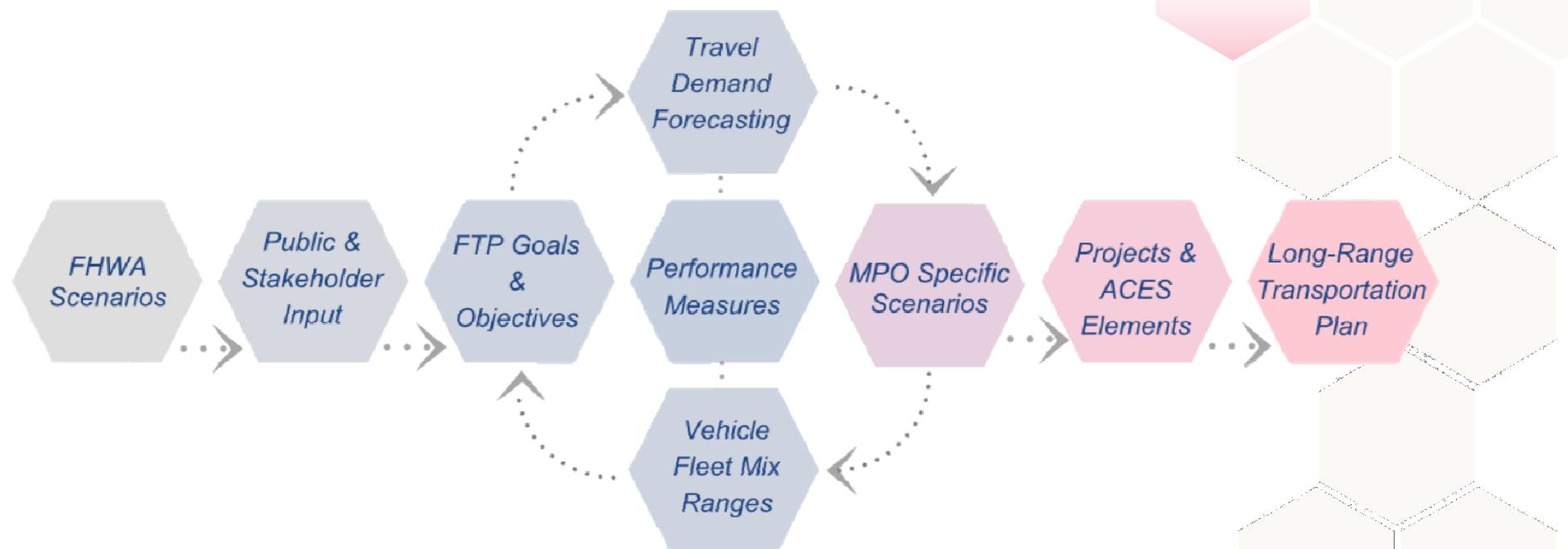
# ACES Planning Process



Trajectories towards CV/AV advancements

**TODAY**

# ACES Planning Process



# Policy Guide at a Glance

- Technology Overview
- Safety Impacts
- Travel Demand Impacts
- Highway System Impacts
- Transit System Impacts
- Funding Impacts

- Planning Processes
- Education & Engagement
- Considerations



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# Key Points: Safety

- Fatalities in Florida are on the rise, ACES may help reverse the fatalities trend.
- During transition, partial automation may increase risks associated with distracted driving.



Technology	Received Benefit
Forward collision warning	▼27% Front-to-rear crashes ▼20% Front-to-rear crashes with injuries ▼7% Claim rates for damage to other vehicles ▼14% Claim rates for injuries to people in other vehicles
Forward collision warning plus autobrake	▼50% Front-to-rear crashes ▼56% Front-to-rear crashes with injuries ▼13% Claim rates for damage to other vehicles ▼21% Claim rates for injuries to people in other vehicles
Lane departure warning	▼11% Single-vehicle, sideswipe and head-on crashes ▼21% Injury crashes of same types
Blind spot detection	▼14% Lane-change crashes ▼23% Lane-change crashes with injuries ▼9% Claim rates for damage to other vehicles ▼12% Claim rates for injuries to people in other vehicles
Rear automatic braking	▼62% Backing crashes ▼13% Claim rates for damage to the insured vehicle ▼26% Claim rates for damage to other vehicles
Rearview cameras	▼17% Backing crashes
Rear cross-traffic alert	▼22% Backing crashes

Source: IIHS

## Key Points: Transit

- ACES may indirectly reduce demand for transit but create opportunities for more cost effective and customer friendly service.
- MPOs are in a unique position to help local transit agencies adapt by transforming into “mobility managers” that help broker trips using multiple providers across an area.



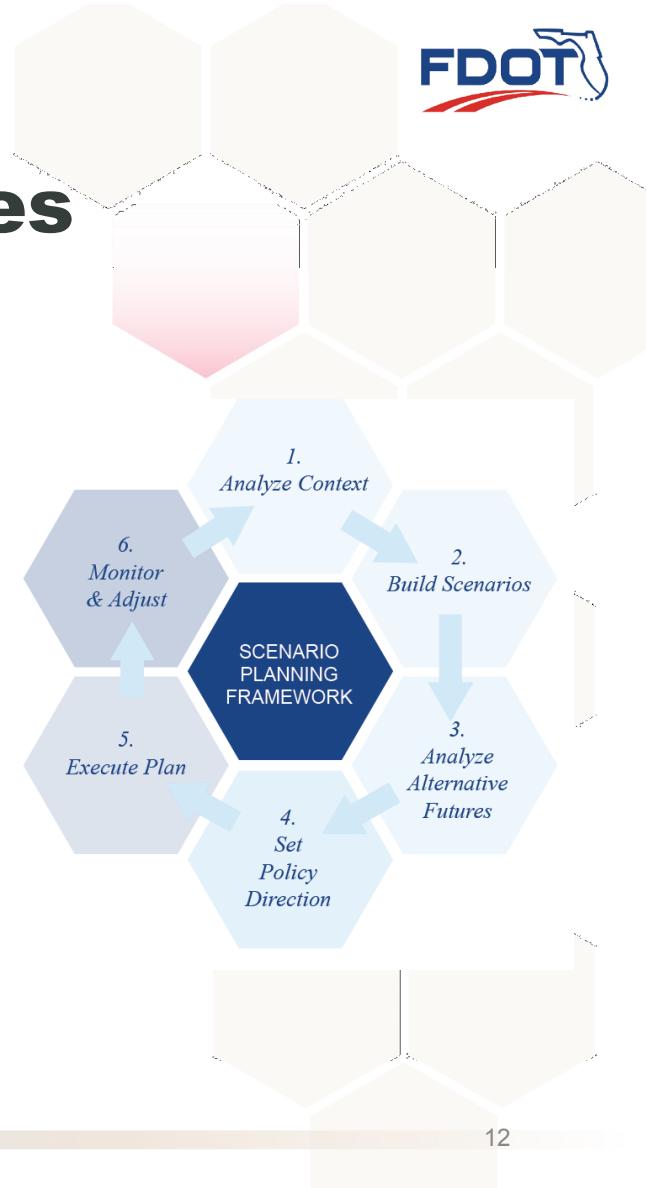
## Key Points: Funding

- Financial scenarios can help evaluate the impact on MPO fiscally constrained capital programs.
- Transportation funding relies heavily upon the motor fuel tax; the future of which is uncertain.
- Coordination with federal and state agencies is crucial to develop new funding mechanisms that will be successful in the face of ACES.



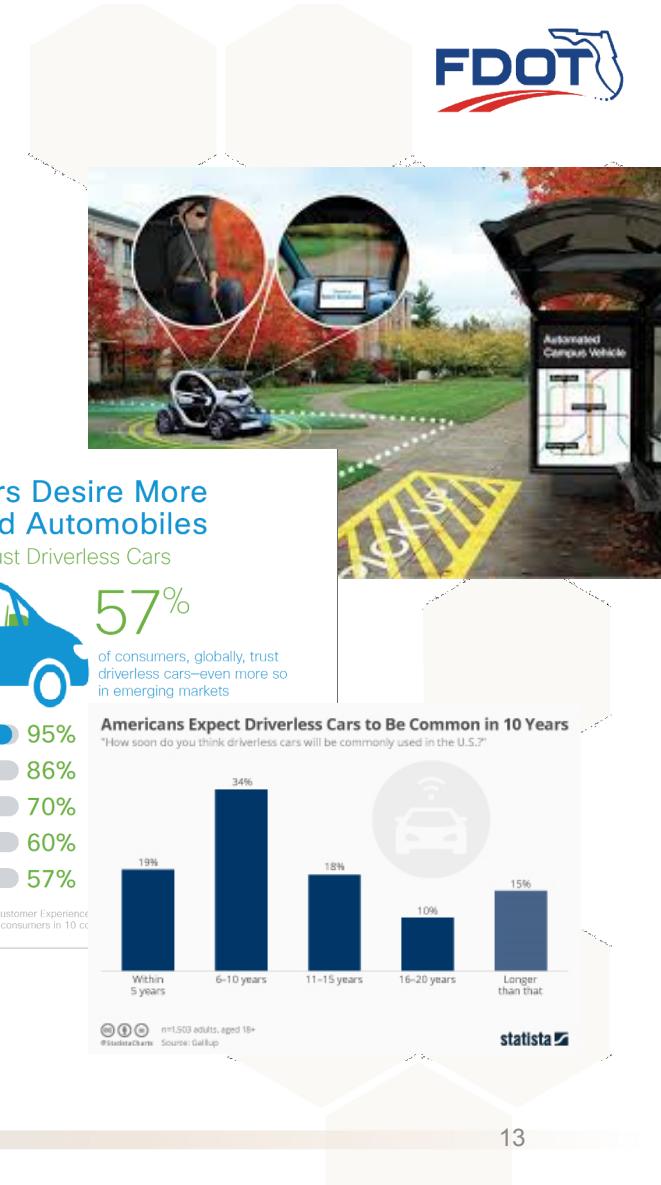
# Key Points: Planning Processes

- ACES will transform performance-based planning and, with it, the types of projects MPOs prioritize and plan.
- Collecting, storing, and the use of data will change
- Finding locally meaningful data may require MPOs to conduct or participate in pilot ACES projects.

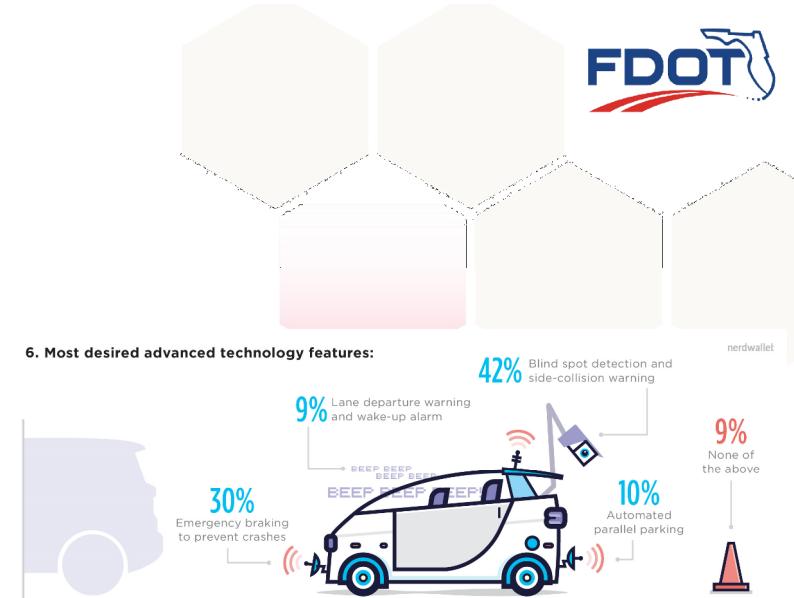
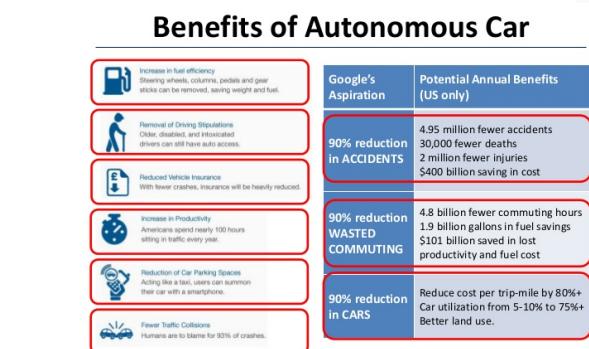


# Key Points: Engagement

- ACES introduce equity and other issues that may affect how MPOs define their community visions, goals and performance measures.
- MPOs will face new and perhaps unprecedented demands on engagement staff, resources and technical knowledge to address new needs and new stakeholders.
- ACES opens up new and more complex communication needs and opportunities across many broad topic areas.



# Considerations Topics

**Benefits of Autonomous Car**

Benefit Category	Benefit Description	Potential Annual Benefits (US only)
Google's Aspiration	90% reduction in ACCIDENTS	4.95 million fewer accidents 30,000 fewer deaths 2 million fewer injuries \$400 billion saving in cost
Reduced Vehicle Insurance	With never crashes, insurance will be heavily reduced.	
Increase in Productivity	Driving 100 hours sitting in traffic every year.	4.8 billion fewer commuting hours 1.9 billion gallons in fuel savings \$101 billion saved in lost productivity and fuel cost
Reduction of Car Parking Spaces	Acting like a taxi, users can summon their car with a smartphone.	
Fewer Traffic Collisions	Humans are to blame for 99% of crashes.	Reduce cost per trip-mile by 80%+ Car utilization from 5-10% to 75%+ Better land use.

Ref: <http://www.cartoondu.co.uk/infographics/the-ultimate-car-of-the-future/>  
 Google, US NHTSA, AAA, Texas A&M Transportation Institute, Columbia University Earth Institute and Devil's Advocate Group's analysis

# Considerations – Education and Engagement

- 4 Identify and develop staff skills and knowledge on advances in ACES to help them better inform and serve the public, local decision-makers and other participants in the planning process.

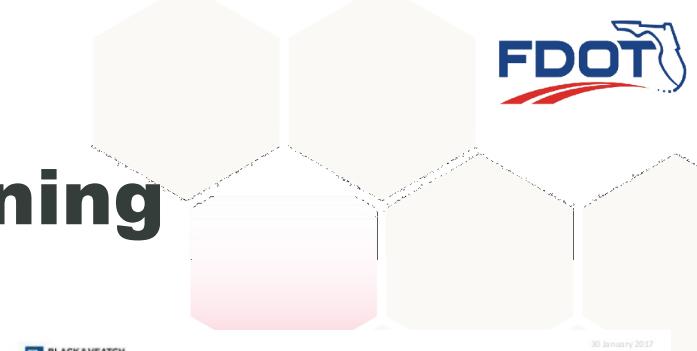
1	Coordinate with other organizations regarding ACES communication roles and responsibilities.
2	Report ACES impact on transportation system performance and other community vision, goals, objectives and assets.
3	Collaborate with the private sector to deploy ACES technologies in more uniform, predictable ways.
4	Identify and develop staff skills and knowledge on advances in ACES to help them better inform and serve the public, local decision-makers and other participants in the planning process.
5	Help the public understand ACES technology so that community decisions about related investments and impacts are made in a timely, factual and sustainable fashion.
6	Develop a roadmap of appropriate interactions between MPOs and industry, legislatures, federal government and others to facilitate ACES deployment and accelerate the accompanying societal benefits.
7	Consider developing an ACES committee to inform other policy committees on the trade-offs of ACES.
8	Develop an industry council to identify opportunities for private-sector ACES interactions and collaboration.



# Considerations – Fiscal Planning

- 1** Determine potential effects of ACES on infrastructure funding, revenue sources and stakeholder support.

- 1 Determine potential effects of ACES on infrastructure funding, revenue sources and stakeholder support.
- 2 Explore funding scenarios to evaluate effects of revenue shortfalls and alternative revenue sources on capital programs.
- 3 Investigate road pricing and other non-traditional funding sources that better support desired community outcomes.
- 4 Coordinate with ACES committee and the public to weigh the benefits and drawbacks of non-traditional funding sources to determine whether there is the political will to adopt and sustain those sources in support of a community vision.
- 5 Coordinate with federal and state agencies to ensure that new funding mechanisms create opportunities to replace local revenue sources disrupted by ACES.
- 6 Capitalize on the funding opportunities at federal, state and/or local funds.



BLACK &amp; VEATCH

30 January 2017

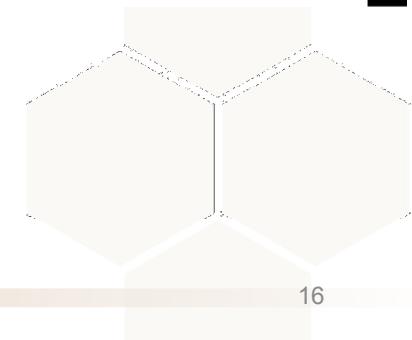
## HOW SMART CITY INITIATIVES SHOULD BE FINANCED

	By Organization Type		
	Government/ Municipality	Smart Services Providers	Total
Public/Private Partnerships	<b>67.6%</b>	<b>83.8%</b>	74.5%
Government Grants/Subsidies	52.2%	51.5%	51.9%
Tax Incentives	39.0%	45.5%	41.7%
Property Taxes	<b>5.1%</b>	<b>23.2%</b>	12.8%
Only Municipal Funds	8.1%	8.1%	8.1%
Only Private Funds	4.4%	7.1%	5.5%

Grey shading indicates notably higher/lower ratings compared to all other groups combined.

Q1-19. What would be (or is) the most effective financing model for "smart city" initiatives? (Select all that apply)

14



16

# Considerations – Planning

- b. Identify and prioritize major corridors where fixed route transit can be most effective in an ACES future and plan for supporting transit features and land use.

1	Refine or reframe MPO goals in light of ACES opportunities, impacts and uncertainties.
2	Link local ACES-related long-term goals with state and federal goals to take advantage of benefits and future opportunities.
3	Use regular planning processes such as development of unified work program and scenario planning to capture new data and trends that can be used to achieve regional vision and goals.
4	<p>Transit Planning</p> <ul style="list-style-type: none"> <li>a. Reconsider current transit development plan in light of ACES-related opportunities and threats.</li> <li>b. Identify and prioritize major corridors where fixed route transit can be most effective in an ACES future and plan for supporting transit features and land use.</li> <li>c. Support integration of transportation payment and trip planning systems across public and private mobility service providers</li> <li>d. Identify locations for mobility hubs where flexible taxi services can interface with fixed route transit.</li> </ul>
5	<p>Performance Measures</p> <ul style="list-style-type: none"> <li>a. Develop and continually refine a flexible approach to determining ACES-driven system performance needs and measures.</li> <li>b. Create and test new or refined performance measures that better reflect federal and state regulatory requirements while better meeting community needs, preferences and expectations.</li> </ul>
6	<p>Smart Cities</p> <ul style="list-style-type: none"> <li>a. Work with municipalities and the private sector to define, collect and share “smart cities” data relevant to long-range planning</li> <li>b. Create and test new or refined performance measures that better reflect federal and state regulatory requirements while better meeting community needs, preferences and expectations.</li> <li>c. Partner</li> </ul>



# Considerations – Policy

2 Coordinate with local governments on land-use and parking policies to achieve local and regional goals.

- 1 Identify ACES solutions to mitigate potentially increased VMT and vehicle emissions.
- 2 Coordinate with local governments on land-use and parking policies to achieve local and regional goals.
- 3 Work with the local transit agency to develop policies that integrate ride hailing and TNCs with traditional transit, including integrated payment.
- 4 Develop a comprehensive freight strategy that addresses private sector and military freight needs and trends.



Source: [www.planetizen.com](http://www.planetizen.com)



# Considerations – Project Prioritization

1 Build consensus with MPO members regarding how to account for ACES in project development and prioritization.

- a. Increased road marking implementation and maintenance for machine vision (e.g. electronic lane markings that allow use of V2I to provide more accurate lane markings and to provide changing road lanes for work zones.)

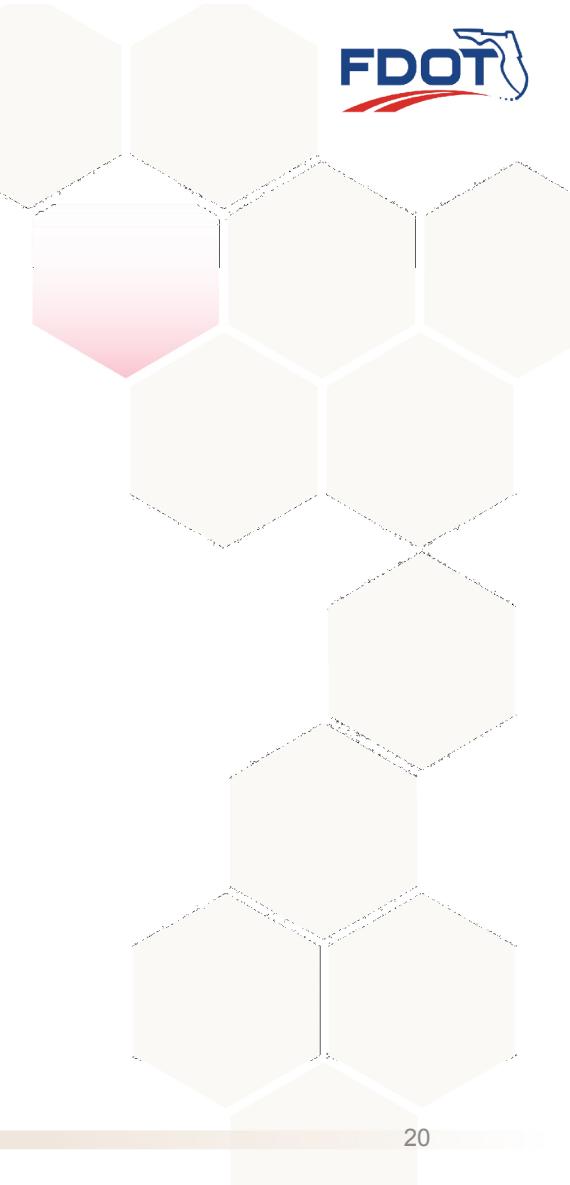
1	Build consensus with MPO members regarding how to account for ACES in project development and prioritization.
2	<p>Explore how best to implement new ACES-related infrastructure needs and standards into project planning, including such considerations as the need for:</p> <ul style="list-style-type: none"> <li>a. Increased road marking implementation and maintenance for machine vision (e.g. electronic lane markings that allow use of V2I to provide more accurate lane markings and to provide changing road lanes for work zones.)</li> <li>b. Increased pavement maintenance for safe automated vehicle operation</li> <li>c. Electric vehicle charging and related power generation and distribution systems</li> <li>d. Supplementary or supportive ITS investments</li> <li>e. Dedicated or priority lanes for exclusive use by ACES vehicles (intermittently or uniformly)</li> <li>f. Signal priority for ACES vehicles</li> <li>g. Parking access and priority for ACES vehicles</li> <li>h. Evaluation of future operations related to lane management and restrictions (truck platoons operating in the left lanes rather than the right lanes, for example), pick up zones for transportation network companies, etc.</li> <li>i. Other ACES-related needs as identified</li> <li>j. ACES-related impacts on non-transportation related programs (911, Meals on Wheels, Air Quality, etc.)</li> <li>k. Incorporate into existing or planned Complete Streets projects</li> </ul>
3	Incorporate ACES-related investments into already programmed TIP/STIP and fiscally constrained LRTP infrastructure plans and individual projects.



Source: [www.wonderfulengineering.com](http://www.wonderfulengineering.com)

# Travel Demand Modeling Efforts

- Model Scripting & Keys
  - Modify Terminal Times
  - Modify Capacities
  - Modify Mode Choice
- Demand Analysis
  - Testing 6 FHWA Alternatives on
    - GUATS
    - CFRPM



# Next steps and deliverables

- Distribute complete Guidance Document  
(July 2018)



# Questions and discussion



Source: Mercedes Benz  
(mbusa.com/mercedes/future/model/model-All\_New\_F015\_Luxury)



Source: Buick Avista Concept interior  
(http://st.motortrend.com/uploads/sites/5/2016/01/Buick-Avista-concept-interior-5.jpg)