

# MOTOR CARRIER

2017

# MOTOR CARRIER SYSTEM PLAN

JUNE 2017







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# 1. INTRODUCTION

## 1.1 MOTOR CARRIER SYSTEM PLAN PURPOSE

The Florida Department of Transportation (FDOT), along with many state departments of transportation nationwide, has historically interacted with motor carriers on only a few traditional aspects. Those aspects generally include:

- Asset protection – enforcing size and weight limits to protect Florida’s highway system and bridges from damage due to overweight vehicles
- Safety concerns – performing safety inspections and enforcing traffic laws in an effort to reduce the number of crashes related to commercial motor vehicles

During the development of the Freight Mobility and Trade Plan (FMTP),<sup>1</sup> several issues and opportunities were identified related to trucking. The purpose of Florida’s first Motor Carrier System Plan is to build on the success of the FMTP and look at addressing mobility and competitive advantage concerns specifically from a trucking point of view.

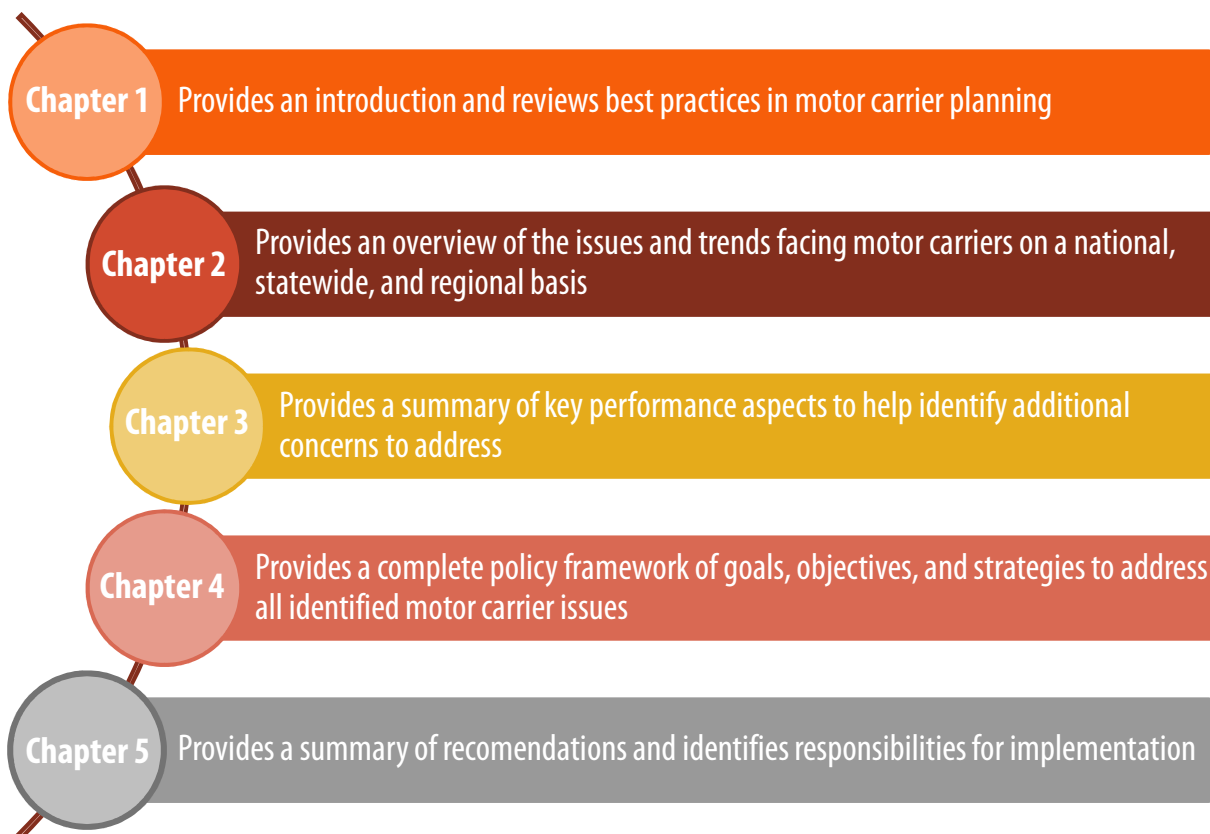
The Motor Carrier System Plan has no statutory requirements; however, development was specifically coordinated with other modal plans developed under the Freight, Logistics and Passenger Operations (FLP) Office at FDOT. Together, the full set of modal system plans provide FDOT with a cohesive planning process.

### 1.1.1 PLAN ORGANIZATION

As Florida’s first Motor Carrier System Plan, there is no set format or information to update. The plan begins by setting a foundation of critical issues to address that go beyond the traditional elements mentioned above. Key performance analyses complement the input from stakeholders to build a more complete picture of freight movements by truck in Florida. Once the key concerns and opportunities are identified, the plan moves into the strategies developed to address those issues. Finally, the plan concludes with some key recommendations and by assigning implementation roles to strategies. By holding all parties accountable, this plan will continue to have impacts for years to come.

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<sup>1</sup> *Freight Mobility and Trade Plan, Florida Department of Transportation, 2014*



## 1.2 RELATED PLANS AND RESOURCES

The Motor Carrier System Plan is a new concept for FDOT; however, the need to be consistent with Florida's latest planning efforts is always important. The following section highlights some key plans and initiatives relevant to the Motor Carrier System Plan that were considered as part of plan development.

### 1.2.1 FREIGHT MOBILITY AND TRADE PLAN (FMTP)

In 2010, the Florida Chamber Foundation and the Florida Department of Transportation (FDOT) collaborated on the Florida Trade and Logistics Study.<sup>2</sup> This study identified the Panama Canal expansion as an opportunity for Florida to transform its economy and advocated a call to action. The 2012 Florida Legislature echoed the freight vision for Florida and passed House Bill (HB) 599,<sup>3</sup> which called for the development of a FMTP. Later in 2012, the Federal Moving Ahead for Progress in the 21st Century Act (MAP-21) encouraged states to develop comprehensive freight plans.



The FMTP was developed and completed in two phases: the Policy Element and the Investment Element. The Policy Element identified objectives and strategies to guide freight efforts and identified responsibilities for implementation. The Investment Element identified freight needs, criteria for state

<sup>2</sup> <http://www.floridaleagueofcities.com/docs/default-source/International-Relations/2010-12-floridatradeandlogisticsstudy.pdf>

<sup>3</sup> <http://laws.flrules.org/2012/174>

investments in freight, and prioritized projects across modes. It was during the development of the multimodal FMTP that FDOT determined there was a need to address trucking/motor carrier initiatives in a separate plan.

#### FMTP Goals:

- Increasing the flow of domestic and international trade through the state’s seaports and airports, including specific policies and investments that will recapture cargo currently shipped through seaports and airports located outside the state
- Increasing the development of Intermodal Logistics Centers (ILCs) in the state, including specific strategies, policies, and investments that capitalize on the empty backhaul trucking and rail market in the state
- Increasing the development of manufacturing industries in the state, including specific policies and investments in transportation facilities that will promote the successful development and expansion of manufacturing facilities
- Increasing the implementation of compressed natural gas (CNG), liquefied natural gas (LNG), and propane energy policies that reduce transportation costs for businesses and residents located in the state

#### FMTP Objectives:

1. Capitalize on freight transportation advantages of Florida through collaboration on economic development, trade, and logistics
2. Increase operational efficiency of goods movement
3. Minimize costs in the supply chain
4. Align public and private efforts for trade and logistics
5. Raise awareness and support for freight movement investments
6. Develop a balanced transportation planning and investment model that considers and integrates all forms of transportation
7. Transform the FDOT’s organizational culture to include consideration of supply chain and freight movement issues

### 1.2.2 FLORIDA TRANSPORTATION PLAN (FTP) AND STRATEGIC INTERMODAL SYSTEM (SIS) POLICY PLAN UPDATE



The FTP is the statewide long-range transportation plan for all of Florida. It defines Florida’s future transportation vision and identifies goals, objectives, and strategies to accomplish that vision. All other planning efforts at FDOT aim to align with the FTP.

The FTP development centered on five types of questions:

- **Where have we been?** How has our transportation system changed during the past century?
- **Where are we today?** What does our transportation system look like now?

- **Where are we going?** What factors will shape future demand for transportation in Florida? What range of futures should Florida's transportation partners prepare to address?
- **Where do we want to go?** What are the desired outcomes for Florida's transportation system during the next 50 years?
- **How do we get there?** What emphasis areas should guide Florida's transportation partners in accomplishing this vision?

The Vision Element<sup>4</sup> provides a longer-term view of the major trends, uncertainties, opportunities, and desired outcomes shaping the future of Florida's transportation system over the next 50 years. The Policy Element<sup>5</sup> defines goals, objectives, and strategies for Florida's transportation future over the next 25 years. The Policy Element is the core of the FTP and provides guidance to state, regional, and local transportation partners in making transportation decisions. The Implementation Element will determine emphasis areas and key actions for the next 5-25 years. The goals set in the FTP are shown in **Figure 1-1**.

**Figure 1-1: Florida Transportation Plan Goals**



<sup>4</sup> Florida Transportation Plan Vision Element, Florida Department of Transportation, August 2015

<sup>5</sup> Florida Transportation Plan Policy Element, Florida Department of Transportation, December 2015

The Strategic Intermodal System (SIS) Policy Plan<sup>6</sup> identifies policies for planning and implementing Florida's SIS, the statewide high-priority network of transportation facilities critical to Florida's economic competitiveness. In 2015, FDOT updated both the FTP and the SIS Policy Plans.

Florida's Governor and Legislature established the SIS in 2003, to enhance Florida's economic competitiveness by focusing state resources on the transportation facilities most critical for statewide and interregional travel. The SIS includes the state's largest and most significant commercial service and general aviation airports, spaceports, public seaports, intermodal freight terminals, interregional passenger terminals, urban fixed guideway transit corridors, rail corridors, waterways, and highways. SIS facilities are very relevant to the Motor Carrier System Plan, as they account for a dominant share of the people and freight movement to, from, and within Florida.

SIS Policy Objectives:

- Ensure the efficiency and reliability of multimodal transportation connectivity between Florida's economic regions and between Florida and other states and nations
- Expand transportation choices and integrate modes for interregional trips
- Provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment

These SIS objectives also form the basis for three new SIS areas of emphasis: interregional connectivity, intermodal connectivity, and economic development. Success in meeting the SIS Policy objectives will depend on all modes of transportation.

### 1.2.3 FREIGHT ROADWAY DESIGN CONSIDERATIONS AND COMPLETE STREETS

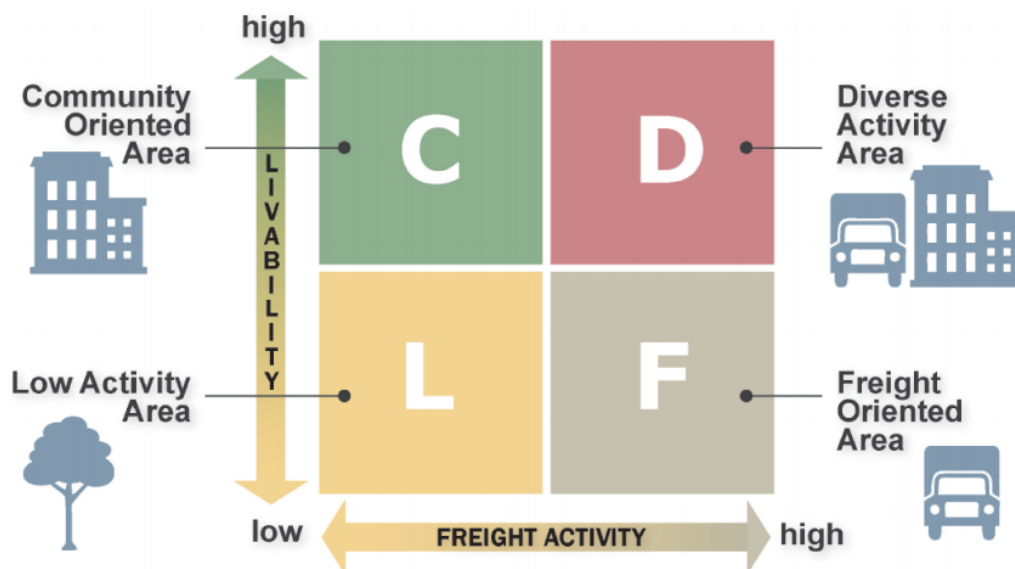
The Freight Roadway Design Considerations (FRDC) document was developed by FDOT District 7 in 2014, following the completion of their regional strategic freight plan. The Tampa Bay Regional Strategic Freight Plan<sup>7</sup> looked at options to improve freight mobility and to support economic development, as well as how to position the region to fund freight priorities. During development of the plan, FDOT District 7 determined that freight roadway design guidance was needed to help roadway designers and planners balance goods movement and livability.

One of the key aspects of the document is defining context. Context-sensitive design approaches help match appropriate design strategies to the level of goods movement and land use patterns. **(Figure 1-2)** Areas with higher densities or residential and employment centers could have an emphasis on livability, and other areas are characterized by higher levels of freight activity, such as industrial or distribution centers. Determining the context of a project is the first step in selecting appropriate roadway design.

<sup>6</sup> *Strategic Intermodal System (SIS) Policy Plan, Florida Department of Transportation, January 2016*

<sup>7</sup> *Tampa Bay Regional Strategic Freight Plan, Florida Department of Transportation District 7, 2012*

Figure 1-2: Defining Context Areas



The Context Areas of the Freight Roadway Design Considerations are described below:

- **Low Activity Areas** are characterized by land uses that generally would be compatible with freight mobility, but actual freight activity (truck traffic) in these areas is low. Therefore, these areas are not targeted for freight improvement strategies.
- **Community Oriented Areas** have low freight traffic and are characterized by medium- to high-density residential, office, and mixed uses that engender pedestrian, bicycle, and automotive traffic. Designing transportation facilities for these user groups generally impedes freight mobility, incorporating elements like fewer and narrower travel lanes, tight turn radii at intersections, and low travel speeds. Freight mobility strategies in these areas should be focused to a limited number of corridors that provide good freight accessibility to the area and limit impacts to other travel modes and the community character.
- **Freight Oriented Areas** have high levels of truck traffic and land uses that are supported by goods movement, such as industrial, commercial, and agricultural designations. These are areas where roads should generally be designed to facilitate truck movements, including design elements like wide travel lanes and wide turn radii at intersections. Implementing freight mobility improvements in these areas would likely have few, if any, negative sociocultural impacts. Indeed, such improvements generally would bolster the productivity of the industrial and commercial uses along the corridor.
- **Diverse Activity Areas** have elements of both community oriented and freight oriented areas. Freight activity is high in these areas, either in terms of truck traffic or industrial and commercial land uses (or both), but there are also fairly dense residential and/or office uses. In such areas, freight mobility improvements would warrant special consideration to accommodate trucks, emphasizing the primary role of the freight facility and catering to the needs of other users of the facility, including motorists, bicyclists, and pedestrians.

Another key aspect of the FRDC is the selection of appropriate design strategies. Once the roadway designer understands the project context, it is easier to select design criteria or specifications to address the actual project needs. This document is intended to serve as a companion to existing FDOT manuals and design guidance. The FRDC guides roadway designers and planners through key questions to capture how design elements can be combined into design strategies that affect the quality of service for different roadway users.

The FRDC is being incorporated into the FDOT Complete Streets effort to ensure freight considerations are part of the conversation when designing for all roadway users. The FDOT Complete Streets Policy<sup>8</sup> and new Complete Streets Implementation Plan<sup>9</sup> will help provide safer, context-sensitive roads by putting "the right street in the right place".



FDOT is in the process of revising the Department's Plans Preparation Manual (PPM)<sup>10</sup> to be replaced by the new FDOT Design Manual (FDM) which is scheduled to be published in 2018. The FDM will be a web-based manual consisting of three parts:

- Part 1 - Development and Processes
- Part 2 - Design Criteria
- Part 3 - Plans Production

Going forward, many chapters in the new FDOT Design Manual likely will refer roadway designers to appropriate sections of the Freight Roadway Design Considerations document to set context relevant to freight activity. These efforts are important to the Motor Carrier System Plan in that addressing context encourages roadway designers to consider freight impacts and users.

## 1.2.4 STRATEGIC HIGHWAY SAFETY PLAN

The Strategic Highway Safety Plan (SHSP)<sup>11</sup> was developed to address highway safety. The plan is the state's five-year comprehensive roadway safety plan for achieving Florida's vision of zero traffic-related fatalities. The SHSP includes 13 Emphasis Areas that guide Florida's safety efforts.

The SHSP update process included:

- Analysis of safety data collected to identify trends in the number of traffic fatalities and serious injuries and factors often associated with these events (**Figure 1-3**)



<sup>8</sup> Complete Streets Policy, Florida Department of Transportation, 2014

<http://www.flcompletestreets.com/000-625-017-a.pdf>

<sup>9</sup> Complete Streets Implementation Plan, Florida Department of Transportation, 2015

<http://www.flcompletestreets.com/CSIPlan.shtm>

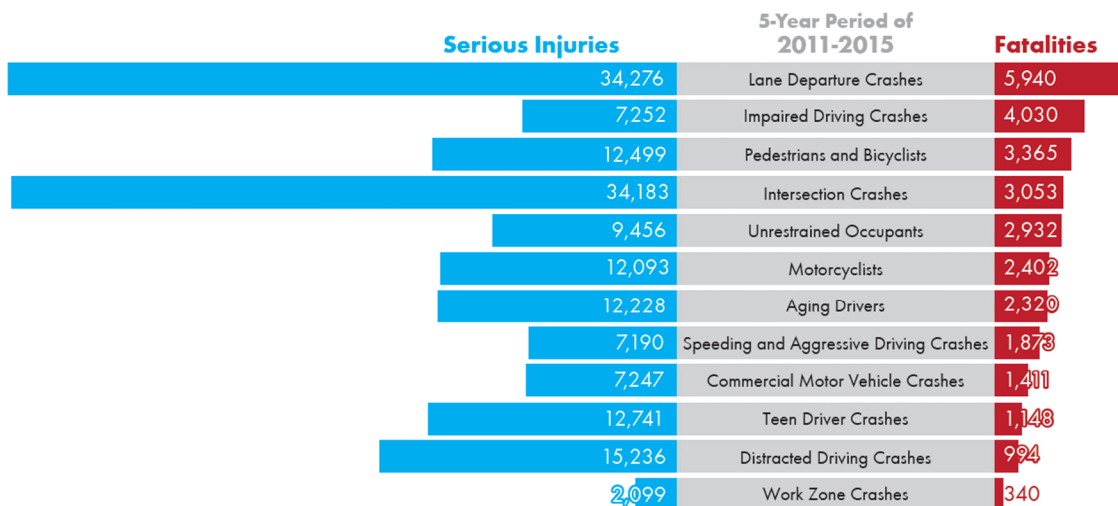
<sup>10</sup> Plans Preparation Manual, Florida Department of Transportation, 2016 <http://www.fdot.gov/roadway/ppmanual/ppm.shtm>

<sup>11</sup> Strategic Highway Safety Plan, Florida Department of Transportation, 2016

[http://www.fdot.gov/safety/SHSP2012/FDOT\\_2016SHSP\\_Final.pdf](http://www.fdot.gov/safety/SHSP2012/FDOT_2016SHSP_Final.pdf)

- Highlighted several safety issues of concern to the public, including bicycle and pedestrian safety, commercial vehicles, the impacts of changing technologies, and the role of design and operational decisions in creating a safe environment
- Consideration of extensive partner and public input, as well as coordination with eight strategic safety coalitions and Florida's 27 Metropolitan Planning Organizations (MPOs)

**Figure 1-3: Crash Data Associated with Emphasis Areas**



Note: Multiple factors are involved in almost every crash.

Source: Department of Highway Safety and Motor Vehicles (2016).

*Strategic Highway Safety Plan, Florida Department of Transportation, 2016*

The SHSP identified key trends, including several related to goods movement. The plan noted that technology is changing how we move, and that there are associated safety impacts. Freight growth also means more trucks on Florida's roadways, with growth projected to continue in the future. Likely in part due to these trends, the SHSP identified Commercial Motor Vehicle Crashes as a new Emphasis Area. These represent the primary focus for Florida's traffic safety improvement efforts for the next five years.

Safety coalitions are developed to address each of the Emphasis Areas. They are charged to build strategic plans that identify targeted strategies and actions to reduce fatalities and serious injuries. Strategies recommended by the SHSP to address Commercial Motor Vehicle Crashes include:

- Conduct targeted enforcement for violations in high crash locations associated with commercial vehicles
- Use public awareness program, outreach efforts, and social media to increase motorist awareness of safe driving around commercial vehicles
- Collaborate with the trucking and bus industry on programs and initiatives to improve safety and reduce crashes

Like the plans mentioned earlier in the chapter, the Strategic Highway Safety Plan provides key insights, opportunities, needs, and strategies to consider in the development of Florida's first Motor Carrier System Plan.



## 1.3 SUMMARY OF BEST PRACTICES IN MOTOR CARRIER PLANNING

As mentioned previously, FDOT determined a Motor Carrier System Plan was needed to move beyond asset protection and safety to truly addressing truck mobility in Florida. This was a new concept for FDOT; therefore, the first step was to review best practices in motor carrier planning to determine what makes sense for Florida to pursue.

### 1.3.1 RECENT FEDERAL LEGISLATION RELATED TO MOTOR CARRIER PLANNING

Historically, planning is the responsibility of the public asset owner, which requires the inclusion of public input and system performance oversight. MPOs, although not asset owners, have planning responsibility to identify local improvement and system conditions. Together, plans at several levels address transportation improvement needs and investments.

The MAP-21 was signed into law in 2012.<sup>12</sup> This Federal legislation provided funding for surface transportation programs and established a National Freight Policy and a National Freight Network. It also encouraged states to prepare a comprehensive plan for immediate and long-range freight related planning and investment within three years of legislation.

In December of 2015, the FAST ACT (Fixing America's Surface Transportation Act) was enacted.<sup>13</sup> This legislation continues the MAP-21 focus on freight and provides multi-year funding.

Key highway freight provisions in the FAST Act:

- Adds a new freight formula funding program (National Highway Freight Program)
- Adds a new discretionary program to fund nationally significant freight and highway projects - Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE Grants)
- Expands the freight network
- Continues focus on accelerating project delivery

#### National Highway Freight Program

Generally, National Highway Freight Program (NHFP) funds must contribute to the efficient movement of freight on the National Highway Freight Network (NHFN) and be identified as freight investments in the State's freight plan (required in Fiscal Year 2018 and beyond).<sup>14</sup> In addition, a state may not allocate more than 10 percent of its total NHFP apportionment each year for freight intermodal or freight rail projects.<sup>15</sup>

Of the 25 eligible project types for which the FAST Act provides federal funding, only about half of the project types relate to state-owned infrastructure or systems. The other project types address technology or other related effort. Federal legislation tends to focus on publicly owned assets, not the behavior of private

<sup>12</sup> Public Law 112-141

<https://www.gpo.gov/fdsys/pkg/PLAW-112publ141/pdf/PLAW-112publ141.pdf>

<sup>13</sup> Public Law 114-94

<https://www.gpo.gov/fdsys/pkg/PLAW-114publ94/pdf/PLAW-114publ94.pdf>

<sup>14</sup> 23 U.S.C. 167 (i)(5)(A)

<sup>15</sup> 23 U.S.C. 167 (i)(5)(B)

sector operators. One of the major themes of the FAST Act was additional flexibility, and this is reflected in the variety of ways to address the efficient movement of freight.

The FAST Act included a provision that requires each State that receives funding under the National Highway Freight Program to develop a State Freight Plan that provides a comprehensive plan for the immediate and long-range planning activities and investments of the State with respect to freight. The United States Department of Transportation (US DOT) released Guidance on State Freight Plans and State Freight Advisory Committees in October 2016.<sup>16</sup> As of fall 2016, many State Freight Plans have been completed or are nearing completion.<sup>17</sup> Both MAP-21 and the FAST Act encourage states to establish a State Freight Advisory Committee. The Florida Freight Transportation Advisory Committee has been established in Florida.

### FASTLANE grants (Nationally Significant Freight and Highway Projects)

In addition to the new formula freight program, the FAST Act also establishes a discretionary competitive grant program of \$4.5 billion over five years to provide financial assistance to nationally and regionally significant highway, rail, port, and intermodal freight and highway projects. US DOT refers to this program as “FASTLANE” grants.

Under the program, States, large MPOs, Tribes, Localities, and Federal land management agencies may apply for grants for projects which generally must have a total cost of at least \$100 million. Each year, a minimum amount of funds must be used for rural projects (25 percent) and projects under the \$100 million cost threshold (10 percent).<sup>18</sup>

### National Highway Freight Network (NHFN)

The FAST Act requires the Federal Highway Administration (FHWA) to establish a National Highway Freight Network, to include the Primary Highway Freight System (PHFS), critical rural and urban freight corridors (as designated by the States, and in some cases, by MPOs), and the portions of the Interstate System not included in the PHFS (see **Figure 1-4**). After the initial designation, FHWA must re-designate the PHFS every five years, with up to three percent growth each time.<sup>19</sup>

<sup>16</sup> *Guidance on State Freight Plans and State Freight Advisory Committees* <https://www.gpo.gov/fdsys/pkg/FR-2016-10-14/pdf/2016-24862.pdf>

<sup>17</sup> *Federal Highway Administration (FHWA)* [http://ops.fhwa.dot.gov/Freight/freight\\_analysis/state\\_info/index.htm](http://ops.fhwa.dot.gov/Freight/freight_analysis/state_info/index.htm)

<sup>18</sup> <https://www.fhwa.dot.gov/fastact/summary.cfm>

<sup>19</sup> <https://www.fhwa.dot.gov/fastact/summary.cfm>

Figure 1-4: National Highway Freight Network



Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations

### 1.3.2 STATE ACTIVITIES RELATED TO MOTOR CARRIER PLANNING

At the state level, trucks represent an infrastructure component (facility needs) and a service or operational aspect (permits and enforcement). While examples of motor carrier system planning were sparse, it is anticipated that transportation planning agencies will increasingly see the importance of understanding the user perspective.

To comply with MAP-21, most states have initiated statewide freight planning, and this will likely continue under the FAST Act. Generally, most states have not recognized the need to develop a separate motor

carrier or trucking plan. However, several states have or are currently engaged in planning studies or efforts that are motor carrier related:

- Utah completed its first freight plan in November 2015, the Utah Freight Plan, for compliance with the MAP-21.<sup>20</sup>
- Wisconsin DOT recently undertook a facilities study which included weigh stations, truck parking facilities, and gateways for entry. While not devoted solely to trucks, the study will identify and analyze public truck parking sites and facilities used for other purposes than simply highway transportation.<sup>21</sup>
- Minnesota conducted a study focused on business revenue volumes along corridors. This corridor analysis resulted in identifying the need and, subsequently, designating a super heavy haul network of corridors to support the movement of wind energy and heavy haul commodities within the state.<sup>22</sup>
- Washington State has identified specific truck projects in their State Freight Plan.<sup>23</sup>
- Maryland completed their Strategic Goods Movement Plan which views motor carrier movement as a partnership between public and private sector freight system owners and users.<sup>24</sup>
- Maine, Massachusetts, New Hampshire, Vermont and Rhode Island established a multi-state permit to facilitate commerce.<sup>25</sup>
- New York State is in the process of establishing a single portal for all oversize overweight permits in the state to include New York City clearances and restrictions.
- Pennsylvania also is exploring automated multijurisdictional truck permitting. At the State level, most interest has been aimed at streamlining the truck permit system.

### 1.3.3 METROPOLITAN PLANNING ORGANIZATION (MPO) ACTIVITIES RELATED TO MOTOR CARRIER PLANNING

Established in the early 1970's through Federal legislation, MPOs have policy making authority for transportation projects and programs. MPOs cooperate with State and public transportation operators to set spending levels for Federal funds which support transportation projects. MPOs typically do not own or operate transportation systems that they serve. MPOs generally address:

<sup>20</sup> UDOT Freight Planning Section: <http://www.udot.utah.gov/main/f?p=100:pg:0:::V,T,4368>

<sup>21</sup> <http://wisconsin.dot.gov/Pages/about-wisdot/newsroom/news-rel/207a-co-stoc.aspx>

<sup>22</sup> Western Minnesota Regional Freight Study, 2009  
<http://www.dot.state.mn.us/ofrw/PDF/westernmnfreightstudy.pdf>

<sup>23</sup> Washington State Freight Mobility Plan, 2014  
<http://www.wsdot.wa.gov/NR/rdonlyres/4AB1DCDE-5C29-4F08-B5E7-697F432C34D7/0/2014WashingtonStateFreightMobilityPlan.pdf>

<sup>24</sup> Maryland Strategic Goods Movement Plan, 2015  
<http://www.mdot.maryland.gov/newMDOT/Freight/Documents/Strategic%20Goods%20Movement%20Plan.pdf>

<sup>25</sup> [www.maine.gov/sos/cec/rules/29/250/250c155.doc](http://www.maine.gov/sos/cec/rules/29/250/250c155.doc)

- Regional decision making
- Transportation improvement options
- Prepare and maintain a Long-Range Transportation Plan (LRTP)
- Develop their component of the Transportation Improvement Program (TIP)
- Performance measure targets
- Encourage public engagement

Trucks play an extensive role in freight movement due to their speed and flexibility to move freight. The American Trucking Association (ATA) has a slogan “If you bought it, a Truck brought it” which exemplifies the importance of local truck transportation in our global supply chain. Below is a sampling of MPO planning efforts related to motor carrier and trucking.

- The Southern California Association of Governments (SCAG) has developed studies of their freight system, but has not studied trucking needs. When surveyed, SCAG reported that they have a goods movement component in their regional transportation plan. They conduct numerous corridor level studies focused on truck traffic, truck bottleneck analyses, and regional freight plans, but they do not have a standalone motor carrier plan.<sup>26</sup>
- The Chicago Metropolitan Agency for Planning (CMAP) is currently addressing the streamlining and simplification of truck permits across 284 individual units of government to improve commercial vehicle truck movement. A private sector stakeholder group is in the early stages of identifying a group of motor carrier projects which might be tagged “Create for Trucks”. This could become a system of truck routes which would improve resiliency and reduce congestion. In addition, the Illinois Tollway recently completed the Commercial Vehicle Strategic Plan (Jan 2015) to better understand the needs of the trucking industry.
- The Atlanta Regional Commission (ARC) developed their Atlanta Regional Freight Mobility plan in 2008, which noted a need for additional study on truck routing and operations. The Atlanta Strategic Truck Route Master Plan included a thorough analysis of truck traffic and identified routes which were physically compatible to accommodate truck traffic. A Regional Strategic Truck Route Network was identified, and a list of projects to improve mobility were included.<sup>27</sup>
- The Delaware Valley Regional Planning Commission (DVRPC) which encompasses the greater Philadelphia metro area has expanded their Philly Freight Finder highway-performance mapping software to highlight truck movements with a travel time index to help avoid congested routes.<sup>28</sup>
- The Houston-Galveston Area Council (H-GAC) regularly experiences large volumes of petrochemicals moving to facilities across the region. In response to hazardous material movement concerns, 38 corridors have been designated for these highly sensitive and hazardous freight movements in their Regional Goods Movement Plan.<sup>29</sup> The MPO also has identified evacuation routes and critical freight corridors for emergency use. The MPO also is part of a zero-emission

<sup>26</sup> <https://www.scag.ca.gov/>

<sup>27</sup> Atlanta Strategic Truck Route Master Plan (ASTRoMaP)  
<http://www.atlantaregional.com/transportation/freight#astromap>

<sup>28</sup> <http://www.dvrpc.org/webmaps/phillyfreightfinder/#map>

<sup>29</sup> Houston-Galveston Area Council Regional Goods Movement Plan, 2013  
<http://www.h-gac.com/taq/freight-planning/documents/HGAC-regional-goods-movement-plan-12-05-13.pdf>

cargo transport program which supports fuel diversity, alternative fuel use, and voluntary idle reduction campaigns.

- The Arrowhead Regional Development Commission (ARDC) Duluth-Superior Metropolitan Interstate Council identified the need for bi-state permits to enhance administrative efficiency of oversize overweight shipments to and from the port area and to support gross vehicle weight harmonization between neighboring states. These interests led to an initiative to streamline and harmonize truck permits between Wisconsin and Minnesota.<sup>30</sup>

These examples illustrate that many MPOs focus on the infrastructure and routes used rather than addressing motor carrier issues and needs from a trucking/user perspective.

### 1.3.4 POTENTIAL MOTOR CARRIER PLANNING ACTIVITIES

Based on best practices at the State and Local level, potential planning activities to support Florida's Motor Carrier System Plan could include:

- Truck restrictions such as peak period bans, route diversions, noise ordinances, delivery curfews in suburbs, and hazardous material route restrictions as potential context sensitive approaches
- Resiliency – a reconciliation of the Strategic Highway Network. Evacuation Corridors and an inventory of critical cargo assets
- Road design and construction changes for designated heavy haul corridors, improved entry and exit ramps, merges, and capacity and safety improvements
- Road pricing changes such as off-peak and peak period tolls
- Fleet management changes, such as automatic vehicle location and routing sensors, voluntary off-peak operations, driver training and management
- Intelligent transportation data collection and dynamic communication
- Traffic engineering improvements such as lane design restrictions, wider lanes, variable message signs, and speed restrictions
- Public drop lots/depots to support empty container repositioning and congestion mitigation
- Shipper and receiver actions such as voluntary and mandatory off-peak operations, anti-idle zones and delivery curfews
- Incident management changes such as automated detection and site surveillance
- Inspection and enforcement changes such as automated surveillance and inspection enforcement
- Alternative fuel distribution and a focus on air quality improvements
- Information management improvements such as highway advisory, parking and traffic updates

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<sup>30</sup> <http://www.dsmic.org/>

- Parking capacity improvements
- Outreach programs

The following chapter will expand upon these various potential components and describe their relationship to the issues identified by stakeholders engaged in the development of Florida's Motor Carrier System Plan.

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## 2. ISSUES & TRENDS

### 2.1 ISSUES IDENTIFICATION PROCESS

As noted in **Chapter 1**, several issues and opportunities related to trucking were identified during the development of the FMTP. Taking the next step to thoroughly review and identify critical issues for motor carriers was an important early step in the process of developing the first Motor Carrier System Plan. By identifying the key issues first, FDOT had the guidance needed to craft appropriate strategies to address those issues. This chapter provides an examination of issues and trends facing the motor carrier industry nationwide and in Florida.

The 17 critical issues detailed below were identified through stakeholder outreach, research conducted in support of this planning effort, and from industry advocates such as the American Transportation Research Institute (ATRI). FDOT started with the top 10 issues identified in ATRI's 2015 annual publication of critical issues in the trucking industry.<sup>31</sup> This captured the national perspective of current motor carrier issues. By combining the top 10 ATRI issues with trucking issues identified in the FMTP, FDOT was able to develop a clearer picture of the trucking issues most important to Florida. These issues then were presented to a group of FDOT and industry stakeholders, the Motor Carrier Working Group, for review, and they suggested three additional issues to include in the Plan.

FDOT acknowledged early in the process that it may have limited ability to address some of the critical issues identified. For example, several issues identified in the ATRI survey relate to Federal regulations that FDOT cannot impact directly. Regardless of the limitations, FDOT wanted to take a comprehensive approach to determine what could be addressed that is beyond the scope of what has traditionally been done to improve goods movement on Florida's roadways.

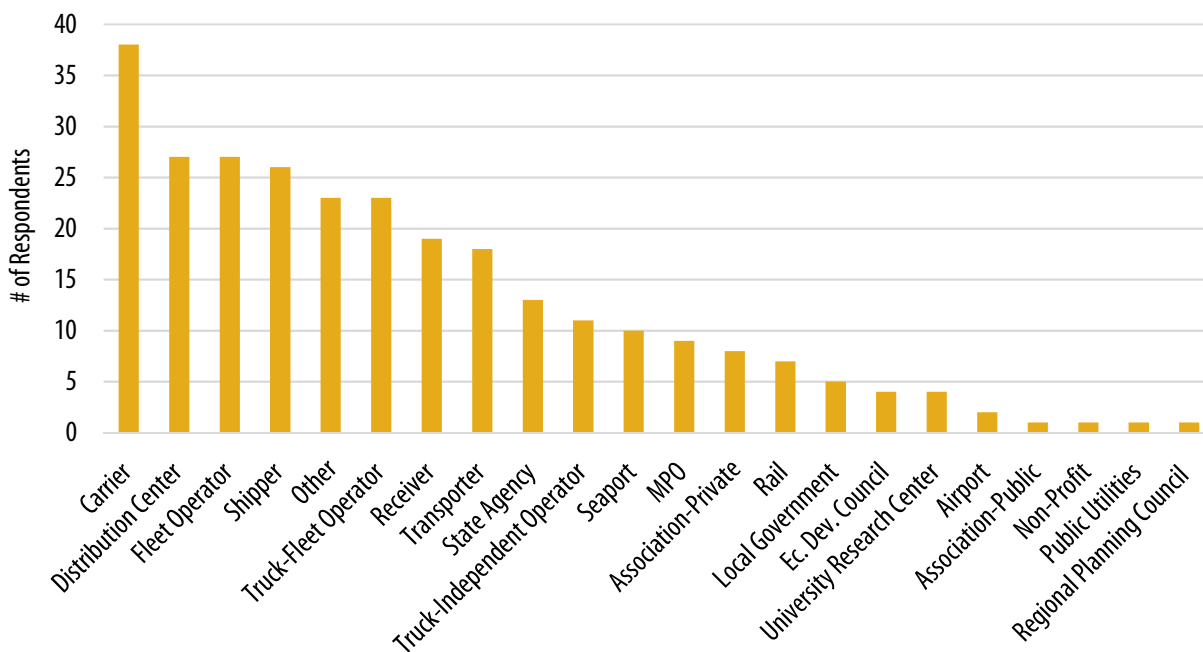
### 2.2 CRITICAL ISSUES SURVEY

To gather input from a variety of key stakeholders, FDOT developed a Motor Carrier Critical Issues Survey. Participants were asked to identify the perspective they represented, including categories such as shippers, carriers, MPOs, State Agency, etc. As shown in **Figure 2-1**, there were 144 participants with a good mix of respondent perspectives mostly due to the pro-active cooperation of the Florida Trucking Association. Their partnership during the development of the Plan was essential to gathering industry input.

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<sup>31</sup> *Critical Issues in the Trucking Industry*, American Transportation Research Institute (ATRI), October 2015  
<http://atri-online.org/2015/10/18/critical-issues-in-the-trucking-industry-2015/>

**Figure 2-1: Critical Issues Survey Respondents**



The survey listed all 17 critical issues identified so far, with links to Fact Sheets on each issue to provide background. These Fact Sheets are available in the **Appendix**.

Participants were then asked to:

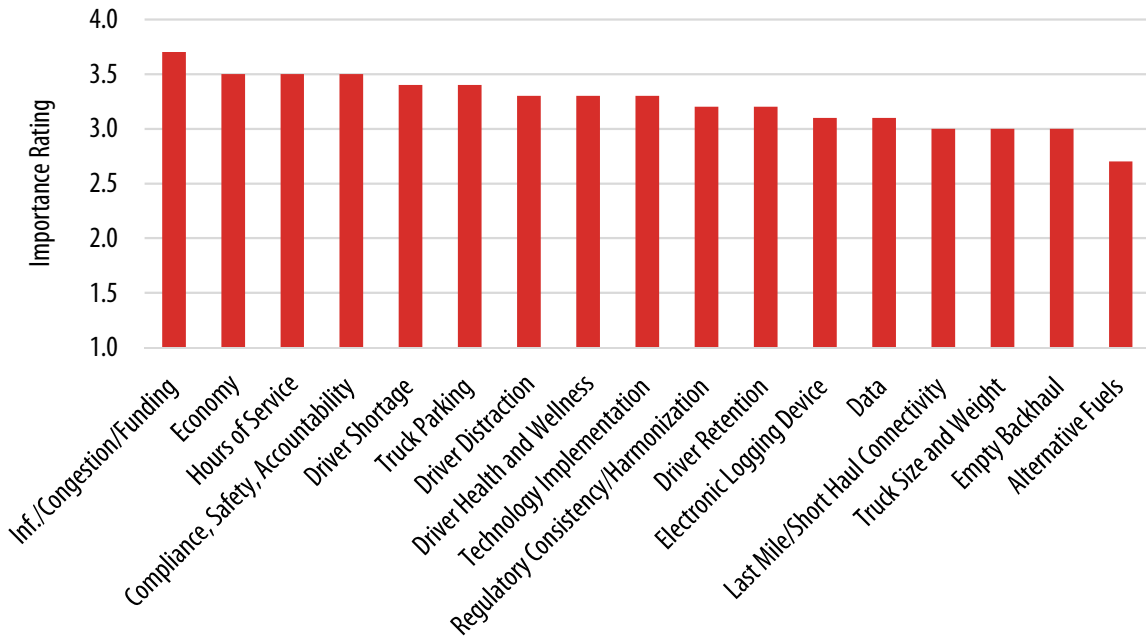
- Review and rate the importance of each issue identified to date
- Provide suggestions for any potential actions to address each issue
- Identify any additional issues to consider going forward

Ratings ranged from 2.7 to 3.7 out of a possible score of 4, with 4 meaning “Very Important” and 1 meaning “Not Important”. **Figure 2-2** shows the breakdown of importance scores for each critical issue. Ratings were all fairly close – so no issue stood out as an absolute priority to address or remove. Based on how much the comments overlapped, it also highlighted how many of the identified issues are deeply intertwined with each other.

The Infrastructure/Congestion/Funding issue was identified as the most important to respondents, which fortunately FDOT has a greater ability to impact than many of the other issues. The alternative fuels issue received the lowest importance rating of the 17, likely due to the current low price of diesel fuel. Should the price rise steeply again, implementation of alternative fuel options may become more of a concern in the future.

In addition to importance ratings, comments received as part of the survey were used to craft many of the draft Goals, Objectives, and Strategies that were later refined into the final version available in **Chapter 4**. FDOT received at least three suggestions from stakeholders for every issue, and over 20 ideas for many of the issues. This participation should provide certainty that all identified issues were addressed in the Plan. For more information regarding the Critical Issues Survey and the survey results, visit the Motor Carrier System Plan site at: <http://www.fdot.gov/rail/publications.shtm>.

**Figure 2-2: Highest Rated Issues**



## 2.3 IDENTIFIED MOTOR CARRIER ISSUE DETAILS

A greater understanding of these issues, including their causes and potential solutions, was key to guiding FDOT motor carrier related policy direction. This section goes into more detail on each of the issues identified in the 17 Fact Sheets, as they were intended only to familiarize stakeholders with key concepts before they provided feedback. This section addresses each issue more thoroughly to capture all aspects identified during the entire Plan development process.

### 2.3.1 HOURS OF SERVICE

Hours of Service regulations are one of the biggest issues currently facing the motor carrier industry. In 2015, Hours of Service topped ATRI’s list of Critical Issues in the Trucking Industry for the third year in a row.<sup>32</sup> These regulations impact all aspects of the industry from driver job satisfaction to company profits, and ultimately safety.

Hours of Service regulations are issued by the Federal Motor Carrier Safety Administration (FMCSA) and govern the number of hours an individual can operate a commercial motor vehicle in the United States before coming off duty. These regulations were created as a safety measure to eliminate the practice of driving while drowsy or fatigued. Fatigue is credited as one of the primary causes of crashes involving Commercial Motor Vehicles (CMVs).



<sup>32</sup> *Critical Issues in the Trucking Industry*, American Transportation Research Institute (ATRI), October 2015  
<http://atri-online.org/2015/10/18/hours-of-service-back-for-third-year-in-a-row-as-top-concern-in-annual-trucking-industry-survey/>

Three main factors which contribute to driver fatigue include circadian rhythm (sleep patterns), sleep deprivation, and cumulative fatigue effects. Hours of Service (HOS) are enforced by Department of Transportation officers in each state. **Table 2-1** shows driver related factors in fatal crashes involving heavy trucks during 2012. The data indicates that driver impairment is the fourth highest factor in these crashes and that asleep or fatigued drivers make up the largest segment of impaired drivers.

**Table 2-1: Driver Related and Driver Impairment Factors in Fatal Heavy Truck Crashes**

Driver Related Factor	Single Vehicle Crash		Multi Vehicle Crash		Total	
	#	%	#	%	#	%
<b>Speeding Related</b>	94	13.1%	198	6.5%	292	7.8%
<b>Distraction/ Inattention (Cell Phone, Lost In Thought, Eating, Etc.)</b>	86	12.0%	156	5.1%	242	6.4%
<b>Failure to Yield Row</b>	34	4.7%	130	4.3%	164	4.4%
<b>Impairment (Fatigue, Alcohol, Illness, Etc.)</b>	75	10.4%	75	2.5%	150	4.0%
<b>Driver Impairment Related Factors</b>						
<b>Asleep or Fatigued</b>	40	5.6%	23	0.8%	63	1.7%
<b>Under the Influence of Alcohol, Drugs, or Medication</b>	21	2.9%	37	1.2%	58	1.5%
<b>Illness, Blackout</b>	9	1.3%	10	0.3%	19	0.5%

*Source: Large Truck and Bus Crash Facts 2012, Federal Motor Carrier Safety Administration, June 2014*

FMCSA regulations (Title 49, CFR, Part 395) contain subparts which stipulate the provisions for maximum driver time for cargo vehicles (395.3); Records of duty status (395.8); Off-duty status (395.13); and Automated recording devices (395.15).

As of December 2015, the FMCSA Hours of Service regulations limit driving time to 11 hours, with a maximum on-duty time of 14 hours. Off-duty time minimum must be 10 hours within a minimum duty cycle of 21 hours. A maximum of eight hours may be worked before a 30-minute rest break. A 34-hour restart provision is required per consecutive seven-day period.<sup>33</sup>

Florida Statute 316.302 contains the intrastate Hours of Service regulations. These state regulations are less restrictive and allow extended driving times under certain conditions. Florida forfeits a portion of the Motor Carrier Safety Assistance Program funding because of these exceptions.

The FMCSA estimates that the restart provision will primarily impact 15 percent of the 1.6 million truck drivers with the most intensive driving schedules. The Agency estimates the benefits of the new safety rules will result in saving 19 lives and will prevent approximately 1,400 crashes and 560 injuries annually.<sup>34</sup>

Companies and drivers that commit egregious violations of the rule could face the maximum penalties for each offense. Trucking companies that allow drivers to exceed the 11-hour driving limit by three or more hours could be fined \$11,000 per offense, and the drivers themselves could face civil penalties of up to \$2,750 for each offense.

Due to the loss of driver productivity, carriers have responded with rate increases in the range of 3-9 percent depending upon the type of carriers' service (long haul, short haul, intercity, or dedicated/contract

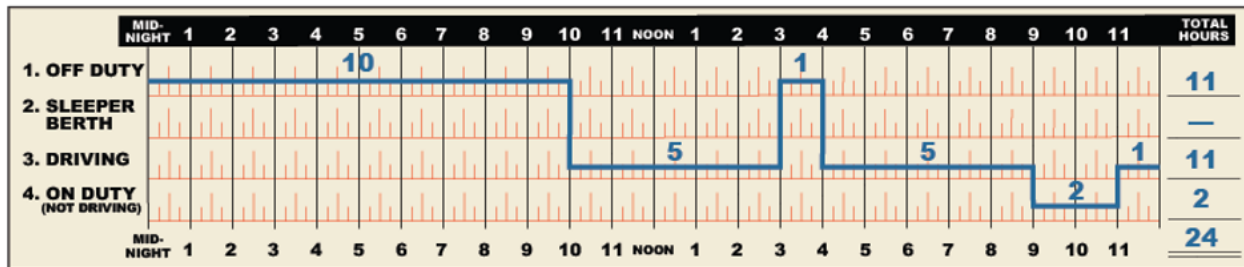
<sup>33</sup> <https://www.fmcsa.dot.gov/regulations/title49/section/395.1>

<sup>34</sup> <https://www.fmcsa.dot.gov/newsroom/statement-fmcsa-administrator-anne-s-ferro-house-transportation-and-infrastructure-0>

rates). Carriers were not able to pass rate increases down to all customers and have moved 3-4 percent of their business to intermodal rail where service exists.

Driver hours are recorded in a log book by location and must identify any change in duty status. Drivers are required to keep a log page for each of the previous seven consecutive days. There are exceptions to these rules which allow for special circumstances or operating territories. It is estimated that a large percentage of log books contain some errors which has led the industry to adopt electronic logging devices (ELDs). **Figure 2-3** provides an example of a driver’s HOS log book. The blue line represents the number of hours a driver spent in each duty status.

**Figure 2-3: Example of a Driver HOS Log Book**



Source: Federal Motor Carrier Safety Administration, 2015

In Fiscal Year 2015, FDOT completed 67,000 driver inspections: 18,000 violations were found. The number one violation in Florida was log book reporting violations which range from: 1) did not have their log book and 2) HOS violations.

The HOS regulations issue is not unique to the United States. Efforts to understand the severity of the problem and provide solutions are taking place in other countries.

For example, the government of Australia passed heavy vehicle driver fatigue reform legislation in 2008 aimed at addressing the issue. The legislation is similar to FMCSA Hours of Service regulations in that it regulates work and rest hours and requires the use of work diaries to track compliance by drivers.

One of the leading insurers of heavy trucks in Australia, National Transport Insurance, provides leading research on truck accidents through its National Truck Accident Research Centre. This Center is involved in conducting truck accident research and publishing an annual major accident investigation report. The most recent report published in 2015, reviewed 549 truck involved crashes reported during the year 2013, and found that 13 percent of the crashes were attributable to driver fatigue. This is a substantial decline from a high of 20 percent of crashes attributable to fatigue in 2007.<sup>35</sup>

### 2.3.2 COMPLIANCE, SAFETY AND ACCOUNTABILITY (CSA)

Compliance, Safety, Accountability (CSA) is a Federal Motor Carrier Safety Administration (FMCSA) initiative to improve large truck and bus safety and ultimately reduce crashes, injuries, and fatalities that are related to commercial motor vehicles. The program was established in 2010, and provides an enforcement and

<sup>35</sup> Major Accident Investigation Report, NTI, National Truck Accident Research Centre, 2015 <http://www.nti.com.au/>  
 Australian National Heavy Vehicle Regulator (NHVR)  
<https://www.nhvr.gov.au/law-policies/heavy-vehicle-national-law-and-regulations>

compliance model that allows FMCSA and its state partners, to proactively contact a larger number of carriers in order to address safety problems before crashes occur.

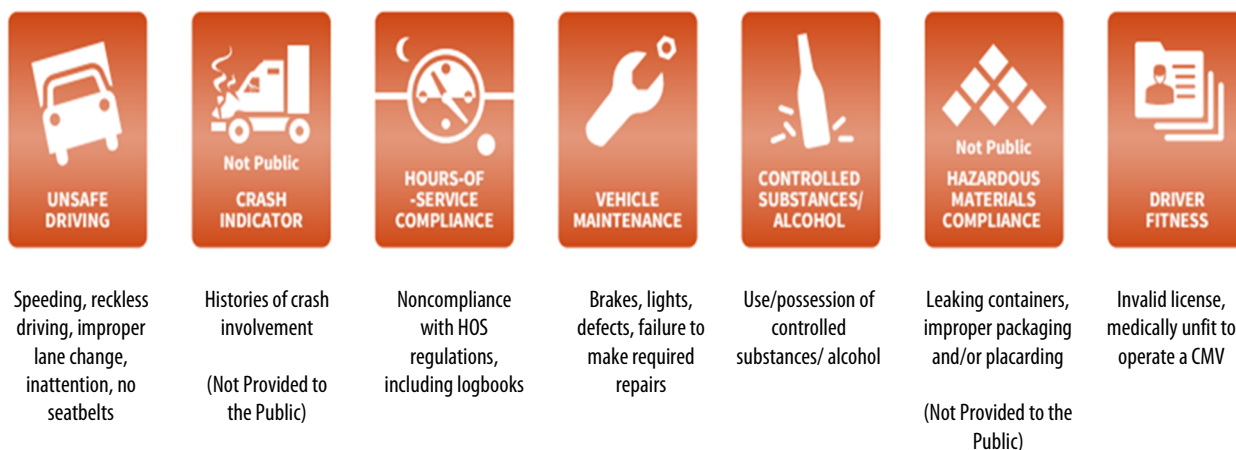
CSA is an important issue for the motor carrier industry due to concerns with the type of data collected and its subsequent use in determining a driver’s safety score. A driver’s individual safety score can greatly impact their ability to get hired and insured. There are also concerns regarding consistency of data across states and driver privacy. The recent “FAST” Act has made some important changes to public access of this data.

There are three core components of the program: 1) The Safety Measurement System (SMS), 2) The Safety Interventions Process (SIP), and 3) The Proposed Safety Fitness Determination (SFD).

### The Safety Management System (SMS)

The SMS system analyzes data collected from roadside inspections, including all violations and investigation and crash reports for the last two years to prioritize carriers for interventions. Data collected is organized into seven Behavior Analysis and Safety Improvement Categories (BASICS). See **Figure 2-4** for an overview of each type of data.

**Figure 2-4: The Seven BASICS of Safety**



Source: Federal Motor Carrier Safety Administration, 2015

The SMS system calculates a quantifiable measure of a motor carrier’s performance and ranks each carrier based on their BASIC measure (higher scores indicate worse performance). The SMS system has been considered effective in helping the Agency identify high crash-risk carriers for interventions. The FAST Act passed in December 2015 removes carrier specific scores from public view.<sup>36</sup>

### The Safety Intervention Process (SIP)

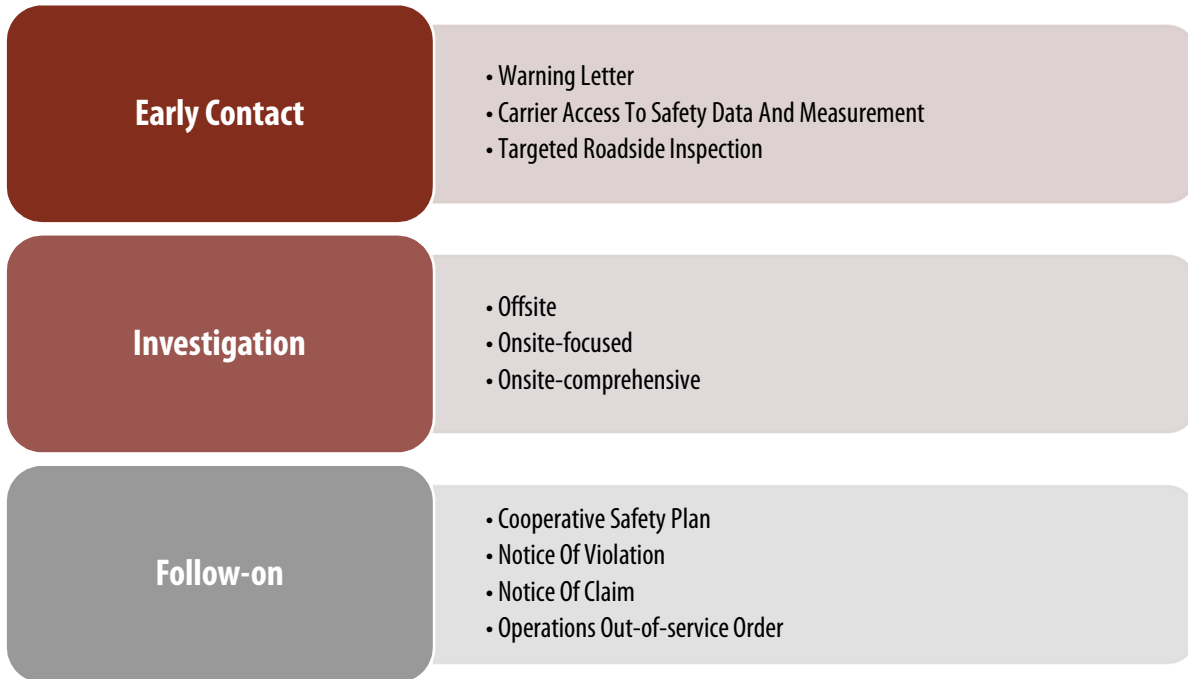
The second core component focuses on intervention, which is an enforcement action that may be taken when a carrier’s safety performance data indicate a potential safety risk. Intervention options of the FMSCA range from early warning letters to ordering a carrier to cease operations. An FMCSA intervention evaluates why safety problems occur, recommends remedies, encourages corrective action, and when necessary,

<sup>36</sup> <https://csa.fmcsa.dot.gov/documents/smsmethodology.pdf>

invokes strong penalties for carriers failing to comply. Intervention strategies are grouped into three categories of early contact, investigation, and follow-on.<sup>37</sup>

**Figure 2-5**, shows potential specific actions that may be taken by the FMCSA as intervention strategies in each category.

**Figure 2-5: Intervention Categories and Corresponding Specific Actions**



*Source: Federal Motor Carrier Safety Administration, 2015*

### Proposed Safety Fitness Determination Process (SFD)

The third component is a safety fitness determination process proposed to replace the current safety rating process. The current process (in use since 1982) is a three-tier federal rating system that assigns ratings of “satisfactory-conditional-unsatisfactory” to federally regulated motor carriers.

On January 15, 2016, the FMCSA published the proposed rule implementing the safety fitness determination process. The proposed rule updates FMCSA’s safety fitness rating methodology by integrating on-road safety data from inspections with the results of carrier investigations and crash reports. Under the proposed rule, the resulting fitness rating will be used to determine a motor carrier’s overall safety fitness on a monthly basis. A single determination of fit or unfit will replace the current three-tier system, with an unfit determination requiring a carrier to take immediate action to improve performance or cease operations. The initial comment period for the proposed rule ended May 23, 2016, but there has been no update on their website.<sup>38</sup>

<sup>37</sup> <https://csa.fmcsa.dot.gov/about/Interventions.aspx>

<sup>38</sup> <https://csa.fmcsa.dot.gov/About/Evaluate>

## Evaluating the CSA

Two years after the initial implementation of CSA, the FMCSA Administrator cites a 167 percent increase in website traffic, an 8 percent decline in equipment violations at roadside inspections, and a 10 percent drop in driver violations per inspection. Furthermore, the majority of carriers surveyed stay on top of their CSA data and use it to improve safety.

"CSA literally has changed the way carriers do business,"<sup>39</sup> says Dave Heller, Director of Safety and Policy for the Truckload Carriers Association. "It has put safety to the forefront, much more than it ever has been before."<sup>40</sup>

Carriers have objected stating that the CSA SMS program does not have a strong enough predictive relationship between carrier scores and crash incidents. Most carriers lack sufficient safety performance data to ensure that FMCSA can reliably compare them with other carriers, leading to inaccurate profiles. Carriers have advocated that the SMS data driven process should be improved to allow FMCSA to focus intervention efforts and resources where they will have the greatest impact.

AS previously noted, in Fiscal Year 2015, Florida completed 67,000 driver inspections and identified 18,000 violations. The top four violations included:

- Log book violations
- Traffic control violations (stop signs, speeding, red lights, etc.)
- Hand held device distractions
- Driver record of duty status violation<sup>41</sup>

Florida tracks annual crash statistics in the Florida Integrated Report Exchange System. Data from 2013-2015 is highlighted below in **Table 2-2**:

**Table 2-2: Commercial Vehicles and Commercial Vehicle Crashes, 2013-2015**

Category	2013	2014	2015	% Change 2013- 2014	% Change 2014- 2015	Total Change
<b>Commercial Vehicle Crashes</b>	32,091	34,438	37,353	7% Increase	8% Increase	5,262
<b>Commercial Vehicles Involved in Crashes</b>	34,840	37,348	40,282	7% Increase	8% Increase	5,442

Source: Florida Integrated Report Exchange System, 2015

### 2.3.3 DRIVER SHORTAGE

The freight motor carrier industry is currently facing a driver shortage, and the shortage is expected to worsen in coming years. According to the American Trucking Association (ATA), in 2014, the estimated

<sup>39</sup> <http://www.truckinginfo.com/article/story/2013/01/a-look-at-csa-after-two-years.aspx>

<sup>40</sup> <http://www.truckinginfo.com/article/story/2013/01/a-look-at-csa-after-two-years.aspx>

<sup>41</sup> Florida Highway Patrol (FHP), Monthly Activity RECAP, 2015.



shortage of qualified heavy truck drivers was 38,000 drivers. The shortage is expected to reach 48,000 drivers by 2015 and if the trends continues to almost 175,000 by 2024.<sup>42</sup>

The primary causes of truck driver shortages include demographics, gender, lifestyle, increasing regulations and alternative jobs available. The current average long haul over the road heavy truck driver is 49 years old. Only 5.8 percent of heavy truck drivers are women and 38.6 percent of heavy truck drivers are minorities which is increasing. Truck driver turnover is high due to the demanding nature of the job and time away from home. This job requires endurance and many drivers have 11 hour shifts per day.<sup>43</sup>

Commercial truck classification is determined by the vehicle weight. The FHWA has established three weight classifications. Class 7-8 trucks are considered heavy duty with gross vehicle weight exceeding 26,000 pounds.

Most heavy truck drivers have a high school diploma and have attended professional truck driving school. A heavy truck driver must have a commercial driver's license (CDL). A heavy truck driver must be 21 years old to apply for an interstate CDL. Those persons 18-21 years olds can hold a CDL for the purpose of intrastate trucking.

Title 49, CFR, Part 383 specifies the requirements for obtaining a commercial vehicle driver's license. In this statute, medical, residency, knowledge, and skill requirements are identified. The FMCSA has developed and issued standards for state testing and licensing of CDL holders. States issue CDL's after the applicant passes knowledge and skill tests. CDL's are required for drivers who operate certain classes of vehicles in interstate, intrastate or foreign commerce.

There are three classes of CDL licenses. Class A CDL's are permitted to operate a combination of vehicles which in combination weigh over 26,001 lbs. Class B CDL licenses are required for a single vehicle exceeding 26,001 lbs. or any vehicle towing a vehicle with GVW that exceeds 10,000 lbs. A Class C CDL license is for any single vehicle or combination of vehicles designated to transport 16 or more passengers, including the driver, or any vehicle transporting hazardous materials.

Endorsements maybe required for drivers operating specialized types of commercial vehicles such as double/triple trailers, passenger or tank vehicles, hazardous materials vehicles, or school buses. Restriction codes maybe included based upon the mechanical type of equipment or medical variance for the driver. CDL applicants may be disqualified for a prior felony, driving violations, or medical conditions.

There are 36 schools in Florida that offer commercial driving courses. The average class size is 19 students. The average course runs 8-12 weeks to earn a commercial driver's license. To earn a Class B or Class C license the program maybe shorter. The first few weeks of the program include preparation for the Florida written driving exam with emphasis placed on driving laws in the state. The second portion of the program involves building upon and improving driving skills. There are trucking academy programs, county schools, technical institutes, and education centers offering commercial vehicle driving courses. The average cost of tuition for one of these programs is \$2,893. Many programs qualify for federal financial aid. By filling out

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<sup>42</sup>

<http://www.trucking.org/ATA%20Docs/News%20and%20Information/Reports%20Trends%20and%20Statistics/10%206%2015%20ATAs%20Driver%20Shortage%20Report%202015.pdf>

<sup>43</sup>

<http://www.trucking.org/ATA%20Docs/News%20and%20Information/Reports%20Trends%20and%20Statistics/10%206%2015%20ATAs%20Driver%20Shortage%20Report%202015.pdf>

Free Application for Federal Student Aid (FAFSA) forms, a proposed applicant can determine what federal loans and grants might be available. The average scholarship award in Florida is \$1,264, and the average study loan amount is \$3,596.<sup>44</sup>

Once training has concluded, a series of tests must be completed at the Florida Department of Highway Safety and Motor Vehicles. Depending on the class of driver's license, various tests must be completed. Typically, prospective drivers must demonstrate pre-trip, basic skills, and driving skills.

In 2014, according to the U.S. Bureau of Transportation Statistics, median pay was \$39,520 per year or approximately (\$19.00/Hour). There were 1,797,700 heavy truck jobs in 2014. Outlook for heavy truck driving jobs from 2014-24 is estimated to grow by 6 percent (average growth). More than 98,800 drivers will be needed to fill the projected job openings over this period of time.

In Florida, there were 77,140 heavy truck jobs in 2014 estimated to grow by 20 percent by 2024. Across the board, Florida salaries are close to national averages. The median income for a Florida truck driver is \$34,800 per year, with the top 10 percent of truck drivers earning more than \$55,000 per year. Wages vary based upon time spent on the road, driver experience, seniority and type of equipment operated.<sup>45</sup>

According to ATRI, 34 percent of the operational cost of trucking consists of driver pay. The impacts of a driver shortage could be significant since it is estimated that 68.9 percent of all freight tonnage moves at least some portion of the transportation journey by truck. Driver shortages vary by types of trucking services performed and may grow or decline based on economic growth.

In order to attract drivers during a driver shortage, many carriers are looking to increase wages and improve other work-life benefits such as preferred days off and newer model tractors. While many skeptics feel that the shortage is primarily driven by driver pay, due to a highly-fragmented industry, passing along rate increases to shippers has been difficult. Many carriers are focused on hiring returning military veterans with experience. Others are advocating that the minimum driver age be reduced to 18 to attract a work force just graduating from high school.

Florida employs over 70,000 heavy truck drivers with a (2014) average wage of \$34,800. Florida has more truck drivers than truck driving jobs. A location quotient of 1.0 means that jobs equal demand. With a location quotient of .76, Florida has more drivers than jobs which could be a location advantage for prospective industry attraction. With some of the lowest truck wages in the nation, truck transportation in Florida is more economical than in Georgia or Alabama. The states with the highest employment level of heavy truck drivers are provided in **Table 2-3**.

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<sup>44</sup> <http://www.alltrucking.com/schools/florida/truck-driving/>

<sup>45</sup> <http://www.alltrucking.com/jobs/florida/>

**Table 2-3: States with the Highest Employment of Heavy Truck Drivers**

State	Employment (1)	Employment Per Thousand Jobs	Location Quotient (9)	Hourly Mean Wage	Annual Mean Wage (2)
Texas	165,650	14.75	1.23	\$20.02	\$41,640
California	127,330	8.42	0.70	\$20.86	\$43,380
Pennsylvania	72,590	12.84	1.07	\$20.80	\$43,260
Florida	70,320	9.17	0.76	\$17.64	\$36,700
Illinois	66,890	11.60	0.96	\$21.90	\$45,550

Source: Bureau of Labor Statistics, May 2014

### 2.3.4 DRIVER RETENTION

The FMCSA estimates that there are approximately 5.6 million drivers holding CDL licenses. The cost to hire and train a heavy truckload driver is approximately \$5,000, per individual. Truck driver turnover for large truckload carriers averaged 90-95 percent in 2014. This means for the trucking company to maintain the same driver count annually for each driver employed, another driver must be hired to ensure a pool of qualified drivers. Smaller truckload carriers have a slightly better driver retention rate with a turnover averaging 80-90 percent in 2014.

The FMCSA Pre-employment Screening Program (PSP) helps carriers make more informed hiring decisions by providing a commercial driver's five-year crash and three-year inspection history. While pre-employment screening is not mandatory, research results suggest that the use of this program results in better safety records.<sup>46</sup>

Carriers began using the PSP program in May of 2010. Within the first year of use, 20,000-50,000 searches were being made per month. During the second year of use, 60,000-70,000 inquires per month were being made by hiring carriers to confirm driver applications were accurate. Driver use of the system has been low with less than 2,000 inquires per month, made primarily to confirm data accuracy. Carriers reported that after implementation of the PSP program, company crash rates were reduced by 8 percent and driver out of service scores were reduced by 17 percent.

Due to the high cost of employment turnover many trucking companies are reviewing compensation packages and work structures. Time-at-home is a top reason drivers leave the trucking industry. There are three components to time-at-home which include frequency of home time, duration, and predictability. Many carriers are looking at new dispatching models to improve time-at-home.

Driver compensation is another reason for driver turnover. Most drivers are paid per mile which can create stress during off-peak seasonal work fluctuations. To address this cash flow issue, some companies are exploring minimum pay programs. Many drivers seek a positive employee-employer relationship, which is difficult when the employee is on the road and out of the office most of the time. To improve these relationships, many carriers are creating retention managers who focus on a group of drivers. Some carriers are developing personality tests to measure a prospective applicant's response to stress, uncertainty, and independence. These tests help ensure applicants are good matches for work assignments.

<sup>46</sup> <https://www.psp.fmcsa.dot.gov/psp/Default.aspx>

### 2.3.5 TRUCK PARKING

A shortage in truck parking has recently received increased nationwide attention. Several national studies conducted between 1996 and 2003, established the fact that truck parking shortages were occurring and affecting highway safety. As a result, the US DOT, and many state DOTs, have completed and/or are currently working on a variety of studies and projects to measure and remedy the nationwide shortage of truck parking. A 2002 FHWA report entitled, "Study of Adequacy of Commercial Truck Parking Facilities", identified two negative consequences from an inadequate supply of truck parking: (1) tired truck drivers may continue to drive because they have difficulty finding a place to park for rest, and (2) truck drivers may choose to park at unsafe locations, such as the shoulder of the road and exit ramps, if they are unable to find parking.<sup>47</sup>

The issue has become more prominent in recent years due to tragic incidents regarding truck driver safety and new Hours of Service regulations. Research into past studies and projects shows efforts to implement truck parking correspond with federal legislation, and several of the past major surface transportation funding acts addressed truck parking.

#### Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21)

Under TEA-21 (1998), the FHWA was mandated by the Congress to complete a commercial motor vehicle parking study. The purpose of the study (completed in 2001) was to determine the location and quantity of parking facilities at commercial truck stops, travel plazas, and public rest areas on the national highway system that could be used by motor carriers to comply with Federal Hours of Service rules.

#### Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

SAFETEA-LU (2005), authorized an initial amount of \$25 million for a pilot program to address the shortage of long-term parking for commercial motor vehicles on the National Highway System (NHS). Over \$30 million was made available from 2005 through 2012. The majority of projects focused on the use of technology to provide information to truck drivers regarding truck parking availability. The first two of these Intelligent Transportation System (ITS) projects funded are underway in California along Interstate 5 (I-5) and the east coast (seven states on the I-95 Corridor).

From 2010 to 2012, a total of 18 projects were awarded across 11 states. The high level of applications indicates a shortage of truck parking remains. During the programs duration, states proposed projects costing more than \$231 million. In the first round of project solicitations for 2012 alone, FHWA received 23 applications requesting a total of \$49 million in grants with only \$2.9 million available for awarding.

The pilot program was discontinued in 2012, when the Moving Ahead for Progress in the 21st Century Act (MAP-21) became law.

#### Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21)

MAP-21 (2012) include truck parking activities and projects as eligible activities for various funding programs. In addition, MAP-21 contained Jason's Law which directed US DOT to conduct a survey and

<sup>47</sup> <http://www.fhwa.dot.gov/publications/research/safety/01158/index.cfm>

nationwide comparative assessment regarding truck parking. The survey and comparative assessment were required to complete three main tasks:

- Evaluate the capability of each state to provide adequate parking and rest facilities for commercial motor vehicles engaged in interstate transportation
- Assess the volume of commercial motor vehicle traffic in each state
- Develop a system of metrics to measure the adequacy of commercial motor vehicle parking facilities in each state

To evaluate the capability of each state to provide adequate parking and rest facilities, FHWA developed a survey for state DOTs and customized questionnaires for community stakeholders. Stakeholders included representatives from truck drivers, trucking firm logistics personnel, and travel plaza and truck stop owners and operators. The surveys provided a range of perspectives on the issue of truck parking.

State DOTs and the American Association of State Highway Transportation Officials (AASHTO) responses focused on the site location and selection of new or expanded parking facilities, gaining a better understanding of supply chain freight flows, and identifying appropriate agencies or stakeholders to serve as champions for the issue.

The primary concerns of commercial vehicle enforcement and safety officials revolved around improving safety, changing public perception about truck parking, and accommodating the diverse industry parking needs.

The trucking industry expressed interest in expanding the discussion past a simple adequacy by number question to a discussion on improving real-time information about parking availability, addressing varying driver preferences, and focusing on the need for both short- and long-term parking.

Travel center and truck stop operators viewed the issues through a retail prism with focus on meeting customer needs, understanding the challenges related to developing truck stops, measuring and meeting parking needs, and improving communications with truck drivers about parking and service availability.

To assess the volume of commercial motor vehicle traffic in each state, FHWA used annual state-issued data obtained from the Federal-aid highway program. This data provides annual commercial truck activity levels by measuring truck vehicle miles travelled (VMT) on the National Highway System (NHS). The activity levels on the NHS were mapped together with public and privately provided truck parking spaces to show supply and demand in each state.

The FHWA worked with the Stakeholder Technical Working Group (STWG) to develop metrics useful in evaluating truck parking in each state. The study team identified and categorized a variety of metrics through surveying existing studies and stakeholder input. Categories of metrics identified include:

- **Parking Demand** – the need for parking such as level of truck activity, proximity to highways and suppliers, and origins and destinations
- **Parking Supply** – capacity, such as number of spaces, congestion at parking locations, and amenities
- **Economic Valuation** – the economic value of spaces, return on investment, and cost benefit of parking development

- **Safety** – crime and crashes related to parking, availability of safety mechanisms at parking locations, information availability for safe parking, and reports of unofficial parking
- **Driver Demographics and Needs** – types and industry characteristics of drivers and rest requirements by type, driver fatigue, and amenities required
- **Location Dynamics** – design and accommodation of truck types, ingress and egress, and activity at parking locations
- **Environment** – impacts of congestion and delays related to insufficient parking and to capture environmental benefits of supply
- **Development** – public plans including truck parking, planning and zoning issues, incentives for truck parking, and economic benefit

The metrics then were placed into three tiers based on availability and the ease with which they could be implemented. Tier 1 included the basic set of metrics used in the creation of Tiers 2 and 3. Tier 2 metrics are more complicated to obtain and implement, and Tier 3 metrics are aspirational, as they would require additional research and development to implement.

The FHWA recently published the results of the Jason’s Law Truck Parking Survey and Comparative Analysis in August 2015.<sup>48</sup>

### State Activities

There are numerous examples of efforts by state DOTs to implement the Federal laws and address the shortage of truck parking. These efforts range from statewide plans analyzing truck parking conditions to pilot program projects implementing and evaluating proposed solutions.

Many states and MPOs have completed, or are working on, truck parking studies. These studies typically include an existing conditions analysis detailing the locations and characteristics of existing truck parking facilities and a survey of the demand for the facilities. As part of this analysis, areas that face a shortage of truck parking facilities are identified. The plans naturally follow with proposed strategies and actions the DOT may take to remedy identified issues. These strategies are often the genesis of pilot studies.

A summary of efforts by state DOTs to implement the federal laws and address the shortage of truck parking is provided below. These efforts are organized into two major categories: 1) Pilot program projects implemented to study the effectiveness of proposed strategies, and 2) Studies and plans aimed at understanding the issue and providing recommendations.

### Pilot Program Projects

#### *Florida DOT – Truck Parking Availability System (TPAS) (Current)*

FDOT has realized the importance and need for additional long-term truck parking and has begun to implement systems to alleviate this shortage. One such system is the FDOT Truck Parking Availability System (TPAS) which provides truck drivers with information on available parking spaces in the state. This system is currently being piloted and installed in various locations throughout the state. The location of this pilot project is along I-10 at a rest area west of Tallahassee in Leon County, Florida (**Figure 2-6**). The Leon

<sup>48</sup>[http://www.ops.fhwa.dot.gov/Freight/infrastructure/truck\\_parking/jasons\\_law/truckparkingsurvey/index.htm](http://www.ops.fhwa.dot.gov/Freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey/index.htm)

County pilot project involved using the magnetometer and infrared sensor that monitors every parking stall. The data provided from these stations will be conveyed to truck drivers by the use of roadside dynamic messaging and the State's traveler information system, Florida 511.<sup>49</sup>

**Figure 2-6: FDOT Truck Parking Availability - Future Location on I-10**



Source: Google Maps

*Minnesota DOT – Truck Parking Availability Study: Demonstration Project (2015)*

The Minnesota Department of Transportation (MnDOT), along with its project partners, the University of Minnesota and the ATRI, were involved in a demonstration project to employ an automated truck stop management system that could determine and communicate the number of occupied parking spaces to commercial vehicle drivers in a corridor.

The system used a network of cameras to monitor parking availability at truck stops, automatically identifying available spaces in real time. This information was used to notify drivers and carriers about parking availability via a website, in-cab messaging, and variable message displays a few miles ahead of the rest area on the highway. The project was designed to test the feasibility of installing the system at MnDOT safety rest areas, as well as at commercial truck stops. Successful demonstrations of this technology can improve safety, reduce driver fatigue, lead to better trip and operations management by drivers and carriers, and help MnDOT and private truck stop owners manage capacity more effectively.<sup>50</sup>

*Maryland DOT Emergency Truck Parking Pilot (2011)*

The Maryland DOT, along with the Maryland Motor Truck Association and the I-95 Corridor Coalition, launched a pilot program that identifies park-and-ride lots big enough to accommodate large trucks in emergency weather situations.

<sup>49</sup> Florida Department of Transportation. <http://www.dot.state.fl.us/trafficoperations/Newsletters/2016/2016-May.pdf#page=2>

<sup>50</sup> <http://www.cts.umn.edu/research/featured/truckparking>

The program includes mobile phone applications for iPhone, Android, and BlackBerry operating systems. The applications give truckers a way to navigate the six new lots and existing trucking parking. The program now provides for 45 locations in the state available to truck parking in severe weather situations.

The park-and-ride lots include facilities owned and operated by the Maryland DOT's State Highway Administration and the Maryland Transportation Authority, which will manage snow removal on the lots.

All the parking options can be accessed electronically, instead of traditional paper maps, or viewing the online map. The regular and new emergency truck parking lots can be viewed in three different ways:

- An interactive map accessible from a personal computer's web browser
- A downloadable pdf map to be viewed and printed
- A mobile device application.<sup>51</sup>

### Recent State and MPO Planning Efforts

#### *Florida DOT – Update the I-4 Tandem Truck Lot Assessment (2016)*

Florida's Turnpike Enterprise is currently conducting an update of the Orlando Tandem Truck Staging Lot Preliminary Study, July 2008. The updated study will assist in decision-making activities to identify an ultimate location and configuration for tandem truck staging in the Orlando area. The location must meet the needs of the trucking industry, preserve safety and operational efficiency of the Turnpike system, and be compatible with adjacent land use and aesthetic standards.

#### *Florida DOT – Assess Additional Truck Parking along Florida's Turnpike (2016)*

Florida's Turnpike Enterprise is currently conducting an update of the Truck Parking Utilization Study dated July 2015. This additional truck parking study provides an assessment of existing Turnpike truck parking capacity, truck parking demand, and opportunities to increase the truck parking capacity. All existing truck parking opportunities along Florida's Turnpike, including privately-owned travel centers, are being summarized and mapped. The privately-owned travel center parking capacity will be added to the capacity summarized in the 2015 study and reported separately. Surplus parcels owned by Florida's Turnpike Enterprise (FTE) and potential sites requiring acquisition also are being inventoried and mapped.

#### *Florida DOT – Site Feasibility Study for Truck Parking and Park-and-Ride Lot (2015)*

Florida District 6 conducted a study of the planning and environmental management services associated for the development and evaluation of a truck parking facility and park-and-ride facility. The purpose of this project was to conduct a site feasibility study, develop and evaluate alternatives, and recommend a layout for the construction. The proposed project is located within the area of Miami-Dade County, Florida, in the northwest quadrant of SR 836/Dolphin Expressway and SR 821/Homestead Extension of the Florida's Turnpike (HEFT) interchange.

#### *Florida DOT – Commercial Motor Vehicle Parking Trends at Rest Areas and Weigh Stations #BDK80 977-14 (2012)*

FDOT's Research Center along with Florida International University researchers studied the truck parking problem in Florida. The intent was to determine the supply and demand characteristics for commercial

<sup>51</sup> <http://roads.maryland.gov/pages/emergencytruckparking.aspx?pageid=856>



truck parking and to test a smart management technology for truck parking. The end goal was to increase the efficiency of commercial drivers and to reduce problems resulting from inadequate parking facilities.<sup>52</sup>

#### *Virginia Department of Transportation (VDOT) Truck Parking Study (2015)*

The VDOT truck parking study was conducted between September 2013 and June 2014. It provided VDOT with current information to address truck parking challenges statewide. The primary purpose of this study was to identify the frequency of trucks parking on ramps near interchanges, rest areas, and welcome centers on the Corridors of Statewide Significance (CoSS) and to determine where truck parking is needed.

Starting with the latest interstate truck parking research in Virginia: “Estimation of the Demand for Commercial Truck Parking on Interstate Highways in Virginia” (2004), conducted by the Virginia Center for Transportation and Innovation Research (VCTIR), this study documents the supply of truck parking spaces throughout the state. It includes public and private facilities and estimates truck parking demand for each CoSS using a methodology established by FHWA in “Study of Adequacy of Commercial Truck Parking Facilities” (2002).<sup>53</sup>

#### *Utah Truck Parking Study – 2010-2012*

In August 2010, the Utah Department of Transportation (UDOT) received a grant for the Utah I-15 Truck Parking Study. The study was funded by the Truck Parking Initiative from the FHWA through SAFETEA-LU, Section 1305, Truck Parking Facilities. The purpose of the grant was to complete a truck parking study along the approximately 400 mile I-15 Corridor in Utah. Utah’s I-15 Truck Parking Study was designed to seek answers to three questions:

- Does the I-15 Corridor have a truck parking problem
- What do CMV drivers think about truck parking along the I-15 Corridor and in Utah
- If there is a truck parking problem, what can UDOT do to help alleviate the issues

The study included the formation of a project management committee that guided the study, which included the following work:

- Reviewed previous truck parking studies including the National CMV Drivers Survey
- Reviewed Utah safety data centered on large truck crashes
- Conducted Utah’s own survey of CMV drivers along the I-15 Corridor
- Performed an inventory of truck parking on the interstates in Utah
- Identified current and future truck parking demand using Freight Analysis Framework version 3
- Conducted focus groups with commercial truck stop facility managers and CMV drivers for reaction to the survey results, their perception of truck parking along the I-15 Corridor, as well as to explore possible truck parking solutions
- Conducted a limited warehouse survey for truck parking
- Worked with private property owners for potential public/private partnerships for additional truck parking locations; Developed and distributed a Utah truck parking map
- Initiated an ongoing process of developing and implementing a Utah truck parking Smartphone application

<sup>52</sup> <https://trid.trb.org/Results?txtKeywords=BDK80+977-14#/View/1238011>

<sup>53</sup> [http://www.virginiadot.org/projects/resources/VirginiaTruckParkingStudy\\_FinalReport\\_July2015.pdf](http://www.virginiadot.org/projects/resources/VirginiaTruckParkingStudy_FinalReport_July2015.pdf)

- Created a website that provided and housed the study information along with interactive maps, study presentations, final written report, and other study information.<sup>54</sup>

#### *North Central Texas Council of Governments (NCTCOG) – Truck Parking Study (2014)*

The NCTCOG is conducting a Truck Parking Study to identify areas where additional truck parking is needed, to identify areas where safe truck parking could be constructed per Jason’s Law, and to identify potential future projects for incorporation into Mobility 2040.

### Older Planning Studies

#### *Minnesota Department of Transportation – Interstate Truck Parking Study (2008)*

The Minnesota Interstate Truck Parking Study was undertaken to help MnDOT develop the information necessary to support decisions regarding future approaches to the truck parking issues in Minnesota. The issues examined by the study included determining what the state’s role should be in the provision of truck parking; which provisions of long-term truck parking will provide the greatest support to the state’s economy, and what actions will provide the greatest impact on traffic safety, while taking maximum advantage of effective technology and available federal programs. The Minnesota Interstate Truck Parking Study examined the supply and demand of public and private commercial vehicle parking along Minnesota’s three primary Interstate Corridors: I-90, I-35, and I-94. The study was conducted through three primary tasks:

- An inventory of Minnesota’s Interstate Truck Parking Supply
- Truck Parking Demand Analysis
- Survey Results of Trucking Company Practices and Attitudes Regarding Truck Parking<sup>55</sup>

#### *Maryland Truck Parking Study 2005*

The Truck Parking Study focused on determining whether Maryland had adequate parking for the number of commercial motor vehicles that travel through the state. The primary goal of the study was to identify all commercial motor vehicles illegally parked on the shoulders and ramps on Maryland highways, and at the same time, count all parked commercial vehicles at truck stops, rest areas, truck weigh and inspection stations (TWIS), and Park & Ride lots. The study also is relevant to Virginia in that it documents the number of trucks parked illegally along the I-95 Corridor. Data was collected during the “nightly” peak for a five-day period from Sunday to Thursday (January 23 – 27, 2005) along the I-95 Corridor.

#### *Illinois DOT Truckers Park/Rest Facility Study (2008)*

This study examined the current state of truck parking and rest area facilities in the Northeast Illinois Region to determine if and how problems from truck parking affect freight transportation infrastructure, safety, and the region’s economy and environment. A taxonomic study of truck traffic volume and truck parking availability was completed. Truck parking sites for this report comprise private and public sites. Interviews were conducted with state, county, and municipal authorities, and truck drivers. The primary problems found involved two groups of truckers. One group is the independent, over-the-road drivers with Chicagoland deliveries and pickups. This group has fewer resources available for securing parking when needed. These truckers are responsible for much of the ‘nuisance’ parking in residential, retail, or manufacturing areas. The second group contributing to nuisance parking is local company drivers who park in areas designed for over-the-road truckers and access ramps. The consequences of nuisance parking

<sup>54</sup> <http://www.udot.utah.gov/truckparking/research-study.html>

<sup>55</sup> [http://www.dot.state.mn.us/ofrw/PDF/MN\\_TrkParkFnlRpt.pdf](http://www.dot.state.mn.us/ofrw/PDF/MN_TrkParkFnlRpt.pdf)

include safety hazards, problematic environmental effects from emissions and toxins, and a diminished freight transportation system affecting the local economy.

Solutions include: improving parking sites by creating additional parking for the drivers needing it and re-using brownfield sites, underutilized retail and manufacturing parking areas, and seasonally affected sites to create additional parking. Communication of site availability via radio or other means also is proposed. Since the impacts and needs are diffused over the region, further study of both procedural, such as the development of design guides, and programmatic private and public solutions are proposed.<sup>56</sup>

#### *North New Jersey Truck Stop Study – 2008*

The North Jersey Transportation Planning Authority undertook this study to determine the adequacy of available truck parking in the region and to identify solutions to providing additional parking facilities to meet demand. As part of this study, a database of regional truck stops was developed. The database included information on the facility ranging from parking capacity to vehicle size limits and amenities provided. A survey of the trucking industry also was undertaken to ascertain the challenges from the driver's perspective and the industry's perspective. From these tasks and identifying the demand using the 2002 FHWA methodology, the report identified a number of recommendations for further consideration.<sup>57</sup>

### 2.3.6 ELECTRONIC LOGGING DEVICES (ELDS)

An Electronic Logging Device (ELD) is an electronic solution that enables professional truck drivers and commercial motor carriers to track Hours of Service (Record of Duty Status) easily. The new ELD rule will include technical and performance specifications that will define features and functions of these devices. ELD specifications typically include:

- Connection to the truck's engine to record if the truck is in motion
- Allow the driver to log in and select On-duty, Off-duty, or On-Duty Not Driving, and drive segments must be automatically selected based on vehicle movement
- Graphically display a Record of Duty Status, so a driver can quickly see hours in a day
- Provide data in a format that is standardized and can be transmitted to law enforcement in a number of prescribed ways, such as wireless web services, universal serial bus (USB), or Bluetooth 2.0
- Be provider-certified that the device meets the proper specifications
- Be listed on an FMCSA website

Electronic Logging Devices range from an annualized price of \$165 to \$832, with the most popular device used today priced at \$495/truck. With the finalized rules, ELDs are expected to drop to \$200 per unit without any additional options.

<sup>56</sup> <https://apps.ict.illinois.edu/projects/getfile.asp?id=2977>

<sup>57</sup> <http://www.njtpa.org/planning/regional-studies/recently-completed-studies/the-njtpa-north-jersey-truck-stop-study-refinement/njtpatruckreststopstudy/njtpaphaseitruckreststopreport.aspx>

Carriers must retain up to eight supporting documents for every 24-hour period a driver using ELDs is on duty. Those documents must be retained for six months, and drivers must submit supporting documents to the motor carrier no later than 13 days after receiving them.

Those supporting documents must include:

- Driver name or carrier-assigned identification number, either on the document or on another document enabling the carrier to link the document to the driver, or the vehicle unit number if that number can be linked to the driver
- Date
- Location (including name of nearest city, town, or village)
- Time

Supporting documents may come from the following five categories:

- Bills of lading, itineraries, schedules, or equivalent documents that indicate the origin and destination of each trip
- Dispatch records, trip records, or equivalent documents
- Expense receipts
- Electronic mobile communication records, reflecting communications transmitted through a fleet management system (FMS)
- Payroll records, settlement sheets, or equivalent documents that indicates payment to a driver

On December 10, 2015, FMCSR 49 CFR Parts 385, 386, 390 and 395, effectively mandate the use of ELDs within two years (December 2017 anticipated). The rule includes the minimum performance and design standards for Hours of Service ELDs and the requirements for the mandatory use of these devices by drivers currently required to prepare Hours of Service Record of Duty Status.

The mandate exempts drivers of trucks built before model year 2000, based on concerns over the lack of electronic feasibility to incorporate ELDs with older engines. Drivers currently using legacy on-board systems (Automatic On-Board Recording Devices or AOBRDs) will be given until December 2019 to transition to ELDs.

It is estimated that drivers will gain up to an extra 20 minutes per day since they will no longer have to spend time filling out paper logs. ELDs will help drivers quickly assess remaining on-duty driving time, allowing for more efficient scheduling. Vehicle inspection reports made electronically also will save time. ELDs will improve a driver's ability to comply with Hours of Service rules, increase miles per gallon by monitoring motor speed thus potentially resulting in fewer speeding incidents, and provide a measurement of unproductive engine idling resulting in a decrease in out-of-route miles and reduction in fuel spending.

According to eldfacts.com, "The FMCSA believes the total annual cost of ELD adoption will be \$975 million, which includes all equipment for carriers and commercial truck inspectors, as well as inspector and driver

training. To be fair to the business changes ELDs can impact, another \$604 million was budgeted for extra drivers and CMVs needed to ensure that no driver exceeds HOS limits.” All in, the net benefits of ELDs outweigh the costs with expected paperwork savings of over \$1.6 billion annually, plus crash reduction costs of \$395 million.<sup>58</sup>

Industry supplies of electronic logs have been in use over the past few years as larger truckload companies have adopted what appeared to be an inevitable circumstance. **Figure 2-7** shows an example of an Electronic On-Board Recorder. One carrier identified a significant learning curve which could place compliant drivers at risk of violation due to simple coding issues. Software providers are working to perfect devices and training to ensure a seamless transition.

Larger carriers report productivity improvements because electronic log books can feed other reporting systems within the company, and smaller carriers have concerns over the burdensome implementation of technology, especially carriers with less than five trucks.

**Figure 2-7: An example of an Electronic On-Board Recorder**



Source: “Creative Commons Electronic on Board Recorder (EOBR)” by ISAAC Instruments Inc. is licensed under CC BY-SA 3.0

### 2.3.7 DRIVER HEALTH

Truck driver health is an issue fast becoming one of the most serious threats to the long-haul trucking industry. Truck drivers face many health issues and more challenges than the general public. Irregular schedules, long work hours, lack of sleep, the stress and anxiety of driving in various weather conditions, smoking, and poor diet and nutrition are among the challenges drivers encounter in seeking a healthy lifestyle.

Truck drivers serve a vital role in our nation’s economy by ensuring the safe and timely delivery of goods across the U.S. Gaining a better understanding of how to improve the lives of truckers both on the road and at home is vital to ensuring their continued service. Failure to do so will serve to exacerbate the related and growing problem of driver shortages.

<sup>58</sup> <http://eldfacts.com/>

## National Institute for Occupational Safety and Health Survey

Long-haul truck drivers are professional drivers of heavy and tractor-trailer trucks whose delivery routes require them to have to take sleep breaks away from home. Historically, there has been limited information on illness and injury in this population which prompted the survey by the National Institute for Occupational Safety (NIOSH). The survey was conducted in 2010, with 1,670 long-haul truck drivers at 32 locations across the country. The data collected from this survey is being used to establish a picture of the health conditions, risk factors, and work practices for U.S. long-haul truck drivers, giving the trucking industry and researchers valuable information to guide health and safety efforts. The NIOSH survey provides a wealth of information regarding both the physical and mental health conditions facing long-haul truck drivers. The completed study was published in January 2014 in the American Journal of Industrial Medicine. The statistics found in this issue paper are the results of the NIOSH survey.<sup>59</sup>

### Physical Health Concerns

There are a variety of factors contributing to the health conditions of truck drivers. First and foremost, the sedentary nature of truck driving offers little opportunity for exercise during working hours. In addition, many interstate routes find drivers traveling in “food deserts” or areas lacking in healthy food alternatives. Most truck stops and travel centers contain typical pre-packaged and processed food. This food is often sugar-laden, fatty, and high in calories. While truck stops are increasingly offering healthier alternatives, the typical food still dominates. Long hours behind the wheel and poor sleep patterns also contribute to negative health patterns.

Some of the notable findings from the study include:

- 69 percent of the drivers surveyed were obese
- 54 percent of drivers smoked
- 88 percent of long-haul truck drivers reported having at least one risk factor (hypertension, smoking, and obesity) for chronic disease, compared to only 54 percent of the general U.S. adult working population

### Mental Health and Stress

Long-haul truck drivers also suffer from stress and other mental health concerns. Many of the same factors impacting physical health, irregular schedules, long hours, and lack of sleep also impact mental health. The additional stress of regulatory compliance, delivery deadlines, and driving in adverse weather conditions contribute to higher- than- average levels of mental stress and the accompanying health consequences. The NIOSH study reported that long-haul truck drivers face unrealistic deadlines that may contribute to risky behaviors and put them at greater risk of injury.

Nearly 75 percent of drivers perceived their delivery schedules as too tight, which NIOSH said could be an incentive for them to be unsafe. Surveyed drivers reported “sometimes” or “often” taking the following risky behaviors:

- Driving when tired, in poor weather conditions or in heavy traffic (47 percent sometimes, 25 percent often)
- Violating Hours of Service rules (27 percent sometimes, 10 percent often)

<sup>59</sup> National Institute for Occupational Safety and Health. <http://www.cdc.gov/niosh/updates/upd-01-16-14.html>

- Speeding (26 percent sometimes, 5 percent often)

### Safety

A full-time driver can spend 60 hours a week on the road. With so much time spent on the road, driving safety and crashes are always a concern for truck drivers. The NIOSH survey reported the following statistics related to heavy trucks and crashes:

- 35 percent of drivers reported a truck crash while working as a long-haul truck driver
- 24 percent reported a near miss in the previous seven days
- 17 percent reported at least one moving violation ticket
- 36 percent were often frustrated by other drivers on the road

### Medical Requirements

In spite of the previously mentioned conditions that contribute to poorer than average health, truck drivers are held to higher medical standards than many other civilian occupations.

Motor carrier drivers are required to complete a Commercial Driver Medical Examination (CDME) to become medically certified in accordance with Section 391.43 of the Federal Motor Carrier Safety Regulations. The results of the CDME determined whether a driver qualifies for unrestricted certification (2 years), shortened certification (1 year), or does not meet the medical requirements.

Shortened certifications may be given for otherwise disqualifying conditions, such as hypertension and diabetes, if no other disqualifying conditions are present. The purpose of the history and physical examination is to detect the presence of physical, mental, or organic conditions of such a character and extent as to affect the driver's ability to operate a commercial motor vehicle safely.

Disqualifying conditions include:

- Corrected vision in one eye worse than 20/40
- Horizontal field of vision less than 70 degrees
- Color vision deficiencies
- Unable to hear a forced whisper at five feet
- Insulin-dependent or uncontrolled diabetes mellitus
- Epilepsy
- Anti-convulsion medication for treatment of seizures or epilepsy
- Blood pressure above 180/110
- Untreated respiratory dysfunction
- Implanted defibrillator
- Supplemental oxygen use
- Unstable mental conditions and psychoses
- Current alcoholism
- Use of Schedule 1 drugs or methadone

### 2.3.8 ECONOMY

Transportation is a key essential for economics stability and growth in all modern day societies. The same can be said in reverse as economics determines many important aspects of the transportation industry.

Throughout the world, the motor carrier industry is heavily affected by the status of their regions economy. For example, as the economy increases, so does demand for more goods and the means by which to transfer them. In order to continue to compete in today's global economy, it is essential to have strong transportation networks to support economic expansion and global trade.

The economy has many direct and indirect influences on the motor carrier industry. When the economy fluctuates, it can affect everything from fuel costs to demand of goods. A change in these variables has the potential to cause drastic changes within the commercial motor vehicle industry.

As the economy continues to grow so does the volume of freight needed to be transported. According to the *U.S. Freight Transportation Forecast to 2026*, published in 2015, there will be an increase of approximately 29 percent in the volume of freight over the next 11 years.<sup>60</sup> As trucks play a large role in the transportation of all freight in the United States, this increase in demand is a topic of great concern for the industry in order to continue meeting the demand. Some of the other key findings in the *U.S. Freight Transportation Forecast to 2026* are outlined below:

- Trucking still will be the dominant mode of freight transportation, although the share of tonnage it hauls dips slightly. Even though truck tonnage grows over the forecast period, trucking's share will dip from 68.8 percent in 2014, to 64.6 percent in 2026
- Due to tremendous growth in energy production in the U.S., pipelines will benefit more than other modes. Between 2015 and 2026, pipeline volumes will increase an average of 10.6 percent a year, and their share of freight will increase from 10.8 percent in 2015, to 18.1 percent in 2026
- The number of Class 8 trucks in use will grow from 3.56 million in 2015, to 3.98 million by 2026

While the overall share of the total tonnage transported by trucks will decrease by 2.2 percent between 2014 and 2026, the total volume of freight is increasing significantly which will lead to an increase in the demand for motor carriers. Additionally, there will be an increase in the need of licensed professionals who are able to drive heavy load vehicles. Since driver shortage is already a problem in the U.S. today, it is crucial to make changes now before it becomes a more prominent issue in the future that impacts the economy.

Addressing the driver shortage now is going to help reduce the possibility of major issues in the future. In states such as Florida, there are scholarships offered to qualified individuals to make trucking school more affordable. Actions such as creating more scholarships, as well as increasing wages could potentially increase driver incentives and retention.

In addition to the economy having an effect on the demand on the commercial motor carrier industry, it also has an effect on the funding for transportation. As the economy becomes stronger, more funding is available to be delegated to improve the roadways used by all motorists. This topic is relevant to the CMV industry because an efficient and reliable road network will allow CMVs to travel cross country to pick up and deliver goods thus impacting the economy.

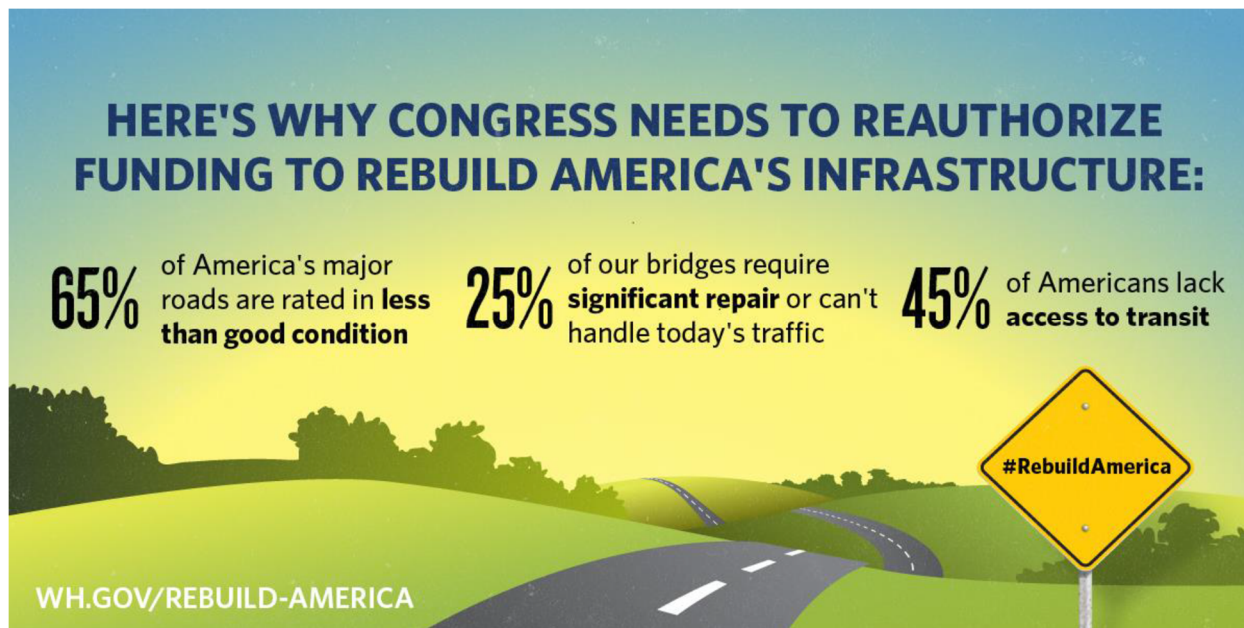
A successful transportation network allows for commercial motor vehicles to safely and efficiently transport products across the nation. Unfortunately, many of the roads and bridges in the U.S. used by both commuters and trucks alike are not in a state of good condition and need significant repair. As shown in **Figure 2-8**, according to statistics published by the White House in the report "*An Economic Analysis of*

<sup>60</sup> American Trucking Association. <http://www.trucking.org/article.aspx?uid=4caa8338-9128-40fe-ab45-c6fb0c24e417>



*Transportation Infrastructure Investment*” approximately 65 percent of roads are rated below good condition.<sup>61</sup> Poor roads and bridges can lead to increased traffic and travel times, and subsequently increased costs of transporting goods.

**Figure 2-8: Rebuild America Key Statistics**



Source: *Economic Analysis of Transportation Infrastructure Investment*, 2014.

When government is in a stable place economically and is able to invest in infrastructure improvements, a number of good outcomes can arise specifically for the CMV industry. For example, improving roads can increase the safety of heavy vehicles traveling over them. Not only does it improve safety, it can also reduce the cost of fees associated with driving on the road. Older roads are able to support less weight, leading to steeper fees associated with heavy loads. On the other hand, newer roads are generally able to support more load which reduces the costs of permitting for large and overweight vehicles.

Expanding the current highway network (**Figure 2-9**) also can reduce travel times by reducing congestion. Congestion and bottlenecks are significant problems faced by the trucking industry that lead to increased travel time and the overall cost of transportation. When the economy is able to invest in the roadway and highway networks, the commercial motor vehicle industry can benefit from additional construction, such as expanded roads, additional routes, and as a result, shorter trip times. A larger investment in the highway network can lead to more direct routes being made. Direct travel routes lead to shorter travel times and cheaper cost of transportation. This in turn reduces the price of goods for consumers.

Although there is no way to completely control the economy and the effects that it has on the commercial motor vehicle industry, there are measures that can be implemented today to reduce the impact in the future. An important step is for the industry to keep up-to-date on the predictions of the economy over the upcoming years. The values provided in the forecasts can at least provide a rough estimate of the economic

<sup>61</sup> [https://obamawhitehouse.archives.gov/sites/default/files/docs/economic\\_analysis\\_of\\_transportation\\_investments.pdf](https://obamawhitehouse.archives.gov/sites/default/files/docs/economic_analysis_of_transportation_investments.pdf)

trends based on historic patterns. Considering the interconnectivity and interdependence of the trucking industry to the economy and the trucking industry’s impact on the economy, it is vital for the trucking industry to monitor economic trends. As such, addressing concerns like truck driver shortage and infrastructure improvements now can help reduce the impact of any economic fluctuations that may occur in the future.

**Figure 2-9: Current United States National Highway System**



Source: U.S. Department of Transportation Federal Highway Administration<sup>62</sup>

### 2.3.9 INFRASTRUCTURE/CONGESTION/FUNDING

A well-performing transportation system benefits businesses by facilitating a more efficient, reliable, and safe exchange of goods and services. In return, this benefit also is passed on to consumers by having lower priced goods and better access to jobs. Transportation is the platform that links our commerce exchanges and promotes our economic competitiveness both in-state and inter-state. Florida’s transportation system infrastructure, congestion, and funding all go hand-in-hand. In order to minimize congestion, a safe, interconnected, and efficient infrastructure network with a reliable funding source to pay for infrastructure improvements is essential.

The trucking industry is currently, and will likely remain for the foreseeable future, the predominant mode for moving freight due to their speed, reliability and flexibility. With this knowledge, it is imperative to ensure that sufficient infrastructure exists where trucks have efficient access to hubs and outlets as part of the “last mile”; that intermodal access between trucks and other freight modes is facilitated; and that there

<sup>62</sup> Federal Highway Administration. <http://www.fhwa.dot.gov/planning/images/thnhsjpg.jpg>

is a balance for truck impacts on highway congestion and safety with the economic benefits of a healthy truck system.

Florida is continuing to grow and is now the nation's third largest state. The amount of trucks needed to account for the growth and the economic expansion that will come with this growth will further burden Florida's already strained transportation system. Florida will be moving more people and goods through its network of highways, railways, seaports, airports and spaceports resulting in more trucks on the highways. Meeting these challenges will require investment in the transportation infrastructure to keep our economy flowing, maintain Floridians' quality of life and safety, and continue to make the state an attractive tourist destination.<sup>63</sup>

Despite the billions of dollars Florida already spends each year, there remains a need for more investment in transportation infrastructure. Investment is needed to: increase capacity, maintain road conditions, and increase safety.

### Infrastructure

In accordance with House Bill (HB) 599 (2012), FDOT developed the FMTP. This plan consists of two different elements: the Policy Element which lays out the policy framework, identifies responsibilities for implementation, and meets all requirements of HB 599; and the Investment Element which identifies freight needs, identifies criteria for state investment in freight, prioritizes freight investments across modes, and meets requirements of MAP-21.

The Florida Freight Network consists of all Florida facilities on the NHFN, all designated SIS facilities that are not purely passenger-oriented, and additional connectors to facilitate freight movement through the "last mile". These facilities promote the complete movement of goods and streamline logistics and enhance efficiency, especially the "last mile" connection between hubs and interregional corridors. Twenty-seven and a half percent of respondents considered this the best strategy for addressing infrastructure challenges according to the ATRI Study: "Critical Issues in the Trucking Industry, 2015".

Florida's trucking industry is heavily dependent on the highway system. Florida has 122,391 centerline miles of public roadways, with 12,116 of those miles included in the State Highway System and over 4,293 miles designated as the highway portion of the SIS. These highways link the majority of Florida's SIS hubs such as airports, spaceports, seaports, rail terminals, and other intermodal/freight facilities.

### Routine Maintenance

FDOT has a Maintenance Rating Program (MRP) that is a uniform evaluation system for maintenance features on the SHS. The MRP is defined as a method of conducting a visual and mechanical evaluation of routine highway maintenance conditions. The purpose of the evaluation is to provide information that should be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established FDOT objectives.

The MRP survey is conducted by trained personnel and, is completed on all types of highway facilities. The type of maintenance required determines the classification of a particular facility. The current facility classification types are:

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<sup>63</sup> Florida Tax Watch-Meeting Florida's Transportation Investment Needs, February 2016

- Rural Limited Access – Interstate, toll and other limited access roadways that have adjacent property unimproved, agricultural, low-density population, and industrial and light commercial development
- Rural Arterial – All other rural roadways not covered above that have adjacent property unimproved, agricultural, low-density population, and industrial and light commercial development
- Urban Limited Access – Interstate, toll, and other limited access roadways that have adjacent property of high-density population and industrial and heavy commercial development
- Urban Arterial – All other urban roadways not covered above that have adjacent property of high-density population and industrial and heavy commercial development

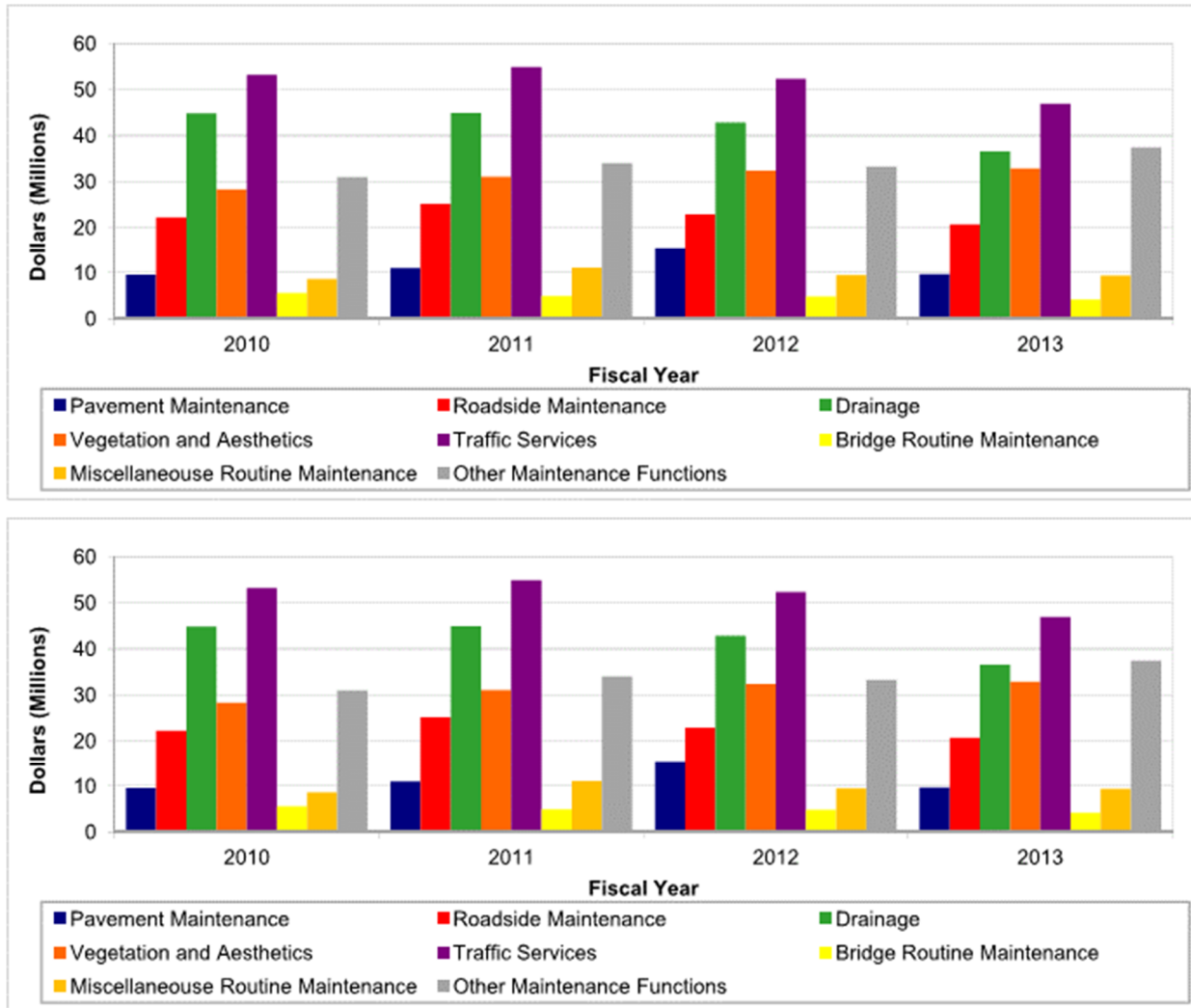
Each of the Highway Facility types is divided into 5 elements:

- Roadway
- Roadside
- Traffic Services
- Drainage
- Vegetation/Aesthetics

Further divisions of these elements include those features that are characteristic to an individual element. FDOT's Asset Maintenance Program places high value on adequately maintaining the transportation facilities the FDOT currently owns. Through routine maintenance functions, the life and performance of existing facilities can be maintained, ultimately saving money while preserving safe and effective operation.

**Figure 2-10** shows the routine maintenance costs by function.

**Figure 2-10: Routine Maintenance Costs by Function**



Source: Florida Transportation Trends and Conditions Report, February 2014

The condition of Florida’s roads and bridges is among the best in the nation, but maintenance and repair will be an ongoing and increasing cost. While road conditions are generally favorable, there is still ample room for improvement. Of the state’s more than 26,000 miles of roads that are eligible for federal aid, 4.8 percent are rated “not acceptable” and need major repairs or replacement. In addition, 17 percent of the state’s more than 12,000 bridges are either “structurally deficient” (243 bridges) or “functionally obsolete” (1,760 bridges).<sup>64</sup>

Having a well-connected transportation network means faster, more reliable travel times for both people and goods. Consequences of not having well-connected and maintained infrastructure for a transportation system are higher costs to businesses and consumers due to increased cost of vehicle maintenance/repairs because the roadways are in poor condition and congestion also becomes an issue. If pavement

<sup>64</sup> American Road and Transportation Builders Association, 2015, US Transportation Construction Industry Profile, Florida Transportation Facts

deteriorates enough, the road may require complete rebuilding, which is much more expensive than routine maintenance costs.

#### *Prioritization of Projects*

This section discusses the prioritization and project selection process for projects. FDOT has limited funding to execute all of the project needs of the transportation system, so it focuses on three program areas when considering investment decisions:

- Highway Capacity
- Preservation
- Safety

Each of these programs has their own specified funding source so projects do not compete with each other.

#### Highway Capacity Program

The FDOT's capacity program is a statewide "needs-based" planning effort which uses objectives analysis to identify capacity improvements for the following areas:

- SIS Capacity
- Non-SIS Capacity and Other Enhancements

FDOT allocates funds for SIS projects throughout the state based on need to ensure the state's most important transportation facilities retain their ability to safely and efficiently move large volumes of people and goods throughout the state and connect to other states and nations. **Figure 2-11** show the flow chart for the SIS Capacity Improvement program.

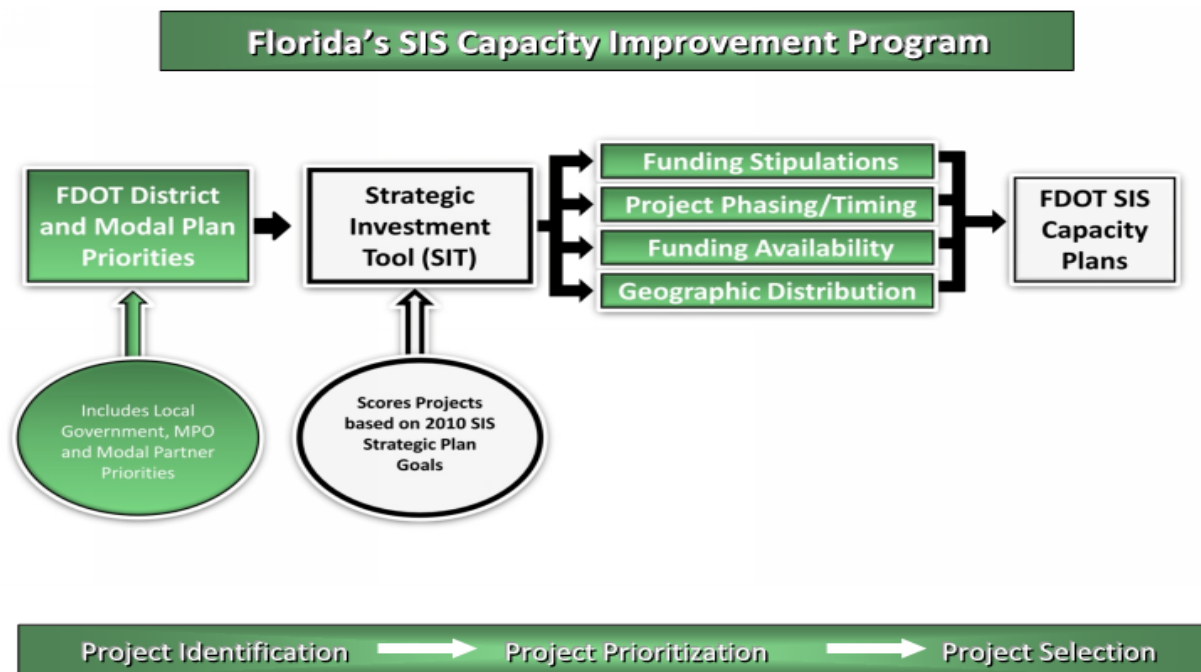
Once the needs are identified and project costs are established, the following factors are considered in the prioritization and project selection process:

- **District and Modal Plan Priorities:** project priorities that are identified by FDOT district offices, modal plans, MPOs, and local government modal plan priorities.
- **Strategic Investment Tool (SIT):** this tool is used to prioritize and score SIS highway projects based on SIS Strategic Plan goals using quantitative measures for each goal. The six 2010 SIS Goals are: Safety and Security; Maintenance and Operations; Mobility and Connectivity; Economic Competitiveness; Livable Communities; and Environmental Stewardship.

It will cost an estimated \$2.2 billion to make needed repairs on 830 structures in the state.

-American Road and Transportation Builders Association, 2015

Figure 2-11: SIS Capacity Improvement Program



Source: FDOT Systems Planning Office

After completion of the SIS prioritization process, the needs must further be analyzed to determine whether the projects qualify for funding. The following factors are considered by FDOT before a project can be advanced:

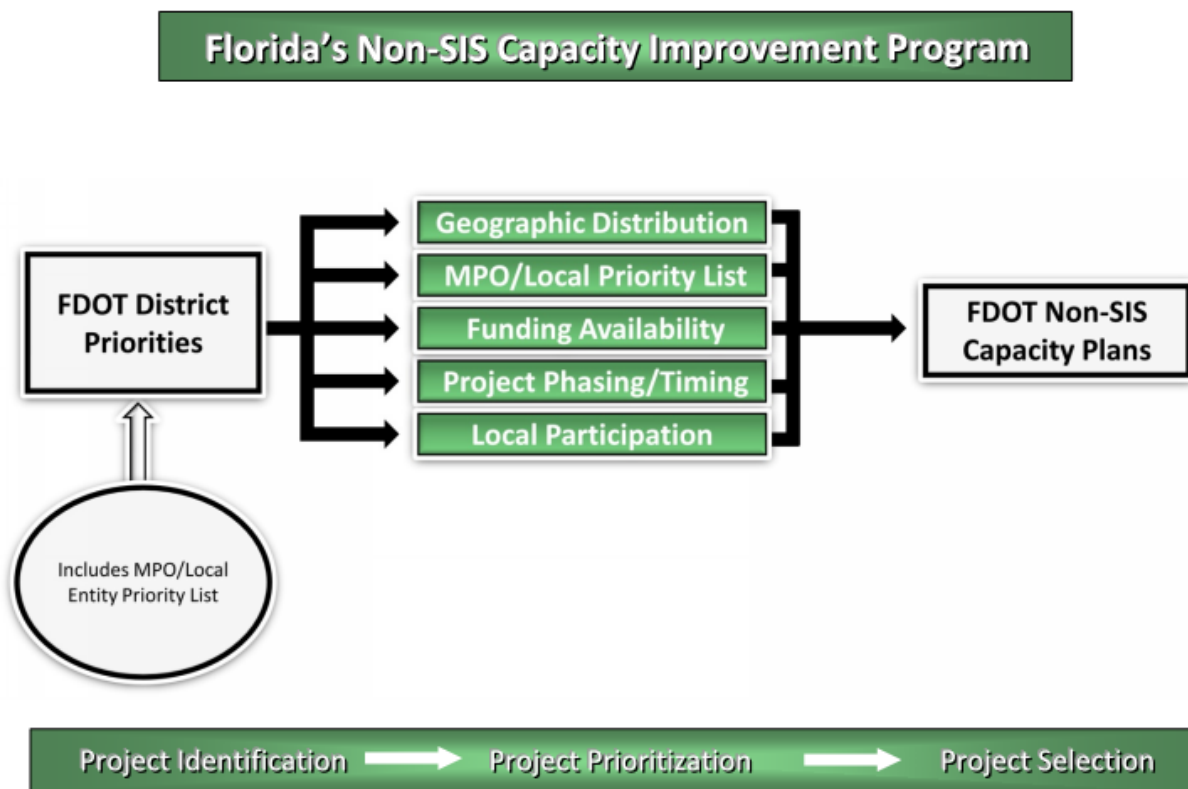
- **Funding Stipulations/Commitments:** Determine if the project will require a funding match from a MPO, local government, or modal partner -- also consider any previous multi-year commitments
- **Project Phasing/Timing:** Determine if the project is ready for production consistent with the available funding and if advancing one phase of the project will require moving other phases
- **Funding Availability:** Determine if sufficient funding is available for the needed project and whether the project is eligible for specific types of funds
- **Geographic Distribution:** Determine if funding is being distributed reasonably to the Districts

Projects that fall under the Non-SIS Capacity and Other Enhancements are projects that add capacity, improve highway geometry, provide grade separations, improve turning movements through signalization improvements and storage capacity within turn lanes, and include other enhancement phases which support a main capacity improvement. **Figure 2-12** shows the Non-SIS Capacity Improvement Program process.

Needs on the Non-SIS Capacity Facilities are based upon local and regional considerations such as support of local comprehensive plans to include economic objectives and land use activities. Similar to the SIS Capacity Projects, the Non-SIS Capacity and Other Enhancements projects go through a project prioritization process by which the following factors are considered when prioritizing the projects:

- **MPO and Local Entity Priorities:** Takes into account local and regional mobility, economic conditions and impacts to the area
- **Regionally Significant Transportation Facilities:** Accounts for regional transportation corridors serving major commercial, industrial, or medical facilities

**Figure 2-12: Non-SIS Capacity Improvement Program**



Source: FDOT Systems Planning Office

Upon completion of the prioritization process, projects are further analyzed based on the following circumstances and factors to determine whether projects can be funded:

- **Geographic Distribution:** Districts manage the distribution of funds among the counties in the district
- **MPO/Local Entity Priority:** Entities provide a prioritized list of transportation projects within their jurisdiction for evaluation for eligible funding
- **Funding Availability:** Districts determine if there is sufficient eligible funding available for the project
- **Project Phasing/Timing:** District must consider if the project is ready for production, which may entail analysis of multiple phases to ensure projects can be completed if phases are initiated



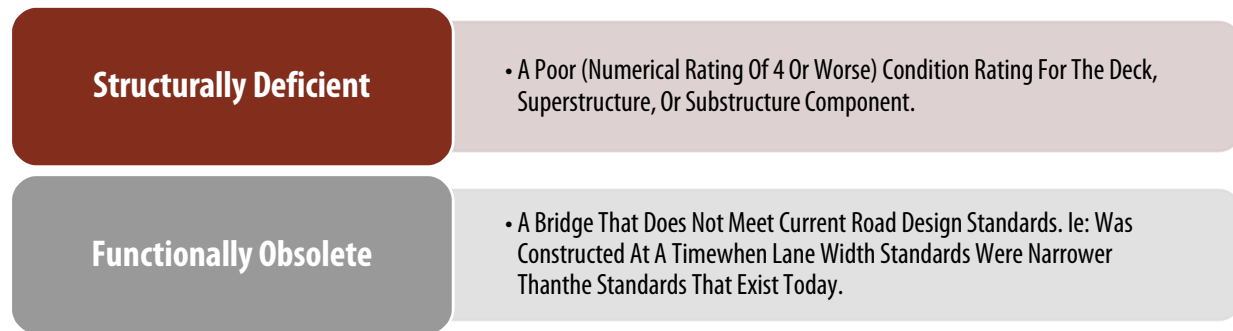
- **Local Participation:** District consider whether the MPO/Local entity can provide match funding to complete a project

Preservation Program

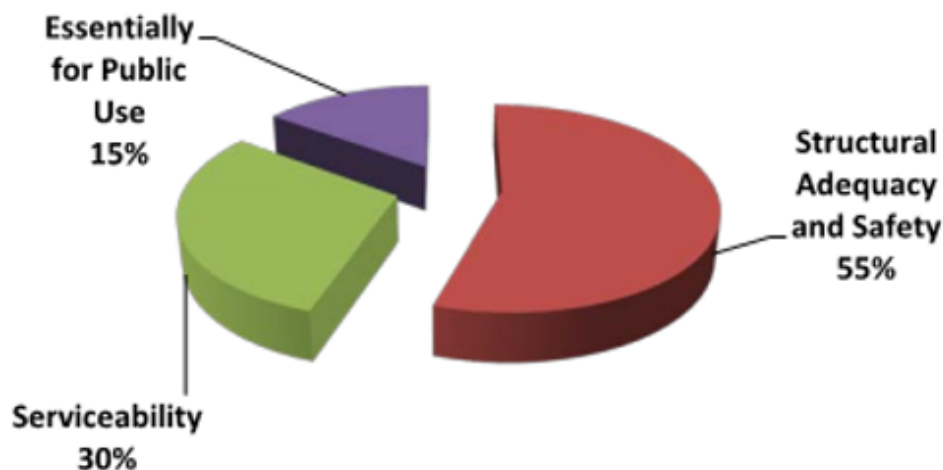
Preservation of transportation facilities is a top priority for the State, and FDOT monitors the conditions of state roadways and bridges on a scheduled basis. The preservation program relies on performance-based measures to determine whether the conditions of its facilities meet statutory standards. The program consists of two areas:

- Bridge Repair and Replacement
- Resurfacing

Section 334.046(4)2, F.S., requires FDOT to ensure that 90 percent of FDOT-maintained bridges meet Department standards. Each bridge on a public transportation facility is required to be inspected at least once every two years (Section 335.074, F.S.) During each inspection, the bridge receives a rating for the deck, a rating for the superstructure, and a rating for the substructure that supports the superstructure. The ratings are scaled from 0 to 9 and anything rated under a 4 is considered to be in poor condition. If a bridge is deemed deficient upon inspection, it is categorized into one of two categories defined by the FHWA:



A bridge is given a sufficiency rating (**Figure 2-13**) from FHWA to determine if it is eligible for federal bridge construction funds. The rating scales from “0 to 100” for the overall bridge structure. If a bridge has a rating over 80 it will not be eligible for federal bridge construction funds. If the bridge rating is less than 50, it generally will qualify for replacement using the federal bridge construction funds. Bridges with ratings between 50 and 80 can typically use federal bridge construction funds for rehabilitation work.

**Figure 2-13: Sufficiency Rating**

Source: FDOT-Prioritizing Florida's Highway Investments, 2012/2013

At least once a month the District Feasible Action Review Committee (FARC) meets to review all bridge inspection reports that have been completed since their last meeting. During the meeting, FARC identifies appropriate actions for each bridge which may include maintenance projects, bridge repair projects, or bridge replacement projects.

During the annual FDOT Work Program Office Programming Cycle, each district bridge maintenance office determines which projects will be programmed based on the general guide for prioritization:

- All bridges in poor condition must be addressed
- Bridges where repair is required to protect the safety of the public are addressed
- Bridges in good condition are addressed if an early repair is identified as an alternative to performing a more expensive later repair

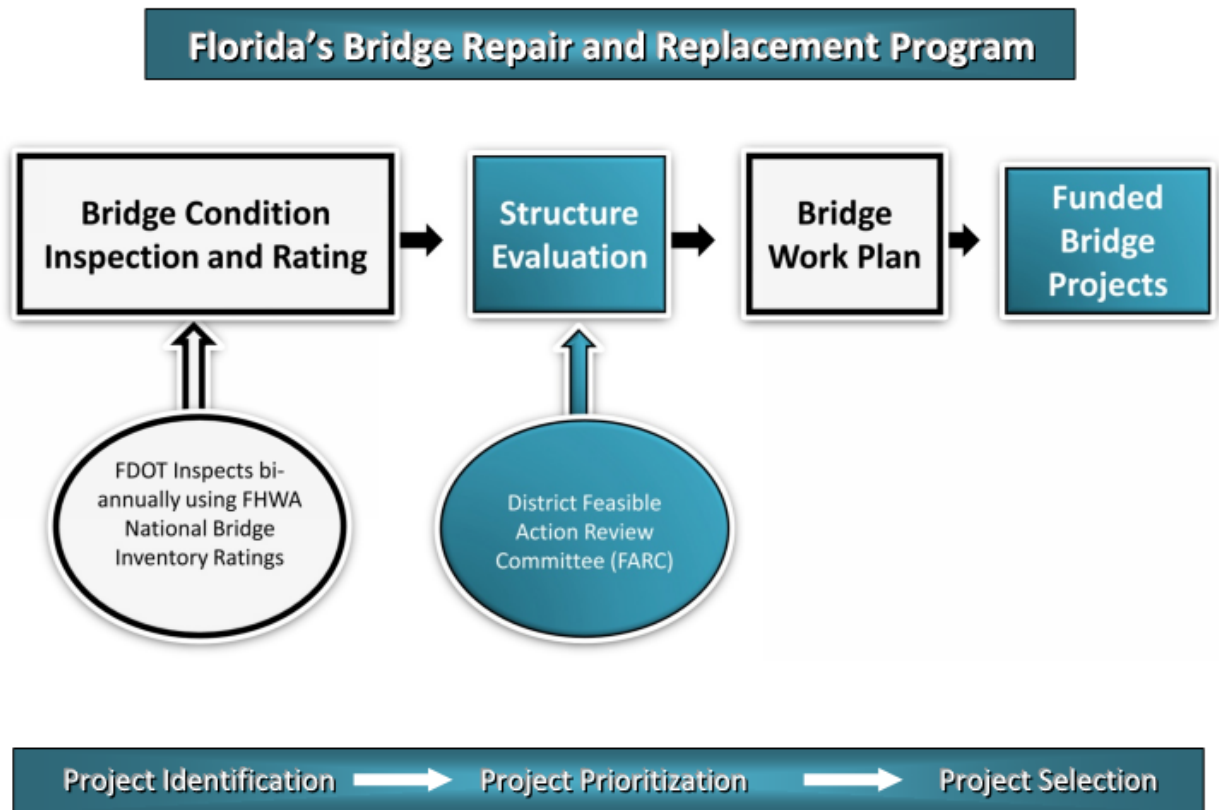
FDOT Central Office reviews the Bridge Work Plan for compliance to FDOT's policies and procedures after each district has completed their portion.

Local government bridges also qualify for the federal bridge replacement funds, and FHWA requires that no less than 15 percent of the funds be spent for off-system bridges. FDOT limits the replacement of bridges to structurally deficient bridges. This program is not intended to be the sole source but to supplement the local agencies efforts for managing and maintaining their bridges. After the list of structurally deficient bridges is finalized, the bridge is prioritized based on the condition ratings and the following characteristics:

- Width is too narrow
- Inadequate vertical clearance
- Posted for weight restrictions
- Bridge or the roadway floods frequently
- Traffic must reduce speed to cross the bridge due to the geometry of the bridge
- The amount of traffic using the bridge
- The length of the detour if the bridge were closed

From this prioritized list, bridges will be selected based on available funds. **Figure 2-14** shows the Bridge Repair and Replacement Program Process.

**Figure 2-14: Bridge Repair and Replacement Program Process**



Source: FDOT-Prioritizing Florida's Highway Investments, 2012/2013

Section 334.046(4)1, F.S., requires FDOT to ensure that 80 percent of the pavement on the SHS meets Department standards. The pavement is measured annually through the Pavement Condition Survey. The FDOT Pavement Management Section uses the condition ratings throughout the resurfacing program project prioritization process to:

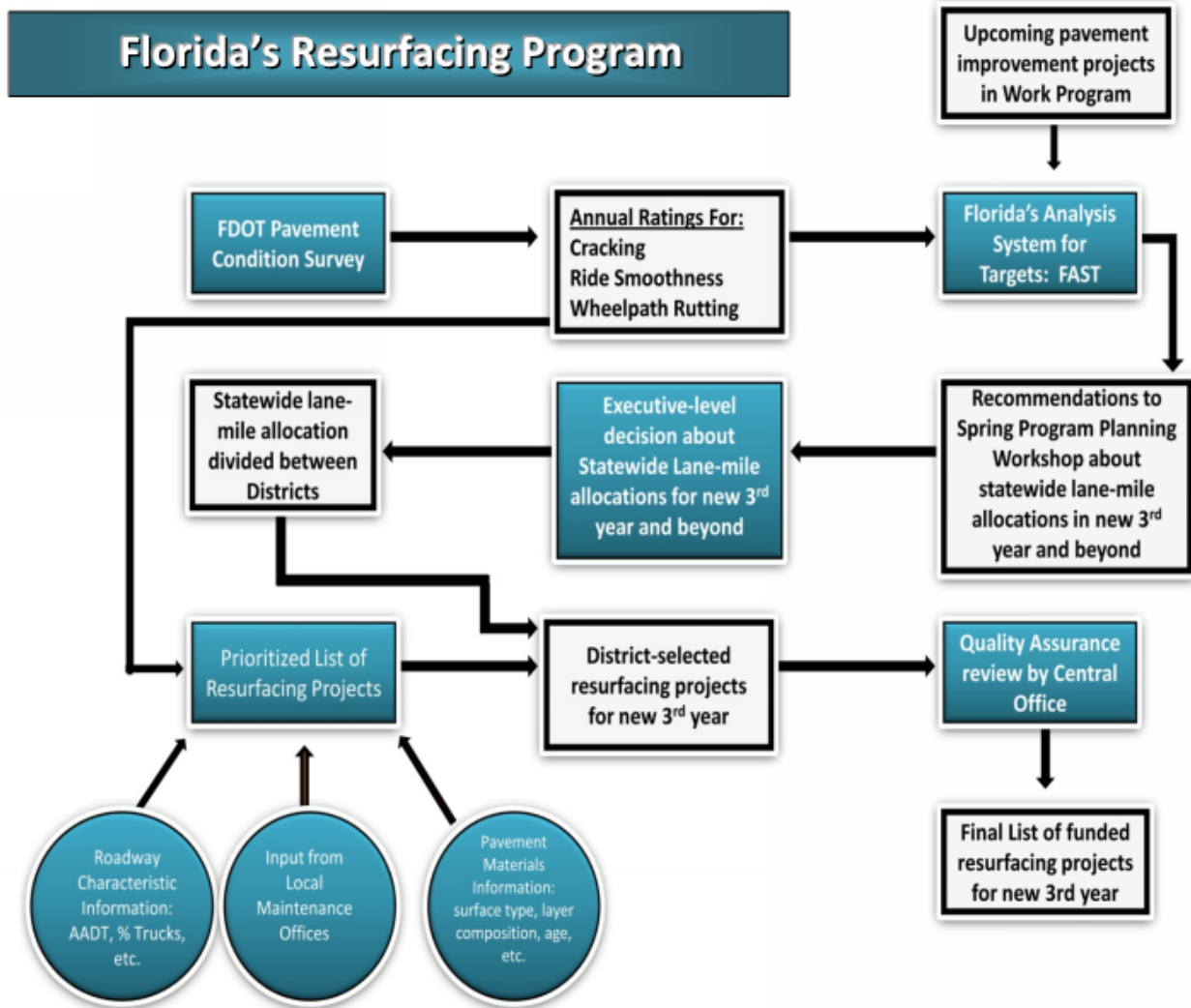
- Determine the percentage of pavement needing to be resurfaced each year to ensure statutory compliance
- Calculate district resurfacing allocations
- Identify potential resurfacing projects

The highway pavement is rated on three criteria: wheel path rutting, cracking and ride quality. They are rated on a scale of 0 to 10 with 10 being the best. If any section of highway is graded less than 6.4 out of 10 for any of the categories, then the pavement is listed as deficient.

In addition to the pavement condition ratings, there are other factors considered when selecting projects for prioritization such as pavement age, pavement thickness, surface type (dense-graded friction course or open-graded friction course), geographic location, traffic volumes, truck volumes, materials, and the “Do-Nothing” alternative.

The FDOT Pavement Management Section reviews all resurfacing projects to ensure that they are adequately addressing the needs of the SHS. The review process prevents the inclusion of resurfacing projects where the need is not yet apparent and ensures that other sections are not allowed to deteriorate to a point where they pose safety hazards or will require total reconstruction. **Figure 2-15** shows the process for the Resurfacing Program.

**Figure 2-15: Resurfacing Program Process**



Source: FDOT-Prioritizing Florida's Highway Investments, 2012/2013

Safety Program

FDOT's Safety Program is primarily a federally funded program that includes infrastructure improvements, such as the Highway Safety Improvement Program (HSIP), which also includes the High Risk Rural Roads (HRRR) Program. Another federally funded program is the Safe Routes to School (SRTS) Program, which includes both infrastructure improvements along with education efforts that encourage bicycling and walking to school. Each program contains specific criteria for eligibility and formal application processes are used to request project funding.

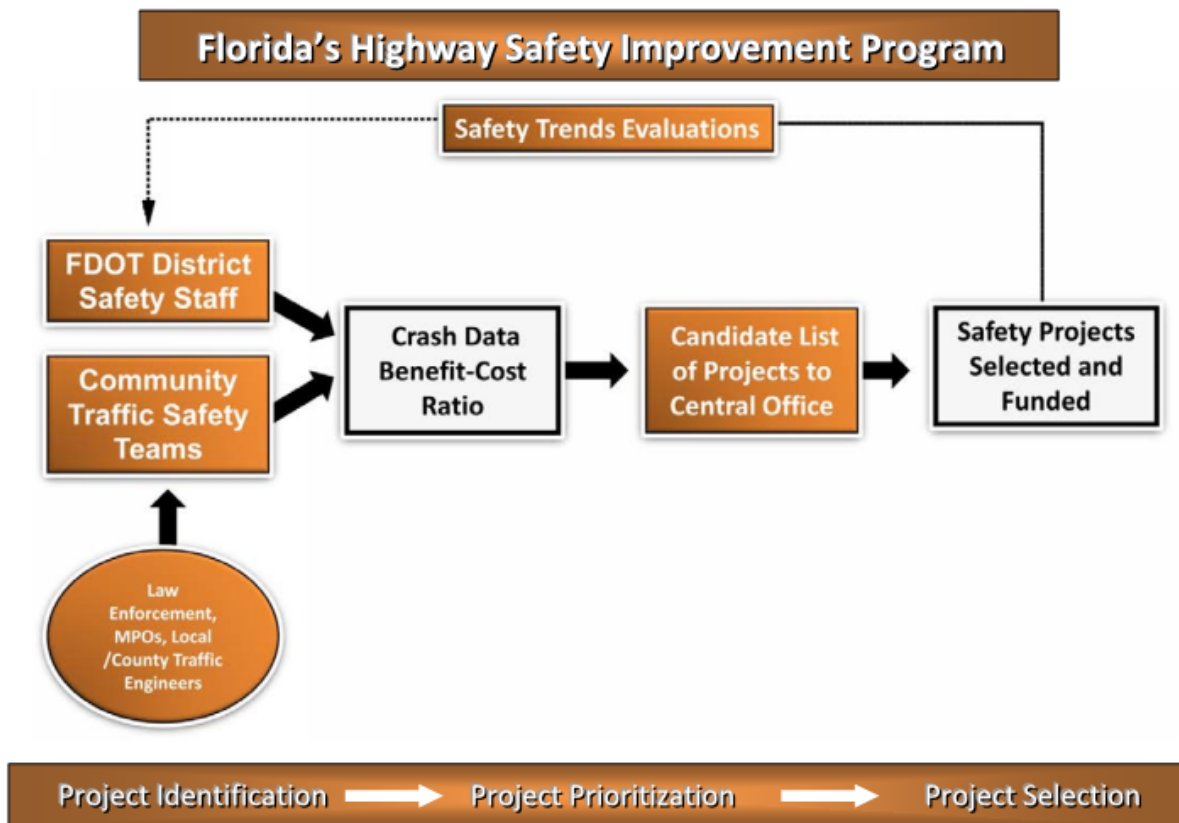
Safety improvements on Florida’s highways are funded in a variety of ways. Many preservation and capacity projects include safety improvements which are not funded through FDOT’s safety program.

The main purpose of the HSIP is to reduce fatal and serious injuries resulting from traffic crashes. This program addresses low cost (typically \$1 million or less) projects that are normally completed within 3 years from conception to construction. The projects from the HSIP are developed to correct specific traffic crash problems and/or other safety defects. Projects need to have a benefit-cost ratio greater than 1 and be included in one or more of the emphasis areas of the Strategic Highway Safety Plan to be eligible for HSIP funding. Specific criteria related to HSIP project selection include the following:

- Benefit-cost ratio greater than 1
- High crash location (segment or intersection)
- Transparency report (5 percent Report)
- Strategic Highway Safety Plan (SHSP) Emphasis Areas
- Skid hazard elimination
- Run off road mitigation
- Roadside obstacle elimination

Figure 2-16 show the HSIP project identification, prioritization, and selection process.

**Figure 2-16: Highway Safety Improvement Program (HSIP) Process**



Source: FDOT-Prioritizing Florida’s Highway Investments, 2012/2013

The HRRR program addresses safety projects on rural collectors or rural local roads that have an above average rate of fatal or incapacitating injury crashes. To receive HRRR funding, the average crash rate must be 0.15 crashes per million vehicle miles of travel. These funds are managed on a statewide basis with each FDOT District budgeted up to \$100,000 for unforeseen use.

The primary purpose of the SRTS program is to increase the safety and the number of students in grades K-8 who walk or bike to school. Seventy to ninety percent of the SRTS funding is intended for infrastructure projects that are projected to substantially improve the ability for children to walk and bike safely to and from school. Ten to thirty percent of the funding is intended to be used for non-infrastructure activities to educate students and adults and to encourage students to walk and bike to and from school.

An interconnected, efficient, and well-maintained transportation system remains a key component to facilitate the safe, cost-effective, and reliable movement of goods and passengers.

### Congestion

Florida's transportation system is shared between freight and non-freight related traffic. Congestion along roadways leads not only to the deterioration of roadway infrastructure over time but also longer driving times, increased safety risks, reduced reliability, and increased transportation costs. Time spent trapped in traffic not only wastes fuel, resulting in higher out-of-pocket costs for businesses and households, but also wastes time that could be spent engaged in more productive activities.

Managing congestion on Florida roads is one of the most critical components of the state's unfunded transportation needs. Congestion is not only costly to commuters and travelers, but also to businesses whose freight trucks are delayed.

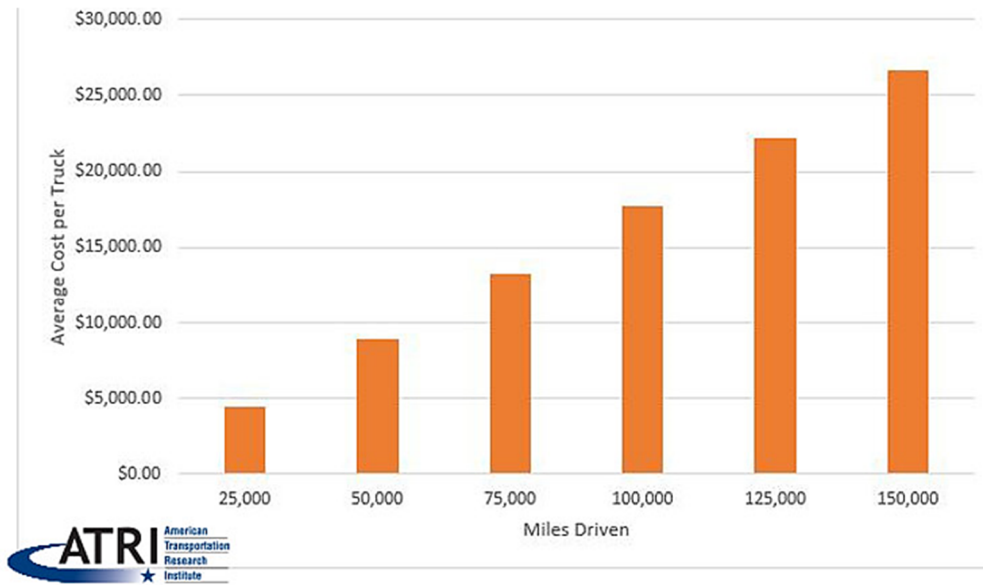
Seventy-seven percent of the \$400 billion worth of goods delivered annually from Florida is transported by trucks on the state's highways. An additional 16 percent is delivered by parcel, U.S. Postal Service, or courier, which also use highways.<sup>65</sup> **Figure 2-17** shows the average cost of traffic congestion per truck mile driven.

Delay on the NHS calculated to be over 728 million hours equating to approximately \$49.6 billion in increased congestion-related costs to the trucking industry.

- Estimating the Cost of Congestion to the Trucking Industry, ATRI 2016

<sup>65</sup> TRIP, *Key Facts about Florida's Surface Transportation System and Federal Funding*, April 2015

**Figure 2-17: U.S. Average Cost of Traffic Congestion per Truck Mile Driven**



Source: American Transportation Research Institute, 2016

According to TRIP, a national non-profit transportation research group based in Washington, D.C., 59 percent of Florida’s major urban interstates are congested during peak hours.<sup>66</sup>

“Florida’s Current and Future Heavily Congested SIS Corridors, January 2017”, states that 275 of the 4,575 (approximately 6 percent) highway miles on the SIS are congested.<sup>67</sup>

FDOT’s SIS Bottleneck Study of 2015, **Figure 2-18**, identified the top five statewide freight bottlenecks as:

- I-4 WB – N 36<sup>th</sup> St. to I-275
- US 27 – SR 821 to SR 826
- I-275 NB over Old Tampa Bay
- SR 826/Palmetto Expressway SB – NW 74<sup>th</sup> St. to NW 25<sup>th</sup> St.
- I-95 NB – SR 838 to SR 816

- Florida is ranked #1 for total cost of congestion per mile basis; accounting for over \$4.6 billion and 9.3 percent share of the total cost of congestion.
- Florida also ranks 5th for the cost per NHS segment mile by state; accounting for 17,329 NHS segment miles at \$267,354 per mile.

- American Transportation Research Institute, 2016

<sup>66</sup> [http://www.tripnet.org/docs/Fact\\_Sheet\\_FL.pdf](http://www.tripnet.org/docs/Fact_Sheet_FL.pdf)

<sup>67</sup> [http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily\\_Congested\\_Corridors\\_2017.pdf](http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily_Congested_Corridors_2017.pdf)

**Figure 2-18: Statewide SIS Freight Bottlenecks**

Source: FDOT's SIS Bottleneck Study of 2015

Projects such as widening lanes and shoulders, upgrading roads from two to four lanes, adding or improving medians, and improving road markings and traffic signals can reduce accidents and improve traffic flow to help relieve congestion.

Transportation provides a myriad of benefits. An improved system can save motorist time and money by reducing congestion, gas consumption, and wear and tear on vehicles, as well as improving safety. Increased transportation spending itself creates jobs and has a large return on investment, as much as \$5.60 for each dollar spent.

### Funding

Florida receives funding for its transportation system from several sources including Federal, State, MPO's, Local Municipalities, and Tolling Authorities. Each of these sources contributes funds for improving the infrastructure and safety of the transportation system for both passengers and freight users.

#### *Current Funding Sources*

In July of 2012, MAP-21, was signed into law by then President Barack Obama. MAP-21 funded surface transportation programs at more than \$105 billion for fiscal years (FY) 2013 and 2014. MAP-21 was the first long-term highway authorization bill enacted since 2005. Following MAP-21, the FAST Act was passed in December 2015. The FAST Act authorizes \$305 billion over fiscal years 2016 through 2020 for highway,



highway and motor vehicle safety, public transportation, motor carrier safety, hazardous materials safety, rail, and research, technology, and statistics programs.

MPO's receive Federal, State, and Local funding to carry out their required tasks. They receive FHWA Section 112 (Planning or PL) funds that are set aside specifically by Congress to perform the metropolitan planning process. These funds can be used for up to 80 percent of a project, with the required 20 percent match. Florida uses toll credits as a "soft match" provided by the State for the 20 percent match. MPO's also receive Federal Transit Administration Section 5303 funds for transit planning and research activities. Like the PL funds, these 5303 funds also can be used for 80 percent of a project with the 20 percent match. MPO's are responsible for approving transportation projects funded with Federal assistance, regardless of the grant program.

Through the MPO process, there is coordination between local jurisdictions and stakeholders to ensure that prioritized and funded projects are meeting the needs of the community, region, and state.

Florida's State funding budget for FY 2015/16 appropriated approximately \$10 billion for transportation. The cost to maintain and improve roadways is expensive and reliant on public funding from Federal, State, and Local sources generated from different types of taxes. The gas tax brings in over half (57 percent) of the State transportation revenue. Florida's State and Local governments spend less on transportation than the average state, spending \$551 per capita on transportation and only \$421 per capita on roads. This ranks Florida the 41st among the 50 states.<sup>68</sup>

FDOT has over \$12.9 billion in highway projects funded through 2021 on the SIS Network and another \$2.17 billion in other modal projects.

- Florida TaxWatch – Meeting Florida's Transportation Investment Needs, February 2016

Tolling authorities contribute to the maintenance and infrastructure of the transportation system by using the funds collected by tolls on roadways and bridges to maintain those specific roadways and bridges relieving FDOT of the additional costs.

#### *Concerns with Sustainability of Current Funding Options for the Future*

Fuel taxes have historically funded 90 percent of the federal Highway Trust Fund (HTF). Due to the decline of tax collections in recent years, largely because of inflation's effect on the real value of the tax rates and reduction in vehicle miles traveled, some members of Congress are concerned that the HTF is no longer self-sustaining. Since 2008, Congress has prevented projected shortfalls in the HTF by transferring \$69.9 billion from the Treasury's general fund to the HTF.<sup>69</sup>

The Federal Fuel Tax is currently set at 18.3 cent/gallon for gasoline, 24.3 cents/gallon for diesel, and a 0.10 cents/gallon is added to both gasoline and diesel to fund the HTF (**Table 2-4**). This fuel tax has not increased since 1993.<sup>70</sup> It is also not indexed for inflation and the inflation rate from 1993 until 2015 was 64.6 percent; therefore, the real rate of tax has remained static and actual revenues have declined. More

<sup>68</sup> Florida TaxWatch – Meeting Florida's Transportation Investment Needs, February 2016

<sup>69</sup> Congressional Research Service – The Federal Excise Tax on Motor Fuels and the Highway Trust Fund: Current Law and Legislative History, August 12, 2015

<sup>70</sup> Kiplinger – A Brief History of the Federal Gasoline Tax, July 2, 2014

fuel-efficient vehicles and more modal alternatives also have added to the decrease in revenues, since users are purchasing less fuel and seeking alternative modes of transportation.

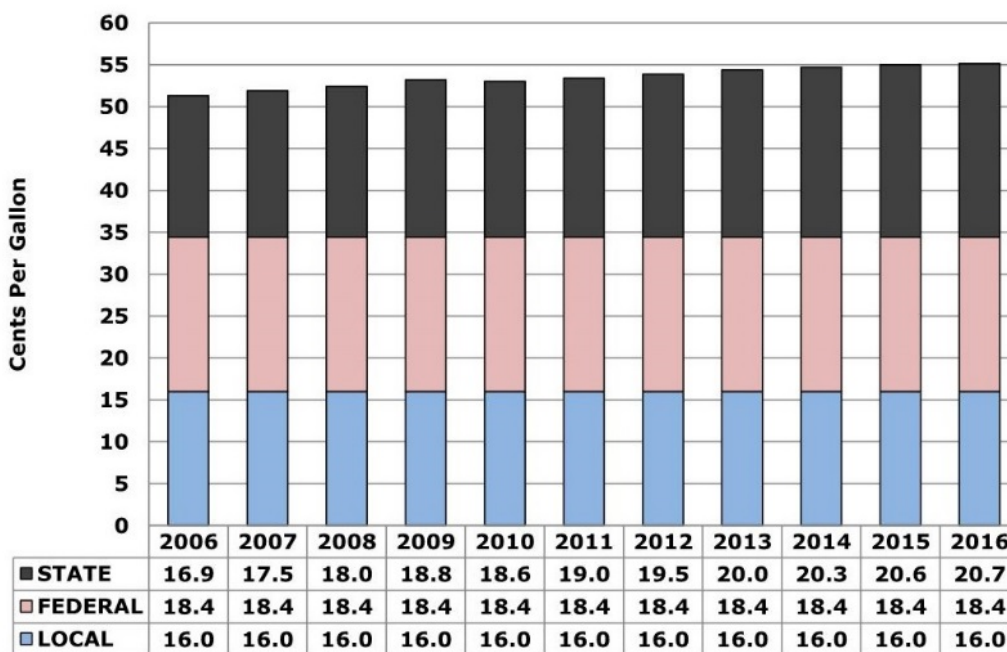
**Table 2-4: Federal Motor Fuel Excise Tax Rates Under Current Law**

Category	Current Tax Rate (Cents / Gallon)	Expiration Date of Current Law Rate	Permanent Law Tax Rate (Cents / Gallon)
Gasoline	18.3	September 30, 2016	4.3
Diesel	24.3	September 30, 2016	4.3
Leaking Underground Storage Tank (LUST) Trust Fund Tax	0.10	September 30, 2016	Expires

Source: Internal Revenue Code Section 4081

Currently Florida’s fuel tax rate is at 36.58 cents/gallon of gasoline and 33.77 cents/gallon of diesel. Florida’s fuel tax rate varies with the Consumer Price Index (CPI). **Figure 2-19**, shows the gradual rate increase of fuel taxes over time.

**Figure 2-19: Historical Fuel Tax Rates**



Source: FDOT Comptroller Office

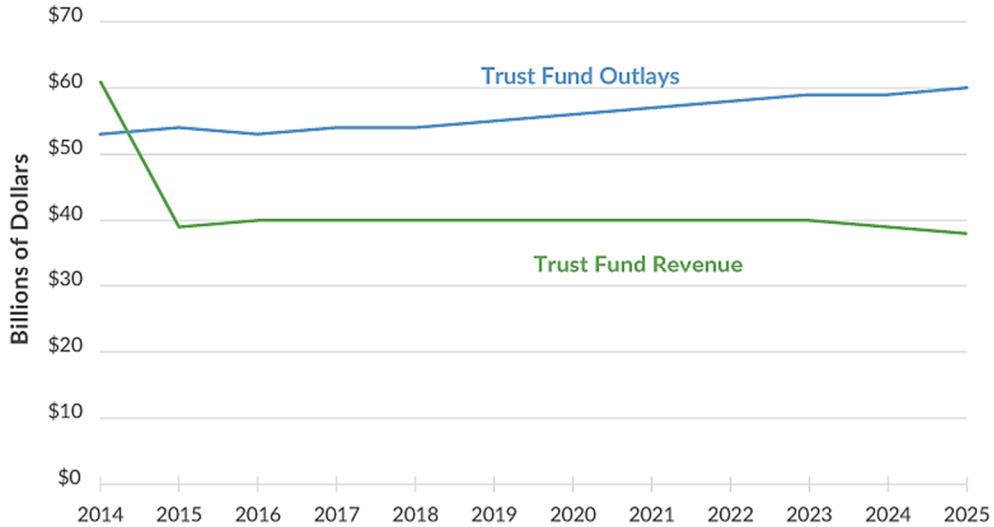
The Congressional Budget Office projects that from now through 2025, the HTF will have a cumulative deficit of about \$168 billion after adjusting for transfers (**Figure 2-20**). One possible reason why the HTF has insufficient revenue to cover its current obligations is the constant erosion of the value of the gas tax, its largest source of funding.

Several proposals have been made to find a solution that ensures the HTF remains solvent, but there is a political divide on how to address this issue.

According to the “Tax Foundation – Options to Fix the Highway Trust Fund”, if Congress does decide to pursue revenue options to fix the HTF, they should avoid unsound tax policy and instead pursue a permanent

policy that conforms to the benefit principle. One option is to increase the gas tax, adjust it to inflation, and offset that increase by reducing another tax by the same amount of revenue. This swap would be revenue neutral: an exchange of one tax for another.

**Figure 2-20: Estimated Highway Trust Fund Outlays and Revenues 2014-2025**



Source: CBO Tax Foundation

Other options that have been mentioned are listed in **Table 2-5** with the advantages and disadvantages of each option:

**Table 2-5: Options for Funding the Highway Trust Fund**

Option	Advantages	Disadvantages
<b>Vehicles miles traveled (VMT)</b> – drivers would pay a flat rate per mile for the total number of miles that their vehicle traveled in a given amount of time	It represents the most direct form of payment for user fee and many would view it as a fair solution	Implementation could be difficult, there are tremendous capital costs for implementation, and it would present a fairness issue for out of state drivers.
<b>Raise a sales tax</b> – even a small increase such as half cent would have a major effect in generating funds for transportation infrastructure	A small increase would be relatively easy to pass	It is a non-direct form of payment
<b>Implement tolls</b> – local municipalities have long used tolls to fund local road and bridge projects, and it works because people who use the infrastructure help pay for it	It would be a direct user fee and many would view it as a fair solution	Implementation could be difficult, and there would be large capital costs for implantation infrastructure and management
<b>Raise the gas tax</b> – people pay for what they use; if someone uses a whole tank of gas driving and putting that wear and tear on the transportation infrastructure, they directly pay for that use when they fill their tank up and pay an amount for that use	It is fair in the sense that users pay per amount of gas they use	Due to the changing ways that Americans are driving, this seems to be an unsustainable option
<b>Cut and divert</b> – cut and divert funds from an existing budget area. Main issue with this option is finding a yearly recurring account from which that the money would come. Efficiency, especially in large organizations, is vital, and to be able to trim the budget from somewhere within the government instead of raising taxes would enable the government to do more with less	There would be no increase in tax or fee.	Finding existing funds could prove to be difficult.

Source: Tax Foundation – Options to Fix the Highway Trust Fund, 2015

### 2.3.10 DRIVER DISTRACTION

The use of technology in all vehicles is increasing. While there is no common definition in the research community, known forms of distracted driving include:

- Visual distractions, (i.e. looking away from the roadway)
- Auditory distraction (i.e. response to a ringing phone)
- Biomechanical distraction (i.e. manually adjusting the radio volume)
- Cognitive distraction (i.e. lost in thought)
- Combinations of distractions such as eating or searching for a phone

The FMCSA is promoting the phrase: “No Call, No Text, No Ticket”, as a friendly reminder to avoid driver distraction.

FMCSA prohibits texting by CMV drivers while operating in interstate commerce and imposes sanctions, including civil penalties and disqualification from operating CMVs in interstate commerce, for drivers who fail to comply with this rule. Additionally, motor carriers are prohibited from requiring or allowing their drivers to engage in texting while driving. FMCSA amends its commercial driver's license (CDL) regulations to add to the list of disqualifying offenses a conviction under state or local traffic laws or ordinances that prohibit texting by CDL drivers while operating a CMV, including school bus drivers. Recent research commissioned by FMCSA shows that the odds of being involved in a safety-critical event (e.g., crash, near-crash, unintentional lane deviation) is 23.2 times greater for CMV drivers who engage in texting while driving than for those who do not. Texting drivers who took their eyes off the forward roadway for an average of 4.6 seconds which at 55 miles per hour equates to a vehicle traveling 371 feet before a driver reaction. In circumstances where a crash happens, violations negatively impact SMS results.

This rulemaking increases safety on the nation's highways by reducing the prevalence of or preventing certain truck- and bus-related crashes, fatalities, and injuries associated with distracted driving. The rule can be found at 75 FR 59118.

Federal fines and penalties for texting while driving can result in driver disqualification. Penalties can be up to \$2,750 for drivers and up to \$11,000 for employers who allow or require drivers to use hand-held communication devices for texting while driving.

In 2013, the State of Florida passed a “Florida Ban on Texting While Driving Law” (s. 316.305, F.S.), which addresses the prohibition of using wireless communications devices while driving. This law is only enforceable as a secondary action. The “Put It Down” Proclamation was signed in 2013, by Florida Governor Rick Scott to promote safe driving.

To fight distracted driving, cellular carriers are devising ways to block incoming calls and texts when a phone is in a moving car. T-Mobile is leading the way with its new DriveSmart service, available at \$4.99 a month. The company's DriveSmart service automatically disables a phone in a moving car by sensing switches between cell towers. When a vehicle has been moving for 10 seconds, calls are silently sent to voicemail. Text messages are answered with an automatic response, explaining that the recipient is driving. Other cell carriers could soon follow T-Mobile's lead. According to *The New York Times*, Sprint, Nextel and AT&T are exploring the technology, and Verizon Wireless has been working with small companies to offer a service similar to DriveSmart. In recent months, mobile application (app) developers have introduced related products such as SafeCell, PhoneGuard, and Drive Safely.

The FDOT, in a public-private partnership with GEICO Insurance, unveiled a statewide safety campaign in June of 2015, to tackle the problem of distracted driving on Florida's roads. As part of a national effort to encourage drivers to pull into a safe location to use their phone for calling, texting, and accessing mobile apps, Florida has designated 64 Rest Areas, Welcome Centers, and Turnpike Service Plazas throughout the state as "Safe Phone Zones," more than any other state.

### 2.3.11 EMPTY BACKHAUL

Empty backhaul continues to be a large issue in the trucking industry. According to research done by the National Private Truck Council, approximately 28 percent of all miles traveled by private fleets are with empty trucks.<sup>71</sup> Having over a quarter of all trucks empty significantly reduces both productivity and profitability of the motor carrier industry. Additionally, empty backhaul causes many negative consequences for other areas, as well. Environmentally, the high number of empty trucks causes an additional amount of emissions being released into the atmosphere without a counterbalance of goods delivered. Empty trucks from a transportation system perspective add to congestion on the roads. Fuel consumption by trucks in the United States accounted for approximately 26.5 percent of total highway fuel consumption at 44.957 billion gallons in 2010.<sup>72</sup> Fuel used by trucks carrying little to no cargo is a big part of this value. Addressing empty backhaul is a significant opportunity to reduce costs and environmental impacts for the commercial motor vehicle industry.

#### Trading Challenges and Opportunities

Florida face major challenges and opportunities directly affecting commerce and the commercial motor vehicle industry. Geography is both a challenge and an opportunity. Being a peninsula in the southeast corner of the United States, Florida is not necessarily in the most economical location for imports and exports needing to be transported throughout the country and worldwide. A recent study, *Analysis of Global Opportunities and Challenges for Florida Seaport, 2015*, identified the imbalance of truck flows to and from the State as an important strategy for the ports and the State to market to ocean carriers, beneficial cargo owners, distribution center developers and manufactures. With the imbalance of full inbound truckloads to empty northbound returns, carriers, manufactures, and distribution centers could be able to secure favorable backhaul rates for northbound distribution of imported containerized cargo and transloaded cargo. This would further enhance the attractiveness of utilizing Florida transportation system and moving north discretionary cargo not destined for the state's consumer base. The CMV industry could benefit by a more robust two-way movement of goods to and from the southeast U.S.

At the same time, Florida's proximity to the nations of the Caribbean Basin, Central and South America, and Mexico does provide significant two-way trade opportunities to import and export goods utilizing Florida's transportation network. Accessibility to imports from these regions not only serves Florida's growing population and annual visitors, but greatly increases the volume of goods that do move and could move through Florida to other states. As the global north-south and east-west trade routes continue to expand, Florida has the capability to benefit from the expansions (**Figure 2-21**).

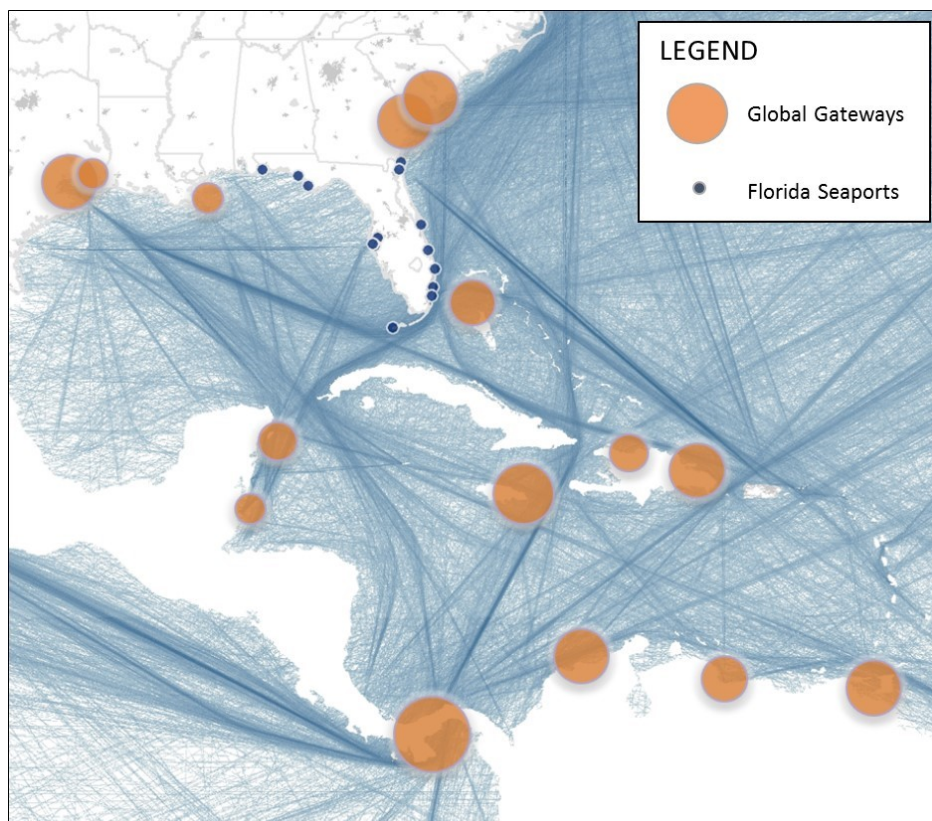
The State also produces many tons of goods such as oranges and airplane parts to be exported across the nation and the globe. According to the U.S. Census Bureau, Florida's top U.S. export is civilian aircraft,

<sup>71</sup> National Private Truck Council. <http://www.nptc.org/gary-petty-column-3/538-benefits-of-fleet-optimization-center-march-2009-issue>

<sup>72</sup> Federal Highway Administration. [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/nat\\_freight\\_stats/docs/12factsfigures/table5\\_7.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/12factsfigures/table5_7.htm)

engines, and parts.<sup>73</sup> Florida also produces many other electronics, turbine parts, motorboats, and small machines to be distributed throughout the country and worldwide. Employing a strategy to encourage the relocation of manufacturers to Florida to be closer to the distribution system and to focus on the development of Florida-grown manufacturers also will help solve the empty backhaul dilemma.

**Figure 2-21: Florida and Latin America Sea Trade Lanes and Global Gateways**



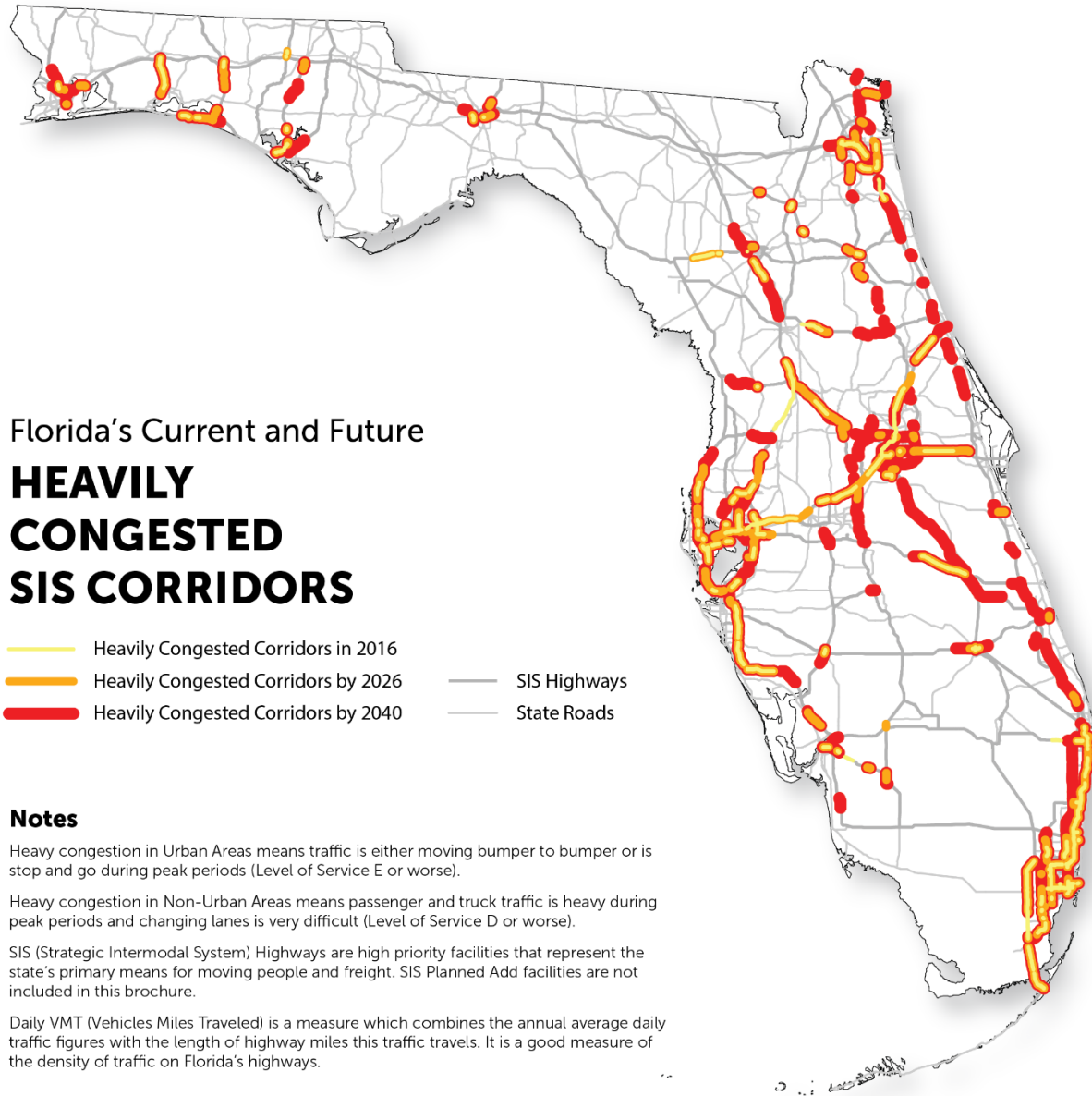
Source: [http://www.flchamber.com/wp-content/uploads/2016/08/FloridaTradeandLogisticsStudy\\_December2010.pdf](http://www.flchamber.com/wp-content/uploads/2016/08/FloridaTradeandLogisticsStudy_December2010.pdf)

Another challenge for Florida is the shrinking transportation capacity. Many of the current systems, including SIS highways, soon will become unable to support the predicted traffic volumes (**Figure 2-22**).<sup>74</sup> Limited funding will restrict the needed improvements to support the higher demand on major transportation routes. In addition, continued investment in port infrastructure to service the large container ships and megaships is critical to facilitate the flow of goods through Florida ports. This value-added component of the supply chain creates jobs and economic growth for Florida workers and companies. If trade cannot move efficiently and cost-effectively through Florida's transportation network, it will seek and find other alternatives. These are significant challenges facing the State if not addressed in the years to come.

<sup>73</sup> US Census Bureau. <http://www.census.gov/foreign-trade/statistics/state/data/fl.html>

<sup>74</sup>Florida Department of Transportation. [http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily\\_Congested\\_Corridors\\_2017.pdf](http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily_Congested_Corridors_2017.pdf)

**Figure 2-22: Florida’s Current and Future Heavily Congested SIS Corridors - 2017**



Source: [http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily\\_Congested\\_Corridors\\_2017.pdf](http://www.fdot.gov/planning/systems/programs/mspi/pdf/Heavily_Congested_Corridors_2017.pdf)

Current Trade Logistics

According to calculations published by the Florida Chamber Foundation, there is a large imbalance of trade flow entering and exiting Florida (**Figure 2-23**). This difference in imports and exports plays a large part in the reason why many trucks leave the state mostly or completely empty. Florida needs to close this gap in order to help minimize the effects on the empty backhaul problem faced by the state.

Figure 2-23: Florida Trade Flows



Source: [http://www.flchamber.com/wp-content/uploads/2016/08/FloridaTradeandLogisticsStudy\\_December2010.pdf](http://www.flchamber.com/wp-content/uploads/2016/08/FloridaTradeandLogisticsStudy_December2010.pdf)

### Prevention of Empty Backhaul

One of the main ways to prevent loss in revenue due to empty backhaul is early detection and planning. Currently, companies and various entities are exploring opportunities to minimize the losses due to empty or light backhaul. An example of this optimization would be: Company **A** picking up an order for Company **B** on a return trip to a common destination. By doing this, both companies and organizations benefit because they are able to split the cost of the return trip instead of having a second vehicle make that trip.

One non-profit organization aiming to optimize the consumer goods industry supply chain is the Voluntary Interindustry Commerce Solutions Association (VICS). Their program known as “Empty Miles” allows dozens of trucking companies to list their empty truck routes on a common website. By doing so, companies are able to collaborate and thus, save a great deal of time and money. To put the potential savings of using empty backhaul services in perspective, the retail company, Macy’s, uses “Empty Miles” and is expected to save approximately \$25,000 per empty route according to an article by *The New York Times*.<sup>75</sup> Of the 328 routes Macy’s posted, 70 of them were filled yielding a savings of approximately \$1,750,000. Furthermore, the Empty Miles program has saved millions of dollars for the companies in terms of diesel cost. As a result of Empty Miles, Schneider National claimed to have saved 5,554 gallons of diesel fuel which in turn prevented 61.65 tons of carbon dioxide from being released into the atmosphere.

As trade opportunities continue to increase, the challenge is to create ways to reduce the number of empty trucks moving across Florida’s transportation network.

<sup>75</sup> *The New York Times*. [http://www.nytimes.com/2010/04/22/business/energy-environment/22SHIP.html?\\_r=0](http://www.nytimes.com/2010/04/22/business/energy-environment/22SHIP.html?_r=0)



### 2.3.12 ALTERNATIVE FUELS

Throughout history, the primary fuel of choice for motor vehicles has changed from one kind to another due to factors such as availability, new technology, regulations and costs. Today, a variety of alternatives to diesel are being investigated for use in heavy trucks. These include cleaner diesel alternatives such as bio diesel, algae based diesel, dimethyl ether, hybrid, electric technology, hydrogen fuel cells, natural gas, and propane.

Bio diesel is produced from a variety of fats and oils. It can be used in compression-ignition (diesel) engines with little or no modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics. One of the most common sources is soybean oil. Biodiesel reduced CO<sub>2</sub> emissions by 78 percent compared to petroleum diesel.<sup>76</sup>

Hydrogen fuel cells also are being developed for use in heavy trucks. A hydrogen fuel cell directly converts the chemical energy in hydrogen to electricity powering an electric motor. Hydrogen electric engine trucks have more horsepower and double the torque of clean diesel and liquefied natural gas trucks with zero emissions. Furthermore, this technology allows these engines to be quieter creating less noise pollution.<sup>77</sup>

Another alternative fuel growing in popularity is compressed or liquefied natural gas (CNG/LNG). Natural gas is plentiful in North America and is one of the cleanest burning hydrocarbons. Natural gas emits virtually no particulates when used as a transportation fuel and produces 25 percent less CO<sub>2</sub> emissions than oil and 50 percent less CO<sub>2</sub> emissions than coal.

Natural gas is fast becoming a popular alternative fuel for private and public fleets. It is used in 1 in 4 American transit buses and is increasingly seeing use in school bus fleets, delivery vehicles, and over-the-road-trucks. It is particularly appealing for commercial fleets due to its potential to reduce fuel expenses by up to 50 percent compared to traditional gasoline, lowered maintenance costs, and ease of training for mechanics and maintenance personnel.

The FAST Act included a provision to address one of the drawbacks of converting heavy trucks to use natural gas: the added weight of the LNG equipment. The modifications needed for a diesel truck to use natural gas could add up to 2,000 pounds of weight. This additional weight lessens the amount of freight the truck can carry while staying within the required weight standards. The FAST Act exempts the weight attributable to the natural gas propulsion system from the total vehicle weight calculations.

Alternative fuels have the potential to drastically impact the motor carrier industry as they impact trucks, the very heart of the industry. It remains to be seen whether one of the alternatives listed above, or a yet-to-be discovered technology, will become the fuel of choice for the industry. Motor carriers will need to closely monitor alternative fuel advancements in order to make informed business decisions as these alternatives become available.

Almost all of the major heavy truck manufacturers and large transport fleet owners are actively investigating fuel alternatives and watching advancements in technology. As with most business decisions, the primary factor determining employment of new technology is cost. In order for a motor carrier to adopt new fuels and technology, they must be able to realize cost savings or other benefits sufficient to overcome the initial cost of purchasing new or retrofitting existing equipment. The current price of diesel is a large

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<sup>76</sup> Biodiesel Facts. [www.biodiesel.org](http://www.biodiesel.org)

<sup>77</sup> TTSI Logistics. <http://www.tts-i.com/sustainability>

part of this decision-making process. When diesel prices are lower, there is less incentive for motor carriers to adopt alternatives. Conversely, increases in diesel prices or new regulations also may serve to speed up the adoption of alternative fuels.

In 2011, Florida was home to two natural gas fueling stations. That number has now grown to 30 with more planned or under construction.<sup>78</sup> The State also has a Natural Gas Fuel Fleet Vehicle Rebate program administered by the Department of Agriculture and Consumer Services. The program provides a rebate of up to \$25,000 for the cost of converting a vehicle to natural gas. Each applicant is eligible to receive up to \$250,000 per fiscal year on a first come, first served basis. Florida also is deferring state tax collection on natural gas until 2018, when the tax will be equal to that of a gallon of diesel (currently 21 cents).<sup>79</sup>

### 2.3.13 HARMONIZATION

Regulatory consistency is a major concern in the commercial vehicle industry. Although some federal agencies such as the FMCSA set guidelines for all motor carriers within the United States, often individual states place additional rules for vehicles driving through their state. These variations can lead to problems within the industry, as many trucks travel long distances over multiple state borders.

The Florida Highway Patrol (FHP) Office of Commercial Vehicle Enforcement provides a Commercial Motor Vehicle Manual. In the manual, the FHP outlines all the rules, regulations, and permits required by commercial motor vehicles within Florida. The purpose of the manual is to ensure drivers know how to comply with the laws and regulations set forth within the State. This is important to ensure that all motor carrier activities within Florida are safe and economical. The manual provides detailed explanations on everything from size and weight limits to the angle at which flags must be mounted on oversized vehicles. Truck drivers traveling in the state are able to reference this manual to guarantee that they are in compliance. Basic requirements for operating CMVs in Florida include:

- A valid and current tag registration
- Department of Highway Safety and Motor Vehicles fuel decal if the vehicle combination exceeds 26,001 pounds GVW or if the power unit has three or more axles, regardless of weight, and if operating interstate
- Correct size and weight
- All parts and equipment in safe working condition
- Display of a valid Florida or US DOT number<sup>80</sup>

While CMV drivers have the Commercial Motor Vehicle Manual to reference when driving in Florida, problems start arising once they cross into one of the border states. The two states that border Florida are Georgia and Alabama. While all three states follow the general guidelines set forth by the FMCSA, each state has their own additional regulations.

<sup>78</sup> Florida Natural Gas Association <http://floridagas.org/>

<sup>79</sup> Florida Department of Agriculture and Consumer Services. [www.freshfromflorida.com](http://www.freshfromflorida.com)

<sup>80</sup> *Commercial Motor Vehicle Manual 2013*

An example of regulatory consistency common for motor carriers is the need for various permits when traveling from state to state. Florida, Georgia, and Alabama are all members of what is known as the International Registration Plan (IRP), which is an agreement between all states within the continental United States, the District of Columbia, and all Canadian provinces. The International Registration Plan allows for commercial vehicles to travel through multiple states or provinces and only pay registration fees in one jurisdiction.<sup>81</sup> This fee is then split up between the various jurisdictions based on the percentage of the trip spent in each state. Commercial motor vehicle drivers have the option of paying the one registration fee or buying trip permits for each state through which they are traveling.

Trip permits and fees associated with the various types can vary from state to state. Most states require the permits to be purchased in advance and placed on the vehicle prior to entry into the state. Without proper permits, CMV drivers are subjected to various penalties and fines. What one state considers as a safe operating weight on its roads could be twice as much as the bordering state. The way to avoid penalties is to improve the consistency over state lines.

One important regulation that can vary from state to state is the age at which drivers can get their commercial driver's license (CDL). Florida, Georgia, and Alabama are all states that allow drivers between the ages of 18-21 to operate CMV to specific size and weight specifications within their respective state. Other states throughout the United States also have various age restrictions with some allowing drivers as young as 16 years old to operate CMV within their state. The reason that younger operators are not allowed to travel over state borders is because of a US DOT restriction. At the age of 21 years old, the interstate restriction is lifted, and the drivers are able to operate motor vehicles in other states.

The downside of this interstate restriction on age of driver is that it can often discourage younger drivers from pursuing a commercial driver's license. Since younger drivers are restricted to driving only within the state in which they applied for the license, this situation can lead to smaller job opportunities and salaries. If these drivers relocate to another state, they have to apply for a new standard driver's license in that state as well as apply again for a CDL.

Currently, some states have different requirements to obtain commercial driver's licenses. In Maine, one must be 16 years old, have a driver's license, obtain a medical certificate, and pass the written exam and driving test. While most states have similar requirements, some mandate additional conditions such as passing a vision exam. Standardizing the requirements for obtaining commercial driver's licenses and lifting the interstate restriction that would allow drivers to begin driving at a younger age are two ways to encourage more persons to consider the trucking industry as a career.

Another problem faced by motor carrier drivers crossing state borders is that of the state motor fuel tax. Motor fuel tax, specifically diesel fuel tax as it pertains to commercial motor vehicles, plays a large part of the price of fuel from state to state. **Table 2-6** illustrates the difference in price of the fuel taxes in Florida and the neighboring states. The problem with these taxes is that it can cause large fluctuations in the price for fuel as a driver crosses from one state to another. Especially for privately-owned companies that are heavily dependent on profits, traveling through and doing business within states with higher diesel taxes are not always worth the investment.

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<sup>81</sup> International Registration Plan <http://www.irponline.org/?page=EDUFAQ#9>

**Table 2-6: Motor Fuel Taxes as of April 1, 2017**

State	Gasoline Tax Total (State and Federal Tax in Cents/Gallon)	Diesel Tax Total (State and Federal Tax in Cents/Gallon)
Alabama	41.31	46.29
Florida	55.19	58.17
Georgia	49.49	58.59
Louisiana	38.41	44.41
Mississippi	37.19	42.80

Source: American Petroleum Institute<sup>82</sup>

It is important to address consistency among laws and regulations of commercial motor vehicles across state lines for a variety of reasons, and coordination between States and the Federal government is key. Different permitting and fees from one state to another can cause confusion and penalties if not properly conveyed to drivers. For this reason, it is also helpful to make sure the proper permitting is easy to understand and readily available to drivers.

### 2.3.14 SIZE AND WEIGHT

#### Truck Size and Weight Impacts

Approximately four-fifths of all expenditures on U.S. freight transportation are being accounted for by the trucking industry.<sup>83</sup> Federal and State regulations have established standards regarding size and weight of commercial motor vehicles in order to preserve the infrastructure including pavement, highway facilities, and structures, as well as to ensure safe and efficient travel of both freight and non-freight related vehicles. Furthermore, since size and weight issues are two of the primary conditions contributing to trucking costs, regulating these factors can have significant economic impacts.<sup>84</sup>

Commercial motor vehicle size and weight have been regulated by the Federal government since 1956, although the majority of these limitations were established during the Surface Transportation Assistance Act (STAA) of 1982.

Primarily due to safety concerns with longer and heavier vehicles, as well as the increased wear and tear from these vehicles, the STAA placed a weight limit of no more than 80,000 pounds for CMVs traveling on the Interstate Highway System. Furthermore, with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Congress further limited trucks weighing more than 80,000 pounds to only allow these vehicles on certain routes. **Figure 2-24** presents an overview of the federal truck size and weight limits.

The FHWA is the administrative body that is responsible for making sure states comply with the federal standards regarding truck size and weights. However, the federal truck size and weight limits do not apply to all of the nation's highways (**Figure 2-25**). Where Federal standards do not apply, states can set their own regulations that can be more or less restrictive than the federal standards.<sup>85</sup>

<sup>82</sup> American Petroleum Institute. <http://www.api.org/~media/Files/Statistics/StateMotorFuel-OnePaggers-Apr-2017.pdf>

<sup>83</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr267.pdf>

<sup>84</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr267.pdf>

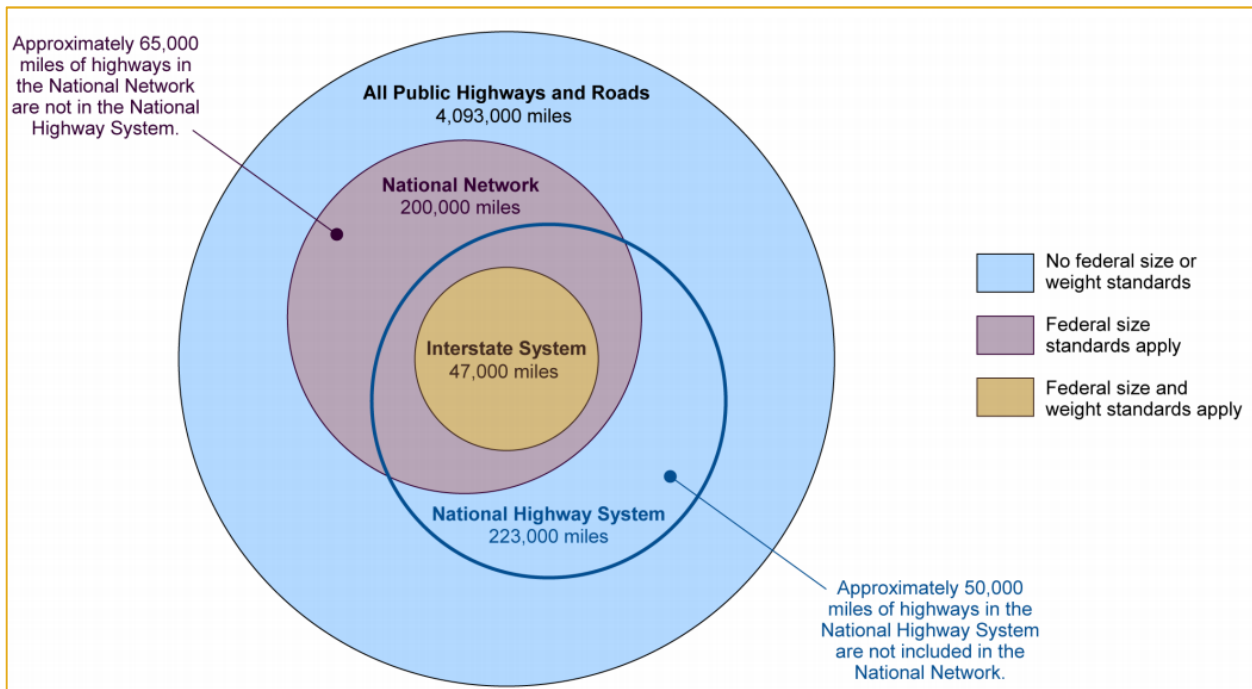
<sup>85</sup> <http://www.gao.gov/assets/670/668711.pdf>

**Figure 2-24: Federal Vehicle Size and Weight Standards**



Source: The U.S. Government Accountability Office (GAO)

**Figure 2-25: Highway Miles Subject to Federal Size and Weight Standards by Highway System, 2012**



Source: The U.S. Government Accountability Office (GAO)

Chapter 316 of the Florida Statutes and Title 49 of the Code of Federal Regulations regulate maximum weight and size of trucks. In Florida, the Florida Highway Patrol Office of Commercial Vehicle Enforcement (OCVE) enforces these laws. On the Interstate System, truck weights and sizes are checked by FDOT weight inspectors at one of the state’s 20 fixed weigh station locations or through mobile enforcement with portable scales. **Table 2-7** presents an overview of the truck size and weight limits in Florida.

**Table 2-7: Truck Size and Weight Limits in Florida**

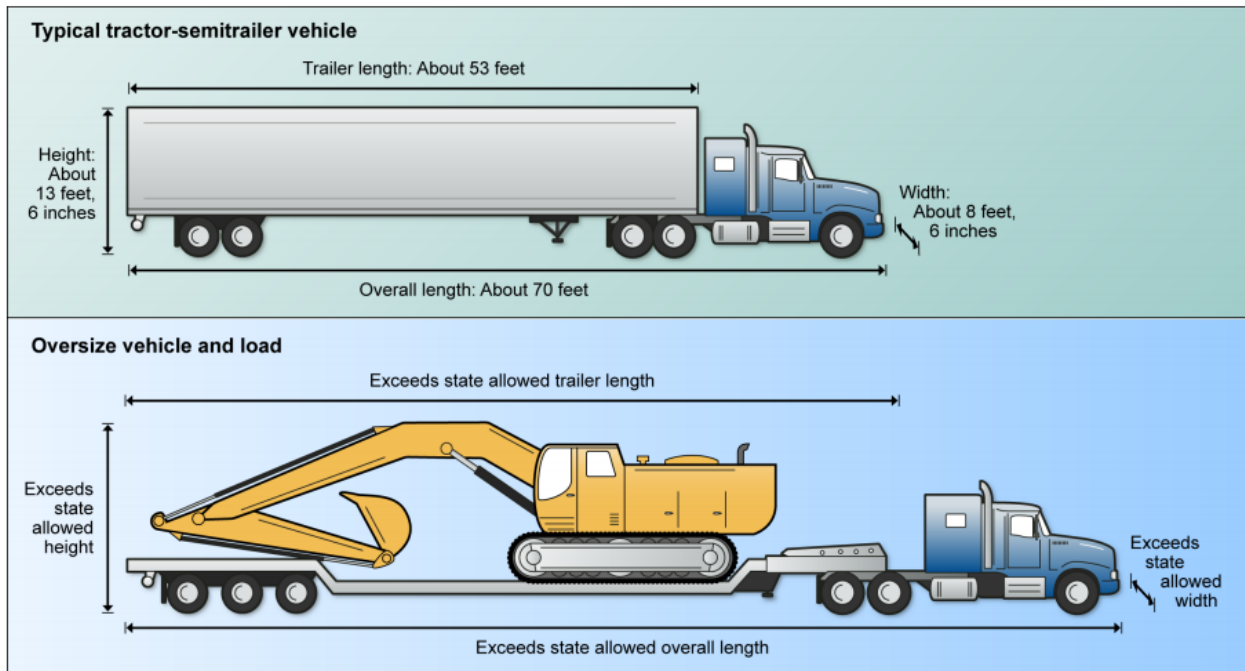
Category	Limit
Gross Weight (Under Certain Conditions)	80,000 Lbs.
Single Axle, Maximum Weight	22,000 Lbs.
Tandem Axel, Maximum Weight	44,000 Lbs.
Semi-Trailer Length Including Load (Commercial Vehicles Only)	48'/53'
Automobile and Boat Transporter Semi-Trailers	50'
Single Unit	40'
Straight Truck-Trailer Combination	68'
Buses	50'
Width of Truck/Load (On Road With Traffic Lanes 12' Wide or More)	8'6"
Height	13'6"
Maximum Overhang Over Front or Front Bumper of Vehicle	3'
Bus Combination- Non-Commercial Vehicle	65'
Non-Commercial Vehicle Combinations (Maximum of One Trailing Unit)	65'

Source: Florida Highway Patrol, 2013

Oversize/Overweight Trucks

Trucks that do not adhere to the federal and/or state size and weight standards are considered to be "oversize" and/or "overweight". **Figure 2-26** presents two examples of oversize/overweight vehicles.

**Figure 2-26: Typical and Oversize Vehicles and Loads**



Source: The U.S. Government Accountability Office (GAO)

The federal government does not issue permits for transportation involving excess size or weight; this matter is up to the states. The FDOT issues oversize/overweight permits for a fee (Rule 14-26, Florida Administrative Code). These permits can be obtained and paid for online through FDOT's Permit Application Systems (PAS).<sup>86</sup>

FDOT is currently working on an electronic automated bypass system for oversize/overweight vehicles that would match trucks with permits electronically and allow compliant trucks to bypass the weigh stations. The system is expected to save enforcement time, but also to reduce time delays for the freight operators, caused by manual inspections of permit documents.

In a 2015 study, the U.S. Government Accountability Office (GAO) found that state regulations regarding truck size and weight limits vary significantly by state (within the Federal legal parameters) from 48 feet up to as much as 65 feet.

In addition, the study found that permitting practices and permitting criteria for oversize/overweight trucks varied by State. Most States utilize some form of online permitting system and require an escort vehicle to accompany an oversize/overweight vehicle (**Figure 2-27**). However, some States have implemented automated routing systems which provide the oversize/overweight vehicles with a specific route to follow.<sup>87</sup>

**Figure 2-27: Example of Escort Vehicle**



Source: [http://certifiedpilotcars.com/media\\_page.html](http://certifiedpilotcars.com/media_page.html)

A previous study conducted by Purdue University in 2002, had come to the same conclusions regarding the variability of state regulations regarding size and weight, as well as the differences in permitting criteria.

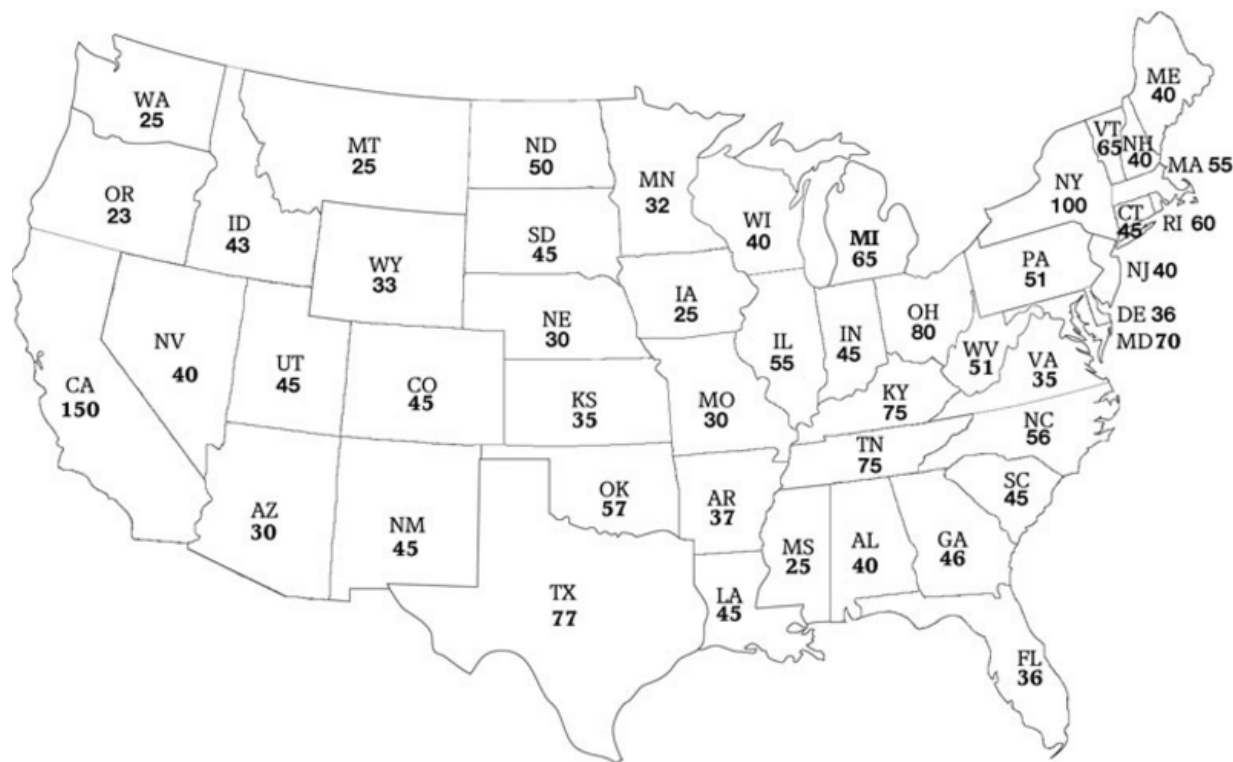
<sup>86</sup> <https://gis.dot.state.fl.us/PermitApplicationSystem/Account.aspx/LogOn?ReturnUrl=%2fPermitApplicationSystem>

<sup>87</sup> <http://www.gao.gov/assets/670/668711.pdf>

This study also concluded that permitting fees varied a great deal by state.<sup>88</sup> The differences in permitting fees could place certain states in a disadvantage where trucking companies would choose alternative routes through states with lower fees.

**Figure 2-28** presents an overview of the estimated permit cost (state permit fee + service fee) by State for oversized trucks that do not exceed the dimensions of 80'x12'x14'6".

**Figure 2-28: Estimated Oversize Permit Cost by State**



Source: <http://www.heavyhaul.net>

**The Future of Truck Size and Weight Limits**

*MAP-21 US DOT Comprehensive Truck Size and Weight Limits Study*

Since the Surface Transportation Assistance Act of 1982, some states, along with various interest groups of the trucking industry, have proposed changes to the federally-set truck size and weight limits.

In April 2016, the US DOT released the final results of a comprehensive study concerning current federal truck size and weight limits along with potential impacts of changes to those limits.

The study comprised extensive public outreach in order to understand how potential changes to the currently set limits would impact various groups with an interest in freight transportation.

<sup>88</sup> <http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2608&context=jtrp>



Overall the study concluded that not all interest groups would benefit from a potential increase to truck size and weight limits. In addition, it was determined that States had varying opinions regarding the Federal policy on truck size and weights: some States would prefer stronger federal control and some would prefer more flexibility. A conclusion of the study was that the US DOT determined that no changes should be made to federal policy regarding truck size and weights at this point in time.<sup>89</sup>

**FAST Act**

The Fixing America's Surface Transportation Act (FAST Act) authorized federal surface transportation programs for five fiscal years (FY 2016-2020). The following FAST Act Codes are applicable to truck size and weight limitations:<sup>90</sup>

- 23 U.S.C. 127 – Vehicle weight limitations – Interstate System
- 49 U.S.C. 31111 – Length limitations
- 49 U.S.C. 31112 – Property-carrying unit limitation
- 49 U.S.C. 31113 – Width limitation
- 49 U.S.C. 31114 – Access to the Interstate System

Furthermore, the FAST Act divides truck size and weight regulations into six categories:

- Milk Products (Sec. 1409)
- Interstate Weight Limits (Sec. 1410)
- Emergency Route Working Group (Sec. 5502)
- Additional State Authority (Sec. 5516)
- Automobile Transporter (Sec. 5520)
- Commercial Delivery of Light- and Medium-Duty Trailers (Sec. 5523)

**Table 2-8** presents an overview of the FAST Act provisions that modified federal requirements regarding truck size and weight on the Interstate System and the National Network.<sup>91</sup>

**Table 2-8: FAST Act Modifications to Truck Size and Weight Limits**

Category	Modification
Heavy-duty tow and recovery vehicles	The FAST Act exempts covered heavy-duty tow and recovery vehicles from federal interstate weight limits. [FAST Act §1410; 23 U.S.C. 127(m)]
Grandfathering of existing limits on certain highways	The FAST Act allows for the continuation of current state weight limits on certain routes in Texas designated as I-69. [FAST Act §1410; 23 U.S.C. 127(n)]The FAST Act allows for the continuation of current state size and weight limits on a segment of U.S. 63 in Arkansas if the segment is designated as an interstate system route. [FAST Act §1410; 23 U.S.C. 127(p)]
Logging vehicles in Wisconsin and Minnesota	The FAST Act increases the allowable weight of covered logging vehicles that may travel on certain segments of I-39 in Wisconsin and I-35 in Minnesota to gross weights of 98,000 and 99,000 pounds, respectively. [FAST Act §1410; 23 U.S.C. 127(q)]
Emergency vehicles	The FAST Act increases the maximum gross vehicle weight allowance of an emergency vehicle on the Interstate System to 86,000 pounds. [FAST Act §1410; 23 U.S.C. 127(r)]

<sup>89</sup> <http://www.fhwa.dot.gov/reports/tswstudy/EXECSUM4.htm>

<sup>90</sup> <http://ops.fhwa.dot.gov/Freight/sw/index.htm>

<sup>91</sup> <http://www.fhwa.dot.gov/fastact/factsheets/trucksizeweights.cfm>

Natural gas vehicles	For the purpose of Interstate System weight limitations, the FAST Act increases the allowable weight of a natural gas vehicle by an amount equal to the difference between the weight attributable to the vehicle's natural gas tank and fueling system and the weight of a comparable diesel tank and fueling system, up to a maximum gross vehicle weight of 82,000 pounds. [FAST Act §1410; 23 U.S.C. 127(s)]
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Source: FHWA

### Additional Ongoing Research

As set forth in the Transportation Equity Act for the 21st Century (TEA-21), the Transportation Research Board (TRB) is currently conducting a study regarding the federal truck size and weight regulations to determine if changes to these limits are advisable, and if so, what implications these changes would have on the environment, safety, the U.S. economy, and other aspects of society.<sup>92</sup>

Furthermore, the US DOT is scheduled to update their Comprehensive Truck Size and Weight Study prior to the next surface transportation reauthorization.

### Pros and Cons of Truck Size and Weight Limits

In its Special Report 267, Regulation of Weights, Lengths, and Widths of Commercial Motor Vehicles (2002), the TRB concluded that the current truck size and weight limits are not working and that the effectiveness of these regulations are being hindered by the increase in special exemptions permits being issued. Furthermore, in certain situations the current regulations might motivate trucks to bypass the interstate highways for secondary roads with lower restrictions. This causes concerns regarding safety and efficiency of the road network.

In the study, the TRB also concluded that the inflexibility of the current regulations, as well as the lack of accountability of highway users, discourages innovation aimed at reducing the costs generated by the trucking industry and to improve highway efficiency.<sup>93</sup>

The number of oversize/overweight permits issued varies from state to state, where some states report an increase in the number of permits being issued and some report a reduction. In 2013, Texas was reported to have the highest number of oversize/overweight permits being issued (400,000), and Washington, D.C issued the fewest number (approximately 2,000).<sup>94</sup>

In their 2002 study, the TRB suggested that the ideal way of controlling costs related to the trucking industry, both now and in the future, is through coordination of all areas of highway management including design, regulations, and cost-based user fees. If one policy were to be changed, then complimentary changes must be done in all other areas.

The TRB also suggests that a federally supervised permit program for oversize/overweight trucks should be established to replace the currently *"largely uncontrolled and unmonitored system of state-issued exemptions"*.

<sup>95</sup> Such a system would increase the understanding of limitations with the existing regulations; simplify the process of making modifications to these regulations; as well as allow for a more accurate evaluation process of any potential changes.

<sup>92</sup> <http://www.fhwa.dot.gov/reports/tswstudy/EXECSUM4.htm>

<sup>93</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr267.pdf>

<sup>94</sup> <http://www.gao.gov/assets/670/668711.pdf>

<sup>95</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr267.pdf>

On the contrary, the 2015 study by the U.S. GAO through interviews with state officials determined that the majority of the States thought that federal regulations regarding permitting were unnecessary. Although, additional resources regarding best practices would be useful in order to improve their current processes.<sup>96</sup>

In the 2016 US DOT Truck Size and Weight Study, it was determined that in 2011, states spent approximately \$635 million on enforcing truck size and weight limits, of which approximately 85 percent were labor costs. New technologies have the potential to lower these costs and such systems are increasingly being deployed by States all over the country.<sup>97</sup>

Some of the primary concerns with increased truck size and weight limits are the safety concerns with longer and heavier vehicles, as well as the additional stress these vehicles would place on the current infrastructure.

In the 2016 US DOT Truck Size and Weight Study, it was mentioned that an increase of the current federal truck size and weight limits from 80,000 to 91,000 pounds would require approximately 4,800 bridges to either be strengthened or replaced in order to handle the added stress. The US DOT estimated that the cost of this would be approximately \$1.1 billion.<sup>98</sup>

In addition, the need for increased infrastructure improvements also generates concerns regarding the cost recovery for both the Federal government and for the States.

Finally, increased truck size and weight limits would likely impact the overall productivity of the overall freight system. These vehicles might need to travel at lower speeds to reduce the risk of infrastructure damages and/or the length/width of the vehicles might result in disturbances of the existing traffic flow in situations of merging, and entering/exiting the roadway.<sup>99</sup> In summary, there are many unresolved issues and challenges requiring difficult decisions regarding the discussion of truck weight and size regulations.

### 2.3.15 TECHNOLOGY

#### Industry Impacts of Automated Vehicles

An autonomous vehicle, or automated vehicle, is a vehicle that has been equipped with advanced sensors such as radar, Light Detection and Ranging (LIDAR), cameras, etc., combined with computing abilities that allow the vehicle to recognize its surroundings and to activate steering, braking, and acceleration without the assistance of the driver (**Figure 2-29**).

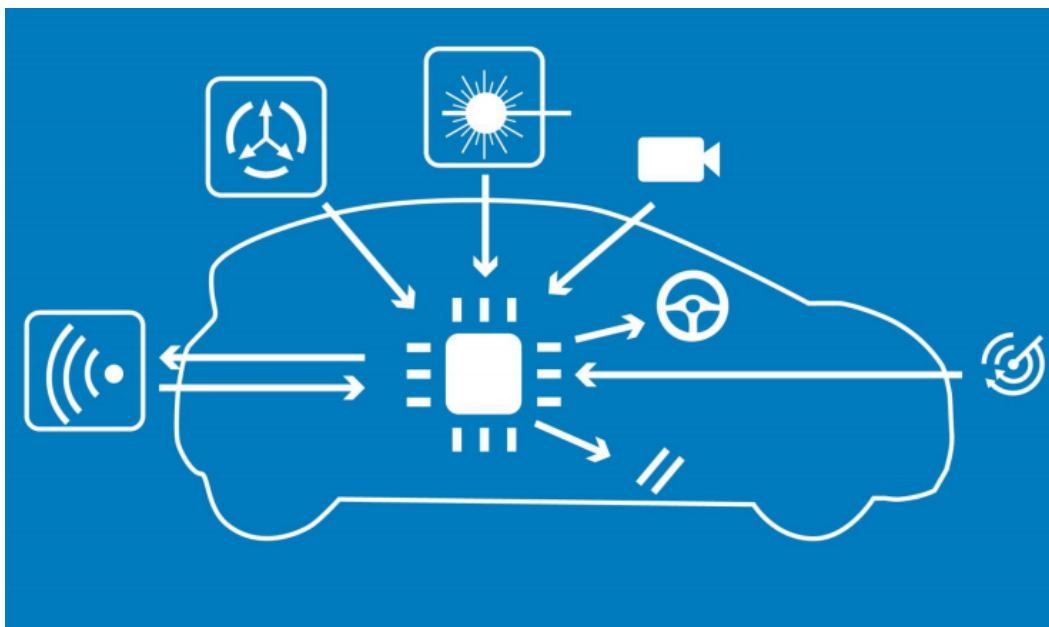
<sup>96</sup> <http://www.gao.gov/assets/670/668711.pdf>

<sup>97</sup> [http://ops.fhwa.dot.gov/freight/sw/map21tswstudy/technical\\_rpts/ccanalysis.pdf](http://ops.fhwa.dot.gov/freight/sw/map21tswstudy/technical_rpts/ccanalysis.pdf)

<sup>98</sup> <https://www.aar.org/BackgroundPapers/Truck%20Size%20and%20Weight.pdf>

<sup>99</sup> <http://ops.fhwa.dot.gov/freight/sw/map21tswstudy/ctsw/CTSLWS%20Report%20to%20Congress%20FINAL.pdf>

**Figure 2-29: Example of Automated Vehicle**



Source: The European Technology Platform on Smart Systems Integration (EPoSS)

The growing fields of automation technologies are bringing the deployment of automated vehicles closer to reality. In order to maximize the benefits of autonomous vehicle technology, in 2013, the US DOT’s National Highway Traffic Safety Administration (NHTSA) issued a Policy Document on Automated Driving to provide guidance to the States regarding autonomous vehicle testing. The document defines vehicle automation as having five levels (**Table 2-9**).

**Table 2-9: NHTSA Vehicle Automation Levels**

Automation Level	Description
No-automation (level 0)	The driver is in complete and sole control of the primary vehicle controls – brake, steering, throttle, and motive power – at all times.
Function-specific automation (level 1)	Automation at this level involves one or more specific control functions. Examples include electronic stability control or pre-charged brakes, where the vehicle automatically assists with braking to enable the driver to regain control of the vehicle or stops faster than possible by acting alone.
Combined function automation (level 2)	This level involves automation of at least two primary control functions designed to work in unison to relieve the driver of control of those functions. An example of combined functions enabling a level 2 system is adaptive cruise control in combination with lane centering.
Limited self-driving automation (level 3)	Vehicles at this level of automation enable the driver to cede full control of all safety-critical functions under certain traffic or environmental conditions and in those conditions to rely heavily on the vehicle to monitor for changes in those conditions requiring transition back to driver control. The driver is expected to be available for occasional control, but with sufficiently comfortable transition time. The Google car is an example of limited self-driving automation.
Full self-driving automation (level 4)	The vehicle is designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip. Such a design anticipates that the driver will provide destination or navigation input, but is not expected to be available for control at any time during the trip. This includes both occupied and unoccupied vehicles.

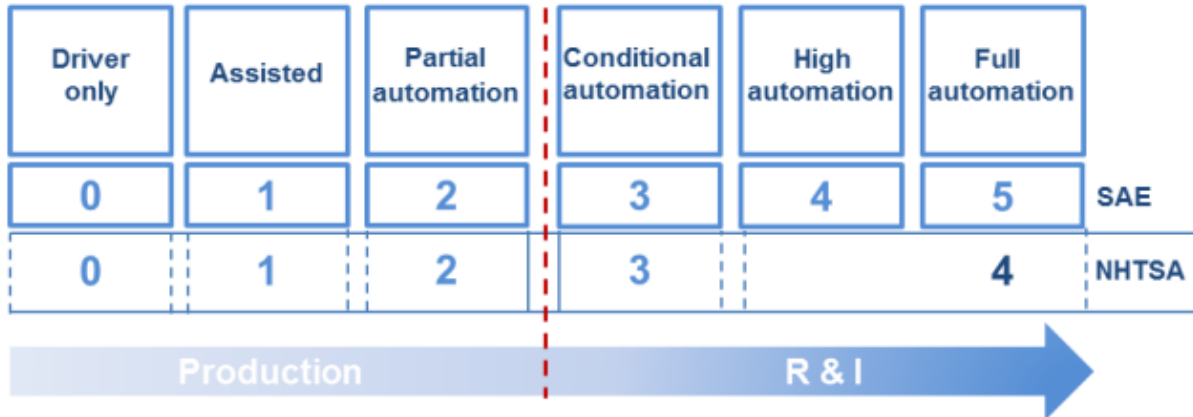
Source: NHTSA

Where the NHTSA utilizes five subclasses (as described above), the Society of Automobile Engineers (SAE) uses six subclasses to classify road vehicle automation. For levels 0-2, the human has the primary

responsibility of driving; for level 3 the driver has the possibility of doing other activities while driving, but still needs to monitor the vehicle; for levels 4 and 5, the driving is completely achieved by the vehicle.<sup>100</sup>

**Figure 2-30** presents a visual summary of both these NHTSA and the SAE classification standards side by side.

**Figure 2-30: SAE and NHTSA Levels of Road Vehicle Automation**



Source: The European Technology Platform on Smart Systems Integration (EPoSS)

**Benefits**

The implementation of automated vehicles has the capability to significantly improve many areas of transportation. Some of the primary benefits of automated vehicles include reduced congestion levels, lessened environmental impacts and enhanced public safety. The US DOT highlights the following benefits of automated vehicles on their website:

- Reducing the number of crashes caused by drivers or other conditions (e.g., weather and roadway conditions)
- Reducing aggressive driving
- Reducing travel time and improving travel time reliability
- Expanding the reach of transportation modes to disabled and older users, as well as providing "first mile, last mile" connectivity service for all users
- Increasing the efficiency and effectiveness of existing transportation systems<sup>101</sup>

**Traffic and Infrastructure Impacts**

Clearly, automated vehicles will have a major impact on many aspects of the road network. However, there are many areas of concern that must be addressed to successfully implement automated vehicles,

<sup>100</sup> [http://www.smart-systems-integration.org/public/documents/publications/EPoSS%20Roadmap\\_Smart%20Systems%20for%20Automated%20Driving\\_V2\\_April%202015.pdf](http://www.smart-systems-integration.org/public/documents/publications/EPoSS%20Roadmap_Smart%20Systems%20for%20Automated%20Driving_V2_April%202015.pdf)

<sup>101</sup> [http://www.its.dot.gov/research\\_areas/automation.htm](http://www.its.dot.gov/research_areas/automation.htm)

particularly in instances where the automated vehicle would need to safely navigate alongside normal cars.<sup>102</sup>

Some areas of concern with automated vehicles include safety, environmental, as well as changes to the traffic flow.<sup>103</sup>

In addition, issues such as hacking, reliability of the technologies, as well as human user errors are major concerns with these technologies. Currently, many of these issues are being addressed through research, as well as live road testing.

One of the most highly debated issues with automated vehicles might be the financial aspect. This includes both the cost of infrastructure enhancements, as well as the cost of the vehicles themselves. The true cost of automated vehicles is yet unknown, and additional research is needed to fully understand its financial impacts.

### Policy Issues, Laws and Regulations

For the technology to reach its optimal benefits, State policies, laws, and regulations likely will need to both incentivize and regulate automated vehicles. For example, automated vehicles might be required in certain express lanes to optimize use and maximize capacity of these lanes. In addition, Federal laws and regulations must be established to address liability and insurance concerns of automated vehicles.

### Additional Impacts

In **Table 2-10**, the Victoria Transport Policy Institute<sup>104</sup> has summarized many of the potential benefits with automated vehicles but also several potential areas of concern.

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<sup>102</sup> [http://www.smart-systems-integration.org/public/documents/publications/EPoSS%20Roadmap\\_Smart%20Systems%20for%20Automated%20Driving\\_V2\\_April%202015.pdf](http://www.smart-systems-integration.org/public/documents/publications/EPoSS%20Roadmap_Smart%20Systems%20for%20Automated%20Driving_V2_April%202015.pdf)

<sup>103</sup> [brochure-european-truck-platooning-challenge-2016.pdf](https://www.eutruckplatooning.com/brochure-european-truck-platooning-challenge-2016.pdf): <https://www.eutruckplatooning.com>

<sup>104</sup> The Victoria Transport Policy Institute is an independent research organization dedicated to developing innovative and practical solutions to transportation problems. <http://www.vtpi.org/>

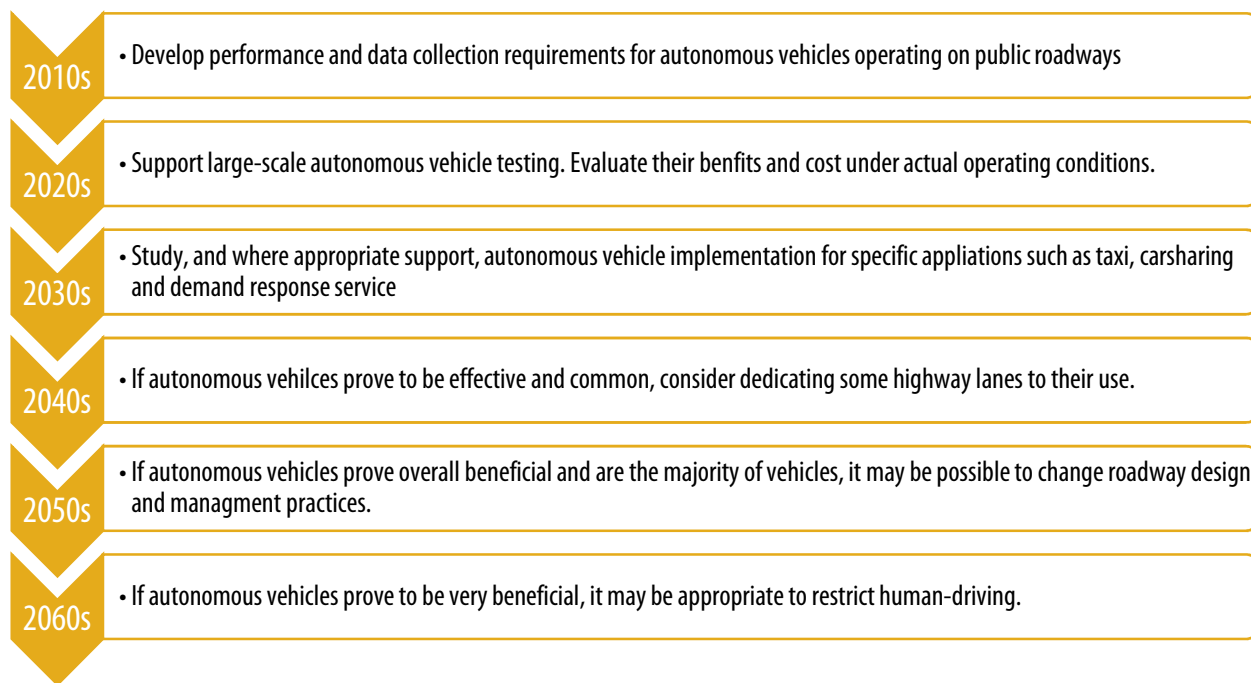
**Table 2-10: Benefits and Costs/Problems with Autonomous Vehicles**

Benefits	Costs/problems
Reduced driver stress. Reduce the stress of driving and allow motorists to rest and work while traveling.	Increases costs. Requires additional vehicle equipment, services, and maintenance, and possibly roadway infrastructure.
Reduced driver costs. Reduce costs of paid drivers for taxis and commercial transport.	Additional risks. May introduce new risks, such as system failures, be less safe under certain conditions, and encourage road users to take additional risks (offsetting behavior).
Mobility for non-drivers. Provide independent mobility for non-drivers, and therefore reduce the need for motorists to chauffeur non-drivers, and to subsidize public transit.	Security and privacy concerns. May be used for criminal and terrorist activities (such as bomb delivery), vulnerable to information abuse (hacking), and features such as GPS tracking and data sharing may raise privacy concerns.
Increased road capacity, reduced costs. May allow platooning (vehicle groups traveling close together), narrower lanes, and reduced intersection stops, reducing congestion and roadway costs.	Induced vehicle travel and increased external costs. By increasing travel convenience and affordability, autonomous vehicles may induce additional vehicle travel, increasing external costs of parking, crashes, and pollution.
More efficient parking, reduced costs. Can drop off passengers and find a parking space, increasing motorist convenience and reducing total parking costs.	Social equity concerns. May have unfair impacts, for example, by reducing other modes' convenience and safety.
Increase fuel efficiency and reduce pollution. May increase fuel efficiency and reduce pollution emissions.	Reduce employment and business activity. Jobs for drivers should decline, and there may be less demand for vehicle repairs due to reduced crash rates.
Supports shared vehicles. Could facilitate car sharing (vehicle rental services that substitute for personal vehicle ownership), which can provide various savings.	Misplaced planning emphasis. Focusing on autonomous vehicle solutions may discourage communities from implementing conventional but cost-effective transport projects such as pedestrian and transit improvements, pricing reforms, and other demand management strategies.

Source: Victoria Transport Policy Institute

NHTSA is continuously striving to develop additional best practices and policy documents to address issues with autonomous vehicles, for both the testing phase and the operational deployment, in order to provide a uniform national approach to automated vehicles. In addition, the US DOT's automation research furthers the research of automated vehicles into other fields such as enabling technologies, system performance, and policy and planning.

The Victoria Transport Policy Institute has developed a time-line regarding autonomous vehicles and their potential impacts on the planning professions decade-by-decade, **Figure 2-31**.

**Figure 2-31: Autonomous Vehicles Planning Impacts Time-Line**

Source: Victoria Transport Policy Institute

### Industry Impacts of Truck Platooning

Trucks platoons are vehicles that have been supplied with some type of driving support systems that allows the trucks to be interconnected, to communicate with each other, and therefore closely follow each other.

Truck platooning has the potential to become a reality in the near future. To promote better understanding of this technology, research, live road tests, as well as discussions regarding its benefits and potential areas of concern are currently taking place in many parts of the world.

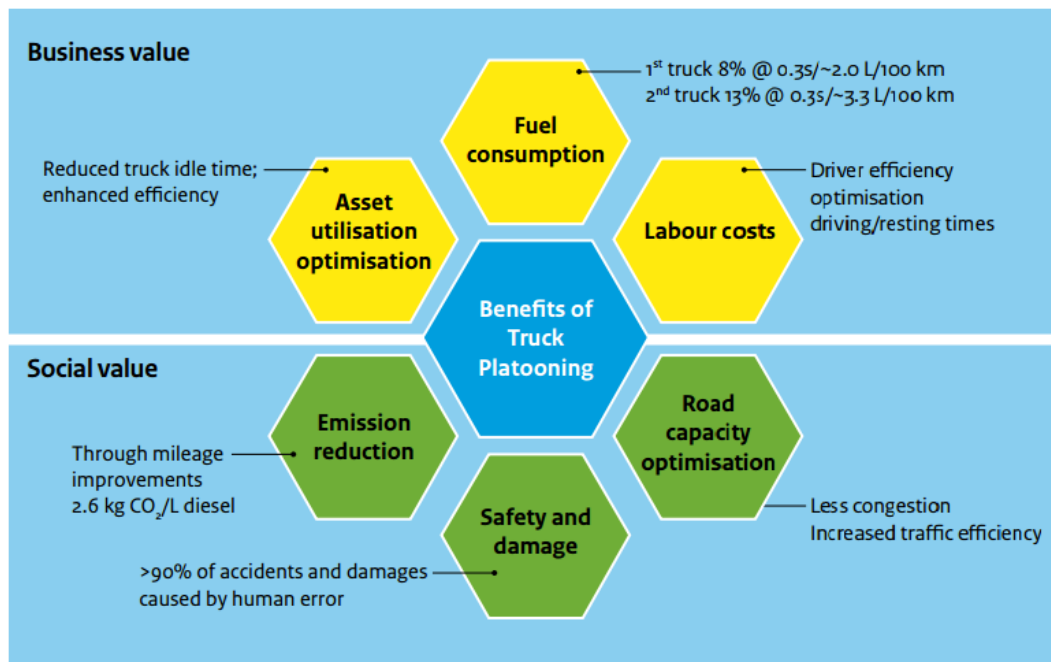
Increased fuel efficiency might be the most prominent benefit of truck platooning, but there are many other potential advantages such as increased traffic efficiency, improved traffic safety, and reduced labor costs.

The smart technology of truck platoons allows the vehicles to drive at a constant speed, closely following each other, which reduces both fuel consumption and emissions. Furthermore, since the trucks are interconnected, when one truck needs to break the following trucks will break immediately (zero reaction time) which can have significant positive impacts on traffic safety. The constant speed of the platoons, as well as the minimized distance between vehicles has the potential of enhancing the existing traffic flow of the highway system.<sup>105</sup>

The Netherlands Organization for Applied Scientific Research (TNO), an independent research organization, has identified and summarized several additional benefits of truck platooning as shown in **Figure 2-32**.

<sup>105</sup> <https://www.eutruckplatooning.com/About/default.aspx>



**Figure 2-32: Benefits of platooning**

Source: The Netherlands Organization for Applied Scientific Research

Some of the most looming concerns with truck platooning, both legal and technical, are currently being identified and addressed through research, as well as live road tests in various countries, including the U.S. Some of these issues include:<sup>106</sup>

- Traffic and Infrastructure Impacts
- Policy Issues, Laws and Regulations
- Industry Impacts of Electronic Truck Parking Notifications

Each one of these issues will be addressed in more detail below.

### Traffic and Infrastructure Impacts

To accommodate truck platoons, changes to the road design might be needed to reduce infrastructural constraints as well as to lower the risk of accidents.

Through its research, the European Union (EU) Truck Platooning Challenge<sup>107</sup> has identified several risks with truck platooning along with potential ways to mitigate these risks. One of these is the increased risk of accidents because of truck platoons operating as a single vehicle entity. The length of the platoon would potentially cause a disturbance in the existing traffic flow, primarily when merging, as well as when entering/exiting the roadway.

<sup>106</sup> LessonsLearnt\_spread.pdf <https://www.eutruckplatooning.com/PageByID.aspx?sectionID=131542&contentPageID=529927>

<sup>107</sup> Six brands of automated trucks have been platooning on public roads from various European cities to the Netherlands. [www.eutruckplatooning.com](http://www.eutruckplatooning.com)

Another potential concern with the length of the truck platoon is increased wear and tear to roads and bridges. The length of the platoon might alter weight and load distribution which could result in a heavier impact on bridges.

**Table 2-11** presents additional risks of truck platooning as identified through the EU Truck Platooning Challenge, as well as ways on how to mitigate these expected risks.

**Table 2-11: Risks of Truck Platooning**

Expected Risks of Truck Platooning	Mitigating Expected Risks
Increased change of accidents/disturbance in traffic flow due to behavior of the truck platoon as a single vehicle entity	Requirements for visibility/recognition of the truck platoon, decoupling at on and off ramps, restrictions/recommendations on specific maneuvers, prescribed following distance, maximum speed
Increased wear and tear on roads/bridges due to the truck platoon as a single vehicle entity	Restrictions on maximum weight and division of load, decoupling at bridges
Limitations of the platooning system in complex traffic situations	Decoupling in complex traffic situations like motorway junctions, traffic density, traffic jams. (mobile) road works and weather conditions, set procedures for truck drivers, prescribed following distance
A truck driver unfamiliar with the platooning system not knowing how to deal with the transition of control	
Failure of the system in specific infrastructural situations: tunnels, slopes and curves	Decoupling at tunnels, x gradient values and x radius values of curves

Source: [eutruckplatooning.com](http://eutruckplatooning.com)

For truck platoons to reach their full potential, to maximize their benefits, and to minimize safety concerns, operation in dedicated lanes might be necessary. This raises debate regarding cost, as well as planning concerns such as identification of lanes to be dedicated to autonomous vehicles.<sup>108</sup>

### Policy Issues, Laws, and Regulations

State regulations will need to be examined and evaluated for their effect on truck automation and platooning. These laws and regulations might need to be altered to accommodate, or place limitations on, various aspects of truck platooning. For example:

- Following distance between vehicles, currently regulated by individual states, would need to be addressed to accommodate truck platooning. Currently, the minimum following distance for trucks in Florida is 300 feet.
- Restrictions on maximum weight, as well as the division of load might need to be altered to comprise truck platooning to minimize wear and tear on roads and bridges.
- To achieve State policy goals regarding freight mobility and to achieve optimal traffic efficiency, different rules and regulations might need to be applied to different corridors. Longer platoons might be allowed on roads serving major distribution centers, or stricter weight limits might be applied to corridors that include bridges and tunnels.<sup>109</sup>

<sup>108</sup> <http://www.vtpi.org/avip.pdf>

<sup>109</sup> [http://orfe.princeton.edu/~alaink/smartdrivingcars/itfvha15/itfvha15\\_usa\\_futuretruck\\_adp\\_tf\\_whitepaper\\_draft\\_final\\_tf\\_approved\\_sept\\_2015.pdf](http://orfe.princeton.edu/~alaink/smartdrivingcars/itfvha15/itfvha15_usa_futuretruck_adp_tf_whitepaper_draft_final_tf_approved_sept_2015.pdf)

## Industry Impacts of Electronic Truck Parking Notifications

In the 2014 ATRI's annual industry survey, truck drivers reported truck parking to be the second most important issue impacting the trucking industry. Furthermore, 75 percent of the 8,000 truck drivers interviewed in a 2015 MAP-21 study reported that they have trouble finding parking at night.<sup>110</sup>

Several States are currently working on deploying new intelligent infrastructure technologies such as electronic truck parking notifications (or intelligent truck parking). These new technologies are expected to increase the amount of information available and to better match drivers to available parking spaces.

Electronic truck parking notifications encompass a variety of different technologies where sensors track and measure parking availability at rest areas. The information is then shared with truck drivers through information telephone numbers, radio broadcast, in-vehicle computers and electronic road signs (**Figure 2-33**).

In a FDOT research study, a smart management technology for truck parking was designed and put to test at two selected rest areas along I-10. The system was based on a combination of wireless communications, data collection, as well as data processing to determine truck use at the rest areas. Overall, the technology provided detailed information of the truck use of the rest areas. Such a system could be used not only to inform truck drivers of available parking spaces, but also to provide continuing data to planners regarding utilization of existing parking facilities and increasing parking demand.<sup>111</sup>

**Figure 2-33: Example of Electronic Truck Parking Notification**



Source: [truckernews.com](http://truckernews.com)

One of the primary benefits of electronic truck parking notifications is the positive impact on safety concerns such as a possible reduction in driver fatigue due to lack of parking availability, as well as a

<sup>110</sup> <http://atri-online.org/wp-content/uploads/2015/09/managing-critical-truck-parking-tech-memo-1-final-09-2015.pdf>

<sup>111</sup> [http://www.dot.state.fl.us/research-center/completed\\_proj/summary\\_te/fdot-bdk80-977-14-rpt.pdf](http://www.dot.state.fl.us/research-center/completed_proj/summary_te/fdot-bdk80-977-14-rpt.pdf)

reduction in accidents as a result of illegal parking.<sup>112</sup> In a 2002 study, FMCSA determined that 8.15 percent of all fatal truck crashes were caused by driver fatigue.<sup>113</sup>

The shortage of truck parking, or the lack of information regarding available parking spaces, is considered to be one of the primary reasons of illegal truck parking along interstate access ramps and shoulders. In a four-year study, the Virginia DOT determined that 25 percent of all reported accidents along major state corridors involving trucks had occurred on highway access ramps.<sup>114</sup>

The study also said that electronic truck parking notifications would have a positive impact on network efficiency and management. Initial research of Intelligent Truck Parking (ITP) in Sweden has indicated a potential reduction in the cost of missing and delayed goods. In addition, electronic truck parking notifications are expected to reduce parking facility search times as well as increase the utilization of existing parking facilities.<sup>115</sup>

To maximize the benefits of electronic truck parking notifications, careful planning would need to take place in order to determine how to best provide the information to its users and to determine which ITP technology to use for which situations/corridors. Road signs as well as information telephone numbers/radio broadcasts might be the best alternative in most situations, since it can be used by the vast majority of drivers. However, road signs have limitations to them since passing motorist would need to be able to read the sign and some argue that electronic road signs could pose as a distraction to drivers. Technology reliability might be one of the primary concerns with electronic truck parking notifications. For example, are trucks entering and exiting the parking being accurately detected?<sup>116</sup>

Another concern is the lag time on how the information is passed on to the users. How often is the information updated and will there still be spaces available once a driver arrives at the parking facility?

### 2.3.16 LAST MILE

The movement of goods from a transportation hub, freight distribution center, or port to its final destination is often referred to as “last leg” or “last mile”. This last leg of the freight system is essential to achieve efficient freight mobility, to move goods from a supplier to a customer, and to minimize the total cost to move goods.

The Council of Supply Chain Management Professionals estimates that last mile transportation can expend as much as 28 percent of the total transportation cost.<sup>117</sup> This is primarily due to the high cost of breaking down loads, as well as costs related to congestion, since last mile transportation usually takes place in urban areas. **(Figure 2-34)** presents an overview of the transportation cost structure.<sup>118</sup>

Last mile connectivity is a critical link of supply chain logistics and e-commerce. A June 2016 study by the U.S. Postal Service Office of the Inspector General highlights that the U.S. e-commerce is projected to reach \$500 billion by 2018, which in turn is expected to have a significant impact on last mile delivery.<sup>119</sup>

<sup>112</sup> [http://midamericafreight.org/wp-content/uploads/MAFC\\_TPMS\\_Synthesis\\_07012015.pdf](http://midamericafreight.org/wp-content/uploads/MAFC_TPMS_Synthesis_07012015.pdf)

<sup>113</sup> <http://ntl.bts.gov/lib/50000/50500/50595/intelligent-transportation-truckparking.pdf>

<sup>114</sup> <http://atri-online.org/wp-content/uploads/2015/09/Managing-Critical-Truck-Parking-Tech-Memo-1-FINAL-09-2015.pdf>

<sup>115</sup> [http://www.bth.se/com/intelligent\\_truck\\_parking.nsf/attachments/Del\\_5\\_Benefits\\_pdf/\\$file/Del\\_5\\_Benefits.pdf](http://www.bth.se/com/intelligent_truck_parking.nsf/attachments/Del_5_Benefits_pdf/$file/Del_5_Benefits.pdf)

<sup>116</sup> <http://ntl.bts.gov/lib/50000/50500/50595/intelligent-transportation-truckparking.pdf>

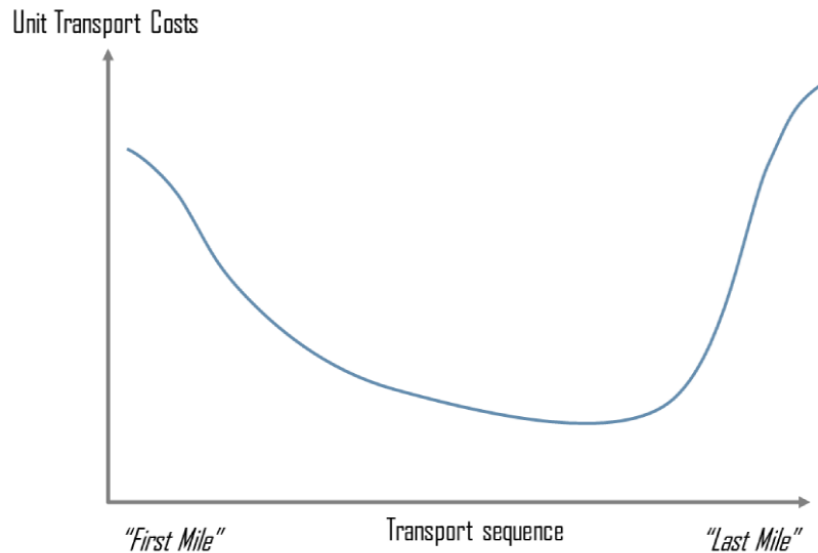
<sup>117</sup> <http://www.ipa.udel.edu/publications/FreightMovementCDBs.pdf>

<sup>118</sup> [https://people.hofstra.edu/geotrans/eng/ch7en/conc7en/first\\_last\\_mile\\_unit\\_costs.html](https://people.hofstra.edu/geotrans/eng/ch7en/conc7en/first_last_mile_unit_costs.html)

<sup>119</sup> <https://www.uspsog.gov/sites/default/files/document-library-files/2016/RARC-WP-16-012.pdf>

Last mile connectivity can cause many challenges, especially in urban areas where there is limited public space and deliveries to retail stores, restaurants, office buildings, etc., often contribute to congestion and safety problems. Furthermore, deliveries often have a negative impact on the transportation network in central business districts since it reduces mobility. These traffic delays are costly for both the trucking industry, as well as for the motorists.<sup>120</sup>

**Figure 2-34: First and Last Mile Unit Cost Structure**



Source: Hofstra University, New York, USA.

Urban areas often have a limited number of loading and unloading zones available. This often forces many trucks to double-park which is a safety concern, as well as a mobility concern resulting in reduced capacity of the affected street.<sup>121</sup>

Last mile delivery also poses many challenges for freight companies in terms of failed deliveries, such as when no one is present to accept the delivery.<sup>122</sup>

In addition, a critical “link” in the supply chain is the “last mile” connection where there is a transfer between modes. The potential exists to also negatively impact transportation capacity at these key connections for truck/rail transfers.

Potential strategies to improve last mile connectivity include:

- Variation in Delivery Vehicles
- Innovative Logistics Solutions
- Delivery Time Regulations
- Consolidation of Less Than Truckload (LTL) loads
- Creating Urban Distribution Centers

<sup>120</sup> [https://people.hofstra.edu/geotrans/eng/ch7en/conc7en/first\\_last\\_mile\\_unit\\_costs.html](https://people.hofstra.edu/geotrans/eng/ch7en/conc7en/first_last_mile_unit_costs.html)

<sup>121</sup> <https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-13-07%20Final-Report-NYSERDA-Freight-Conference-1-2014.pdf>

<sup>122</sup> <https://www.portlandoregon.gov/transportation/article/406590>

- Drop off Points or Parcel Lockers
- Land Use Planning and Zoning Strategies

Each one of these potential solutions will be addressed in more detail below.

### Variation in Delivery Vehicles

Regulating vehicles based on size (length/height/surface), weight (total/per axle), fuel type, noise emission, loading factor, type of goods, etc., could be one potential solution for improving last-mile connectivity, especially in urban areas. These regulations could be written in a way that exclude certain vehicle types completely (24/7), or they could restrict certain vehicles to specific zones and/or at specific times.<sup>123</sup> Some examples of these types of regulations are listed in **Table 2-12**.

**Table 2-12: Examples of Delivery Vehicle Regulations**

Location	Regulation
London	Heavy goods vehicles of more than 18 tons are forbidden to travel at night and during weekends on a delimited network (since 1975)
Paris	Large trucks (larger than 29 square meters) are banned during daytime hours
Tokyo	Large trucks (over 3 tons) are banned in many neighborhoods
Seoul	Large trucks are banned from central areas during working hours (since 1979)

*Source: TRB, Synthesis of Freight Research in Urban Transportation Planning, Report 23, 2013*

Although regulating vehicles has the potential to improve last-mile connectivity, some argue that regulating the size and weight of vehicles increases the amount of trucks on the road, more small-capacity vehicles instead of one larger, and that it could reduce the efficiency of freight transportation overall.<sup>124</sup>

### Innovative Logistics Solutions

New and innovative logistics solutions for urban areas such as deliveries with bikes, drones, robots, and automated vehicles have the potential to improve last mile connectivity.

The sustainability aspect of deliveries with bikes and cargo-cycles (**Figure 2-35**) is a positive reason itself, but bike couriers also have shown to be a fast and reliable delivery option for congested central business districts. However, this logistic solution has its limitations since bike couriers are only capable of delivering low volume and low weight freight.<sup>125</sup>

<sup>123</sup> <http://sites.tufts.edu/uepblog/files/2011/06/Reisman-Impacts-of-Last-Mile-Urban-Freight.pdf>

<sup>124</sup> [http://onlinepubs.trb.org/onlinepubs/nctfp/nctfp\\_rpt\\_023.pdf](http://onlinepubs.trb.org/onlinepubs/nctfp/nctfp_rpt_023.pdf)

<sup>125</sup> <http://www.sciencedirect.com/science/article/pii/S187704281200585X>

**Figure 2-35: Example of Cargo-Cycle**

Source: B-Line.com

Deliveries made by drones (**Figure 2-36**), are currently being tested in many areas of the world by postal services (Australia, Switzerland, and Singapore); retail companies such as Amazon and Rakuten; as well as large logistics providers such as DHL and UPS.<sup>126</sup>

The U.S. Federal Aviation Administration (FAA) estimates that by 2018 as many as 7,500 commercial drones could have sought permits to operate in the U.S. Companies like SideWalk, Starship, and Dispath are currently testing delivery robots for last mile distribution of small packages (20-100 lbs.). Delivery robots are similar to drones in that they are unmanned and controlled remotely by an operator. However, robots travel at lower speeds (4 mph) on sidewalks and in bike lanes. Washington, D.C. is looking into allowing pilot testing of delivery robots in 2017.<sup>127</sup>

As for many other areas of transportation, automated vehicles are expected to have a significant impact on last mile delivery. In February 2016, Google acquired a patent for an autonomous delivery truck (**Figure 2-37**).

<sup>126</sup> <http://logisticstrendsandinsights.com/1919-2/>

<sup>127</sup> <https://www.uspsaig.gov/sites/default/files/document-library-files/2016/RARC-WP-16-012.pdf>

**Figure 2-36: Delivery Drone**



**Figure 2-37: Automated Car Google**



Source: Office of the Inspector General - US Postal Service, June 2016

**Table 2-13** presents an overview of several of the above mentioned new logistic solutions and how these might impact last mile delivery based on research from a June 2016 study by the U.S. Postal Service Office of the Inspector General.

**Table 2-13: Overview of New technologies in Last Mile Delivery**

Technology	Advantages	Limitations	Stage of Development
Algorithms and analytics	<ul style="list-style-type: none"> <li>Fast/cheap/flexible deliver</li> <li>Low capital costs; low barriers to entry</li> <li>Open the door for new delivery models</li> </ul>	<ul style="list-style-type: none"> <li>Some companies have yet to demonstrate a viable business case</li> <li>Trust issues with crowdsourcing</li> </ul>	Large-scale adoption
Delivery drones	<ul style="list-style-type: none"> <li>Fast/flexible delivery</li> <li>Environmentally friendly</li> <li>Can reach remote/hard-to-reach locations more cheaply</li> <li>Can bypass crowded/poor roads</li> </ul>	<ul style="list-style-type: none"> <li>Strictly regulatory restrictions</li> <li>Safety and privacy issues</li> <li>Capacity limitations</li> <li>Delivery distance limitations</li> <li>Remaining technological challenges</li> </ul>	Pilot Studies
Delivery robots	<ul style="list-style-type: none"> <li>Fast/cheap/flexible delivery</li> <li>Environmentally friendly</li> <li>Fewer safety and privacy issues compared with drones</li> <li>Higher capacity compared with drones</li> </ul>	<ul style="list-style-type: none"> <li>Delivery distance and speed limitations</li> <li>Cannot operate in crowded areas</li> <li>Theft issues</li> <li>Limited ability to overcome obstacles in their way</li> </ul>	Pilot Studies
Driverless/ autonomous cars	<ul style="list-style-type: none"> <li>Fast/flexible delivery</li> <li>Low operating cost</li> <li>Environmentally friendly</li> <li>Cost-efficient to reach remote locations</li> </ul>	<ul style="list-style-type: none"> <li>Strict regulatory restrictions</li> <li>High cost of driverless vehicles</li> <li>Many technological challenges still exist</li> </ul>	Experimental

Source: Office of the Inspector General - US Postal Service, June 2016



## Delivery Time Regulations

Establishing a policy that incentivizes off-peak hour deliveries could have a positive impact on urban areas. In 2010, the New York City Department of Transportation (NYC DOT) conducted a pilot program for off-peak hour truck deliveries, between the hours of 7 p.m. and 6 a.m., with 35 participating companies. The study found that travel speeds were significantly improved for the trucks making off-peak hour deliveries. Furthermore, the truck drivers experienced fewer delays and found it easier to park while making deliveries. The delivery times for the routes averaged to be 48 minutes faster during the off-peak hours compared to normal. Overall, the pilot study saw a reduction in congestion levels along with significant savings for the delivery companies.<sup>128</sup>

Although there are many positive aspects with off-peak hour deliveries, most customers still prefer to receive deliveries during normal business hours. Therefore, off-peak hour deliveries can cause logistic problems for the trucking companies in regards to recipient of deliveries. In addition, accepting deliveries at night can put a financial constraint on many businesses in terms of salaries for employees accepting deliveries at night, or in terms of providing secure delivery areas that can be accessed by the delivery companies without employees present.<sup>129</sup>

## Consolidation of Less Than Truckload (LTL) loads

Consolidation of small volumes of freight could be another potential solution for improving last mile connectivity. Freight that is not large enough to require its own truck is often referred to as Less Than Truckload (LTL). On average, a LTL freight company carries shipments ranging from 100 to 10,000 pounds.<sup>130</sup> Since an average truck can hold loads up to 60,000 pounds,<sup>131</sup> freight from several customers is collected and consolidated through a hub and spoke network in order to create full truckloads (**Figure 2-38**). This allows the LTL freight companies to reduce the number of trucks needed with significant cost savings. However, several aspects must be taken into consideration prior to load consolidation, such as the impact it might have on delivery time and the additional route miles that might be incurred with consolidation.<sup>132</sup> Load consolidation also has the potential to reduced congestion and emission levels with fewer trucks on the roads.<sup>133</sup>

<sup>128</sup> [http://www.nyc.gov/html/dot/html/pr2010/pr10\\_028.shtml](http://www.nyc.gov/html/dot/html/pr2010/pr10_028.shtml)

<sup>129</sup> [http://onlinepubs.trb.org/onlinepubs/nctfp/ncfrp\\_rpt\\_023.pdf](http://onlinepubs.trb.org/onlinepubs/nctfp/ncfrp_rpt_023.pdf)

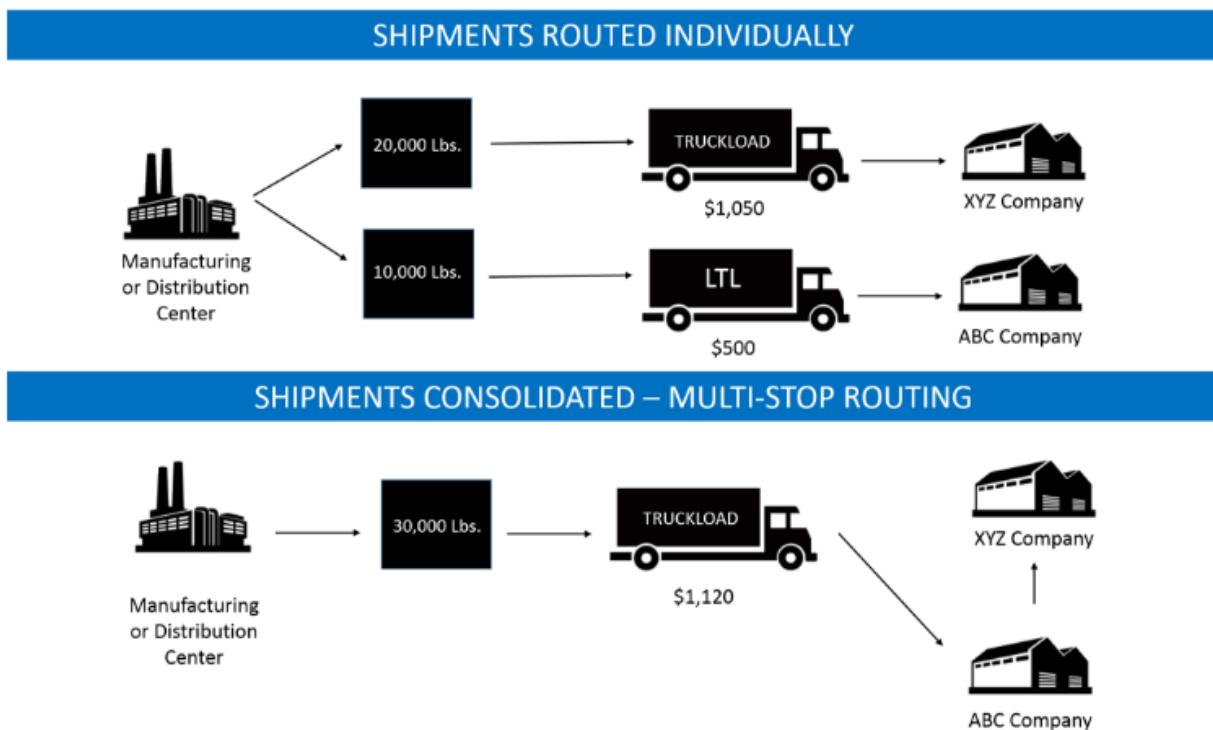
<sup>130</sup> <http://www.gforceship.com/services/ltl-freight>

<sup>131</sup> [https://www.researchgate.net/publication/254400986\\_the\\_load\\_planning\\_problem\\_for\\_less-than-truckload\\_motor\\_carriers\\_and\\_a\\_solution\\_approach](https://www.researchgate.net/publication/254400986_the_load_planning_problem_for_less-than-truckload_motor_carriers_and_a_solution_approach)

<sup>132</sup> <http://cerasis.com/2014/09/24/transportation-management-optimization/>

<sup>133</sup> <http://sites.tufts.edu/uepblog/files/2011/06/Reisman-Impacts-of-Last-Mile-Urban-Freight.pdf>

**Figure 2-38: Example of LTL Load Consolidation**



Source: creasis.com - transportation management optimization

### Creating Urban Distribution Centers

An Urban Distribution Center, or Urban Consolidation Center, is a facility that receives, consolidates, reorganizes, and stores freight prior to the last mile step of the supply chain (Figure 2-39).<sup>134</sup> Some centers also provide services including customer collection, stocking, product handling, pricing/labeling, and waste removal/recycling.<sup>135</sup>

These centers have the potential to improve last mile connectivity by reducing congestion levels in urban areas, as well as reducing the conflict between road users. They can also have a positive effect on the environment by reducing noise from delivery vehicles and reducing fuel consumption and emission levels.

<sup>136</sup>

However, there also are challenges to creating these types of distribution centers such as the capital and operational costs, security and liability issues, as well as adding on another stage to the supply chain which could increase the delivery cost.

Furthermore, the location of the urban consolidation center must be taken into consideration since the center must receive enough throughputs to be economically viable.

<sup>134</sup> <http://sites.tufts.edu/uepblog/files/2011/06/reisman-impacts-of-last-mile-urban-freight.pdf>

<sup>135</sup> <https://www.portlandoregon.gov/transportation/article/406590>

<sup>136</sup> [https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/c-13-07%20final-report-nyserda-freight-conference\\_1-2014.pdf](https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/c-13-07%20final-report-nyserda-freight-conference_1-2014.pdf)

Another concern is the wide range of goods that passes through an Urban Distribution Center which could cause issues in terms of storing and handling.<sup>137</sup>

**Figure 2-39: Example of an Urban Distribution Center in Portland, Oregon**



*Source: Portland Oregon Central City Sustainable Freight Strategy, 2012*

### Drop off Points or Parcel Lockers

Drop off points have the potential to reduce congestion levels, especially on residential streets, and allow for consolidation of deliveries which in turn could reduce fuel levels and be a cost saving to delivery companies.

Furthermore, drop off points or parcel lockers have the potential to reduce the cost for freight companies in terms of failed deliveries. This increases operational efficiency, as well as has the potential to reduce the overall vehicle miles traveled (VMT) for the delivery companies.

Parcel lockers (**Figure 2-40**) are a system of unattended reception boxes which allow the users to both send and receive packages 24 hours a day, 7 days a week. The Polish-based company InPost is one of the major players for this market and the company has more than 3,000 machines implemented in 20 different countries.<sup>138</sup>

<sup>137</sup> <https://www.portlandoregon.gov/transportation/article/406590>

<sup>138</sup> <https://inpost24.com/en/inpost-lockers/global-reach>

**Figure 2-40: Example of an InPost Parcel Locker**



Source: [inpost24.com](http://inpost24.com)

There are many opportunities with parcel lockers, however, also some concerns. In their study, Torrentellé et al. (2012) created a SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis of parcels lockers. Their results are presented in **Table 2-14**.

**Table 2-14: SWOT Analysis of Parcel Locker**

Strengths	Weaknesses
Customers have the possibility to access their packages 7 days a week and 24 hours per day	Parcel lockers are a private action, and the public authorities do not have information about the impacts
Customers are informed of deliveries via text message or e-mail	The final leg of the journey must be made by the customers
Reduction of freight transport trip distance in comparison with attended delivery, thereby reduction of emissions, noise, and energy consumption	
Low delivery costs	
Opportunities	Threats
Efficiency gains for logistic providers	E-commerce is expected to grow further in the future, and this can cause a higher freight mileage due to high number of parcel lockers
Transferable to other cities	

Source: Torrentellé et al. 2012, p. 127

Like Inpost Parcel Lockers, Amazon has started to look into adding lockers in U.S. stores where the store owner receives a small rental fee for hosting the lockers, as well as an increased potential to generate some additional foot traffic in their store.<sup>139</sup>

<sup>139</sup>[https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/c-13-07%20final-report-nyserda-freight-conference\\_1-2014.pdf](https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/c-13-07%20final-report-nyserda-freight-conference_1-2014.pdf)

## Land Use Planning and Zoning Strategies

Last mile connectivity could be improved through land use planning and zoning regulations. FDOT is developing a set of freight roadway design considerations to guide local governments in the planning of new communities and the redesign, expansion, and revitalization of both rural and urban areas (see section in **Chapter 1** regarding freight roadway design considerations and complete streets). Also, these criteria could suggest the different classes of trucks best suited for specific road characteristics and surrounding land uses. In addition, land use strategies could incentivize the creation of freight villages and urban distribution centers, as well as allowing delivery depots in residential neighborhoods and/or neighborhood commercial districts.<sup>140</sup>

Policies, ordinances, and regulations could require off-street delivery bays for large buildings and ensure that off-street delivery areas are included within company premises. These two strategies could reduce congestion levels by reducing the numbers of trucks parking on sidewalks, double parking, etc.<sup>141</sup>

In Barcelona, Spain, an innovative traffic and street space management system was developed allowing for the conversion of some roads into multi-use lanes depending on the time of day.<sup>142</sup> Throughout the day, variable message signs inform drivers as to which drivers may access the road at that particular time. During the time of typical rush hours, the roads open to general traffic. During business hours, only deliveries may be made. Finally, during the night, the roads convert to residential parking. By implementing road signs in congested areas, traffic control operators can reduce time delays for everyone. In terms of commercial motor vehicles, this is a great option because drivers can make their deliveries quickly without the hassle of dealing with many vehicles on the roads.

Furthermore, to promote last mile connectivity, city code and policies (such as noise ordinances, etc.) should be evaluated to identify potential barriers to off-peak hour deliveries.<sup>143</sup>

### 2.3.17 DATA

As with any industry, data collection is a necessity to be able to analyze the efficiency and effectiveness of its procedures and operations.

Gathering and sharing data from Intelligent Transportation Systems (ITS) provides a wide arrange of critical information to allow States to optimize their transportation systems. Using the data collected from the ITS, improvements can be made on processes such as response to severe weather and accidents, as well as improvements to the design and safety of roads, bridges, and transportation systems in general.

By using data, the motor carrier industry can optimize various areas of their operations. The use of data is also able to provide substantial statistics and information to help ensure that concerns within the industry are being addressed. By using surveys filled out by truck drivers and other methods of data collection, concerns such as truck parking and driver shortages become evident by the statistical analysis, and offer a sound basis for implementing solutions to various issues.

<sup>140</sup> <https://www.portlandoregon.gov/transportation/article/406590>

<sup>141</sup> [http://onlinepubs.trb.org/onlinepubs/nctfp/nctfp\\_rpt\\_023.pdf](http://onlinepubs.trb.org/onlinepubs/nctfp/nctfp_rpt_023.pdf)

<sup>142</sup> <http://www.utrc2.org/events/lastmilefreightdelivery.com>

<sup>143</sup> <https://www.portlandoregon.gov/transportation/article/406590>

As previously noted, data provided in 2015 by the American Trucking Association, indicated that there will be a shortage of approximately 175,000 truck drivers in the U.S. by 2024. A deficit of truck drivers can lead to an increase in freight delivery costs, as the number of licensed truck drivers is unable to meet the demand.

Freight data is key in optimizing the use of space and time to get goods from their origin to their final destination. New technologies and processes allow companies to track all their trucks and goods to ensure both are traveling in the most time- and cost-efficient way possible.

Improvements to data collection will offer a more complete understanding of the opportunities and constraints existing within the motor carrier industry. Investing in data collection can easily expand the scope and sheer numbers of the data being collected and analyzed. Making sure to gather information from various sources and utilizing different methods can also make identifying problems easier.

Quality of life is a primary concern for maintaining and growing the availability of truck drivers and the efficient movement of freight. Data collection from drivers reflecting the most important issues such as hours of service, short-haul vs. long haul, parking and amenities, electronic logging and more sophisticated technological advances, the economy, and congestion is contributing to how Local, State, and Federal governments and the private sector develop solutions to address the critical short-term and long-needs of the motor carrier industry.

## **2.4 CONCLUSION**

This chapter describes the top 17 Motor Carrier System Issues identified by a variety of industry stakeholders. It is from this comprehensive description of concerns that an understanding of the complexity of issues emerges. The following chapters will further analyze the current system and performance in light of these identified issues, develop a policy framework, and present next steps for implementation consideration.



# 3. SYSTEMS ANALYSIS & PERFORMANCE

This chapter includes an analysis of motor carrier movements from a private sector supply chain standpoint, an evaluation of the motor carrier safety and enforcement data, and a review of technology impacts to the trucking industry. This chapter includes:

- A high-level summary evaluation of trends in motor carrier movements
- Summary of motor carrier movements in Florida including identification of major motor carrier finished goods and commodity flows in Florida by region
- Analysis of motor carrier safety and enforcement data including a statewide analysis
- Evaluation of selected motor carrier issues (congestion, reliability, bottlenecks, safety, lack of connectivity, etc.)
- Identification of new technology and trends affecting the motor carrier industry and their potential impact on FDOT's policies and programs

## 3.1 EVALUATION OF MOTOR CARRIER MOVEMENTS

Florida's freight transportation system is critical to the economic wellbeing of the State. A growing population with an educated workforce continuously generates additional economic activity. These increases may lead to additional strains placed upon this system which must be strategically improved to accommodate limited financial resources. Without necessary improvements, these strains can negatively impact the transportation system, in particular, Florida's vast roadway network.

Throughout the nation and within Florida, motor carrier, or trucking, is the dominant mode of transportation for the movement of freight. Florida's motor carrier industry is heavily dependent upon the state's roadway network to bring their goods from suppliers to the market. As previously stated in **Chapter 2**, Florida has 122,391 centerline miles of public roads, with 12,116 of those miles included in the State Highway System and over 4,293 miles designated as the highway portion of the SIS.

### 3.1.1 METHODOLOGY

The measures and statistics reported within this chapter are based on inputs, parameters, and final output results as developed from the Florida Statewide Model (Version 6.0). This model was chosen for this analysis

because of its Florida-centric freight component, known as the Florida Freight Supply-Chain Intermodal Model (FreightSIM).

FreightSIM is a behavioral-based freight model which encompasses freight flows between Florida and the rest of the world using a multimodal transportation network. The model captures both domestic, import, and export freight movements from the perspective of the private sector supply chain. Data within FreightSIM is based on the Freight Analysis Framework (FAF3) which estimates commodity movements by truck and weight for truck-only, long distance moves over specific highways, and validated against data from TRANSEARCH and ATRI. For the overall Florida Statewide Model including FreightSIM, the base year is 2010, while the future year is 2040. For the purposes of this analysis, an additional year scenario forecast was developed by project staff for the year 2015.

### 3.1.2 IMPORTANCE OF MOTOR CARRIER MOVEMENTS

Florida is home to a multimodal freight transportation system. The major modes of freight transport within the State include motor carrier, rail, water, and air. Of these four, the motor carrier industry is the more dominant form of freight travel within Florida in terms of both weight and value as shown in **Table 3-1** and **Table 3-2**.

**Table 3-1: Weight of Goods (in KTONs) by Mode**

Mode	2010	2015	2040	Overall Percent Growth 2010 - 2040
Air	500	538	628	25.5%
Rail	118,106	117,717	138,348	17.1%
Truck	578,368	634,560	913,147	57.9%
Water	136,042	154,334	227,110	66.9%
Total	833,016	907,149	1,279,233	53.6%

Source: FreightSIM and CDM Smith Analysis

**Table 3-2: Value of Goods (in Millions) by Mode**

Mode	2010	2015	2040	Overall Percent Growth 2010 - 2040
Air	\$17,055	\$19,310	\$26,162	53.4%
Rail	\$51,294	\$55,023	\$73,778	43.8%
Truck	\$749,950	\$985,930	\$1,827,119	143.6%
Water	\$189,002	\$259,304	\$480,019	154.0%
Total	\$1,007,301	\$1,319,567	\$2,407,079	139.0%

Source: FreightSIM and CDM Smith Analysis

Moving from 2010 to 2040, tonnage weight of goods and their associated monetary values that travel by truck are generally higher than the other modes of freight transport. Even though freight movement via water is shown to have the higher proportion of growth during the 30-year period, motor carrier movements comes in second in terms of growth with these movements representing approximately 71 percent and 76 percent of freight tonnage and value, respectively, in 2040.



Focusing on daily motor carrier movements, the number of trips associated with Florida freight flows is projected to increase by 35 percent by 2040. However, with this increase, the overall composition of where trucks are beginning and ending their travel stays generally consistent. Slightly more than 90 percent of truck movements begin and end their travels within the state. Additionally, five percent of daily trips are associated with imported goods while the remaining four percent is for exports traveling to areas outside of the state.

Overall, freight movements in Florida are critical to the State's economy. In particular, motor carrier movements help provide a significant source of revenue to the State. The value of goods transported by truck is forecasted to grow up to 144 percent by 2040, to well over \$2 billion. Therefore, being sensitive to the needs of this industry is paramount. For example, issues regarding attracting and retaining truck drivers is critical for Florida not only looking at the amount of freight carried by these individuals compared to other transportation modes but also the overall make-up of their origins and destinations.

### Critical Part of Florida's Supply Chain









With the evolution of the worldwide production of goods and a corresponding global competitive marketplace, supply chain management has been elevated to a primary component of business strategies. The management of supply chains consists of developing a patchwork of multimodal transportation movements and logistics to deliver goods. Supply chain management practices govern the selection of the most appropriate mode for the movement of goods and progresses from transporting raw materials, through manufacturing, to the consumer. This modal selection can utilize a simple single modal or a complex network of multimodal solutions.

While different commodities often have very different transportation requirements, shippers utilize the following six criteria when determining a transportation mode:

- Cost
- Reliability
- Transit times
- Capacity
- Safety/security
- Accessibility

The identification of the appropriate mode or combination of modes revolves around creating the optimal combination of these criteria with the degree of each dependent on the needs of the shipper and receiver. The balance is often achieved through a multimodal approach across the entire supply chain or even a single segment. **Figure 3-1** depicts an overview of the modes and factors affecting modal selection.

Figure 3-1: Modes of Freight Movement

MODE	 AIR	 TRUCK	 RAIL	 WATER	 PIPELINE
COST (\$/LB)	>\$1.00	\$0.10 - \$0.03		\$0.01 - \$0.005	<\$0.005
RELIABILITY	↑ Higher	◆ Variable		↓ Lower	↑ Higher
FREIGHT PROFILE	↓ Weight ↑ Value ↑ Time Sensitivity ↑ Inventory Cost	◆ Weight ◆ Value ◆ Sensitivity ◆ Inventory Cost		↑ Weight ↓ Value ↓ Time Sensitivity ↓ Inventory Cost	Variable characteristics associated with the specialized nature of the commodity
TRANSIT TIMES	 FAST				 SLOW
ACCESSIBILITY/ FLEXIBILITY	◆ Variable	↑ Higher	↓ Lower	◆ Variable	↓ Lower

Source: Freight Mobility and Trade Plan Policy Element, Office of Freight Logistics and Passenger Operations, 2013

Of the five modes of freight movement, motor carrier is the most dominant. Motor carrier is critical to Florida's supply chain because it maximizes the greatest return. Motor carrier is generally neutral when considering reliability, and its freight profile of weight, value, and inventory cost. It provides the highest level of accessibility, the broadest range of weight, value, time sensitivity, and inventory cost at a relatively inexpensive cost. However, it surpasses most other modes' transit times while providing shippers with the highest level of accessibility and flexibility. These attributes of maximizing accessibility and flexibility give motor carrier its strategic advantage to other modes.

### 3.1.3 UNDERSTANDING TRUCK SIZE AND FREIGHT FLOWS

Before conducting a motor carrier analysis, it is important to recognize that trucks carrying freight come in a number of sizes dependent upon the needs of the supplier and market. This impacts the number of trucks that utilize Florida's transportation network on a daily basis. The truck sizes assessed for this analysis were Medium and Heavy Freight Trucks. Medium Freight Trucks are those defined under the FHWA Classes 5 through 7 which include single-unit 2-axle, single unit 3-axle, and single-unit 4 or more axle trucks. Heavy Freight Trucks are defined as FHWA Classes 8 and higher including single Trailer 3- or 4-axle trucks and larger tractor trailer configurations.<sup>144</sup> **Figure 3-2** provides an illustration of these and other vehicle category classification used by the FHWA. Overall, Heavy Freight Trucks would typically carry heavier loads than Medium Freight Trucks.

In 2010, motor carrier movements which began and ended their travel within Florida carried almost 83 percent of freight by weight as shown in **Table 3-3**. These movements account for the majority percent of Florida's daily truck movements. However, during this same time period, motor carrier movements

<sup>144</sup> The FreightSIM model does not generate freight carrying trucks in FHWA Classes 2 through 3. FHWA Classes 2 through 3 typically contain passenger vehicles, recreational vehicles, campers, some commercial vehicles, emergency vehicles, hearses, minibuses, and light trailers. These classes are only utilized by the passenger component of the Florida Statewide Model. As such, commodities and industries within FreightSIM utilizes motor carrier options for carrying freight are associated with using either Medium or Heavy Freight Trucks.

associated with imported goods had the second highest share of tonnage (11 percent). Yet, these movements only accounted for five percent of daily movements. Exported goods leaving the state via truck only accounted for six percent of freight moved by weight.

By 2040, the share of weight and value by motor carrier movements circulating within the state is estimated to decrease to 81 percent by weight. There is a similar pattern for import movements. Where these two segments of origin and destination decline, there is an increase for exports leaving Florida via truck – moving from six to eight percent by weight. There are two narratives presented here: 1) the impact of truck size and 2) empty backhaul.

**Table 3-3: Truck Freight Flows by Origin/Destination (O/D) Segment by Weight**



































O/D Segment	2010	2015	2040
Within Florida	83%	82%	81%
From Florida	6%	7%	8%
<b>To Florida</b>	<b>11%</b>	<b>11%</b>	<b>11%</b>

*Source: FreightSIM and CDM Smith Analysis*

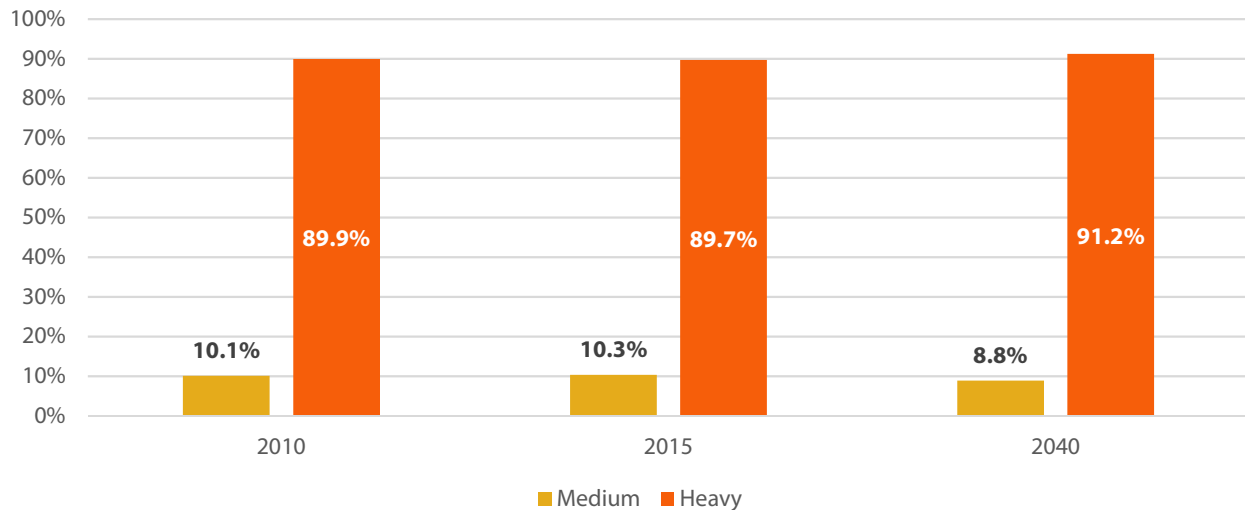
In regards to truck size, trucks carrying imports on a daily basis are fewer in number when compared to export movements and movements staying within the state. Yet, these motor carrier movements move more tonnage than trucks carrying exports.

Examining the number of freight trucks moving along Florida’s network, the majority of trucks are classified as Heavy Freight Trucks. The amount of Heavy Freight Trucks utilizing the State’s transportation network is projected to increase in 2040 as shown in **Figure 3-3**.

Figure 3-2: FHWA 13 Vehicle Category Classification

<b>Class 1</b> Motorcycles		<b>Class 7</b> Four or more axle, single unit	
<b>Class 2</b> Passenger cars		<b>Class 8</b> Four or less axle, single trailer	
			
			
			
<b>Class 3</b> Four tire, single unit		<b>Class 9</b> 5-Axle tractor semitrailer	
			
			
<b>Class 4</b> Buses		<b>Class 10</b> Six or more axle, single trailer	
			
		<b>Class 11</b> Five or less axle, multi trailer	
<b>Class 5</b> Two axle, six tire, single unit		<b>Class 12</b> Six axle, multi-trailer	
			
		<b>Class 13</b> Seven or more axle, multi-trailer	
<b>Class 6</b> Three axle, single unit			
			
			

Source: Federal Highway Administration, 2014. [http://www.fhwa.dot.gov/policyinformation/tmguid/tmg\\_2013/vehicle-types.cfm](http://www.fhwa.dot.gov/policyinformation/tmguid/tmg_2013/vehicle-types.cfm)

**Figure 3-3: Proportion of Heavy vs. Medium Freight Trucks along Florida's Network**

Source: FreightSIM and CDM Smith, Inc. Analysis

Even though imports arriving by truck only account for five percent of daily truck trips, the composition of trucks would include Heavy Freight Trucks carrying larger loads. This is the impact of truck size and weight limitations on truck traffic.

Federal and State legislation specifies size and weight standards for commercial vehicles carrying goods between supplier and market. Trucks used by the motor carrier industry must adhere to these standards to ensure no costly disruption to their movements. Trucks that do not adhere to these size or weight standards are considered to be “oversized” and/or “overweight”. For these trucks to complete their journey, special permits must be obtained. If a special permit is not procured or if the truck during its transit between different pick-up and delivery points violates the conditions of the permit, then the motor carrier must pay penalty fees based on the amount in excess of the legal or permitted limit whether it is size, weight, or both. In addition, in Florida, there are 11 violation types that, if triggered, could potentially place the motor carrier’s driver out of service.<sup>145</sup> All of this impacts transportation costs which are factored into the supply chain and aids in the decision-making by the manufacturer or supplier when choosing the mode of transport for their goods. With the large amount of trucks classified as Heavy Freight Trucks, this is a critical issue as there is a preference for trucks which can carry more or larger goods.

Looking back at the truck freight flows, the number of daily trips associated with imports and exports via truck are still relatively low when compared to internal movements. This could be linked to another narrative – empty backhaul. Empty backhaul is when a truck returns to its original destination with little or no cargo. Empty backhaul is a costly challenge for the State and could explain why export numbers in relation to trucks are lower in terms of number of movements. It is a critical concern because empty backhaul adds additional costs for using motor carriers to deliver freight, as well as an issue for manufacturers and suppliers to choose Florida for their businesses. The State’s small manufacturing sector coupled with the State’s distance from other major U.S. consumer markets and production centers are concerns. The issue of empty backhaul was identified as a critical issue facing Florida in FDOT’s FMTP<sup>146</sup> and

<sup>145</sup> Florida Highway Patrol. 2013. Commercial Motor Vehicle Manual. <http://www.flhsmv.gov/fhp/cve/2013TruckingManual.pdf>

<sup>146</sup> <http://freightmovesflorida.com/statewide-initiatives/freight-mobility-and-trade-plan-overview-fmtp/>

continues to be a major issue addressed in this study (see **Chapter 2**). In addition, the Florida Chamber Foundation has identified Florida historically as a consumer state where motor carriers brought goods to the final destination due to an ever-growing consumer market.<sup>147</sup> Florida is currently working to foster and encourage manufacturing to grow and locate in the State to promote the potential for exporting more goods from Florida via truck.

Within FreightSIM, there are parameters which contain certain assumptions which are of particular interest regarding empty backhaul. More specifically, translating the occurrence of empty backhaul situations by commodity groups suggests that trucks carrying certain commodities at certain distances are more prone to having an empty backhaul movement compared to others. This information comes from the Vehicle Inventory and User Survey (VIUS)<sup>148</sup>.

### 3.1.4 GENERAL TRAVEL PATTERNS AND MAJOR CORRIDORS

Florida manufactures, exports, and imports a variety of commodities to supply the demands of its residents and visitors, as well as populations outside of the State. As previously identified, the majority of motor carrier movements begin and end within the state. As shown in **Table 3-4**, in terms of distance traveled, the majority of daily motor carrier movements travel up to 100 miles. The number of motor carrier movements traveling more than 200 miles drops off significantly. The amount of truck trips traveling greater than 500 miles was greater than 15,500 in 2010, and increases to over 24,000 by 2040. Even though there are higher rates of growth of distance categories greater than 200 miles, the amount was about seven percent of daily motor carrier movements in 2010, and only increase by a single percentage point to eight percent in 2040. As noted in the Florida Chamber Foundation's report, Florida's manufacturers, suppliers and consumers are a considerable distance from other industries and markets. Truck size and weight and empty backhaul concerns may further exacerbate this trend, as well the issues of truck parking and roadway capacity.

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<sup>147</sup> Florida Chamber Foundation. 2013. *Florida: Made for Trade. Florida Trade Logistics Study 2.0*. <http://www.flchamber.com/wp-content/uploads/MadeForTrade-FINAL-Single-1.pdf>

<sup>148</sup> <https://www.census.gov/svsd/www/vius/2002.html>; The most recent year of data available for this dataset is 2002 as it has been discontinued by the U.S. Census. However, there has been movements to try to restore the VIUS in the last few years by federal agencies.

**Table 3-4: Motor Carrier Movements by Distance Traveled**

Miles	2010	2015	2040	Percent Growth 2010-2040
0-100	330,887	349,857	442,277	33.7%
100-200	33,194	34,627	44,545	34.2%
200-300	4,381	5,548	8,775	100.3%
300-400	4,210	4,765	6,249	48.4%
400-500	3,050	3,771	5,098	67.1%
500-600	2,689	2,693	4,015	49.3%
600-700	2,413	2,512	4,397	82.2%
700-800	1,084	1,368	1,548	42.8%
800-900	1,220	1,272	1,718	40.8%
900-1000	1,123	1,375	1,642	46.2%
1000-2000	5,743	6,140	8,144	41.8%
>2000	1,395	1,630	2,841	103.7%
<b>Total</b>	<b>391,389</b>	<b>415,558</b>	<b>531,249</b>	<b>35.7%</b>

Source: FreightSIM and CDM Smith, Inc. Analysis

As Florida moves into the future, the need for infrastructure to be in place to accommodate the growth is important. As briefly described in the beginning of this chapter, the SIS has identified the most significant transportation facilities and services which support the State's economy and well-being. As of December 2015, 70 percent of truck miles traveled occurred on highways designated under the SIS.<sup>149</sup> Analysis of the freight truck volumes was used to identify which roadway segments carried the highest concentrations.<sup>150</sup> Overall, the majority of the segments identified during this analysis to have high concentrations of freight truck volumes were along designated SIS highway corridors.

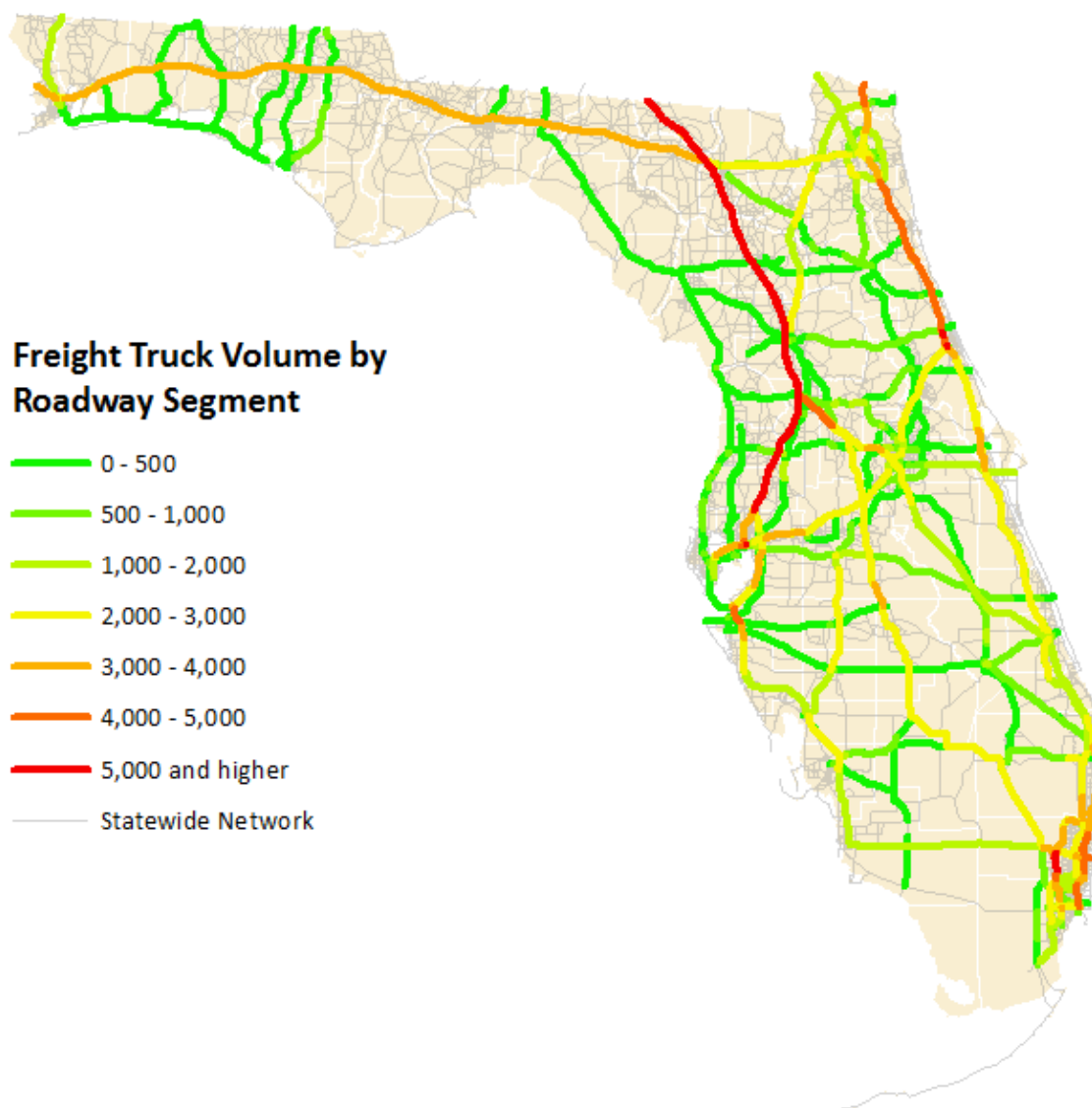
Over the 30-year period analysis, there are specific corridors which are more highly utilized by freight trucks than others. These corridors are more adversely impacted by the higher volumes requiring more investments to ensure non-hindered future freight flows. The following figures display the truck volumes for 2010, 2015 and 2040.

Roadway segments reporting the highest concentration of truck volumes (5,000 or greater) were found along portions of I-75, I-95, I-10, and I-4 shown in **Figure 3-4** for the year 2010. In particular:

- I-4 (I-275 Interchange)
- I-10 (I-75 Interchange)
- I-75 (Georgia/Florida State line to Pasco/Hillsborough County line)
- I-75 (Pines Blvd to I-595/I-75 in Miami-Dade County)
- I-95 (State Road 40 to I-4 in Volusia County)

<sup>149</sup> FDOT Office of Policy Planning, March 2016. Strategic Intermodal System Policy Plan.

<sup>150</sup> This analysis only assesses major highways and doesn't local roadways.

**Figure 3-4: Major Freight Corridors by Volume (2010)**

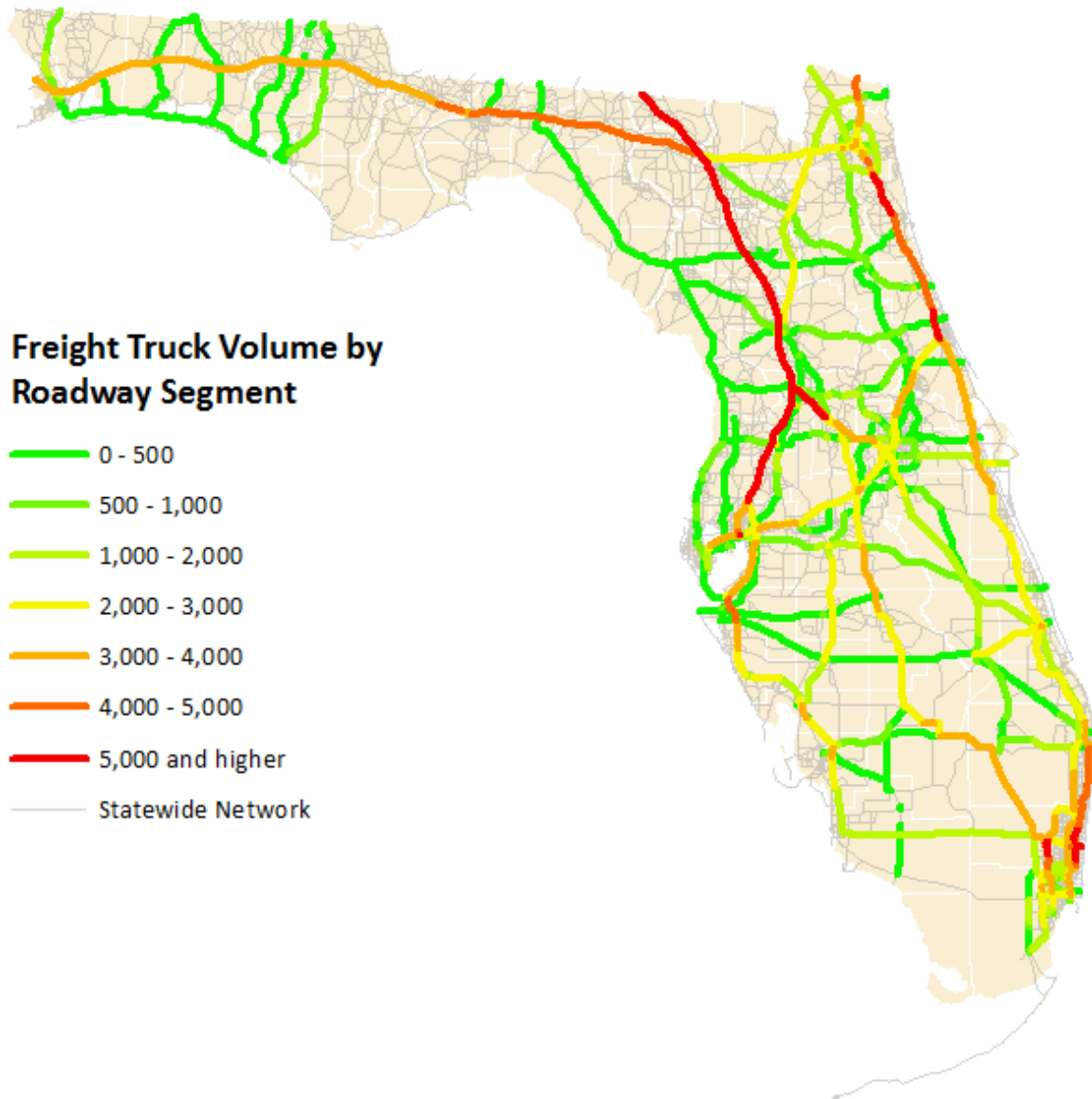
*Note: Highway network from Freight SIM  
Source: FreightSIM and CDM Smith, Inc. Analysis*

Beyond these segments, there are other segments which contain significant freight truck volumes, such as along I-10 (west of I-75), I-95 (from Miami-Dade County to Broward County, Volusia County to Duval County), I-4 (Hillsborough County), and Florida's Turnpike (Sumter County to Lake County).

Moving into 2015 (**Figure 3-5**), those segments showing the highest concentrations of freight truck traffic continue to experience growth. Other segments listed that were not as high, but still contained significant volumes and an increase in volumes include I-10 from I-75 to Gadsden County and I-95 from St. Johns County to Duval County.

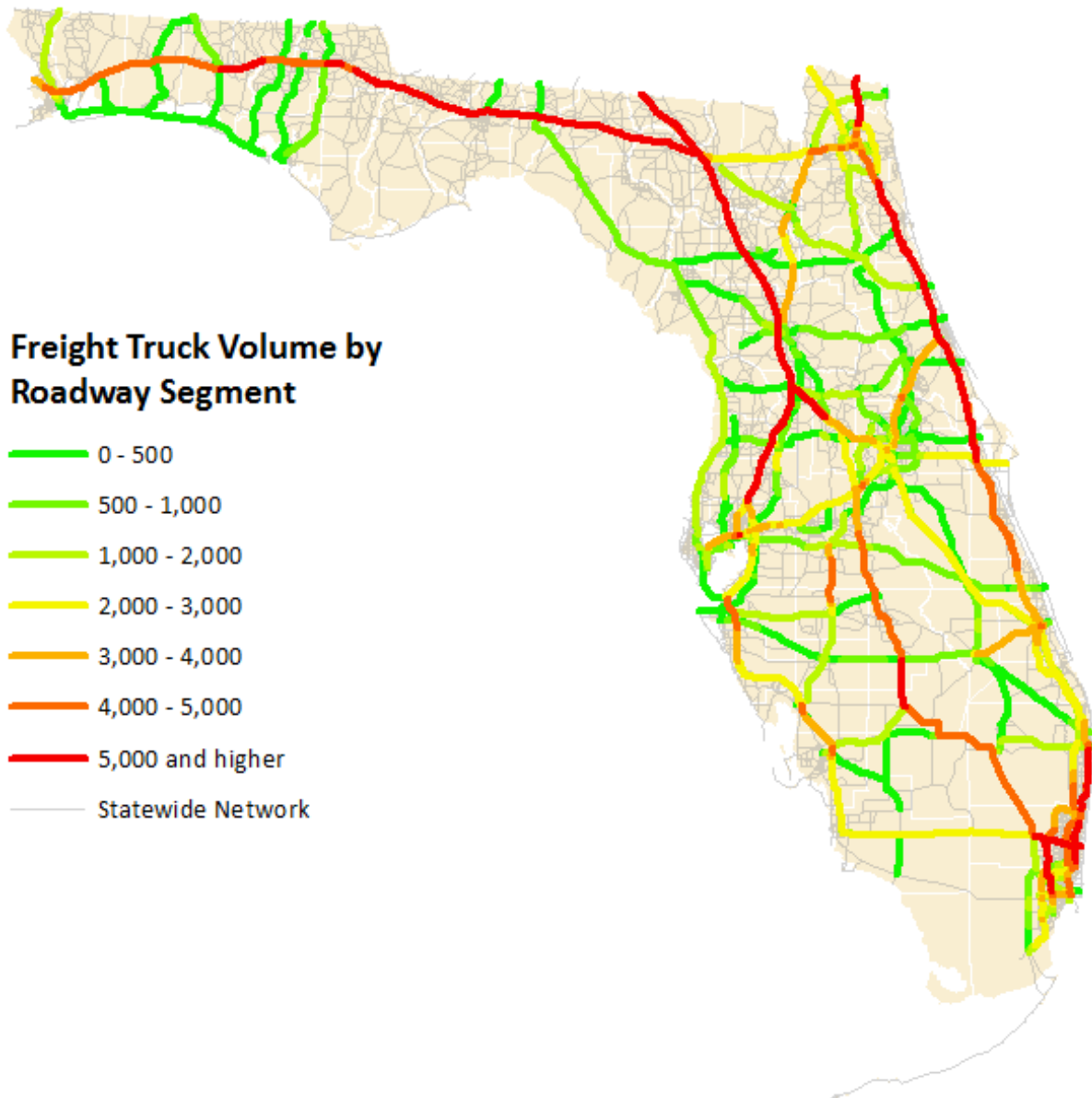


**Figure 3-5: Major Freight Corridors by Volume (2015)**



*Note: Highway network from Freight SIM  
Source: FreightSIM and CDM Smith, Inc. Analysis*

These highway corridors will continue to experience increases in freight truck volumes into 2040, as displayed in **Figure 3-6**.

**Figure 3-6: Major Freight Corridors by Volume (2040)**

*Note: Highway network from Freight SIM  
Source: FreightSIM and CDM Smith, inc. Analysis*

As shown in **Figure 3-6**, the highest concentrations are along:

- Florida's Turnpike (I-75 to US 27)
- I-4 (I-275 Interchange)
- I-10 (I-75 to US 231)
- I-10 (Holmes County to US 331)
- I-595 (US 1 to US 27)
- I-75 (Georgia/Florida State line to Pasco/Hillsborough County line)
- I-95 (I-295 to Georgia/Florida State line)
- I-95 (SR 528 to I-295)
- I-95 (Pines Blvd to US 98)
- SR 826/I-75 (US 41 to I-595/I-75 in Miami-Dade County)
- US 27 (SR 29 to SR 70)

Additional segments along I-10, I-4, I-75, and I-95 experience higher concentrations of freight trucks. During the 30-year period, highways corridors such as US 27 and US 301 also experience significant growth. These corridors seem to act like parallel relievers for other routes, especially I-75. All of the facilities identified are designated under the SIS. As described, SIS Highways provide access to several important hubs. For example, there is substantial freight truck traffic in Miami-Dade, Palm Beach, and Broward Counties which are home to many hubs. Miami-Dade hosts Miami International Airport and PortMiami, while Broward contains Fort Lauderdale/Hollywood International Airport and Port Everglades, and Palm Beach has Palm Beach International Airport and the Port of Palm Beach. SIS Highways function as major routes for these hubs. SIS Highways also provide valuable routes to out-of-state locations.

From 2010 onward, the I-75 Corridor continues to carry a substantial amount of freight truck traffic. This Corridor provides access to Georgia and stretches north to Michigan and the Canadian border. As time progresses, freight truck volumes also increase along I-10 (west of I-75) and I-95. I-10 provides access to Alabama, Texas and four other states before ending in southern California. I-95 continues to travel along the eastern U.S. coastline from Florida to Maine. It is important to understand the connections Florida's roadway network has as it impacts the state's trading partners.

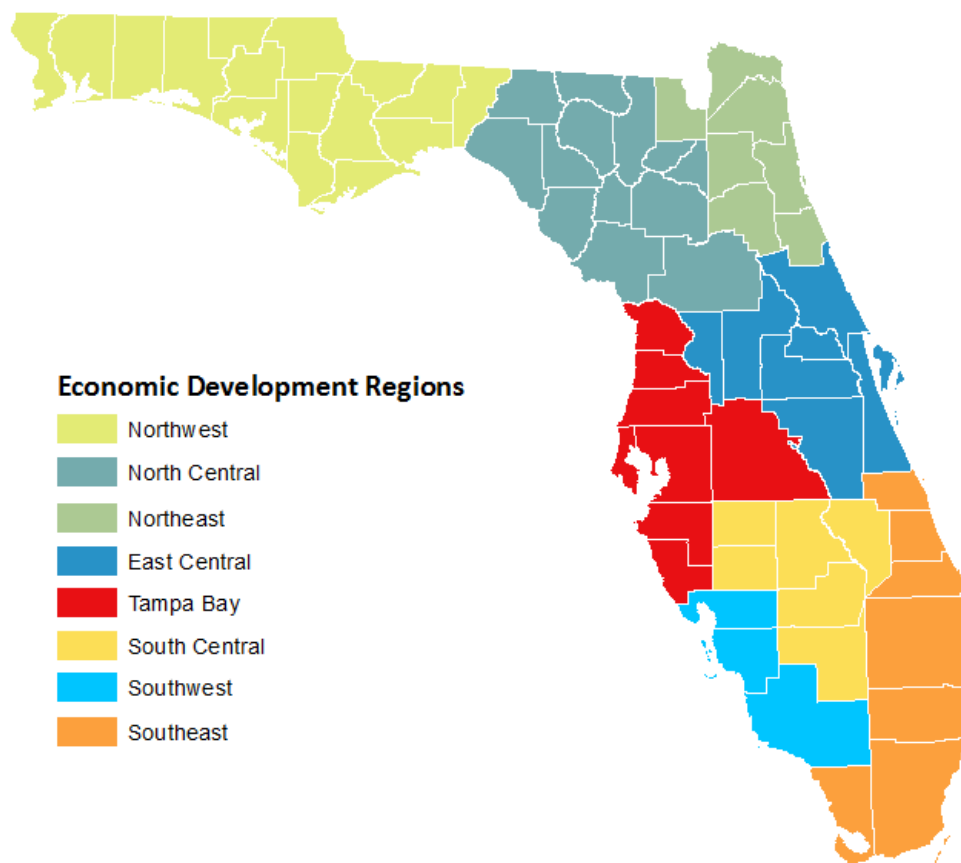
When analyzing FreightSIM, Georgia and Alabama, as expected, are Florida's top two trading partners in regards to both exports and imports based on the number of motor carrier movements between the States. This is not surprising because both are reachable by use of I-10, I-75, and I-95 along with other highways like US 331. Yet, there is a preference to use these facilities because of their reach. For example, I-95 provides direct access to partner states such as both Carolinas, Virginia, Pennsylvania, and New York. I-10 provides access to Mississippi, Louisiana and Texas. Finally, I-75 not only provides direct access to Ohio but also Canada. In addition, this Corridor provides access to major highway Corridors to connect with Illinois.

Overall, much of Florida's trade via truck is within the southeast region of the U.S. with the exception of locations such as Illinois. As stated earlier, the number of daily truck trips drops off after 200 miles. Although there are motor carrier movements with the rest of the nation, as well as Mexico, the lower number of movements could be based on more practical transportation options for certain commodities associated with these other areas to a lack of supply and demand in connection with Florida.

## 3.2 COMMODITY FLOWS IN FLORIDA BY REGION

The previous section provided a high-level summary of motor carrier trends for Florida. This section will go into more detail by examining motor carrier movement trends and commodity flows at the regional level. There are several regions designated throughout the state for reasons such as growth management, infrastructure improvements, natural resources, emergency management, and economic development. Since freight is a significant economic driver for the state, the regional review of freight flows will use Florida's Economic Development Regions as shown in **Figure 3-7**.

**Figure 3-7: Florida's Economic Development Regions**



### 3.2.1 GENERAL FREIGHT FLOWS

Each economic region varies depending on population, available workforce, economic development, available transportation infrastructure, and level of urbanization amongst its counties. These variables would impact the freight flows originating from and moving into each region. As shown in **Table 3-5**, the Southeast Economic Region has the highest amount of regional freight flows in 2010, 2015, and 2040. This should not be surprising because the region includes the major metropolitan areas of Miami and Fort Lauderdale and many strategic SIS designed facilities, including PortMiami, Port Everglades, Fort Lauderdale/Hollywood International Airport and Miami International Airport. The Southeast Economic Region also has the highest growth (62 percent) over that time period.

**Table 3-5: Regional Freight Flows Leaving Each Region (in KTONs)**

Region	2010	2015	2040	Percent Change 2010-2040
Northwest	19,356	18,550	26,245	35.6%
North Central	39,285	40,552	48,971	24.7%
Northeast	76,613	85,374	118,384	54.5%
East Central	107,920	116,154	163,984	51.9%
Tampa Bay	102,885	116,040	158,902	54.4%
South Central	12,095	14,527	17,129	41.6%
Southwest	23,415	24,840	35,465	51.5%
Southeast	279,268	304,719	452,798	62.1%

Source: FreightSIM and CDM Smith, Inc. Analysis

As anticipated, the Southeast also has the highest volume of freight flows moving throughout each region for 2010, 2015 and 2040 as shown in **Table 3-6**. However, the Economic Region with the largest increase (77 percent) in regional freight flow moving throughout a region is South Central. A possible cause of this growth is the development of the Central Florida/Winter Haven Intermodal Logistics Center (ILC). The ILC is strategically located along the CSX rail line with access to SR 60 in Polk County. Polk County is located just north of the South Central Economic Region, within the Tampa Bay Economic Region. Even though the region's growth is only almost 40 percent, this is an increase of over 57 million tons. East Central Economic Region, which also neighbors Polk County, experiences about 52 percent in growth.

**Table 3-6: Regional Freight Flows Moving throughout Each Region (in KTONs)**

Region	2010	2015	2040	Percent Change 2010-2040
Northwest	40,753	39,356	52,804	29.6%
North Central	28,065	35,716	42,631	51.9%
Northeast	81,924	85,742	115,823	41.4%
East Central	144,267	154,019	209,149	45.0%
Tampa Bay	142,313	149,684	198,979	39.8%
South Central	14,498	21,412	25,612	76.7%
Southwest	32,405	33,351	48,885	50.9%
Southeast	273,361	299,423	430,355	57.4%

Source: FreightSIM and CDM Smith, Inc. Analysis

As Florida continues to grow, it is anticipated that the Southeast Economic Region will continue to lead the way with the amount of truck movement. It also will be of interest to see how the development and growth associated with Florida's only SIS designated ILC will transform the Tampa Bay and South Central Economic Regions and impact truck movement throughout the state.

### 3.2.2 MAJOR MOTOR CARRIER MOVEMENTS AND CORRIDORS BY REGION

This section discusses freight truck volumes by region and the major truck corridors for each region. Since trucking is the main mode of transportation for Florida's goods both by weight and by value, analyzing truck movements is a key component to an understanding of the motor carrier system and its impact on Florida's economy.

As shown in **Table 3-7**, the Southeast Region has the highest trucking volume for the 30-year period. With its population, available workforce, transportation infrastructure, geographic proximity, and level of

urbanization, it is not surprising that the Southeast Economic Region accounts for consistently 30 percent of the State's total truck volumes.

**Table 3-7: Freight Truck Volumes by Region (Percentage)**

Region	2010	2015	2040
Northwest	7.0%	6.6%	6.5%
North Central	9.1%	9.4%	9.3%
Northeast	11.4%	11.3%	11.9%
East Central	16.4%	16.8%	15.9%
Tampa Bay	19.1%	19.0%	18.4%
South Central	4.0%	4.2%	4.6%
Southwest	2.4%	2.8%	2.7%
Southeast	30.7%	29.9%	30.8%

Source: FreightSIM and CDM Smith, Inc. Analysis

### 3.2.3 IDENTIFICATION OF KEY COMMODITIES AND FLOWS

A FreightSIM analysis was conducted regarding the commodities transported throughout the State based on the FAF over the 30-year period.<sup>151</sup> The top ten commodities were identified by motor carrier movement, weight, and value for 2010, 2015, and 2040.

As shown in **Table 3-8**, "Other food stuffs" refers to other prepared foodstuffs and was the top export in terms of weight by motor carrier in 2010. It is also forecasted to be the top exported commodity by weight with over 10.6 million tons in 2040. In addition, the commodities generated by Florida's timber/lumber industry are of great significance as "Newsprint/paper" and "Wood Products" are within the top ten for the entire analysis period. "Newsprint/paper" category includes the intermediate processed goods of pulp, newsprint, paper, and paperboard and is the second highest exported commodity with 6 million tons transported by motor carrier anticipated by 2040. In terms of other commodities, the exports of "Motorized vehicles" are seen to enter the top ten in 2015, and grow from slightly more than 2 million tons to over 4.8 million tons by 2040. "Electronics" is another commodity which enters in 2015, and grows significantly into 2040. Commodities in the "Electronics" category are finished goods which includes electronics and other electrical equipment, components and office equipment.

<sup>151</sup> There are 132 identified domestic FAF regions. Of these regions, five are located within Florida: 1) Jacksonville-St. Marys-Palatka, 2) Miami-Fort Lauderdale-Port St. Lucie, 3) Orlando-Deltona-Daytona Beach, 4) Tampa-St. Petersburg-Clearwater, and 5) the Remainder of Florida. Since this is the most detailed level from the FAF for Florida, it is not possible to breakdown the commodities by Economic Region.

**Table 3-8: Top 10 Exports by Weight (in KTONs)**

2010			2015		2040	
Ranking	Commodity	Weight	Commodity	Weight	Commodity	Weight
1	Other foodstuffs	5,158	Other foodstuffs	6,538	Other foodstuffs	10,631
2	Newsprint/paper	3,711	Newsprint/paper	4,028	Newsprint/paper	5,962
3	Fertilizers	2,994	Other agricultural products	2,810	Electronics	5,625
4	Other agricultural products.	2,318	Nonmetal mineral products	2,453	Machinery	5,468
5	Nonmetal mineral products.	2,203	Fertilizers	2,423	Motorized vehicles	4,811
6	Wood products.	2,098	Wood products.	2,370	Nonmetal min. prods.	4,004
7	Articles-base metal	2,040	Articles-base metal	2,277	Other agricultural products.	3,677
8	Base metals	1,680	Electronics	2,227	Fertilizers	3,021
9	Misc. manufacturing products	1,287	Motorized vehicles	1,741	Misc. manufacturing products	2,839
10	Live animals/fish	1,176	Base metals	1,720	Wood products.	2,589

Source: FreightSIM and CDM Smith, Inc. Analysis

The top ten imports by weight is shown in **Table 3-9**. Similar to the exports by weight, Florida largest import category is “Other food stuffs”. In 2010, this category was the top import with 7.5 million tons and is forecasted to grow to 10.6 million tons in 2040. Growth in this category both in exports and imports demonstrates that while Florida’s growers produce and export, Florida is also a major consumer State of goods and relies on a strong motor carrier network to deliver food to its growing population.

Within the state, the top ten commodities by weight are shown in **Table 3-10**. The bulk natural resource categories of “Nonmetal mineral products” and “Gravel” are the two highest commodities by volume for 2010, 2015 and 2040. In 2040, nonmetal mineral products are forecasted to exceed 213 million tons, and gravel is anticipated to approach 110 million tons which clearly surpasses the third ranked commodity.

**Table 3-9: Top 10 Imports by Weight (in KTONs)**

2010			2015		2040	
Ranking	Commodity	Weight	Commodity	Weight	Commodity	Weight
1	Other foodstuffs	7,577	Other foodstuffs	8,108	Other foodstuffs	10,588
2	Wood products	5,538	Wood products	6,063	Wood products	8,176
3	Plastics/rubber	4,548	Basic chemicals	5,129	Plastics/rubber	6,654
4	Base metals	3,443	Plastics/rubber	4,801	Basic chemicals	6,239
5	Basic chemicals	3,345	Motorized vehicles	3,419	Electronics	5,330
6	Newsprint/paper	2,730	Base metals	3,392	Misc. manufacturing products	4,588
7	Motorized vehicles	2,728	Newsprint/paper	2,881	Newsprint/paper	4,272
8	Misc. manufacturing products	2,694	Electronics	2,845	Machinery	4,190
9	Articles-base metal	2,680	Articles-base metal	2,728	Meat/seafood	3,826
10	Gasoline	2,518	Meat/seafood	2,701	Gasoline	3,808

Source: FreightSIM and CDM Smith, Inc. Analysis

**Table 3-10: Top 10 Commodities by Weight within Florida (in KTONs)**

Ranking	2010		2015		2040	
	Commodity	Weight	Commodity	Weight	Commodity	Weight
1	Nonmetal mineral product	111,942	Nonmetal mineral product	128,923	Nonmetal mineral product	213,054
2	Gravel	96,333	Gravel	97,435	Gravel	109,893
3	Gasoline	35,482	Waste/scrap	69,676	Gasoline	48,675
4	Natural sands	22,013	Gasoline	36,379	Natural sands	32,840
5	Other agricultural products	15,151	Natural sands	26,237	Other agricultural products	21,208
6	Other foodstuffs	15,009	Other agricultural products	16,087	Other foodstuffs	21,202
7	Fuel oils	12,149	Other foodstuffs	15,796	Fuel oils	16,565
8	Wood products	10,686	Fuel oils	13,161	Wood products	15,923
9	Logs	9,907	Wood products	11,555	Logs	14,864
10	Alcoholic beverages	9,351	Logs	10,548	Alcoholic beverages	14,777

Source: FreightSIM and CDM Smith, Inc. Analysis

When reviewing the top import and export commodities and the commodities traveling within the state, it was apparent that Florida has many reasons to need an efficient and reliable motor carrier system. The commodity flow data demonstrates that Florida is a growing consumer state requiring a constant influx of both manufactured and food imports. While Florida is indeed still a major producer of food products to export by motor carrier, its growing population requires non-Florida grown products. In addition, Florida is also a very large, vast and diverse state requiring an extensive, integrated and intricate motor carrier network to move commodities within the state.

### 3.2.4 COMMODITY FLOWS BY REGION

Since a commodity analysis using FreightSim has to be done statewide, commodity flows by region were developed utilizing individual County-specific information and aggregating to each economic region. This illustrates which regions are significant in terms of exports and imports, as well as internal commodity flows.

In **Table 3-11**, exports by weight are shown for each region by year. In 2010, Northeast Economic Region led the other regions for exports in terms of weight, followed by Tampa Bay and Southeast, moving into 2040, this dynamic changes. This table shows that 7.3 million tons left the Southeast Economic Region in 2010, and this number is forecasted to increase dramatically to 27 million tons in 2040. In 2010, the Southeast Economic Region was the third highest region for weight, but by 2040, it will surpass all the other regions and account for 30 percent of the State's exports. This correlates with increased Corridor demands as the number of freight truck trips steadily increased within this region, as shown previously. This can also be part of the reason why some Corridors in other regions such as Northeast see higher flows like the I-95 Corridor.



**Table 3-11: Exports by Weight by Region Origin (in KTONs)**

Origin Region	2010	2015	2040
Northwest	3,350	3,423	4,348
North Central	2,231	2,427	3,406
Northeast	9,697	10,294	13,682
East Central	2,717	2,824	4,514
Tampa Bay	8,536	11,332	14,147
South Central	1,017	1,043	1,462
Southwest	1,011	1,554	2,314
Southeast	7,308	11,209	26,986

Source: FreightSIM and CDM Smith, Inc. Analysis

As shown in **Table 3-12**, imports by weight for each region show each region as a destination for commodities. This table displays that 16.9 million tons arrived in the Tampa Bay Economic Region in 2010, and this number is forecasted to increase to 27.1 million tons in 2040.

**Table 3-12: Imports by Weight by Region Destination (in KTONs)**

Designation Region	2010	2015	2040
Northwest	6,606	6,781	7,951
North Central	3,271	3,798	4,607
Northeast	11,598	12,367	17,267
East Central	9,221	9,549	13,594
Tampa Bay	16,919	17,908	27,108
South Central	520	1,120	933
Southwest	2,756	2,419	4,022
Southeast	14,084	17,554	25,935

Source: Freight SIM and CDM Smith, Inc. Analysis

Beyond export and import movements, the analysis also looked at internal motor carrier movements as those make up the bulk of freight truck trips. Motor carrier movements within the State by weight are shown in **Table 3-13**.

**Table 3-13: Weight of Commodities within the State by Region (in KTONs)**

Region	2010		2015		2040	
	Destination	Origin	Destination	Origin	Destination	Origin
Northwest	20,320	11,848	23,906	11,376	35,128	16,796
North Central	18,653	27,331	18,431	27,606	24,373	34,668
Northeast	39,899	56,655	44,656	64,160	63,465	86,642
East Central	108,397	85,885	114,579	93,506	160,924	139,513
Tampa Bay	68,104	69,152	76,052	78,182	106,951	111,146
South Central	7,537	7,937	7,582	7,233	8,646	8,327
Southwest	19,290	16,767	19,496	18,682	31,013	27,351
Southeast	195,327	201,950	214,255	218,214	310,371	316,427
	<b>477,527</b>	<b>477,527</b>	<b>518,958</b>	<b>518,958</b>	<b>740,870</b>	<b>740,870</b>

Source: FreightSIM and CDM Smith, Inc. Analysis

Typically, the regions with the largest population/urban areas have the highest values by weight and volume. The Southeast Region which consists of the Miami and Fort Lauderdale urban areas, is followed in

the ranking by the East Central Region (Orlando), the Tampa Bay Region (Tampa and St. Petersburg), and the Northeast Region (Jacksonville). This demonstrates the relationship between urban areas, population, and increased motor carrier traffic regardless of the weight within areas due to higher population and, thus, greater needs.

What is of more importance is that this table displays the commodities that originate in the region and stay within the state, and the destination for commodities traveling from other regions. This allows an analysis of the region concerning what leaves the region and the goods that are destined for the region, thus its relationship with the movement of goods.

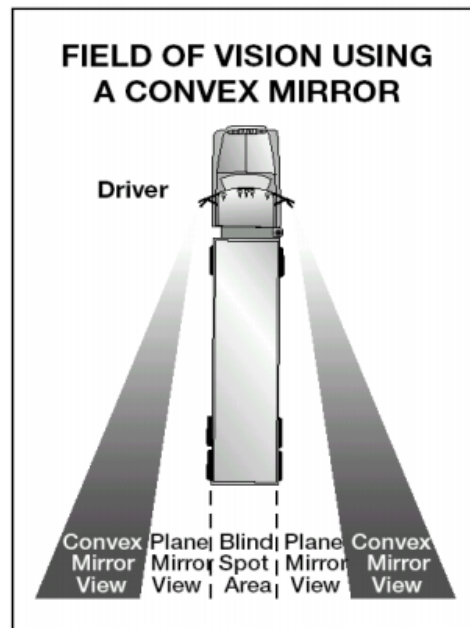
When reviewing the commodities by weight, 195.3 million tons arrived in the Southeast Region in 2010, but approximately 202 million tons left the region for the rest of the state. This is not surprising due to the major seaports and airports in the region and this trend is not forecasted to change over the next 30 years. It also demonstrates the importance of the Southeast Region as the port of entry for many of Florida's goods. By comparison, the East Central Region with the urban area of Orlando is the 2nd highest origin region for commodities in 2010, with 85.9 million tons, but it is a "consumer" region because it receives 108.4 million tons of commodities from the rest of the State.

### 3.3 SAFETY AND ENFORCEMENT DATA

While motor carriers account for a small amount of registered vehicles, crashes involving semi-trucks are a critical concern because many of the traffic incidents involve serious injuries and fatalities. There are many reasons cited when trucks are involved in crashes, such as truckers are on the road for long hours. However, it is important to recognize that there are many fundamental physical aspects of trucks that increase the potential of incidents. A less discussed risk is their size and weight. The average weight of a car is 3,700 lbs., while the weight of a truck can be 80,000 lbs.

In addition, because trucks weigh considerably more than the other vehicles, they become harder to control. Actions like braking and steering must be given special consideration, especially in dangerous weather. Other aspects include:

- Blind spots - Because of their length and build, trucks have much larger blind spots than regular vehicles. The area directly behind the truck and diagonally to each side of the truck are invisible to the truck driver. Potential incidents include trucks changing lanes into a vehicle located in a blind spot or a truck breaking suddenly when there is a car following too closely behind them. (**Figure 3-8**)

**Figure 3-8: Blind Spot Diagram**

Source: Florida Commercial Driver License Handbook, 2016

- Wide turn awareness - Also because of their size, trucks need to swing wide to the left when making right turns and wide to the right when making left turns. There is a potential for conflicts when trucks do not see smaller vehicles flanking them on either side or when smaller vehicles especially motorcycles are to the right of the truck and next to the curb during a right turn.
- Weight distribution which account for rollovers - Trucks are often top-heavy with cargo and cumbersome in general. As such, trucks are much more susceptible to rollovers when turning too fast or driving on on-ramps or off-ramps at unsafe speeds. Rollovers also can occur during adverse roadway conditions during severe weather.
- Jackknifing – This occurs if the truck driver loses control and the cab of the truck moves in one direction and the trailer of the truck moves in another. In many situations, the potential crash involves the trailer swinging around and taking out any other vehicles in its path. Jackknifing can happen if a truck brakes too fast or makes sudden changes in direction.

While trucks are critical to our economy and are sometimes taken for granted on our roadways, the operation of these motor carriers is a difficult task which by their very nature can lead to traffic incidents. It is important to realize this significant differences between trucks and other vehicles before analyzing safety data.

### 3.3.1 OVERVIEW OF CRASHES, FATALITIES, AND INJURIES WITH COMMERCIAL MOTOR VEHICLE (CMV) INVOLVEMENT

This section provides an overview of traffic crashes with CMV involvements. The analysis takes a statewide five year look at the comparison of CMV involved crashes compared to crashes as a whole and the injury levels sustained by drivers and passengers of various classes of vehicles. Data used in this section was obtained from the Florida Department of Highway Safety and Motor Vehicles (HSMV) through their annual *Traffic Crash Facts Report*.



The Traffic Crash Facts Report is published on an annual basis and is available from HSMV's website found at the link below:

<https://www.flhsmv.gov/resources/crash-citation-reports/>

The Traffic Crash Facts Report is built using reports submitted by law enforcement agencies on HSMV form 90010S. These forms are submitted for crashes in which a motor vehicle is involved and which also meet the following criteria:

- Motor vehicle crashes resulting in death or personal injury or
- Motor vehicle crashes in which one or more of the following conditions occur:
  - Leaving the scene involving damage to an attended vehicle or property (Section 316.061 (1), Fla. Stat.) or
  - Driving while under the influence of alcoholic beverages, chemical substances, or controlled substances or with an unlawful blood alcohol level (Section 316.193, Fla. Stat.) or
  - A vehicle was rendered inoperable to a degree that required a wrecker to remove it from the scene of the crash (Effective 7/1/2012) or
  - Involved a commercial motor vehicle (Effective 7/1/2012)<sup>152</sup>

Prior to reviewing the data obtained from the HSMV Crash Reports, it is necessary to identify how the reports define CMVs. The definition of a CMV changed slightly from 2012 to 2013. The two definitions are provided below:

CMV means any motor vehicle or motor vehicle combination used on the streets or highways which:

#### 2010-2012

- Has a gross, declared, or actual weight rating of 10,001 pounds or more or
- Is designed to transport more than 15 persons, including the driver or
- Is transporting hazardous materials and is required to be placarded

#### 2013-2014

- Vehicle Body Type of Bus (Code of '8' on the Crash Report) or Vehicle Body Type of Medium/Heavy Truck (Code of 20 on the Crash Report) or

<sup>152</sup> Please note that while the effective date of the changes above are in July, the figures in this document utilize the above logic for the entire year beginning January 1, 2012, in order to provide a more accurate view towards the future.

- Is transporting hazardous materials and is required to be placarded (Hazmat Placard Indicator of '2' on the Crash Report) or
- Commercial Motor Vehicle Configuration was completed on the Crash Report or
- Has a gross, declared, or actual weight rating of 10,001 pounds or more or
- Commercial indicator on the Crash Report is marked as 'Y' (True)

In addition, it is also necessary to clarify the term “fatalities”. Is it the number of crashes with fatalities or the number of actual people/fatalities and what is the timeframe? According to the Traffic Crash Data Definitions section of the HSMV Crash Reports, a Fatal Traffic Crash is a “... traffic crash that results in one or more fatalities within thirty days of occurrence. (Listed on the Crash Report as Injury Severity code of '5'.)”. A traffic fatality is “... the death of a person as a direct result of a traffic crash within thirty days of the crash occurrence. (Any person listed on the crash report with an Injury Severity code of '5'.)”.

### CMV Crashes When Compared to Crashes as a Whole

The HSMV Crash Reports were first used to examine the total number of crashes in the State and the crashes with CMV involvement over a five-year period from 2010 to 2014. **Table 3-14** provides these numbers, as well as the percentage of the total crashes that CMV crashes comprise.

**Table 3-14: Total Crashes and CMV Crashes Statewide, 2010-2014**

	2010	2011	2012*	2013	2014
Traffic Crashes	235,461	227,998	281,340	316,943	344,170
CMV Crashes	15,288	12,010	28,550	32,055	34,417
CMV % of Total	6.49%	5.27%	10.15%	10.11%	10.00%

*\*Note: Changes to FS 316.066 in 2012 required all crashes involving a commercial motor vehicle to be reported to HSMV. This change caused a corresponding increase in the number of commercial motor vehicle crashes for the 2012 crash year.*

*Source: 2014 HSMV Crash Reports*

According to the First Quarter Performance Report: Fiscal Year 2011 – 2012, the percent change in commercial vehicle crashes to previous year was addressed. In January 2011, the Florida Department of Highway Safety and Motor Vehicles implemented a new crash report form at the request of the FMCSA which has improved the accuracy of commercial vehicle crash reporting. During the 2011-12 fiscal year, the Department was “unable to provide data comparable to that being recorded on the new form.” The Department stated that “...the increased number reflects more accurate reporting and not a significant increase in commercial vehicle crashes.”

The table shows that in terms of total numbers traffic crashes and CMV crashes increased each year from 2012 to 2014. It is interesting to note however, that while the total numbers increased, the percentage that CMV Crashes comprise of total crashes decreased slightly each year from 2012 to 2014.

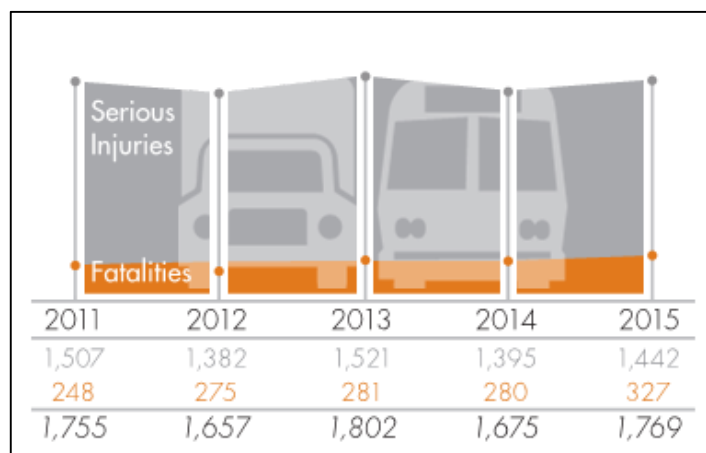
The data also was collected to examine the total number of fatalities and injuries in the State from all crashes and those with CMV involvement over the five-year period of 2010-2014. **Table 3-15** shows that with the exception of 2011, total fatalities and injuries increased every year with total percentage increases of two percent for fatalities and 15 percent for injuries over the five-year period. CMV fatalities decreased over the last three years but have seen a 20 percent increase over the five-year period and CMV injuries have increased every year for a total increase of 42 percent over the study period. Similar to the total amount of crashes, the percentages that CMV fatalities and injuries comprise of the totals decreased the last three years of the study period.

**Table 3-15: Total and CMV Injuries and Fatalities Statewide, 2010-2014**

	2010	2011	2012	2013	2014
All Fatalities	2,444	2,400	2,430	2,402	2,494
CMV Fatalities	192	222	251	237	232
CMV % of total	7.86%	9.25%	10.33%	9.87%	9.30%
All Injuries	195,104	181,654	198,032	210,887	225,608
CMV Injuries	7,147	9,740	9,661	10,041	10,193
CMV % of total	3.66%	5.36%	4.88%	4.76%	4.52%

Source: 2014 HSMV Crash Reports

In addition to the 2014 HSMV Crash Reports, the FDOT State Safety Office updated the Florida Strategic Safety Plan (SHSP) in October 2016. The Plan includes a section with summary crash information on Commercial Motor Vehicles which illustrates serious injuries and fatalities as shown in **Figure 3-9**.

**Figure 3-9: Serious Injuries and Fatalities 2011-2015**

Source: Florida State Highway Safety Plan, 2016 - Department of Highway Safety and Motor Vehicles (2016)

The 2016 Florida Strategic Safety Plan is available from FDOT's website found at the link below:

[http://www.fdot.gov/safety/SHSP2012/FDOT\\_2016SHSP\\_Final.pdf](http://www.fdot.gov/safety/SHSP2012/FDOT_2016SHSP_Final.pdf)

When comparing the number of reported fatalities between the two sources, it is important to note that the exact number can differ. Various definitions of when a fatality is attributed to a motor carrier incident and potential variations in the reporting methods can account for these differences.

### Crashes and Injury Levels by Vehicle Type

Data from the 2014 HSMV Annual Crash Report also was analyzed to review the injury levels associated with different types of vehicles involved in crashes. The data provides information for both the driver and any passengers as to whether they were not injured, possibly injured, suffered non-incapacitating injuries, suffered incapacitating injuries, or suffered fatal injuries. Information regarding vehicle types also was obtained to determine whether these injuries occurred while driving or riding as passenger in the vehicle types listed below:

- Medium/Heavy Trucks (more than 10,000 lbs.)
- Light Trucks (Bus, Cargo Van, Motor Coach, Motor Home, Other light trucks)
- Passenger Cars (Passenger Car, Passenger Van, Pickup Trucks, Sport Utility Vehicle (SUV))
- Two-Wheeled Vehicles (Mopeds and Motorcycles)

**Table 3-16** provides a detailed breakdown of the types of injuries obtained by both drivers and passengers for each of the examined vehicle types in 2014. As would be expected due to the size and weight disparity between medium/heavy trucks and the other vehicle types, drivers and passengers of the medium/heavy trucks fared much better in the amount of injuries sustained. When all three levels of injury were combined, approximately five percent of drivers and passengers of medium/heavy trucks sustained some level of injury. This same measure increased to approximately 27 percent for drivers and passengers of passenger cars. The good news for all vehicle types is that drivers and passengers had a very low fatality rate at less than one percent.

**Table 3-16: Injuries and Fatalities Statewide by Vehicle Type, 2014**

	Total	Not Injured	Possible Injuries	Non-Incapacitating Injuries	Incapacitating Injuries	Fatalities
<b>Drivers</b>						
Medium/ Heavy Trucks	23,383	22,429	503	327	107	17
Light Trucks	16,618	15,009	1,024	455	118	12
Passenger Cars	501,083	365,647	85,968	38,111	10,444	913
Two-Wheeled Vehicles	11,211	1,463	2,428	4,422	2,450	448
<b>Totals</b>	<b>552,295</b>	<b>404,548</b>	<b>89,923</b>	<b>43,315</b>	<b>13,119</b>	<b>1,390</b>
<b>Passengers</b>						
Medium/ Heavy Trucks	3,654	3,445	124	64	21	-
Light Trucks	33,049	30,693	1,654	565	131	6
Passenger Cars	211,187	152,707	38,414	15,334	4,433	299
Two-Wheeled Vehicles	1,171	219	225	460	245	22
<b>Totals</b>	<b>249,061</b>	<b>187,064</b>	<b>40,417</b>	<b>16,423</b>	<b>4,830</b>	<b>327</b>

Source: 2014 HSMV Crash Reports

### 3.3.2 CRASH TRENDS BY REGION

This section of the Plan analyzes CMV crashes by regions in the State. To collect this data, a program known as Signal Four Analytics was used. This web-based software, developed by the GeoPlan Center at the University of Florida, provides past and current crash data. Signal Four Analytics updates the crash reports recorded by the DHSMV daily which makes their database one of the most up to date sources for Florida crash statistics. The interface is useful in that it has many search definitions to allow the user to search for specific statistics.

For more information regarding Signal Four Analytics please visit: <http://s4.geoplan.ufl.edu/>

For the following tables, the search queries were limited to CMV configurations of: Truck more than 10,000 pounds, Tractor/Triple, Truck Tractor/Double Truck, Truck Tractor/Semi-Trailer, and Truck Tractor (bobtail). In addition, the Crash Severity under Circumstances was limited to: Injury-All, Fatality- All, and Property Damage Only. Using the above criteria divided into calendar years, tables were exported to be further subdivided into the same economic regions analyzed for the commodity flows analysis.

**Table 3-17 to Table 3-19** provide data relating to the CMV-involved crashes with fatalities, injuries and property damage by economic region of the state. There does not appear to be any identifiable regional patterns or trends. As would be expected the regions with larger cities and populations have higher levels of crashes and the associated injuries and property damage.

**Table 3-17: CMV Involved Fatality Crashes by Economic Development Region**

	Northwest	Northeast	Tampa Bay	North Central	East Central	Southwest	Southeast	South Central	Total
2011	6	11	12	10	17	3	11	9	<b>79</b>
2012	10	9	18	12	13	6	11	4	<b>83</b>
2013	3	5	14	7	14	5	17	6	<b>71</b>
2014	9	8	16	6	12	2	8	6	<b>67</b>

Source: Signal Four Analytics

**Table 3-18: CMV Involved Injury Crashes by Economic Development Region**

	Northwest	Northeast	Tampa Bay	North Central	East Central	Southwest	Southeast	South Central	Total
2011	51	122	231	83	188	28	267	40	<b>1,010</b>
2012	75	127	228	89	152	34	275	33	<b>1,013</b>
2013	94	126	232	95	199	28	256	43	<b>1,073</b>
2014	87	143	243	74	193	45	253	41	<b>1,079</b>

Source: Signal Four Analytics

**Table 3-19: CMV Involved Property Damage Crashes by Economic Development Region**

	Northwest	Northeast	Tampa Bay	North Central	East Central	Southwest	Southeast	South Central	Total
2011	210	356	605	232	563	77	1022	85	<b>3,150</b>
2012	256	473	621	260	613	129	1178	76	<b>3,606</b>
2013	307	573	815	301	788	179	1375	84	<b>4,422</b>
2014	299	465	923	281	722	235	1404	92	<b>4,421</b>

Source: Signal Four Analytics

As seen when comparing other sources, the number of reported fatalities between the Signal Four Analytics and 2014 HSMV Crash Reports also differ. As mentioned previously, various definitions of when a fatality is attributed to a motor carrier incident and potential variations in the reporting methods can account for these differences.



### 3.3.3 SAFETY INSPECTIONS, CITATIONS, PENALTIES AND ENFORCEMENT ACTIONS

This section analyzes the statewide enforcement data for commercial motor vehicles. The data used for this section of the report was provided by the Florida Highway Patrol's (FHP) Office of Commercial Vehicle Enforcement (CVE). Every year the FHP Office of Commercial Vehicle Enforcement gathers data from law enforcement agencies to document an array of enforcement statistics. This information is then summarized in a FHP CVE Monthly Activity Recap Report. This report was made available for this Plan in the form of Excel spreadsheets but is not actively published by the FHP.



Source: Florida Highway Patrol

The first part of the statewide enforcement data analysis provides the number of safety inspections conducted for the five-year period of 2009 through 2014. In an effort to reduce the number of crashes related to commercial motor vehicles, CVE officers perform safety inspections on commercial vehicles and enforce traffic regulations with an emphasis on violations by commercial motor vehicles and passenger vehicles interacting with large trucks. As shown in **Figure 3-10**, there are six standard types of inspections to which a commercial motor vehicle periodically will be subjected. They range from a driver or truck-only inspection to a combination of the two.

**Figure 3-10: DOT Inspection Levels**

- Level 1 – A complete inspection**
- Level 2 – A walk-around inspection**
- Level 3 – A driver-only inspection**
- Level 4 – An inspection for a special study**
- Level 5 – A vehicle-only inspection**
- Level 6 – Level 1 inspection plus additional examination of Radioactive Material**

Source: FHP Office of Commercial Vehicle Enforcement

The reports provided by the FHP included data collected about levels 1-5. Level 1 is the most common and requires a check of important documents, as well as an inspection of the seat belt, exhaust system, turn signals, tail lamps, head lamps, steering wheel, wheels, rims, and fuel system. The various levels of inspection are summarized in the Monthly Activity Recaps into the categories of total truck and driver inspections, total hazardous materials inspections, and total bus inspections. **Table 3-20** provides the breakdown of the number of inspection conducted by FHP from 2009 through 2014. The total truck and driver inspections category consistently stayed between 91-93 percent of the total vehicle inspections. Similarly, total hazardous material inspections and total bus inspections stayed between six and eight percent and one and two percent, respectively. The trends for four categories followed the same general pattern.

When deficiencies are identified during inspections, two of the most common enforcement measures are to either remove the vehicle or driver from service until the deficiency is corrected. Citations and fines often accompany out-of-service orders, as well. Removing equipment and drivers from service can have significant economic consequences for the individual unable to work or motor carriers unable to use equipment for moving goods. **Table 3-21** provides the number of vehicles and drivers placed out of service, as well as the number of traffic citations issued as a result of the inspection activities. The numbers appear to hold fairly constant over the five-year period. In addition to the behavior and performance of the motor carrier industry, these numbers can be impacted by the level of law enforcement resources and focus of activities.

**Table 3-20: FHP CMV Inspections, 2009 - 2014**

	2009	2010	2011	2012	2013	2014
Total Truck and Driver Inspections	95,890	110,428	103,366	93,793	104,468	113,799
Total Hazardous Material Inspections	6,495	6,603	6,135	7,580	8,756	8,202
Total Bus Inspections	1,173	1,463	1,305	1,633	1,492	1,639
Vehicle Inspections (DVER)	103,558	118,494	110,806	103,006	114,716	123,640

Source: FHP Office of Commercial Vehicle Enforcement

**Table 3-21: FHP CMV Inspections and Resulting Enforcement Actions, 2009 - 2014**

	2009	2010	2011	2012	2013	2014
Vehicle Inspections (DVER)	103,558	118,494	110,806	103,006	114,716	123,640
Vehicles Out-of-Service	14,322	16,375	14,004	12,016	12,833	14,938
Drivers Out-of-Service	6,262	6,946	5,958	5,685	6,369	7,431
Uniform Traffic Citations	20,734	21,283	21,088	21,536	20,059	20,702

Source: FHP Office of Commercial Vehicle Enforcement

In addition to citations issued for the various driver and equipment requirements, citations also are issued for exceeding weight limits. It should be noted that there was a change of data collection reflected in the commercial vehicle values concerning weight during the study time-period. On July 1, 2011, the Office of Motor Carrier Compliance was reassigned from the Florida Department of Transportation to the Florida Highway Patrol. There are now two state entities inspecting motor carriers for compliance with weight regulations: the FHP Office of Commercial Vehicle Enforcement and the FDOT Maintenance Office Motor Carrier Size and Weight. As a result of this shift, law enforcement agencies began reporting their values to the Office of Commercial Vehicles and the FDOT operators of the weigh stations reported their statistics to Motor Carrier Size and Weight. Therefore, the values reported from 2012 through 2014 in the FHP Monthly Activity Recap only reflects the number of commercial motor vehicles being weighed, having received a citation, and the penalties associated with the citations from law enforcement agencies. The trucks passing through fixed FDOT weigh stations do not appear in years 2012 through 2014 accounting for the drastic drop in numbers in **Table 3-22**. In addition to this agency shift, the 2011 Legislature enacted Senate Bill 2160, which created the Law Enforcement Consolidation Task Force. The number difference may be caused

by the growing increase in the use of Weigh in Motion Stations resulting in CMVs passing through fixed FDOT weight stations.

**Table 3-22: Vehicles Weighed and Citations Issued, FDOT 2009 – 2011, FHP 2009-2014**

	2009	2010	2011	2012	2013	2014
Vehicles Weighed	6,521,809	6,704,852	7,158,230	34,658	35,336	50,375
Weight Citations	54,873	51,962	47,611	10,733	11,024	12,532
% of Vehicles Weighed resulting in citations	0.84	0.77	0.67	31	31	25

Source: FHP Office of Commercial Vehicle Enforcement

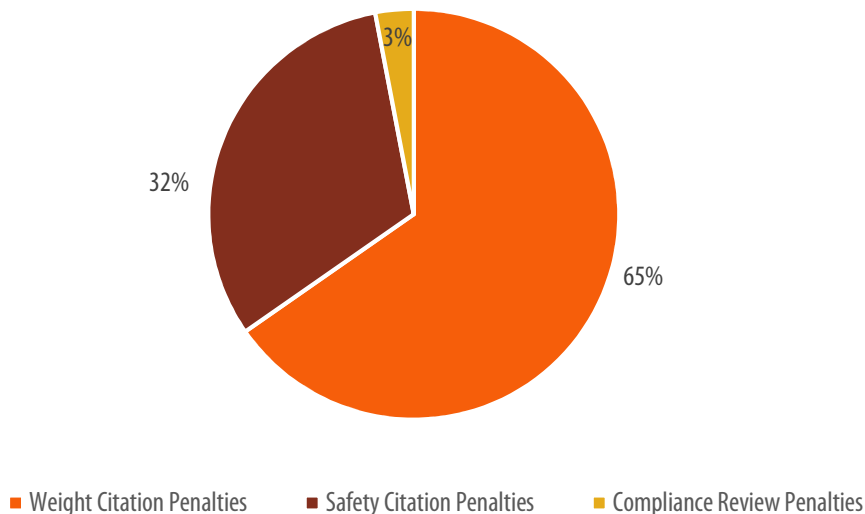
The final group of data extracted from the FHP Monthly Activity Recap was the monetary totals collected as a result of the safety and weight citations. **Table 3-23** shows that compliance review penalties have steadily declined over the five-year period from 2009 to 2014, while weight and safety citation penalties saw a decrease in 2011 prior to three years of increase in 2012 to 2014.

**Table 3-23: Monetary Penalties collected from Citations, 2009-2014**

	2009	2010	2011	2012	2013	2014	2009-2014
Weight Citation Penalties	\$10,270,433	\$10,845,330	\$9,306,147	\$3,678,607	\$3,852,496	\$4,113,023	\$42,066,037
Safety Citation Penalties	\$3,155,299	\$3,564,610	\$3,343,088	\$2,381,384	\$3,772,278	\$4,171,569	\$20,388,227
Compliance Review Penalties	\$662,700	\$453,450	\$372,400	\$200,500	\$165,850	\$91,650	\$1,946,550

Source: FHP Office of Commercial Vehicle Enforcement

**Figure 3-11** provides the percentage breakdown of monetary penalties collected by citation type and shows that weight citation comprises the largest percentage with safety citations second and compliance reviews a distant third.

**Figure 3-11: Commercial Motor Vehicle Monetary Penalties by Citation Type, 2009-2014**

### 3.4 BOTTLENECKS, CONGESTION, AND RELIABILITY

This section contains an evaluation of selected motor carrier issues including bottlenecks, congestion, and reliability. These issues are not new to FDOT. FDOT's Systems Planning Office conducted two studies, in 2012 and 2015, which developed a methodology for identifying bottlenecks on SIS facilities. The 2012 study identified the passenger bottlenecks only, while the 2015 study was expanded to include identifying freight bottlenecks.

The growth of traffic congestion and bottlenecks on Florida's streets and highways is a major concern to travelers, administrators, merchants, developers, and to the community at-large. Its detrimental impacts in longer journey times, higher fuel consumption, increased emissions of air pollutants, greater transport and other affected costs, and changing investment decisions are increasingly recognized and felt across Florida. Congestion and bottlenecks reduce the effective accessibility of residents, activities, and jobs and results in lost opportunities for both the public and businesses.

Mitigating congestion and eliminating bottlenecks by managing traffic better, expanding transport capacity, managing travel demands, or modifying land use requires basic information on how, where, why, and to what extent congestion and bottlenecks occur.

#### 3.4.1 METHODOLOGY

The study developed a methodology to identify bottlenecks on Florida's SIS using vehicle probe data and travel time reliability measures. Phase I of the SIS Bottleneck Study utilized the vehicle probe data from INRIX, a private data provider, while the Phase II utilized the vehicle probe data from National Performance Measurement Research Data Set (NPMRDS) from FHWA. The vehicle probe data provided travel speed on roadways for an entire year at five-minute interval.

Information about the roadway geometry at the identified bottleneck locations can help to determine its cause and suggest corrective action. Identification of bottlenecks and estimation of their activation times

and delay impact can aid FDOT in focusing on relief efforts and ranking them by priority. Applying the methodology routinely over time and with the latest vehicle probe data allows the identification of new bottlenecks and monitoring of existing ones to discern congestion trends.

For the purposes of the study, bottlenecks were identified based on the annual traffic patterns and the set of parameters summarized in **Table 3-24**.

**Table 3-24: Bottleneck Study Analysis Parameters**

Parameter	Definition
Weekday	Monday – Friday (excluding holidays)
Daytime hours	6 am to 7 pm (during weekdays)
Overnight hours	10 pm to 5 am (for entire year)
Peak periods	Morning: 6 am to 9 am (during weekdays) Evening: 4 pm to 7 pm (during weekdays)
Free-flow speed	85 <sup>th</sup> percentile of travel speeds during overnight hours

*2015 SIS Bottleneck Study, FDOT's Systems Planning Office*

### Calculate Performance Measures

The following performance measures are calculated for weekday morning and evening peak periods for both the auto and freight modes of travel. These performance measures are calculated for all the functional classes of roadways along Florida's SIS.

#### *Frequency of Congestion*

Frequency of congestion is typically expressed as the percent of time that travel speeds fall below the threshold speed (75 percent of free-flow speed). The higher the frequency of congestion, the longer is the duration for which travelers experience slower speeds.

#### *Vehicle Hours of Delay*

Vehicle hours of delay is typically expressed as the delay experienced by travelers when travel speeds fall below the threshold speed (75 percent of free-flow speed). Delay indicates the severity of the congestion that affects travel. It is typically used to differentiate between levels of congestion on transportation systems and to define the total amount of congestion.

#### *Planning Time Index*

Planning time index is the ratio of the total time needed to ensure 90 percent on-time arrival as compared to a free-flow travel time. For example, a planning time index of 1.40 means that a traveler should budget for an additional 8 minutes for a 20-minute free-flow trip time to ensure 90 percent on-time arrival. The higher the planning time index, the longer the travelers must allow beyond the free-flow trip time in order to reach a destination on time.

### Quantify Roadway Congestion and Identify Bottlenecks

#### *Roadway Congestion*

*NCHRP Report 398: Quantifying Congestion* presented methods to measure congestion on roadway systems and found that while it is difficult to conceive of a single value that will describe all of the travelers' concerns

about congestion, there are multiple components that interact in a congested roadway or system. A comprehensive picture of congestion on a roadway or a system can be developed by understanding its components – duration, intensity and reliability. Congested roadways along Florida’s SIS were identified by using a combination of the performance measures developed for each of the components of congestion – frequency of congestion, vehicle hours of delay, and planning time index. Each of the components of congestion is assigned an equal weightage while developing the roadway congestion.

### *Identify Bottlenecks*

The portions of roadway network with the highest roadway congestion is identified as a bottleneck. Different thresholds for roadway congestion – and thus the thresholds for the three components of congestion – were selected for interstates and arterials/highways for identifying bottlenecks.

Traffic on arterials/highways behaves very differently from traffic on the freeways since many other outside elements, in addition to traffic levels, control how the traffic flows. These other factors include such items as signal timing plans, signal density, driveway density, and access management features such as raised medians. During overnight hours when fewer vehicles are on the roadway, arterials/highways may have different free-flow speeds than during daylight hours when different signal timing plans are used. Progression along a Corridor may be enhanced by additional green time during peak operating conditions, which changes the free-flow speeds for arterials/highways. As such, different thresholds for roadway congestion were selected for freeways and arterials/highways for identifying bottlenecks.

### Rank the Bottlenecks

Bottlenecks identified in the previous step are ranked using the amount of vehicular delay experienced on those roadways. Delay is used to rank the bottlenecks because this measure indicates the severity of the congestion that affects travel and because it can be used to differentiate between levels of congestion. Eighty-fifth percentile vehicular delay experienced during the year was used to rank the bottlenecks.

## 3.4.2 TOP RANKED STATEWIDE FREIGHT BOTTLENECKS

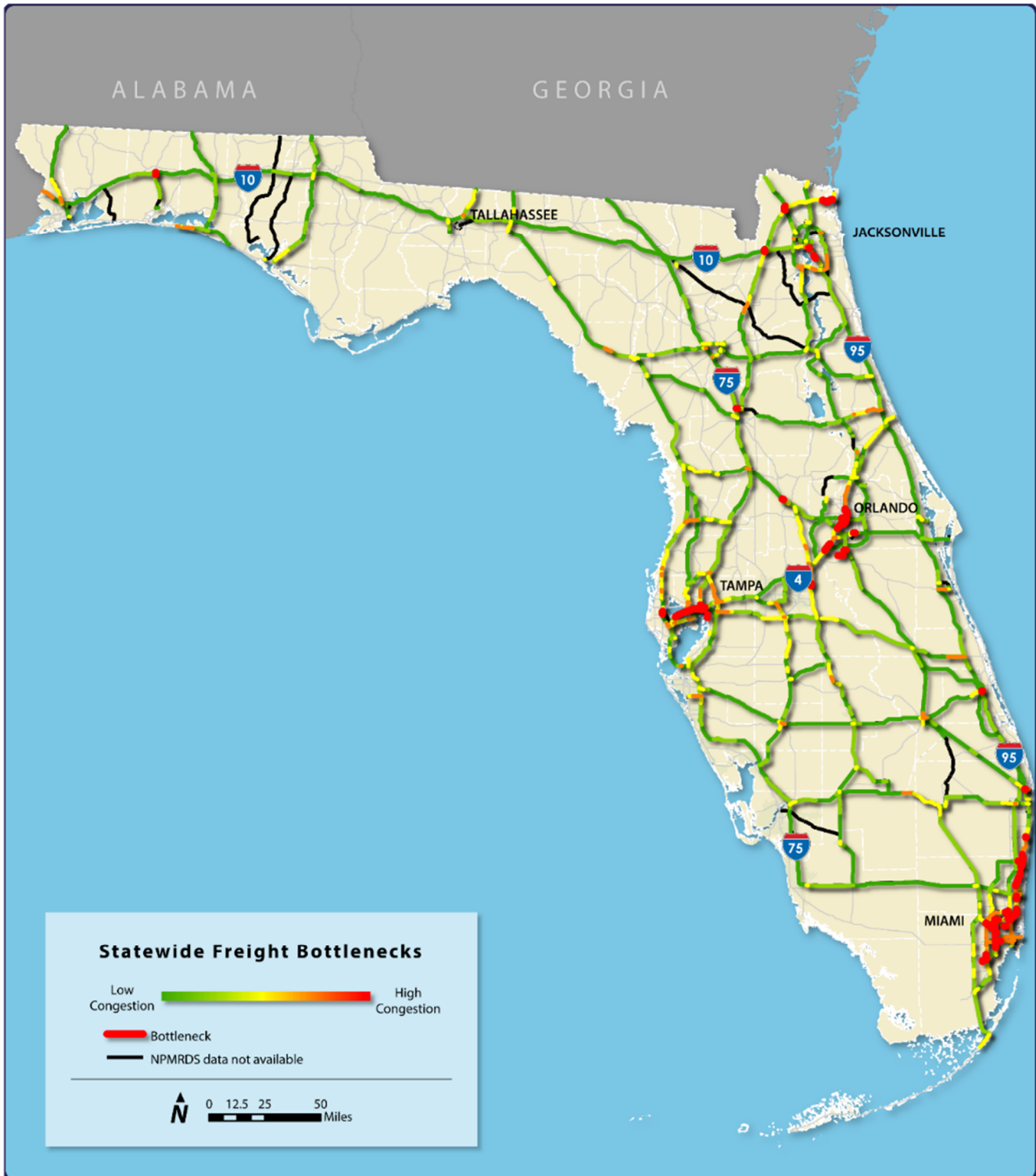
Using the methodology developed, the study identified the top five statewide freight bottlenecks for 2014. These locations are:

- I-4 WB – N 36th St to I-275
- US 27 – SR 821 to SR 826
- I-275 NB over Old Tampa Bay
- SR 826/Palmetto Expressway SB – NW 74th St to NW 25th St
- I-95 NB - SR 838 to SR 816

**Figure 3-12** illustrates the statewide freight bottlenecks.

Currently, there is a plan for an interactive map as part of the ArcGIS for the next update of the Statewide Bottleneck Analysis. It is anticipated that this interactive map will be for internal FDOT use only.

Figure 3-12: Freight Bottlenecks



2015 SIS Bottleneck Study, FDOT's Systems Planning Office

## 3.5 NEW TECHNOLOGY AND TRENDS

This section highlights new technologies and trends affecting the motor carrier industry and identifies their potential impact on FDOT's policies and programs.

The demand for technology advancements in trucking and transportation infrastructure are being driven from multiple sources. First, to improve competitiveness, the trucking industry needs to reduce costs, i.e. fuel consumption, maintenance, insurance, etc., and improve operating efficiencies. Second, Federal and State governments need to improve environmental conditions and safety. Third, today's labor force is reliant on technology and real-time information to be effective, efficient, and safe.

To meet these diverse needs, technology improvements are focused on every aspect of trucking. Fuel efficient truck engines and powertrains, lighter and stronger materials, aerodynamic designs, alternative fuels, and many other vehicle safety and operational enhancements are being improved and employed each year. Communications technology, optimization tools, global positioning systems (GPS), trailer tracking, vehicle-to-vehicle and vehicle-to-infrastructure integration, and other technologies improve operations, efficiency, and safety.

### 3.5.1 TECHNOLOGY BACKGROUND

With expanded data availability, an increase in the number of mobile devices, improved battery life, and the speed of data processing, our ability to connect drivers and trucks has improved significantly in the last ten years. Today, drivers can be updated with important information about their vehicles operating performance, information about customers they serve, and the conditions of the roadway on a real-time basis. This improved access to information has improved safety and efficiency of the trucking industry.

New systems will allow communication between drivers and vehicles, connected vehicles will be able to communicate between vehicles, and autonomous vehicles will be able to communicate with infrastructure and traffic signals. These high-tech communication systems will extend vehicle life and asset utilization. These improvements are expected to have a positive impact on workforce efficiency and are expected to increase carrier productivity and lower costs. Public sector expectations of reduced congestion, improved safety, and the economics of these technology benefits may help drive rapid change and adoption.

Information systems will rely on electronics, satellite communication, fiber optic systems, and "Smart Physical Infrastructure".<sup>153</sup> Three systems will comprise the backbone of the communication program:

- Global Positioning Systems (GPS) – will provide satellite based geo-location and time references for accurate positioning and vehicle tracking
- Inertial Navigation Systems – will monitor and calculate vehicle position, direction and speed with on-board sensor devices
- LIDAR (Laser Illuminated Detection and Ranging) – sensors which identify surrounding objects and terrain with precision location information

The US DOT is working with its subsidiary agencies, the Intelligent Transportation Systems Joint Program Office (ITS JPO), and truck manufacturers on connected vehicle research and the future of autonomous

<sup>153</sup> *The Future of Smart Cities: Cyber-Physical Infrastructure Risk*, U.S. Department of Homeland Security, 2015



vehicle operation. Over the past five years these agencies have developed four connected vehicle research programs to explore the potential of connected vehicles to travelers, traffic information, weather information and infrastructure condition. The programs are:

- Vehicle-to- infrastructure (V2I)
- Safety and dynamic mobility applications (apps)
- Applications for the Environment: Real-time Information Synthesis
- Road-Weather Management

These programs collectively have identified safety, mobility, and environmental benefits. More than 50 vehicle-to-infrastructure applications have been developed and most can be categorized into two vehicle functionality categories as shown in **Figure 3-13**.

**Figure 3-13: Vehicle Functionality Categories**

#### **Connected Vehicle Functionality**

**A connected vehicle contains advanced technology to communicate with an external system but requires a driver.**

#### **Autonomous Vehicles Functionality**

**The US DOT defines automated vehicles as “Those in which at least some aspects of a safety-critical control function e.g. steering, throttle, or braking, occur without the direct driver impact.” Autonomous vehicles can perform some or all driving functions with or without human drivers. Functions include stability control, cruise control, lane centering, driving/steering, braking, speed control, etc.**

### 3.5.2 TRUCK TECHNOLOGY TRENDS

#### Communication Trends

The truck of the future will take full advantage of telematics. Telematics is a combination of the words telecommunications and informatics. Telematics, in a broad sense, is any integrated use of telecommunications with information and communications technology. It is the technology of sending, receiving, and storing information relating to remote objects – like vehicles – via telecommunication devices.<sup>154</sup> Telematics refers to the telecommunication of information and operational conditions. Probes can communicate engine condition and performance to a driver or fleet manager. Route information can be communicated via GPS to identify congestion or directions. Systems such as OnStar can connect the driver to roadside assistance in the case of emergency or accidents.

Telematics also can report when a vehicle starts and shuts down, as well as idling status, location, and speed. This information can provide near up-to-the-minute knowledge of fleet activities in one centralized, web-based interface. Benefits include increased fleet productivity, reduced labor costs, fuel cost control,

<sup>154</sup> <https://www.fleetmatics.com/what-is-telematics>

improved customer service, safety, security, and a reduction in unauthorized vehicle use. In short, telematics provides trucking companies with information to reduce operating expenses.

### Equipment Technology Trends

The U.S. Department of Energy (DOE) launched the SuperTruck Initiative in 2010, with the goal of developing Class 8 combination trucks or tractor trailers that are 50 percent more efficient than baseline models by 2015. This goal was exceeded by the production of a concept SuperTruck tractor-trailer that achieved 10.7 miles-per-gallon. The SuperTruck II projects, announced in early 2016, will focus on plug-in electric powertrain technologies and plug-in hybrid delivery trucks. The goal is to improve fuel efficiency by more than 100 percent. To achieve this improved fuel economy, equipment will be lighter, using carbon fiber panels, and more aerodynamic. Micro-turbine-powered engines will be able to run on natural gas or alternative fuels.<sup>155</sup>

Future trucks also will be more powerful, using light weight turbine driven drivetrains which can operate on multiple fuel types. These improved drive trains, with fewer moving parts than traditional Class 8 vehicles, will be designed to require less maintenance and lower repair costs.

Manufacturers of Class 8 trucks claim to have improved fuel economy by 75 percent with a 43 percent reduction in greenhouse gas emissions. These new engine types are estimated to save about \$20,000 annually. The potential savings in fuel cost and greenhouse gases is enormous considering there are approximately two million registered tractor-trailers on U.S. roads today.

Predictive Cruise Technology has been designed to synchronize on-board computers with GPS systems to sense changes in terrain, as fuel systems then optimize fuel efficiency based on driving conditions. A radar-based adaptive cruise control has also been designed to automatically accelerate or decelerate to maintain safe following distances. Camera activated braking systems can bring a vehicle to a complete stop if the driver does not react in time. New truck prototypes also are equipped with semi-autonomous driving functions which use GPS systems to handle the first and last mile routing and parking assistance. New trucks also are equipped with lithium ion battery-auxiliary power units designed to cut down on unnecessary engine idling, which reduces fuel consumption and greenhouse gases.

It is estimated that there are 6.9 million trailers in North America, and that number is expected to grow by more than five percent over the next five years. Many trailers are now equipped with solar powered tracking systems that can provide real-time location and indicate whether the trailer is empty or loaded.

### 3.5.3 TECHNOLOGY IMPACTS ON FDOT'S POLICIES AND PROGRAMS

In January 2016, US DOT Transportation Secretary Anthony Foxx announced an update to the 2013 preliminary policy statement on autonomous vehicles, which included a commitment of over \$4 billion in the next ten years. This funding is aimed to accelerate the development of technology which will improve the safety of autonomous vehicles.

In 2011, Nevada was the first state to authorize autonomous vehicle operation. California, Florida, Louisiana, Michigan, North Dakota, Tennessee, Utah and Washington D.C. have passed legislation governing the

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<sup>155</sup> <http://energy.gov/eere/articles/supertruck-making-leaps-fuel-efficiency>

operation of autonomous vehicles. These requirements focus on testing parameters, definition of terminology, liability and responsibilities, and operator requirements and licensing.

In 2012, Florida passed legislation to encourage the development, testing, and operation of autonomous technology on public roads. In 2016, Florida expanded autonomous vehicle operation on public roads by removing the technology testing restriction and the presence of a driver in the vehicle.

This future technology already has impacted current FDOT policies and programs. Below are two examples of current technology projects in Florida.

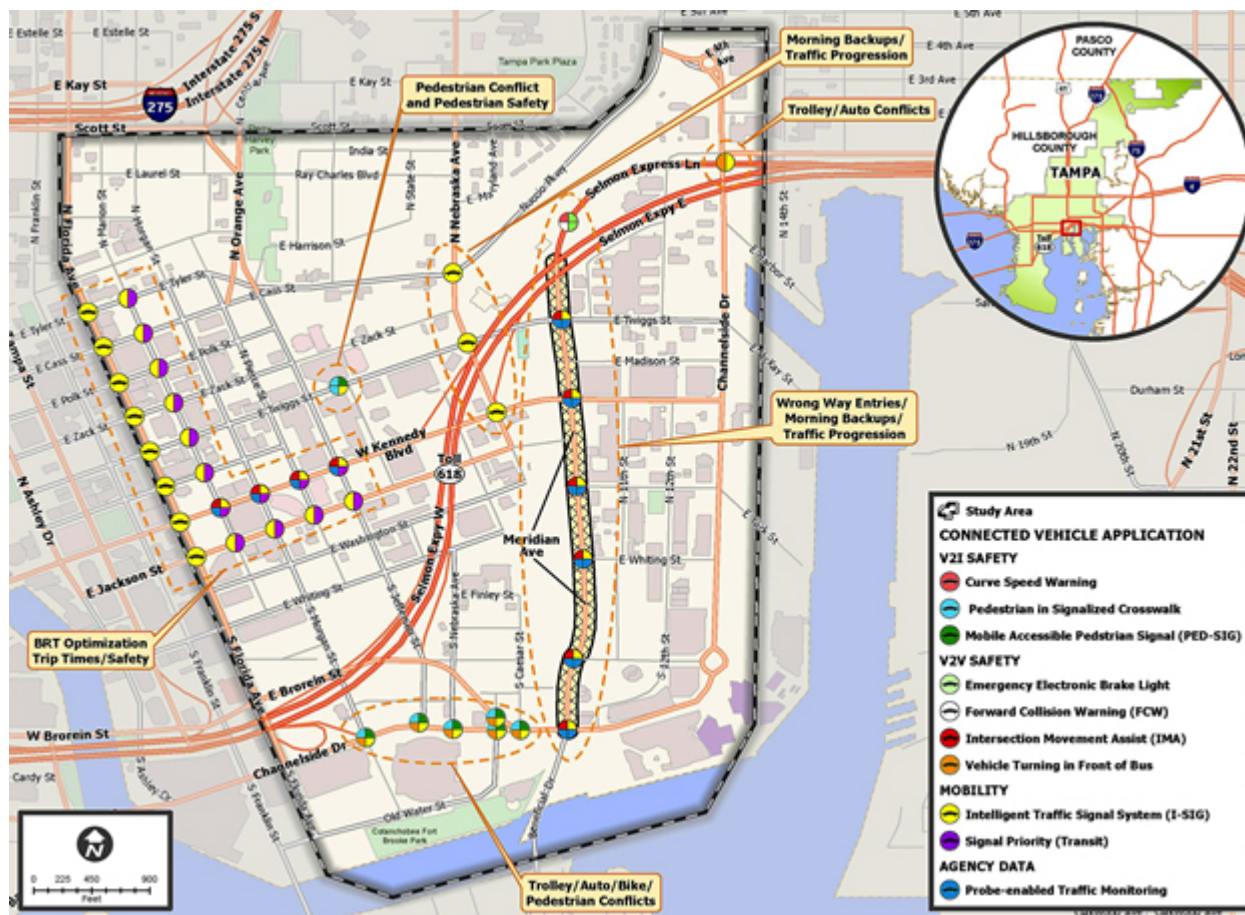
### Examples of Current Technology Projects

#### *Tampa, Florida Connected Vehicle Pilot*

In September 2015, the US DOT committed to the empowerment of cities to solve congestion and safety issues with connected vehicle technology. Florida was awarded \$17 million to host a pilot demonstration project which is being managed by the Tampa-Hillsborough Expressway Authority. The pilot will deploy a variety of connected vehicle technologies. The Lee Roy Selmon Expressway will test reversible express lanes and dynamic traffic conditions created by special events, bus and trolley operations, and pedestrians. The technology pilot is aimed at reducing peak hour congestion, rear-end crashes, transit signal delays, and red light running collisions.

The project, shown in **Figure 3-14**, will deploy a variety of vehicle-to-vehicle technologies aimed to reduce congestion during peak hours and special events, and to reduce rear-end collisions. Vehicle-to-Infrastructure technologies will be aimed at the coordination of vehicles, buses and trolleys, and special event flow controls. Safety, mobility, and agency data applications will be created to reinforce benefits for motorists, pedestrians, and transit operators. Some of the applications will include curve speed warning, intelligent traffic signal systems, intersection movement assist, mobile accessible pedestrian signals, and transit signal priority.

Figure 3-14: Connected Vehicle Pilot Deployment-Downtown Tampa



Source: [http://www.its.dot.gov/pilots/pdf/03\\_CVPilots\\_Tampa.pdf](http://www.its.dot.gov/pilots/pdf/03_CVPilots_Tampa.pdf)

### Truck Parking – Smart Parking Technology

The demand for truck parking is increasing beyond the capacity of public rest areas, private truck terminals and private sector truck stops. Florida ranked as the seventh in a 2015 survey completed by *Overdrive Magazine* which examined truck parking availability in the lower 48 states. The survey used three scoring criteria: 1) number of truck parking spaces per 100,000 truck miles traveled in the state, 2) number of truck parking spaces per 100 miles of national highway system and 3) user feedback. Only 27.8 percent of the truck parking spaces in Florida are publicly-operated.

Florida completed a two-part truck parking study which has resulted in two pilot projects. The first pilot uses wireless in-pavement sensors with a closed-circuit television to determine vehicle presence and verify location availability at the Leon County Rest Areas west of Tallahassee mentioned in **Chapter 2**. A second pilot is located on I-95 near Jacksonville, which counts commercial vehicles entering and exiting the facility. These two systems are being tested to determine the most cost effective and accurate method to communicate truck parking availability.

Eight states in the Midwest/Mid-America region are collectively designing and implementing the Truck Parking Information Management System (TPIMS). This project was awarded a TIGER Grant in 2015, and all States have agreed to their State matching funds and are actively pushing this project to reality in 2017.

## Policy Trends to Watch

### *Autonomous Vehicle*

As mentioned in **Chapter 2**, autonomous vehicle technology is being rapidly developed due to the substantial economic and safety benefits. This new technology is expected to bring multiple platforms and data sharing protocols. It is important to recognize the need for efficient interoperability among the applications and standardization of information systems. The collaboration of Federal agencies and State governments with manufacturers and users will be important.

Autonomous trucks will potentially enable asset owners to operate trucks over extended periods of time, reducing a potential driver shortage, created by limited hours of service requirements. New classes of truck operators/technicians maybe created which may expand the truck workforce. This expansion of truck operator designation may require different licensing specifications.

After market equipment packages will likely be developed for older vehicles. At some point, public policy may require all vehicles must be connected to operate on designated highway systems. Rural systems may struggle to develop the connected infrastructure.

### *Truck Parking Management*

Truck parking information and management systems will need to be standardized to facilitate interoperability among the multi-jurisdictional networks and for ease of understanding for the users. As the price of new trucks increases, carriers likely will seek to extend the operational life of these expensive assets, which will increase the demand for a highly skilled workforce to keep this equipment running. Vehicle ownership models may include a shared asset arrangement.

### *Other Potential Items*

While not a complete list of policy impacts, the following list suggests potential impacts and items to consider for FDOT policies:

- State vehicle registration fees may need to be changed to represent new infrastructure investment
- State driver's license processes may need to be updated to reflect new vehicles and information systems
- Parking areas for unmanned vehicles will need to be developed to accommodate drop-off and pick-up demands especially around events
- Standardization of technology, standards, and protocols regionally and nationally
- Long range transportation planning must emphasize improvements and integration of ITS, IT and other technologies as capacity multipliers and system improvements
- Infrastructure designs may change – more embedded sensors and wiring, less roadside signage, etc.
- Route optimization technology may reroute trucks and cars via alternate routes to reduce congestion

- Data collection, i.e. traffic counts, may be real-time
- Communication with motorcycles will need to be developed
- Traffic engineering may require a holistic approach which incorporates corridor and network integrity
- States and Local jurisdictions likely will have different adoption rates for various technologies
- Automation adoption rates by cars and trucks will likely vary
- Other factors may continue to thwart productivity and efficiencies such as narrow shipping and receiving hours, Federal and State regulations, legal and liability issues, insurance industry acceptance, etc.
- Expectations of improved safety will be high and closely monitored
- Expectations of reliability and accuracy of these technologies and their systems will be high
- Project funding and financing options could be less restrictive than today's funding framework and users may pay for technology services similar to cell phones and television.

# 4. POLICY FRAMEWORK

The Motor Carrier System Plan has been designed to provide guidance on motor carrier related policy and investment decisions and inform other governmental agencies and the private industry on the logistics and trade vision of Florida.

Historically, FDOT has focused on asset protection (compliance, size, and weight issues) and safety. The development of the FMTP Elements brought to the forefront concerns and opportunities related to mobility and competitive advantages specifically for motor carriers. FDOT wanted to be proactive with this information and focus on the facilitation of efficient truck movements.

A key part of the Policy Framework for the Florida Motor Carrier System Plan is to set the strategies that form the core of the Plan. The following set of goals, objectives, and strategies were developed after extensive outreach and collaboration with public and private stakeholders. They represent a synthesis of the various views and issues expressed throughout public forums and internal working group meetings. This chapter delves deeper into the freight outreach process involved in developing and fine tuning these goals, objectives, and strategies.

## 4.1 PROCESS AND STAKEHOLDER OUTREACH

Freight and the link to the economy have been key aspects of Governor Rick Scott's policy agenda. The emphasis on freight in Florida has increased dramatically over the last few years as the state prepared for the expansion of the Panama Canal and meeting the needs of the larger, post-Panamax ships. The objectives and strategies of the Motor Carrier System Plan were partially shaped by these factors.

An internal Motor Carrier Working Group had existed previously at FDOT, and it was re-established to act as an informal steering committee of FDOT offices and partner agencies to advise the project team. The Motor Carrier Working Group was comprised of representatives from the following offices and agencies:

- Maintenance Office (including performance, oversize/overweight, and structures)
- Design Office
- Policy Planning Office



*Motor Carrier Working Group*

- Systems Planning Office
- Safety Office
- Traffic Engineering and Operations Office
- Transportation Data and Analytics Office
- Research Office
- Aviation and Spaceports Office
- Seaports and Waterways Office
- Rail and Motor Carrier Office
- District Freight Coordinators
- Transit Office
- Office of Environmental Management
- Florida's Turnpike Enterprise
- Florida Department of Highway Safety and Motor Vehicles
- Florida Trucking Association



*Motor Carrier Working Group*

The Motor Carrier Working Group met formally four times and reviewed and commented on pertinent materials in preparation for discussions by the various public and private sector stakeholders. The Group provided invaluable expertise on concerns that impact the overall motor carrier industry. This group is a great tool to continue coordination of implementation tasks impacting motor carriers statewide.

Engaging the stakeholders in a deliberative discussion was a primary goal of FDOT. External Business Forums were conducted in Pensacola, Bartow, Fort Lauderdale, and Jacksonville. The forums allowed industry representatives from across the state the opportunity to voice their input or concerns and included the following external partners:

- Fleet operators (UPS, Fedex, Landstar)

- Independent Owner/Operators
- Truck Stop Operators (TA, Loves, Pilot, Flying J)
- Intermodal Operators (FEC, CSXT)
- Shipping and Receiving Companies
- Seaports and Airports
- Metropolitan Planning Organizations (MPOs)
- City/County representatives
- Florida Department of Economic Opportunity
- Enterprise Florida, Inc.



*Motor Carrier Business Forum 1: Pensacola*



- CareerSource Florida and other educational representatives
- Florida Department of Agriculture and Consumer Services

The following stakeholder input is a sample of comments made at the Business Forums. This type of information was instrumental in defining critical issues and later developing and revising goals, objectives, and strategies for the Motor Carrier System Plan.

Sample stakeholder comments:

- Interstates are being used for too much local traffic – no more interchanges
- Consider more “Pony Express” rather than full loads to split up longer trips and reduce empty backhaul
- Develop more of the “right roads” instead of just more roads
- Urban development boundaries are a reality here – they have put gravel lots where possible beyond those boundaries, but otherwise need statewide permission
- Staging areas to break down doubles are often used as relay points instead, with no enforcement
- Focus has been on infrastructure projects because we cannot address most of these other issues
- Questions as to whether there any truck routes associated with the SIS
- Promoting the industry may be an issue that is missing, and different skills are required today
- Weigh-in-motion, produce checks, and truck parking should be co-located
- Need consistent shoulder widths for trucks to pull over and consistency in oversize load permitting
- Use of concrete pavement where appropriate to decrease maintenance costs



*Motor Carrier Business Forum 3: Ft. Lauderdale*

#### 4.1.1 CONSISTENCY MATRIX

The Motor Carrier System Plan is a new plan for Florida prompting FDOT to be very clear how it fits into the hierarchy of existing planning documents. The Motor Carrier System Plan integrates policy guidance from the FTP and the FMTP.

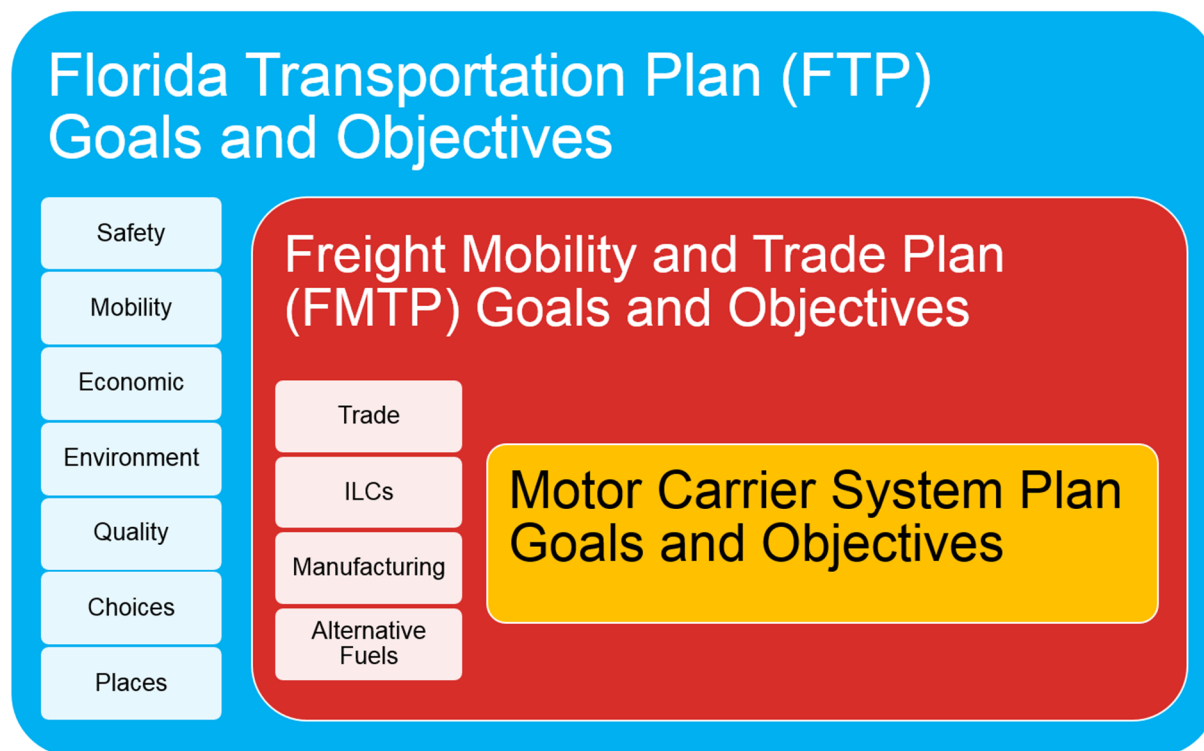
As discussed in **Chapter 1**, the FTP defines Florida’s future transportation vision and identifies goals, objectives, and strategies to accomplish that vision. The FTP is the statewide long-range transportation plan for all of Florida. The FMTP takes that next step and delves into the realm of freight planning. It provides

guidance on goods movement-related policy and investment decisions and informs other governmental agencies and the private industry on the logistics and trade vision for Florida.

As both above Plans address multiple modes of transportation, the main purpose of the Motor Carrier System Plan is to address trucking in a holistic manner. While there are numerous FDOT internal and external plans and programs that impact trucking and motor carrier aspects, this Plan will help coordinate those offices and agencies. With a cohesive set of policies and responsibilities, the collage of staff and stakeholders involved will be better able to coordinate implementation of strategies and solutions without duplication or inconsistency.

**Figure 4-1** shows the hierarchy of plans related to the Motor Carrier System Plan and how the goals were carried through to each. This graphic was used in stakeholder outreach, as well to help those unfamiliar with FDOT planning efforts to visualize the connections.

**Figure 4-1: Consistency Matrix**



## 4.2 MOTOR CARRIER GOALS, OBJECTIVES, AND STRATEGIES

**Figure 4-1** recaps the major themes in goals and objectives associated with existing FDOT plans to illustrate the linkages. The specific language of goals and objectives in the FTP and the FMTP is included in **Chapter 1**.

This graphic illustrates how the Motor Carrier System Plan's policy framework was built based on adapting these existing documents to focus on motor carrier issues, along with input obtained from stakeholder outreach. This led to the development of goals in support of the facilitation of efficient truck movements, as well as objectives and strategies to drill down into specific areas.

### 4.2.1 MOTOR CARRIER GOALS

The Motor Carrier System Plan goals intentionally are aligned with the FTP goals, with additional language added to ensure they are specific to highway goods movement. The goals were reviewed during early internal Working Group meetings and validated again during stakeholder outreach.

The Motor Carrier System Plan Goals are:

- **Safety and Security:** Identify, support, and implement freight highway safety improvements and initiatives
- **Agile, Resilient, Quality:** Continue to invest in quality infrastructure that can be adapted to meet the needs of future freight vehicles and technology
- **Efficient and Reliable Mobility:** Increase operational efficiency of goods movement and maintain reliable mobility for trucks
- **Economic Competitiveness:** Support Florida's global competitiveness and increase the flow of domestic and international trade
- **More Transportation Choices:** Increase the number of quality options for moving freight to, from, and within Florida
- **Environment and Conserve Energy:** Balance the need for environmental protection and conservation with seeking motor carrier efficiencies
- **Quality Places:** Coordinate early and often with local communities to ensure mobility for trucks that is consistent with local and regional priorities

## 4.2.2 MOTOR CARRIER OBJECTIVES

Supporting the seven goals above are 20 corresponding objectives.

Goal Areas	Objectives
Safety and Security	<ul style="list-style-type: none"> <li>• Reduce the number of crashes involving commercial motor vehicles</li> <li>• Create consistency and standardization in permitting, enforcement, etc.</li> <li>• Provide more safe and secure places for truck parking both on and off the Interstate System</li> <li>• Prevent and mitigate trucking-related security risks</li> <li>• Develop transportation infrastructure to effectively allow freight flows to help prepare for, respond to, and recover from emergencies</li> </ul>
Agile, Resilient, Quality	<ul style="list-style-type: none"> <li>• Preserve the existing State Highway System to maintain a state of good repair</li> <li>• Support research, development, and testing of automated and connected freight vehicles and other emerging technologies</li> <li>• Collaborate with stakeholders to collect data relevant to motor carrier operations</li> </ul>
Efficient and Reliable Mobility	<ul style="list-style-type: none"> <li>• Ensure the efficiency and reliability of truck transportation connectivity</li> <li>• Continue to work with stakeholders to fund projects consistent with industry priorities and build relationships</li> <li>• Optimize the functionality and efficiency of existing roadways</li> </ul>
Economic Competitiveness	<ul style="list-style-type: none"> <li>• Identify and resolve issues to improve regulatory and permitting processes</li> <li>• Address empty backhaul</li> <li>• Increase the number of skilled workers in Florida's trucking industry to match demand</li> </ul>
More Transportation Choices	<ul style="list-style-type: none"> <li>• Increase the convenience of connecting between multiples modes of freight transportation</li> </ul>
Environment and Conserve Energy	<ul style="list-style-type: none"> <li>• Plan and develop truck transportation infrastructure that projects the character of the natural environments and avoids or minimizes adverse environmental impacts</li> <li>• Increase the energy efficiency and diversity of transportation-related energy sources</li> </ul>
Quality Places	<ul style="list-style-type: none"> <li>• Plan and develop freight transportation systems that reflect regional and community values, visions, and needs</li> <li>• Transform the organizational culture of state agencies and partners to include consideration of supply chain and freight movement issues</li> <li>• Educate the public on how trucks impact their daily lives in coordination with the Department of Agriculture and Consumer Services, Department of Health, Department of Economic Opportunity, Enterprise Florida, and CareerSource Florida</li> </ul>

## 4.2.3 MOTOR CARRIER STRATEGIES

Supporting each objective are corresponding strategies to guide motor carrier efforts. **Chapter 5** includes a matrix with lead and supporting roles defined at the strategy level. Assigning responsibility is intended to encourage the most appropriate offices and agency partners to follow through on each strategy, while maintaining a holistic approach for consistency.

### GOAL 1

**Safety and Security:** Identify, support, and implement freight highway safety improvements and initiatives

#### **Objective 1.1: Reduce the number of serious injuries and fatalities involving commercial motor vehicles**

*Strategy 1.1.1: Partner on implementation of the Strategic Highway Safety Plan and related initiatives*

*Strategy 1.1.2: Partner with cell phone carriers, insurance companies, and vehicle manufacturers on distracted driving reduction programs*

*Strategy 1.1.3: Investigate the need for additional pre-signage, within Manual on Uniform Traffic Control Devices (MUTCD) guidelines, to emphasize distance to upcoming exits and intersections to commercial motor vehicles*

*Strategy 1.1.4: Coordinate with the trucking industry to identify safety concerns*

#### **Objective 1.2: Encourage greater consistency and standardization in permitting and enforcement**

*Strategy 1.2.1: Ensure consistent interpretation and enforcement statewide*

*Strategy 1.2.2: Recommend the Federal Motor Carrier Safety Administration remove non-preventable and not-at-fault crashes from the Compliance, Safety, Accountability (CSA) system*

#### **Objective 1.3: Provide more safe and secure places for truck parking both on and off the Interstate System**

*Strategy 1.3.1: Define needs, gauge feasibility of solutions, develop more public land into truck parking, and partner with private sector*

*Strategy 1.3.2: Review sufficient security at truck parking and enforcement of proper uses*

#### **Objective 1.4: Prevent and mitigate trucking-related security risks**

*Strategy 1.4.1: Collaborate with Florida Highway Patrol (FHP) and other law enforcement agencies to identify and address risks*

*Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*

#### **Objective 1.5: Develop transportation infrastructure to effectively allow freight flows to help prepare for, respond to, and recover from emergencies**

*Strategy 1.5.1: Increase the resiliency of freight roadways to extreme weather and other environmental conditions*

## GOAL 2

**Agile, Resilient, Quality:** Continue to invest in quality infrastructure that can be adapted to meet the needs of future freight vehicles and technology

### **Objective 2.1: Preserve the existing State Highway System to maintain a state of good repair**

*Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*

*Strategy 2.1.2: Program appropriate resurfacing or reconstruction projects at high traffic areas as needed to maintain a state of good repair*

*Strategy 2.1.3: Inspect and repair pavement at high traffic areas as needed to maintain a state of good repair*

### **Objective 2.2: Support research, development, and testing of automated and connected freight vehicles and other emerging technologies**

*Strategy 2.2.1: Partner to develop coordinated truck parking availability information and signage*

*Strategy 2.2.2: Investigate and evaluate potential impacts of automated vehicles and other technologies on goods movement and infrastructure*

*Strategy 2.2.3: Develop business-friendly approaches to evaluating and implementing new technology through partnerships, studies, and pilot programs*

### **Objective 2.3: Collaborate with stakeholders to collect data relevant to motor carrier operations**

*Strategy 2.3.1: Improve availability of data and associated training*

*Strategy 2.3.2: Work with freight data providers to address proprietary concerns regarding Florida's public records requirements*

*Strategy 2.3.3: Evaluate freight impacts of new technologies or improvements*

*Strategy 2.3.4: Increase standardization of multimodal data collection statewide*

### GOAL 3

**Efficient and Reliable Mobility:** Increase operational efficiency of goods movement and maintain reliable mobility for trucks

**Objective 3.1: Ensure the efficiency and reliability of truck transportation connectivity**

*Strategy 3.1.1: Monitor the performance of key freight routes*

*Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*

**Objective 3.2: Continue to work with stakeholders to fund projects consistent with industry priorities and build relationships**

*Strategy 3.2.1: Develop a statewide list of identified truck mobility improvement needs*

*Strategy 3.2.2: Confirm freight data and findings match actual conditions when feasible*

*Strategy 3.2.3: Identify connections between key freight activity centers and networks eligible for funding*

**Objective 3.3: Optimize the functionality and efficiency of existing roadways**

*Strategy 3.3.1: Provide accurate and real-time information to motor carriers*

*Strategy 3.3.2: Share designated truck routes with third-party providers, apps, and private companies that develop truck routing programs*

## GOAL 4

**Economic Competitiveness:** Support Florida's global competitiveness and increase the flow of domestic and international trade

### **Objective 4.1: Identify and resolve issues to improve regulatory and permitting processes**

*Strategy 4.1.1: Support size and weight standardization where appropriate*

*Strategy 4.1.2: Develop educational resources on commercial motor vehicle regulations to increase awareness*

*Strategy 4.1.3: Review Florida's regulations impacting the trucking industry to determine impacts*

### **Objective 4.2: Address empty backhaul**

*Strategy 4.2.1: Seek to increase the development of manufacturing industries in the state*

*Strategy 4.2.2: Investigate the need for trailer transfer stations to allow drivers to stay within smaller regions with switchovers for longer hauls*

*Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*

### **Objective 4.3: Ensure the number of skilled workers in Florida's trucking industry match demand**

*Strategy 4.3.1: Work with motor carriers and the insurance industry to overcome barriers for young truck drivers*

*Strategy 4.3.2: Educate Florida's youth and the general public on careers in the trucking industry*

*Strategy 4.3.3: Support partnerships in workforce training to better prepare workers for a future in the trucking industry*



## GOAL 5

**More Transportation Choices:** Increase the number of quality options for moving freight to, from, and within Florida

### **Objective 5.1: Increase the convenience of connecting between multiple modes of freight transportation**

*Strategy 5.1.1: Continue to identify and designate intermodal connectors*

*Strategy 5.1.2: Improve connectivity of data, technology, and business processes between transportation modes and systems*

*Strategy 5.1.3: Support the development of intermodal logistic centers (ILCs) that meet statewide needs*

## GOAL 6

**Environment and Conserve Energy:** Balance the need for environmental protection and conservation with seeking motor carrier efficiencies

### **Objective 6.1: Plan and develop truck transportation infrastructure that protects the character of the natural environment and avoids or minimizes adverse environmental impacts**

*Strategy 6.1.1: Coordinate environmental initiatives with stakeholders and partners*

*Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*

### **Objective 6.2: Increase the energy efficiency and diversity of transportation-related energy sources**

*Strategy 6.2.1: Investigate and evaluate potential applications for the utilization of alternative energy sources*

*Strategy 6.2.2: Ensure sufficient signage and/or other notifications from highways to available alternative energy source stations*

*Strategy 6.2.3: Support investment in alternative energy sources for freight vehicles and stations*

*Strategy 6.2.4: Identify and address barriers to alternative energy source station development*

## GOAL 7

**Quality Places:** Coordinate early and often with local communities to ensure mobility for trucks that is consistent with local and regional priorities

### **Objective 7.1: Plan and develop freight transportation systems consistent with regional and community values, visions, and needs**

*Strategy 7.1.1: Enhance coordination between statewide, regional, and local freight planning*

*Strategy 7.1.2: Investigate ways to update rest areas and truck comfort stations to appeal to truck driver teams and promote healthier lifestyle choices*

*Strategy 7.1.3: Research off-peak delivery strategies and support collaborative solutions that balance the needs of all stakeholders*

### **Objective 7.2: Transform the organizational culture of state agencies and partners to include consideration of supply chain and freight movement issues**

*Strategy 7.2.1: Develop guidance to ensure goods movement is addressed in accordance with the Department's Complete Streets effort*

*Strategy 7.2.2: Support efforts to develop a National Highway Freight Network and a National Multimodal Freight Network by improving and preserving these networks for freight movements*

*Strategy 7.2.3: Work with local governments to identify and address truck parking needs near delivery points*

### **Objective 7.3: Educate the public on how trade and logistics impact their daily lives**

*Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*

*Strategy 7.3.2: Identify and promote appropriate forums for communication of issues affecting freight mobility*

**Chapter 4** has delineated the thought process, guidance, and tools used to engage the many stakeholders whether within FDOT, or with other state agencies, or with those partners in the public and private sectors. The goals, objectives, and strategies identified in **Chapter 4** will further frame the efforts to support the Motor Carrier Industry and its essential role in Florida's economy. The comments, ideas, solutions, and discussions when blended with the processes already in place form the basis for **Chapter 5** which seeks to further suggest areas of responsibilities, interests, expertise, and effectiveness to support the viability of the Motor Carrier Industry.



# 5. NEXT STEPS

As previously discussed, setting a unified vision was one of the key reasons Florida’s first Motor Carrier System Plan was developed. There are aspects that impact trucking and motor carriers in almost every office of FDOT, plus many partner agencies. This fragmentation made it very difficult to have effective coordination on all efforts. Continuing the Motor Carrier Working Group meetings and eventual recurring updates of the Motor Carrier System Plan with engaged stakeholders will help increase communication and collaboration going forward.

## 5.1 KEY MOTOR CARRIER ROLES AND RESPONSIBILITIES

**Chapter 2** highlighted the top 17 issues pertinent to the Motor Carrier Industry. **Chapter 3** included an analysis of motor carrier movements from a private sector supply chain standpoint, an evaluation of the motor carrier safety and enforcement data, and a review of technology impacts to the trucking industry. **Chapter 4** provided the framework from which the goals, objectives, and strategies emanated to address motor carrier issues. **Chapter 5** offers the logical conclusion – who does what?

FDOT’s Motor Carrier System Plan implementation strategy needed first to clarify existing roles and identify appropriate lead offices or agencies to assume responsibility for the various strategies. This exercise played out over the course of several Motor Carrier Working Group meetings and informal conversations, as participants discussed their current and ongoing efforts, discovered commonalities, and discussed potential implementation barriers.

This discovery phase helped to educate and remind staff of the impacts of their work on other offices, and it promoted relationship-building to increase cooperation in the future.

The following FDOT Offices and Agency Partners listed below have been assigned a role in the implementation of the Motor Carrier System Plan:

- FDOT Offices:
  - Freight and Multimodal Operations (FMO)
  - Aviation and Spaceports
  - Seaports and Waterways
  - Transit
  - Policy Planning
  - Systems Planning Office
  - Environmental Management
  - Transportation Data and Analytics
  - Research

- Right of Way (ROW)
- Traffic Engineering and Operations
- Design
- Maintenance
- Safety
- Turnpike Enterprise
- Legislative Programs
  
- Agency Partners:
  - Florida Department of Highway Safety and Motor Vehicles
  - Florida Department of Agriculture and Consumer Services
  - Florida Department of Veterans Affairs
  - Florida Department of Economic Opportunity
  - CareerSource Florida
  - Florida Trucking Association

### 5.1.1 FDOT OFFICE IMPLEMENTATION ROLES

The following section identifies specific implementation responsibilities by FDOT office for the Motor Carrier System Plan. Additionally, recommendations suggested by the Motor Carrier Working Group, from online surveys, and captured during the Business Forums and other public meetings are noted below the list of strategies. These suggestions will allow the lead office or agency partner to consider more detailed actions and methods suggested directly by those involved in the development of the Plan.

## Freight and Multimodal Operations (FMO)

### Overview

The Freight and Multimodal Operations (FMO) Office is responsible for assisting in the development of Florida's rail system, both passenger and freight, motor carrier system support, and championing Florida's multimodal freight programs.

### Roles in Motor Carrier System Plan Implementation

Lead Roles

- *Strategy 1.1.2: Partner with cell phone carriers, insurance companies, and vehicle manufacturers on distracted driving reduction programs*
- *Strategy 1.1.4: Coordinate with the trucking industry to identify safety concerns*
- *Strategy 1.2.2: Recommend the Federal Motor Carrier Safety Administration remove non-preventable and not-at-fault crashes from the Compliance, Safety, Accountability (CSA) system*
- *Strategy 1.3.1: Define needs, gauge feasibility of solutions, develop more public land into truck parking, and partner with private sector*
- *Strategy 1.4.1: Collaborate with Florida Highway Patrol (FHP) and other law enforcement to identify and address risks*
- *Strategy 2.2.1: Partner to develop coordinated truck parking availability information and signage*
- *Strategy 2.2.3: Develop business-friendly approaches to evaluating and implementing technology through partnerships, studies, and pilot programs*
- *Strategy 2.3.2: Work with freight data providers to address proprietary concerns regarding Florida's public records requirements*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 3.2.1: Develop a statewide list of identified truck mobility improvement needs*
- *Strategy 3.2.3: Identify connections between key freight activity centers and networks eligible for funding*
- *Strategy 4.1.1: Support size and weight standardization where appropriate*
- *Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*
- *Strategy 4.3.1: Work with motor carriers and the insurance industry to overcome barriers for young truck drivers*

Lead  
Roles

- *Strategy 5.1.3: Support the development of intermodal logistics centers (ILCs) that meet statewide needs*
- *Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*
- *Strategy 6.2.1: Investigate and evaluate potential applications for the utilization of alternative energy sources*
- *Strategy 6.2.4: Identify and address barriers to alternative energy source station development*
- *Strategy 7.1.1: Enhance coordination between statewide, regional, and local freight planning*
- *Strategy 7.2.1: Develop guidance to ensure goods movement is addressed in accordance with the Department's Complete Streets effort*
- *Strategy 7.2.2: Support efforts to develop a National Highway Freight Network by improving and preserving these networks for freight movements*
- *Strategy 7.2.3: Work with local governments to identify and address truck parking needs near delivery points*
- *Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*
- *Strategy 7.3.2: Identify and promote appropriate forums for communication of issues affecting freight mobility*

*Additional Implementation Recommendations and Comments*

- Ensure distracted driving reduction programs are not only aimed at commercial motor vehicle drivers
- Identify safety concerns by interviewing drivers at truck stops instead of only trucking executives or safety departments, and reaching out to contacts that participated in the Jason's Law coalition
- Research not only where truck parking facilities are underutilized, but why they are not being used, and identify potential solutions
- Identify ways the Truck Parking Availability System (TPAS) will be tied to FL 511 and other applications and share that message with trucking partners
- Work with local and private partners to address truck parking needs in individual communities
- Research pilot program options for toll caps or discounts on multiple trips for trucks on tolled freight connectors and drayage routes
- Encourage the use of reactive traffic signals when appropriate to reduce unnecessary stoppage of traffic flow
- Consider all networks available for freight funding, and identify gaps with freight needs to leverage grant funding opportunities in the future
- Investigate ways to measure how a project improves the efficiency of goods movement statewide
- Increase interaction with CareerSource Florida to address talent pipeline challenges
- Review the FDOT ILC Infrastructure Support Program for effectiveness
- Research options to locate alternative energy source stations at existing fueling facilities
- Create educational materials highlighting the roles of FDOT offices, partner agencies, and local and regional partners to guide coordination efforts
- Educate shippers and receivers on how to coordinate with Metropolitan Planning Organizations (MPOs) on long range transportation plans
- Consider implications of oversize and overweight vehicles, as well as smaller freight vehicles when addressing goods movement in context
- Revisit the Florida Freight Network identified in the Freight Mobility and Trade Plan for post-FAST Act relevance
- Review the National Highway Freight Network and National Multimodal Freight Network for deficiencies in ability to move goods effectively
- Develop resources to explain the connection between freight mobility and access to goods

Supporting  
Roles

- *Strategy 1.1.1: Partner on implementation of the Strategic Highway Safety Plan and related initiatives*
- *Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*
- *Strategy 2.3.1: Improve availability of data and associated training*
- *Strategy 2.3.4: Increase standardization of multimodal data collection statewide*
- *Strategy 3.1.1: Monitor the performance of key freight routes*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 3.2.2: Confirm freight data and findings match actual conditions when feasible*
- *Strategy 3.3.1: Provide accurate and real-time information to motor carriers*
- *Strategy 3.3.2: Share designated truck routes with third party providers, apps, and private companies that develop truck routing programs*
- *Strategy 4.1.3: Review Florida's regulations impacting the trucking industry to determine impacts on competitiveness*
- *Strategy 4.2.2: Investigate the need for trailer transfer stations to allow drivers to stay within smaller regions with switchovers for longer hauls*
- *Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*
- *Strategy 5.1.1: Continue to identify and designate intermodal connectors*
- *Strategy 5.1.2: Improve connectivity of data, technology, and business processes between transportation modes and systems*
- *Strategy 6.2.2: Ensure sufficient signage and/or other notifications from highways to available alternative energy source stations*
- *Strategy 7.1.2: Investigate ways to update rest areas and truck comfort stations to appeal to truck driver teams and promote healthier lifestyle choices*
- *Strategy 7.1.3: Research off-peak delivery strategies and support collaborative solutions that balance the needs of all stakeholders*

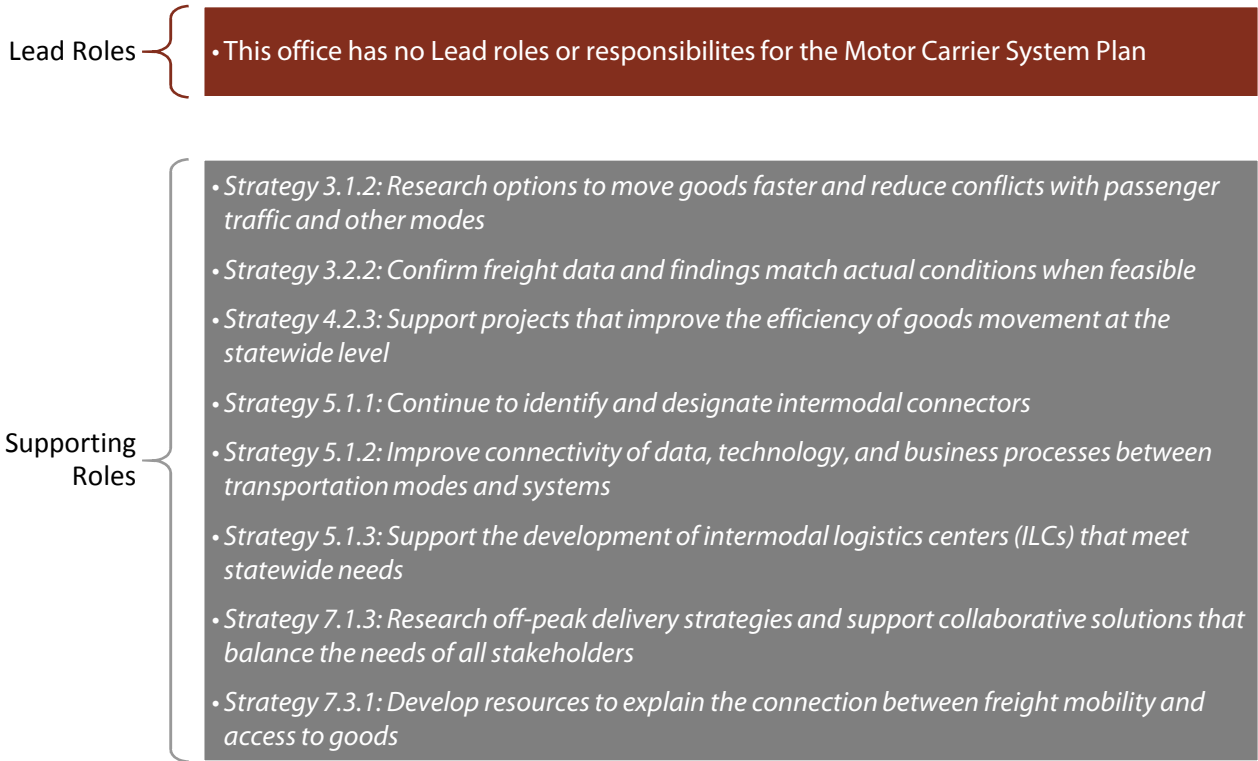


## Aviation and Spaceports

### Overview

The Aviation and Spaceports Office is responsible for the regulation of public and private-use airports, analyzing airspace obstructions, permitting construction within ten nautical miles of public airports, and general developments and improvements of airports and spaceports. Through coordination with other modes, including motor carries, Florida airports ensure the efficient importing and exporting of cargo.

### Roles in Motor Carrier System Plan Implementation

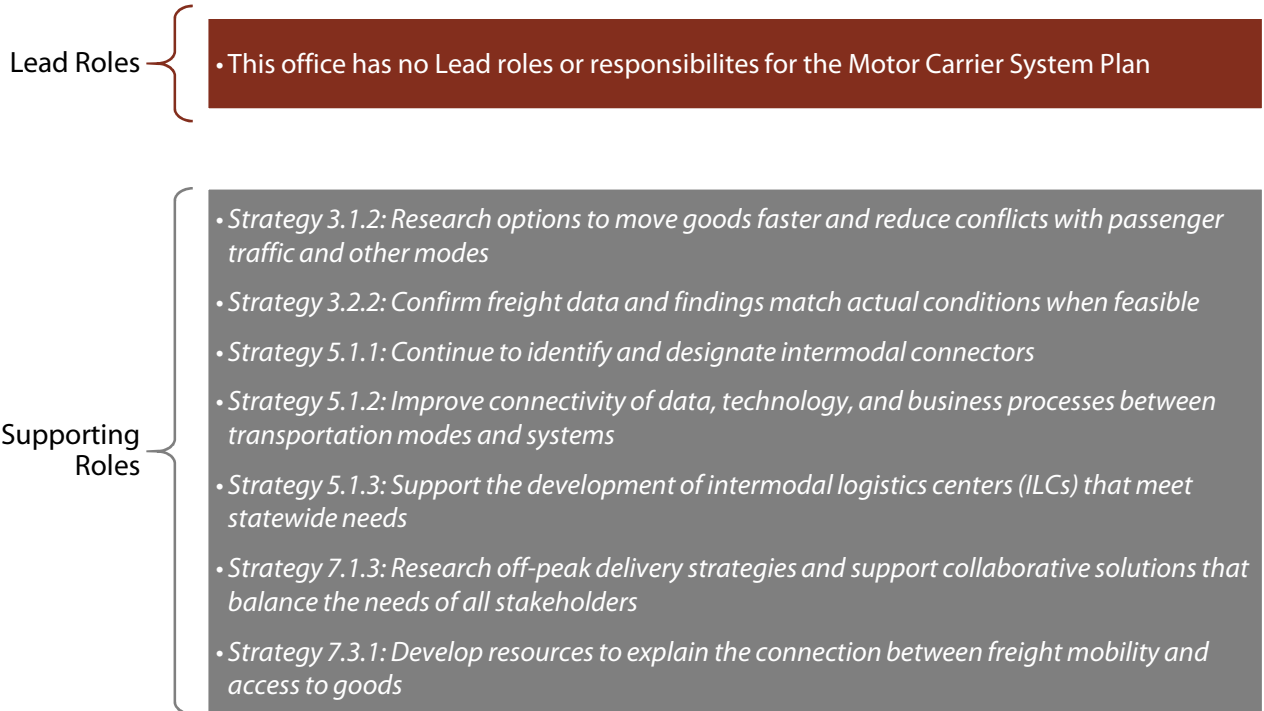


## Seaports and Waterways

### Overview

The Seaport and Waterways Office is a partner with FDOT Planning in the implementation of the SIS, working with Central Office staff, District staff, Florida Ports Council staff, and the eleven SIS seaports in the development of the SIS Multimodal Needs and Cost-Feasible Plans. Through coordination with other modes, including motor carriers, Florida seaports ensure the efficient importing and exporting of cargo.

### Roles in Motor Carrier System Plan Implementation



## Transit

### Overview

Through coordination with other modes, including motor carriers, the FDOT Transit Office ensures the efficient importing and exporting of cargo.

### Roles in Motor Carrier System Plan Implementation

Lead Roles { • This office has no Lead roles or responsibilities for the Motor Carrier System Plan

Supporting Roles { 

- Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes
- Strategy 3.2.2: Confirm freight data and findings match actual conditions when feasible
- Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level
- Strategy 5.1.1: Continue to identify and designate intermodal connectors
- Strategy 5.1.2: Improve connectivity of data, technology, and business processes between transportation modes and systems
- Strategy 5.1.3: Support the development of intermodal logistics centers (ILCs) that meet statewide needs
- Strategy 7.1.3: Research off-peak delivery strategies and support collaborative solutions that balance the needs of all stakeholders
- Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods

## Policy Planning

### Overview

The Office of Policy Planning oversees the planning, policy, and research activities to advance Florida’s statewide transportation system.

### Roles in Motor Carrier System Plan Implementation

Lead Roles {

- *Strategy 1.5.1: Increase the resiliency of freight roadways to extreme weather and other environmental conditions*

### Additional Implementation Recommendations and Comments

- Reach out to drivers that move loads for the Federal Emergency Management Agency (FEMA) and Florida Division of Emergency Management for input

Supporting Roles {

- *Strategy 2.2.2: Investigate and evaluate potential impacts of automated vehicles and other technologies on goods movement and infrastructure*
- *Strategy 2.3.1: Improve availability of data and associated training*
- *Strategy 2.3.4 Increase standardization of multimodal data collection statewide*
- *Strategy 3.2.3: Identify connections between key freight activity centers and networks eligible for funding*
- *Strategy 6.1.1: Support freight needs in the project development process*
- *Strategy 7.1.1: Enhance coordination between statewide, regional, and local freight planning*
- *Strategy 7.2.3: Work with local governments to identify and address truck parking needs near delivery points*

## Systems Planning Office

### Overview

The major responsibilities of the Office of Systems Planning are to implement the Strategic Intermodal System (SIS) through the development of the SIS Needs, Cost Feasible and Ten-Year Project Plans and Work Program; provide policies, procedures, tools, training, and technical assistance for Statewide Programs in growth management analyses and impact, highway interchange justification and modification analyses, highway access management, and transportation level of service analyses.

### Roles in Motor Carrier System Plan Implementation

Lead Roles {

- *Strategy 3.1.1: Monitor the performance of key freight routes*
- *Strategy 5.1.1: Continue to identify and designate intermodal connectors*

### Additional Implementation Recommendations and Comments

- Develop training and guidance to encourage and assist partners to take advantage of data provided by FDOT and develop best practices on how to link transportation data to freight performance
- Establish baseline conditions before implementing new technology improvements to evaluate impacts on freight performance after completed
- Review waterways and barge routes for opportunities to better connect with other modes and networks
- Identify and address potential conflicts with other users on connectors with heavy freight volumes

Supporting Roles {

- *Strategy 1.5.1: Increase the resiliency of freight roadways to extreme weather and other environmental conditions*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 3.2.1: Develop a statewide list of identified truck mobility improvement needs*
- *Strategy 3.2.3: Identify connections between key freight activity centers and networks eligible for funding*

## Office of Environmental Management

### *Overview*

The mission of the Office of Environmental Management is to establish consistent, predictable, and repeatable environmental policies, procedures and programs that promote and preserve Florida's environmental quality, community values, and economic prosperity in support of implementing the Department's programs and projects.

### *Roles in Motor Carrier System Plan Implementation*

Lead Roles

- *Strategy 6.1.1: Support freight needs in the project development process*

### *Additional Implementation Recommendations and Comments*

- Consider trucks, especially with oversize loads, in the design and location of roundabouts

Supporting Roles

- *Strategy 1.5.1: Increase the resiliency of freight roadways to extreme weather and other environmental conditions*
- *Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*
- *Strategy 2.1.2: Program appropriate resurfacing or reconstruction projects at high traffic areas as needed to maintain a state of good repair*
- *Strategy 6.2.3: Support investment in alternative energy sources for freight vehicles and stations*

## Transportation Data and Analytics

### *Overview*

The Transportation Data and Analytics Office is FDOT’s central clearinghouse and principal source for highway and traffic data. The Office gathers data directly through automated means and indirectly through District field personnel or others. The Office provides tools and training to record, process, provide access, analyze, evaluate, and report these data.

### *Roles in Motor Carrier System Plan Implementation*

Lead Roles

- *Strategy 2.2.2: Investigate and evaluate potential impacts of automated vehicles and other technologies on goods movement and infrastructure*
- *Strategy 2.3.1: Improve availability of data and associated training*
- *Strategy 2.3.3: Evaluate freight impacts of new technologies or improvements*
- *Strategy 2.3.4: Increase standardization of multimodal data collection statewide*
- *Strategy 3.2.2: Confirm freight data and findings match actual conditions when feasible*
- *Strategy 5.1.2: Improve connectivity of data, technology, and business processes between transportation modes and systems*

### *Additional Implementation Recommendations and Comments*

- Do more to share existing resources such as ArcGIS Online interactive maps for active projects, railroad system and crossings, and others
- Identify freight data needs to better position the Department to take advantage of grant opportunities
- Coordinate with multiple partners to capture more perspectives during reality checks to confirm freight data and findings

Supporting Roles

- *Strategy 1.3.1: Define needs, gauge feasibility of solutions, develop more public land into truck parking, and partner with private sector*
- *Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*
- *Strategy 2.2.1: Partner to develop coordinated truck parking availability information and signage*
- *Strategy 3.1.1: Monitor the performance of key freight routes*
- *Strategy 3.2.3: Identify connections between key freight activity centers and networks eligible for funding*
- *Strategy 3.3.1: Provide accurate and real-time information to motor carriers*
- *Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*
- *Strategy 7.2.2: Support efforts to develop a National Highway Freight Network by improving and preserving these networks for freight movements*
- *Strategy 7.2.3: Work with local governments to identify and address truck parking needs near delivery points*
- *Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*



## Research

### Overview

The Research Center oversees FDOT’s research program and contracts with state universities and other research service providers to conduct research in all areas of transportation. The Research Center also participates in pooled fund studies with other state transportation agencies and contributes to national studies on subjects of benefit to Florida. FDOT’s research program contributes to increasing the safety, reliability, capacity, and efficiency of Florida’s transportation system.

### Roles in Motor Carrier System Plan Implementation

Lead Roles { • This office has no Lead roles or responsibilities for the Motor Carrier System Plan

Supporting Roles { 

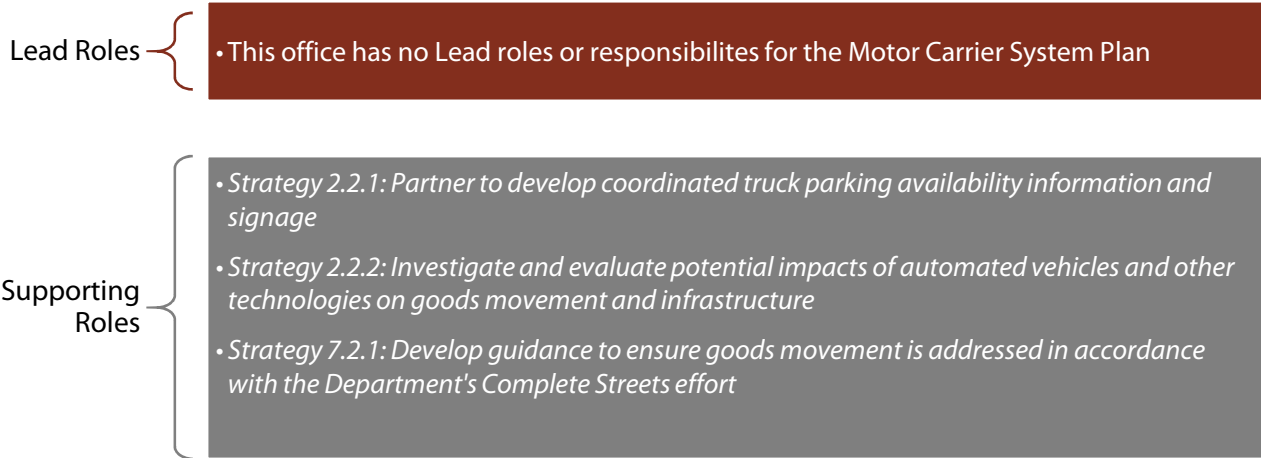
- Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate
- Strategy 2.1.3: Inspect and repair pavement at high traffic areas as needed to maintain a state of good repair
- Strategy 2.2.3: Develop business-friendly approaches to evaluating and implementing technology through partnerships, studies, and pilot programs
- Strategy 2.3.4: Increase standardization of multimodal data collection statewide
- Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes
- Strategy 3.3.2: Share designated truck routes with third party providers, apps, and private companies that develop truck routing programs

## Right of Way Office

### Overview

The Office of Right of Way has a primary mission of acquiring the real property necessary for the construction of transportation facilities. In addition, the Office of Right of Way also is charged with the control of outdoor advertising signs along state highways and the management of the Logo sign program along Florida interstate highways.

### *Roles in Motor Carrier System Plan Implementation*



## Traffic Engineering and Operations

### Overview

The Traffic Engineering and Operation Office - Commercial Vehicles Operations (CVO) includes the operations associated with moving freight in commercial vehicles and the activities that regulate those operations. Activities and operations related to CVO include, but are not limited to: electronic registration, permitting programs, electronic exchange of inspection data between agencies, electronic screening systems, and roadside operations.

### Roles in Motor Carrier System Plan Implementation

Lead Roles

- *Strategy 1.1.3: Investigate the need for additional pre-signage, within Manual on Uniform Traffic Control Devices (MUTCD) guidelines, to emphasize distance to upcoming exits and intersections to commercial motor vehicles*
- *Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*
- *Strategy 3.3.1: Provide accurate and real-time information to motor carriers*
- *Strategy 3.3.2: Share designated truck routes with third party providers, apps, and private companies that develop truck routing programs*
- *Strategy 6.2.2: Ensure sufficient signage and/or other notifications from highways to available alternative energy source stations*

### Additional Implementation Recommendations and Comments

- First consider the effectiveness of existing signage regarding size, design and placement, then consider the potential effectiveness of ITS solutions for which implementation should only be done where warranted
- Determine compatibility and privacy concerns with sharing data related to security concerns
- Identify information most critical to motor carriers and ensure included in FL 511
- Increase visibility of existing resources to the trucking industry
- In addition to truck routes, share local truck restrictions with those that develop truck routing programs

Supporting Roles

- *Strategy 1.1.1: Partner on implementation of the Strategic Highway Safety Plan and related initiatives*
- *Strategy 1.4.1: Collaborate with Florida Highway Patrol (FHP) and other law enforcement to identify and address risks*
- *Strategy 2.2.1: Partner to develop coordinated truck parking availability information and signage*
- *Strategy 2.3.3: Evaluate freight impacts of new technologies or improvements*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 5.1.2: Improve connectivity of data, technology, and business processes between transportation modes and systems*

## Design

### Overview

The Roadway Design Office provides policies, procedures, roadway criteria, and roadway standards for the design of Florida roadways. Additionally, the Office monitors implementation and quality engineering support.

### Roles in Motor Carrier System Plan Implementation

Lead Roles

- *Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*
- *Strategy 2.1.2: Program appropriate resurfacing or reconstruction projects at high traffic areas as needed to maintain a state of good repair*

### Additional Implementation Recommendations and Comments

- Review pavement type selection methodology to confirm it adequately addresses truck weights in freight intensive contexts
- Consider trucks, especially with oversize loads, in the design and location of roundabouts

Supporting Roles

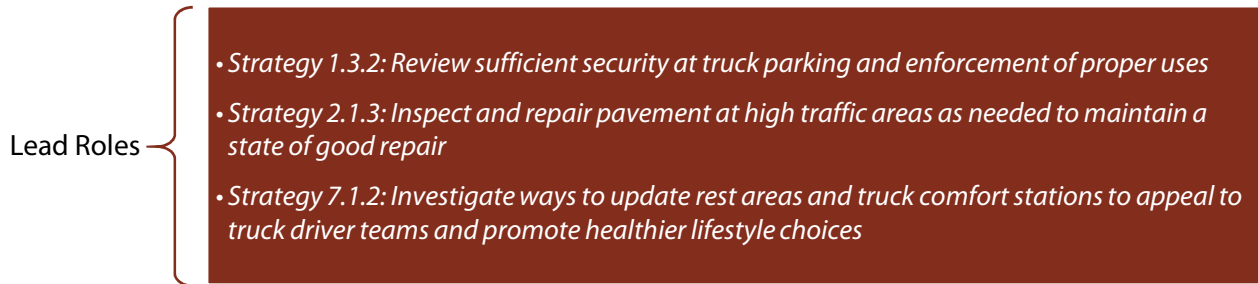
- *Strategy 2.2.2: Investigate and evaluate potential impacts of automated vehicles and other technologies on goods movement and infrastructure*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 7.2.1: Develop guidance to ensure goods movement is addressed in accordance with the Department's Complete Streets effort*

## Maintenance

### *Overview*

Motor Carrier Size and Weight (MCSAW) is managed within the Office of Maintenance which performs commercial vehicle size and weight enforcement to protect Florida's highway system and bridges from damage from overweight vehicles.

### *Roles in Motor Carrier System Plan Implementation*



### *Additional Implementation Recommendations and Comments*

- Research improper uses of truck parking facilities and potential solutions
- The State Highway System is already inspected annually – consider opportunities for truck drivers to identify areas in need of repair that can be communicated to owners of local roads if off-system
- Review opportunities for the trucking industry and private sector to participate in potential improvements to rest areas
- Coordinate with the Transit Office to educate truck drivers on transit connections to restaurants, shopping, and other services from truck parking facilities

Supporting  
Roles

- *Strategy 1.1.2: Partner with cell phone carriers, insurance companies, and vehicle manufacturers on distracted driving reduction programs*
- *Strategy 1.2.1: Ensure consistent interpretation and enforcement statewide*
- *Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*
- *Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*
- *Strategy 2.2.1: Partner to develop coordinated truck parking availability information and signage*
- *Strategy 2.2.2: Investigate and evaluate potential impacts of automated vehicles and other technologies on goods movement and infrastructure*
- *Strategy 3.1.2: Research options to move goods faster and reduce conflicts with passenger traffic and other modes*
- *Strategy 3.2.1: Develop a statewide list of identified truck mobility improvement needs*
- *Strategy 4.1.1: Support size and weight standardization where appropriate*
- *Strategy 4.1.2: Develop educational resources on commercial motor vehicle regulations to increase awareness*
- *Strategy 4.1.3: Review Florida's regulations impacting the trucking industry to determine impacts on competitiveness*
- *Strategy 4.2.2: Investigate the need for trailer transfer stations to allow drivers to stay within smaller regions with switchovers for longer hauls*
- *Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*
- *Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*
- *Strategy 6.2.1: Investigate and evaluate potential applications for the utilization of alternative energy sources*
- *Strategy 6.2.2: Ensure sufficient signage and/or other notifications from highways to available alternative energy source stations*

## Safety

### Overview

The FDOT Safety Office identifies and helps resolve traffic safety issues; gathers, analyzes and reports data on traffic crashes, injuries and deaths in Florida; distributes state and federal traffic safety funds; and conducts public education campaigns.

### Roles in Motor Carrier System Plan Implementation

Lead Roles {

- *Strategy 1.1.1: Partner on implementation of the Strategic Highway Safety Plan and related initiatives*

### Additional Implementation Recommendations and Comments

- Identify locations and corridors with higher amounts of crashes involving commercial motor vehicles and research what makes those areas vulnerable
- Work with agency partners to use crash research to help develop design criteria for freight corridors
- Investigate ways to reduce commercial motor vehicle crashes using tools such as the Rural Intersection Collision Avoidance System
- Coordinate with the Freight and Multimodal Operations Office in the creation of the Commercial Motor Vehicle Safety Coalition

Supporting Roles {

- *Strategy 1.1.2: Partner with cell phone carriers, insurance companies, and vehicle manufacturers on distracted driving reduction programs*
- *Strategy 1.1.3: Investigate the need for additional pre-signage, within Manual on Uniform Traffic Control Devices (MUTCD) guidelines, to emphasize distance to upcoming exits and intersections to commercial motor vehicles*
- *Strategy 1.1.4: Coordinate with the trucking industry to identify safety concerns*
- *Strategy 1.4.1: Collaborate with Florida Highway Patrol (FHP) and other law enforcement to identify and address risks*
- *Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*



## Turnpike Enterprise

### Overview

Florida's Turnpike Enterprise is responsible for operations on all FDOT-owned and -operated toll roads and bridges. This represents about 600 miles of roadway and 80 percent of all toll facilities in Florida.

### Roles in Motor Carrier System Plan Implementation

Lead Roles { • This office has no Lead roles or responsibilities for the Motor Carrier System Plan

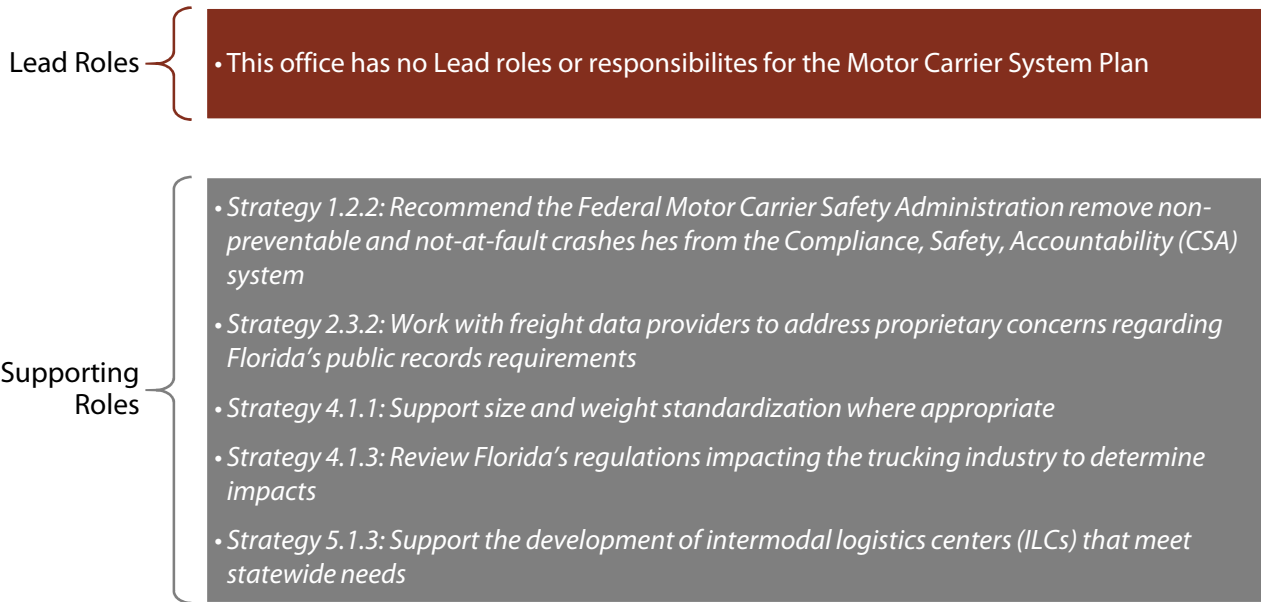
Supporting Roles {  
• Strategy 1.3.1: Define needs, gauge feasibility of solutions, develop more public land into truck parking, and partner with private sector  
• Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions  
• Strategy 7.1.1: Enhance coordination between statewide, regional, and local freight planning  
• Strategy 7.2.3: Work with local governments to identify and address truck parking needs near delivery points

## Legislative Programs

### Overview

The Legislative Programs Office coordinates with the Florida Senate and House of Representative to ensure that lawmakers understand the importance of a safe, efficient, and effective transportation system to Florida’s economy. Highlighting the critical role of freight mobility is a significant component of its message.

### Roles in Motor Carrier System Plan Implementation



## 5.1.2 PARTNER AGENCY IMPLEMENTATION ROLES

The following section identifies implementation responsibilities for the Motor Carrier System Plan by agency partner. As many core functions related to motor carrier extend beyond the responsibilities of FDOT offices, the partnership of these additional agencies and associations is critical.

Additionally, recommendations suggested by the Motor Carrier Working Group, from online surveys, and captured during public meetings are listed below the list of strategies. These suggestions will allow the lead office or agency partner to consider more detailed actions and methods suggested directly by those involved in the development of the plan.

To recap, the agency partners covered in this section include:

- Florida Department of Highway Safety and Motor Vehicles
- Florida Department of Agriculture and Consumer Services
- Florida Department of Veterans Affairs
- Florida Department of Economic Opportunity
- CareerSource Florida
- Florida Trucking Association

## Florida Department of Highway Safety and Motor Vehicles

### Overview

The Florida Highway Patrol (FHP) officers perform safety inspections on commercial vehicles and traffic enforcement with an emphasis on violations by commercial motor vehicle and passenger vehicles interacting with large trucks. FHP Commercial Vehicle Enforcement is a statewide enforcement agency which primarily conducts enforcement efforts through mobile patrols during peak traffic periods.

### Roles in Motor Carrier System Plan Implementation

#### Lead Roles

- *Strategy 1.2.1: Ensure consistent interpretation and enforcement statewide*
- *Strategy 4.1.2: Develop educational resources on commercial motor vehicle regulations to increase awareness*
- *Strategy 7.1.3: Research off-peak delivery strategies and support collaborative solutions that balance the needs of all stakeholders*

### Additional Implementation Recommendations and Comments

- Research potential consistency challenges and possible solutions
- Share existing educational resources with partners to increase awareness
- Consider opportunities to allow truck drivers to provide input on future educational resources
- Increase collaboration with local governments to increase awareness of the impacts local regulations and restrictions can have on goods movement and to encourage involvement of freight stakeholders

#### Supporting Roles

- *Strategy 1.1.2: Partner with cell phone carriers, insurance companies, and vehicle manufacturers on distracted driving reduction programs*
- *Strategy 1.1.4: Coordinate with the trucking industry to identify safety concerns*
- *Strategy 1.3.2: Review sufficient security at truck parking and enforcement of proper uses*
- *Strategy 1.4.1: Collaborate with Florida Highway Patrol (FHP) and other law enforcement to identify and address risks*
- *Strategy 1.4.2: Combine data sources with other security systems to reduce cargo theft, human trafficking, fraud, and non-compliance*
- *Strategy 1.5.1: Increase the resiliency of freight roadways to extreme weather and other environmental conditions*
- *Strategy 4.1.3: Review Florida’s regulations impacting the trucking industry to determine impacts on competitiveness*
- *Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*

## Florida Department of Agriculture and Consumer Services

### Overview

The Florida Department of Agriculture and Consumer Services supports and promotes Florida agriculture, protects the environment, safeguards consumers, and ensures the safety and wholesomeness of food. The Office of Energy is the legislatively designated state energy policy and program development office in Florida.

### Roles in Motor Carrier System Plan Implementation

Lead Roles {

- *Strategy 6.2.3: Support investment in alternative energy sources for freight vehicles and stations*

### Additional Implementation Recommendations and Comments

- Reach out to partners such as the North Florida Clean Fuels Coalition to gain lessons learned and best practices that could be repeated in other parts of the state

Supporting Roles {

- *Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*
- *Strategy 2.1.3: Inspect and repair pavement at high traffic areas as needed to maintain a state of good repair*
- *Strategy 4.1.2: Develop educational resources on commercial motor vehicle regulations to increase awareness*
- *Strategy 6.1.2: Investigate opportunities to safely move more cargo with greater efficiency and reduced emissions*
- *Strategy 6.2.1: Investigate and evaluate potential applications for the utilization of alternative energy sources*
- *Strategy 6.2.2: Ensure sufficient signage and/or other notifications from highways to available alternative energy source stations*
- *Strategy 6.2.4: Identify and address barriers to alternative energy source station development*

## Florida Department of Veterans Affairs

### *Overview*

The Florida Department of Veterans Affairs is the premier point of entry for Florida veterans to access earned services, benefits, and support. The Florida Legislature passed Veterans' Preference laws to assist veterans, their spouses, and family members in pursuing employment opportunities for recruitment, selection, promotion, reemployment and retention.

### *Roles in Motor Carrier System Plan Implementation*

Lead Role { • This office has no Lead roles or responsibilities for the Motor Carrier System Plan

Supporting Role {  
• Strategy 4.3.1: Work with motor carriers and the insurance industry to overcome barriers for young truck drivers  
• Strategy 4.3.2: Educate Florida's youth and general public on careers in the trucking industry  
• Strategy 4.3.3: Support partnerships in workforce training to better prepare workers for a future in the trucking industry

## Florida Department of Economic Opportunity

### Overview

The Department of Economic Opportunity assists the Governor in advancing Florida’s economy by championing the State’s economic development vision and by administering State and Federal programs and initiatives to help visitors, residents, businesses, and communities.

### *Roles in Motor Carrier System Plan Implementation*

Lead Roles {

- *Strategy 4.2.1: Seek to increase the development of manufacturing industries in the state*

Supporting Roles {

- *Strategy 4.1.3: Review Florida’s regulations impacting the trucking industry to determine impacts on competitiveness*
- *Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*

## CareerSource Florida

### *Overview*

CareerSource Florida is the statewide workforce policy and investment board, and its partners include the Department of Economic Opportunity, 24 local workforce development boards, and 100 career centers throughout Florida. Together, they help connect businesses with the talented workforce and training needed to succeed and grow.

### *Roles in Motor Carrier System Plan Implementation*

#### Lead Roles

- *Strategy 4.3.2: Educate Florida's youth and general public on careers in the trucking industry*
- *Strategy 4.3.3: Support partnerships in workforce training to better prepare workers for a future in the trucking industry*

### *Additional Implementation Recommendations and Comments*

- Reach out to trade and logistics programs and build relationships to increase awareness of opportunities in the trucking industry
- Work with trucking companies to identify training opportunities for newer truck drivers and brainstorm potential grant, incentive, and other solutions

#### Supporting Roles

- *Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*

## Florida Trucking Association

### *Overview*

The Florida Trucking Association (FTA) is made up of both carrier members (trucking companies) and supplier members (trucking industry partners and associated vendors). The FTA serves as the direct liaison between the trucking industry, the Florida Legislature, and state regulatory agencies ensuring that the business of trucking is viewed from a legislative and regulatory perspective.

### *Roles in Motor Carrier System Plan Implementation*

#### Lead Roles

- *Strategy 4.1.3: Review Florida's regulations impacting the trucking industry to determine impacts on competitiveness*
- *Strategy 4.2.2: Investigate the need for trailer transfer stations to allow drivers to stay within smaller regions with switchovers for longer hauls*

### *Additional Implementation Recommendations and Comments*

- Need to confirm the need for transfer stations and locations where most appropriate



Supporting  
Roles

- *Strategy 1.1.4: Coordinate with the trucking industry to identify safety concerns*
- *Strategy 2.1.1: Design major truck intersections, roundabouts, ramps, interchanges, and turn lanes to adequately support truck weights where appropriate*
- *Strategy 2.1.3: Inspect and repair pavement at high traffic areas as needed to maintain a state of good repair*
- *Strategy 3.2.2: Confirm freight data and findings match actual conditions when feasible*
- *Strategy 4.1.2: Develop educational resources on commercial motor vehicle regulations to increase awareness*
- *Strategy 4.2.3: Support projects that improve the efficiency of goods movement at the statewide level*
- *Strategy 4.3.1: Work with motor carriers and the insurance industry to overcome barriers for young truck drivers*
- *Strategy 4.3.2: Educate Florida's youth and general public on careers in the trucking*
- *Strategy 4.3.3: Support partnerships in workforce training to better prepare workers for a future in the trucking industry*
- *Strategy 6.2.1: Investigate and evaluate potential applications for the utilization of alternative energy sources*
- *Strategy 7.1.2: Investigate ways to update rest areas and truck comfort stations to appeal to truck driver teams and promote healthier lifestyle choices*
- *Strategy 7.1.3: Research off-peak delivery strategies and support collaborative solutions that balance the needs of all stakeholders*
- *Strategy 7.3.1: Develop resources to explain the connection between freight mobility and access to goods*
- *Strategy 7.3.2: Identify and promote appropriate forums for communication of issues affecting freight mobility*

## 5.2 CONCLUSION

### 5.2.1 IMPLEMENTATION OF MOTOR CARRIER PLANNING ACTIVITIES

In **Chapter 1**, the vision of what potential motor carrier planning activities might be initiated at the State and Local levels to support the Motor Carrier System Plan was presented and bears repeating as this Plan concludes:

- Truck restrictions such as peak period bans, route diversions, noise ordinances, delivery curfews in suburbs, and hazardous material route restrictions as potential context sensitive approaches
- Resiliency – a reconciliation of the Strategic Highway Network. Evacuation Corridors and an inventory of critical cargo assets
- Road design and construction changes for designated heavy haul corridors, improved entry and exit ramps, merges, and capacity and safety improvements
- Road pricing changes such as off-peak and peak period tolls
- Fleet management changes, such as automatic vehicle location and routing sensors, voluntary off-peak operations, driver training and management
- Intelligent transportation data collection and dynamic communication
- Traffic engineering improvements such as lane design restrictions, wider lanes, variable message signs, and speed restrictions
- Public drop lots/depots to support empty container repositioning and congestion mitigation
- Shipper and receiver actions such as voluntary and mandatory off-peak operations, anti-idle zones and delivery curfews
- Incident management changes such as automated detection and site surveillance
- Inspection and enforcement changes such as automated surveillance and inspection enforcement
- Alternative fuel distribution and a focus on air quality improvements
- Information management improvements such as highway advisory, parking and traffic updates
- Parking capacity improvements
- Outreach programs

The goals, objectives, and strategies outlined in **Chapter 4** and the roles and responsibilities suggested in **Chapter 5** clearly delineate a path to engage in and implement these motor carrier planning action items. Lessons learned as discussed in the following section presents a realistic and necessary look at the opportunities and challenges to successfully navigate this path.

## 5.2.2 LESSONS LEARNED

Researching and analyzing the issues impacting the Motor Carrier industry as highlighted in **Chapter 2**, reviewing related facts and figures in **Chapter 3**, developing the issue implementation strategies as discussed in **Chapter 4**, and delineating the roles of responsibility as discussed in **Chapter 5**, have revealed two main lessons learned:

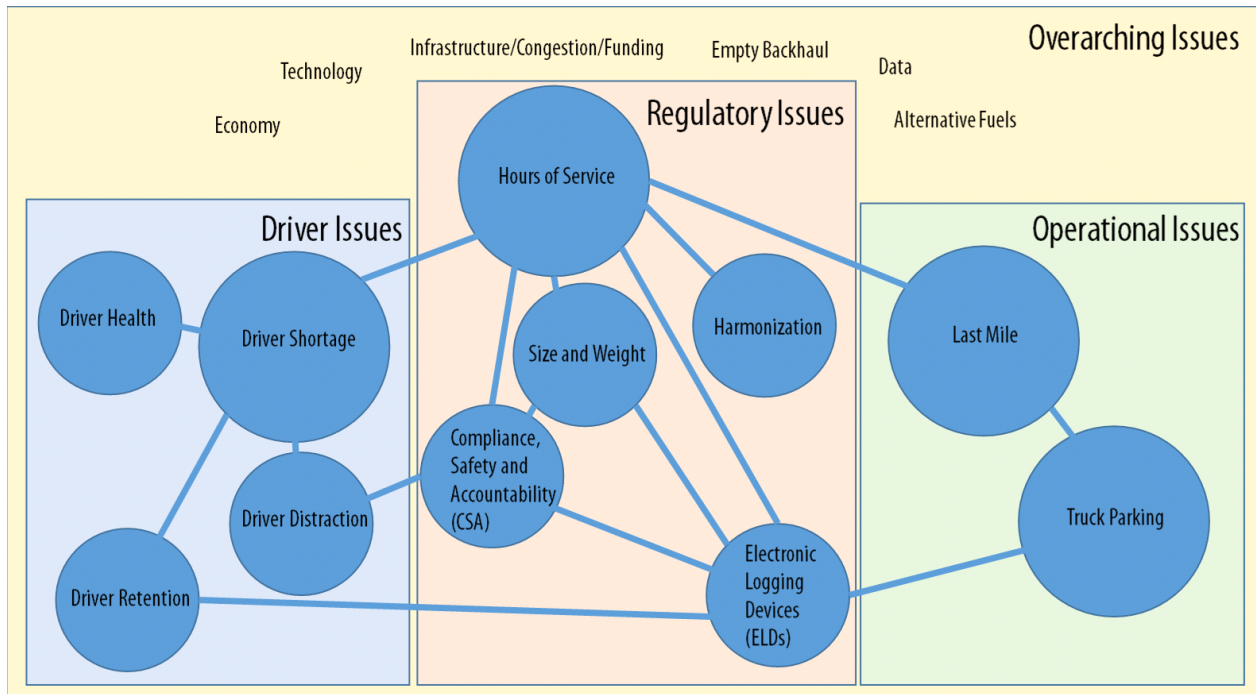
- The issues confronting Motor Carrier vehicles, drivers, and the industry in its entirety are related, connected, and dependent upon one another adding to the complexity of analyzing them and addressing them.
- A coordinated approach using multiple offices within FDOT and fostering strategic partnerships with key Local, State, and Federal agencies and associations and stakeholders is essential to address and resolve Motor Carrier System issues.

### Interconnected Issues

The main reoccurring theme which emerged was how interconnected and related the issues were to one another. During research and analysis, it was difficult to separate where describing one topic ended and one topic started. For example, the issue of *Infrastructure/Congestion/Funding* is so vast, it was difficult to summarize it into key components, while the *Technology* issue has such a wide scope that it intersected with the issues of *Truck Parking* and *Electronic Logging Devices*. There also were specific issues that focused predominantly on Motor Vehicle drivers, but it became apparent that these issues extended beyond a singular category and interconnectivity was apparent and unavoidable. For example, in discussing *Driver Shortage* and *Driver Retention*, the well-being of existing drivers (*Driver Health* and *Driver Distraction*) contributed to the availability of licensed drivers.

Additionally, the complexity of addressing one issue is notably its impact on other issues. Identifying and potentially solving some issues such as *Driver Retention* will have a corresponding positive impact on the issue of *Driver Shortage*. However, it is especially complex if a specific solution to address an issue has unintended or even negative impacts on a different issue. For example, a program to foster the use of autonomous trucks for truck platooning to address *Technology* might have a positive effect on reducing *Driver Shortage* and the need for *Truck Parking*, but it may lead to more trucks on Florida's roads with smaller loads impacting *Empty Backhaul*. Another example currently under discussion is the impact *Electronic Logging Devices* combined with *Hours of Service* have on increasing *Driver Shortage* and increasing the need for *Truck Parking*. When examining the issues, it is not the case of a one-to-one direct impact. The various issues often are connected like a spider web and must be understood and solutions developed within their tangential spheres, **Figure 5-1**.

**Figure 5-1: Interconnectivity of Issues**



Lines of Responsibility and Communication

As stated above, addressing Motor Carrier issues is a very complex undertaking. Providing for the safe and efficient movement of motor vehicles including motor carriers always has been a core business function of FDOT. Trucking serves and impacts all modes of transportation, but it had never been focused upon as a single transportation sector. Aviation, seaports, and rail each have modal offices and modal plans. Space has been blended into aviation from an organizational perspective, but it still has a plan of action. Freight finally has been recognized through the FMTP Elements as a movement which impacts all modes of transportation with the trucking industry most often serving as the mode of first and last delivery.

From the knowledge recently gained from these modal plans, FDOT recognized the importance of developing a specific Motor Carrier System Plan and the Motor Carrier Working Group became a tool to gather information across all aspects of FDOT and from other state agencies and the trucking industry. Historically, the many phases of highway development from needs assessment, planning, financing, statistics, enforcement, design, engineering, permitting, construction, and maintenance were scattered across many different offices, sections, and geographic areas within FDOT. There are many FDOT processes already in place to foster the development of highways with consideration of the movement of motor carriers. This compartmentalization while highlighting and focusing on an individual office’s institutional knowledge to address an issue may have had the unintended consequence of hampering flexibility and creativity to impact an issue. The Motor Carrier Working Group integrated the different FDOT offices, “brought together” partners, and empowered the combined entity. By identifying different concerns from each area, the Motor Carrier Working Group exponentially increased the knowledge base and the overall capability of FDOT to develop the Florida Motor Carrier System Plan.

The Motor Carrier Working Group served a critical purpose to bring the parts of the transportation network into a system for Motor Carriers. With policy and program designation, sector emphasis, and

communication tools, these far-flung responsibilities could continue to be coordinated by the formal establishment of the Motor Carrier Working Group.

### 5.2.3 MOVING FORWARD

FDOT's ability to have a meaningful impact on motor carrier issues is limited to those which can be address internally by FDOT. However, there are other issues for which a different state agency or combination of agencies and partners should become leaders. For example, addressing the issue of *Drive Shortage* may be better suited to Career Source Florida or Employ Florida. In that case, FDOT may only serve as an advocate, or serve in a secondary role. There are other issues which cannot be addressed at a state level, but only at a regional or federal level. In this case, FDOT's influence to address the issue is very limited, such as impacting *Hours of Service*. The Motor Carrier System Plan Business Forums served a critical purpose to gather and vet concerns essential to comprehensive analysis and future planning. This validation process coupled with the FDOT internal capabilities evidenced by the Motor Carrier Working Group have produced a plan which is tangible, implementable, and pragmatic.

In conclusion, Florida's economy prosperity is inextricably linked to the viability of the Florida Motor Carrier Industry. The Florida Motor Carrier System Plan offers the reader a realistic understanding of Motor Carrier issues facing this industry and of the criticality and complexity of initiating and sustaining the best practices, solutions, and strategies for this industry to remain a sustainable component of Florida's transportation and trade network.

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# APPENDIX

In order to provide a baseline of understanding on identified motor carrier issues before working toward solutions, FDOT prepared a series of fact sheets. These fact sheets give a general introduction of the issue, how it impacts Florida, related legislation and regulations, and additional commentary, as needed, to explain the context. Fact sheets included on the following pages cover these motor carrier issues:

- Hours of Service
- Compliance, Safety, Accountability (CSA)
- Driver Shortage
- Driver Retention
- Truck Parking
- ELD Mandate
- Driver Health/Wellness
- Economy
- Infrastructure/Congestion/Funding
- Driver Distraction
- Empty Backhaul
- Alternative Fuels
- Regulatory Consistency/Harmonization with Neighboring States
- Truck Size and Weight
- Technology Implementation
- Last Mile Connectivity
- Data

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# Hours of Service



## Defining the Issue

Issued by the Federal Motor Carrier Safety Administration (FMCSA), Hours of Service (HOS) regulations govern the working hours of any individual can operate a commercial motor vehicle in the United States. Commercial motor vehicles (CMV) include all commercial trucks (10,001 lbs. or greater) and buses (with more than 8 passengers) and/or trucks transporting hazardous materials in a quantity requiring placarding.

These regulations were first adopted in 1938 (by the Interstate Commerce Commission) and have been adapted and modified over time. The purpose of these regulations is to reduce driver fatigue which leads to accidents. Three main factors which contribute to driver fatigue include:

- Circadian rhythm (sleep patterns)
- Sleep deprivation
- Cumulative fatigue effects

Hours of Service (HOS) are enforced by Department of Transportation officers in each state. As of December 2015, hours of service regulations limit driving time to 11 hours, with a maximum on-duty time of 14 hours. Off-duty time minimum must be 10 hours within a minimum duty cycle of 21 hours. A maximum of 8 hours may be worked before a 30 minute rest break. A 34 hour restart provision is required per consecutive seven day period.

Driver hours are recorded in a log book, which must identify any change in duty status, by location. Drivers are required to keep a log page for each of the previous seven consecutive days. There are exceptions to these rules which allow for special circumstances or operating territories. It is estimated that a large percentage of log books contain some errors which has led the industry to adopt electronic logging devices (ELDs).

## Legislative Background



Federal Motor Carrier Safety Administration (FMCSA) regulations are found in part 395 and contain subparts which stipulate the following provisions: (395.1) Scope, (395.2) Definitions, (395.3) Maximum driver time for cargo vehicles (395.5) Maximum drive times for buses, (395.8) Records of duty status, (395.13) off-duty status, (395.15) automated recording devices.

Florida Statute 316.302 contains the intrastate hours of service regulation. These state regulations are less restrictive and allow extended driving times under certain conditions. Florida forfeits a portion of the Motor Carrier Safety Assistance Program funding because of these exceptions.



# Hours of Service

## Intrastate HOS Rules

Driver may drive 12 hours after 10 consecutive hours off duty.

Driver may not drive after 16th hour after coming on duty following 10 consecutive hours off duty.

Driver may not drive after 70/80 hours on duty in 7/8 consecutive days. 34 consecutive hours off constitutes end of 7/8 day period.

Drivers who do not exceed 150 air mile radius and no placarded hazardous materials are exempt from maintaining a log book. Drivers not released from duty within 12 hours must document driving time.

Source: <http://flhsmv.gov/Fhp/CVE/HOS.htm>

## Industry Impact

The FMCSA estimates that the restart provisions will primarily impact 15% of the 1.6 million truck drivers with the most intensive driving schedules. The agency estimates the benefits of the new safety rules will result in saving 19 lives and will prevent approximately 1,400 crashes and 560 injuries annually.

Companies and drivers that commit egregious violations of the rule could face the maximum penalties for each offense. Trucking companies that allow drivers to exceed the 11-hour driving limit by 3 or more hours could be fined \$11,000 per offense, and the drivers themselves could face civil penalties of up to \$2,750 for each offense.

## Carrier Response

Due to the loss of driver productivity, carriers have responded with rate increases in the range of 3-9% depending upon type of carriers service (long haul, short haul, intercity or dedicated/contract rates). Carriers were not able to pass rate increases to all customers and have moved 3-4 % of their business to intermodal rail where service exists.

## Florida by the Numbers

In fiscal year 2015, FDOT completed 67,000 inspections, and 18,000 violations were found. The #1 violation in Florida was log book reporting violations. This includes instances of drivers not having their log book, or improperly recording their hours of service.

## Defining the Issue

Compliance, Safety, Accountability (CSA) is a program developed by the Federal Motor Carrier Safety Administration (FMCSA). It is a data driven program used to monitor motor carrier compliance. There are three core components of the program:

- The Safety Measurement System (SMS),
- The Safety Interventions Process, and
- the proposed Safety Fitness Determination (SFD).

The SMS system analyzes data collected from roadside inspections, including all violations, investigation and crash reports for the last two years to prioritize carriers for interventions. Data collected is organized into seven Behavior Analysis and Safety Improvement Categories (BASICs):

- Unsafe Driving, Crash Indicator,
- Hours-of-Service Compliance,
- Vehicle Maintenance,
- Controlled Substances/Alcohol,
- Hazardous Materials Compliance and
- Driver Fitness.

The SMS system calculates a quantifiable measure of a motor carrier's performance and ranks each carrier based on their BASIC measure (higher scores indicate worse performance). The SMS system has been considered effective in helping identify high crash-risk carriers for interventions.

The second core component focuses on intervention, which is an enforcement action that may be taken when a carrier's safety performance data indicate a potential safety risk. An FMCSA intervention evaluates why safety problems occur, recommends remedies, encourages corrective action, and when necessary, invokes strong penalties for carriers failing to comply. The third component is the proposed safety fitness determination process which would replace the current safety rating process. The SFD would allow FMCSA to remove unsafe carriers from the nation's highways.

## Legislative Background



- Federal Motor Carrier Safety Regulation 49 CFR parts 392 and 397 cover speeding, reckless driving, improper lane change and inattention.
- Hours-of-Service and records of duty status are covered in parts 392 and 391.
- Driver fitness is covered in parts 383 and 396.
- Hazardous Materials Compliance is covered in part 397.
- The Fixing America's Surface Transportation (FAST) Act of 2015 has removed carrier specific CSA results from public display.



# Compliance, Safety, Accountability

## Industry Impact

“CSA literally has changed the way carriers do business,” says Dave Heller, director of safety and policy for the Truckload Carriers Association. “It has put safety to the forefront, much more than it ever has been before.”

Two years after the initial implementation of CSA in 2011 the majority of carriers surveyed stay on top of their CSA data and use it to improve safety. The FMCSA Administrator cites a 167% increase in website traffic and an 8% decline in equipment violations at roadside inspections and a 10% drop in driver violations per inspection.

## Carrier Response

Carriers have objected that the CSA SMS program does not have a strong enough predictive relationship between carrier scores and crash incidents. Most carriers lack sufficient safety performance data to ensure that FMCSA can reliably compare them with other carriers. These carriers are concerned that lack of data can lead to inaccurate profiles. Carriers have advocated that the SMS data driven process should be improved to allow FMCSA to focus intervention efforts and resources where they will have the greatest impact.

## Florida by the Numbers

In fiscal year 2015, Florida completed 67,000 driver inspections and identified 18,000 violations. The top four violations included:

- Log violations,
- Traffic control violations (stop signs, speeding, red lights)
- Hand held device distractions, and
- Driver record of duty status violation.

Florida tracks annual crash statistics in the Florida Integrated Report Exchange System. Data from 2013-2015 is highlighted below:

Category	2013	2014	2015	% Change 2013-2014	% Change 2014-2015	Total Change
Commercial Vehicle Crashes	32,091	34,438	37,353	7% increase	8% increase	5,262
Commercial Vehicle	34,840	37,348	40,282	7% increase	8% increase	5,442

Source: Florida Integrated Report Exchange System, 2013-2015

# Driver Shortage



## Defining the Issue

A critical concern raised by the American Trucking Association is the lack of qualified and certified tractor trailer drivers. Class 8 (heavy) tractor trailer drivers operate trucks with gross vehicle weight exceeding 26,000 pounds. They move freight along intercity routes, and can be away from home for a few days or for weeks at a time. This job requires endurance and many drivers have 11 hour shifts per day. Class 8 truck drivers

are subject to drug testing and health screening to ensure safety. Most heavy truck drivers have a high school diploma and have attended professional truck driving school. A heavy truck driver must have a commercial driver's license (CDL). A heavy truck driver must be 21 years old to apply for an interstate CDL. 18-21 years olds can hold a CDL for the purpose of intrastate trucking.

In 2014 (according to Bureau of Transportation Statistics), median pay was \$39,520 per year or approximately (\$19.00/Hour). There were 1,797,700 heavy truck jobs in 2014. Outlook for heavy truck driving jobs from 2014-24 is estimated to grow by 5% (average growth). More than 98,800 drivers will be needed to fill the projected job openings over this period of time.

## Legislative Background

Commercial truck classification is determined by the vehicle weight. The Department of Transportation's Federal Highway Administration (FHWA) has established three weight classifications. Class 7-8 trucks are considered heavy duty.

The Federal Motor Carrier Safety Administration (FMCSA) specifies the requirements for Commercial vehicle driver's licenses in part 383. In this statute medical, residency, knowledge and skill requirements are identified. The FMCSA has developed and issued standards for State testing and licensing of CDL holders. States issue CDL's after the applicant passes knowledge and skill tests. CDL's are required for drivers who operate certain classes of vehicles in interstate, intrastate or foreign commerce.

There are three classes of CDL licenses.

- Class A CDL's are required to operate a combinations of vehicles which in combination weigh over 26,001 lbs.
- Class B CDL licenses are required for a single vehicle exceeding 26,001 lbs. or any vehicle towing a vehicle with GVW that exceeds 10,000 lbs.
- A Class C, CDL license is for any single vehicle or combination vehicle designated to transport 16 or more passengers, including the driver, or any vehicle transportation hazardous materials.

Endorsements maybe required for drivers operating specialized types of commercial vehicles such as double/triple trailers, passenger or tank vehicles, hazardous materials or school buses. Restriction codes maybe included based upon the mechanical type of equipment or medical variance for the driver. CDL applicants may be disqualified for prior felony, driving violations or medical conditions.



## Industry Impact

The primary causes of truck driver shortages include demographics, gender, lifestyle, increasing regulations and alternative jobs available. In 2014, the estimated shortage of qualified heavy truck drivers was 38,000 drivers. The shortage is expected to reach 48,000 drivers by 2015 according to the American Trucking Association. The current average long haul over the road heavy truck driver is 49 years old. Only 5.8% of heavy truck drivers are women, and 38.6% of heavy truck drivers are minorities. The percentage of minority truck drivers is growing, but not enough to offset the shortage. Truck driver turnover is high due to the demanding nature of the job and time away from home.

According to the American Transportation institute (ATRI), 34% of the operational cost of trucking consists of driver pay. The impacts of a driver shortage could be significant since it is estimated that 68.9% of all freight tonnage moves at least some portion of the transportation journey by truck. Driver shortages vary by types of trucking services performed and may grow or decline based on economic growth.

## Carrier Response

In order to attract drivers during a driver shortage, many carriers increase wages and improve other work-life benefits such as preferred days off and provide newer model tractors. The shortage is a complex issue driven by various factors. Due to a highly fragmented industry, rate increases are often passed along to shippers and contribute to driver shortage difficulties. Many carriers are focused on hiring returning military veterans with experience. Others are advocating that the minimum driver age be reduced to 18 to attract a work force just graduating from high school.

## Florida by the Numbers

Florida employs over 70,000 heavy truck drivers with a (2014) average wage of \$36,700. Florida has more truck drivers than truck driving jobs. A location quotient of 1.0 means that jobs equal demand. With a location quotient of .76, Florida has more drivers than jobs which could be a location advantage for prospective industry attraction. With some of the lowest truck wages in the nation, truck transportation in Florida is more economical than Georgia or Alabama. The five location quotient leading states are listed below.

State	Employment	Employment per Thousand Jobs	Location Quotient	Hourly Mean Wage	Annual Mean Wage
Texas	165,650	14.75	1.23	\$20.02	\$41,640
California	127,330	8.42	0.70	\$20.86	\$43,380
Pennsylvania	72,590	12.84	1.07	\$20.80	\$43,260
Florida	70,320	9.17	0.76	\$17.64	\$36,700
Illinois	66,890	11.60	0.96	\$21.90	\$45,550

Source: Bureau of Labor Statistics, May 2014  
<http://www.bls.gov/oes/current/oes533032.htm>

# Driver Retention



## Defining the Issue

The Federal Motor Carrier Safety Administration (FMCSA) estimates that there are approximately 5.6 million drivers holding Commercial Driver's Licenses (CDL). The cost to hire and train a heavy truckload driver is approximately \$5,000 per individual.

Truck driver turnover for large truckload carriers averaged 90-95% in 2014, and can often be above 100%. Only about 1/3 of the drivers stay for 2-5 years or more, with many quitting within 1-3 months.

This high turnover rate equates to a trucking company having to hire a second driver for each driver employed, just to maintain the same driver count annually and ensure a pool of qualified drivers. Smaller truckload carriers have a slightly better driver retention rate of 80-90%.

## Legislative Background



The Federal Motor Carrier Safety Administration's (FMCSA) Pre-employment Screening Program (PSP) helps carriers make more informed hiring decisions by providing a commercial driver's five-year crash and three-year inspection history.

While pre-employment screening is not mandatory, research results suggest that the use of this program results in better safety records.

## Industry Impact

Carriers began using the Federal Motor Carrier Safety Administration's (FMCSA) Pre-employment Screening Program (PSP) program in May of 2010:

- Within the first year of use between 20,000-50,000 searches were being made per month.
- During the second year of use, 60,000-70,000 inquires per month were being made by hiring carriers to confirm driver applications were accurate.

Driver use of the system has been low with less than 2000 inquires per month, made primarily to confirm data accuracy. Carriers reported that after implementation of the PSP program company crash rates were reduced by 8% and driver out of service scores by 17%.

## Carrier Response

Due to the high cost of employment turnover, many trucking companies are reviewing compensation packages and work structures. Time-at-home is a top reason drivers leave the trucking industry. There are three components to time-at-home which include:

- frequency of home time,
- duration, and
- predictability.

Many carriers are looking at new dispatching models to improve time-at-home.

Driver compensation is another reason for driver turnover. Most carriers are paid per mile which can create stress during off-peak seasonal work fluctuations, to address this cash flow issue, some companies are exploring minimum pay programs.

Many drivers seek a positive employee-employer relationship, which is difficult when the employee is on the road and out of the office most of the time. To improve these relationships many carriers are creating retention managers who focus on a group of drivers. Some carriers are developing personality tests to measure a prospective applicant's response to stress, uncertainty and independence. These tests help ensure applicants are good matches for work assignments.

## Florida by the Numbers

There are 36 schools in Florida that offer commercial driving courses. The average class size is 19 students. The average course runs 8-12 weeks to earn a commercial driver's license. To earn a Class B or Class C license the program is often shorter.

The first few weeks of the program include preparation for the Florida written driving exam which focuses on driving laws in the state. The second portion of the program involves building upon and improving driving skills.

There are trucking academy programs, county schools, technical institutes and education centers. The average cost of tuition for one of these programs is \$2,893. Many programs qualify for federal financial aid. By filling out FAFSA forms you can find out what federal loans and grants you are eligible for. The average scholarship award in Florida is \$1,264 the average study loan amount is \$3,596.

Once training is completed a series of tests must be completed at the Florida Department of Highway Safety and Motor Vehicles. Depending on the class of driving licenses various tests must be completed. Typically prospective drivers must demonstrate pre-trip, basic skills and driving skills.

In Florida, truck drivers earn between \$22,300 per year and \$54,700 annually. The average driver income in 2012 was \$34,500. Wages vary based upon time spent on the road, driver experience, seniority and type of equipment operated.



# Truck Parking



## Defining the Issue

Truck Parking has been identified by states and the trucking industry as an issue which directly affects safety on the roadways. Several national studies conducted between 1996 and 2003 established the fact that truck parking shortages were occurring and affecting highway safety. As a result, the U.S. Department of Transportation and many State Departments of Transportation have completed and are working on a variety of studies and projects to measure and remedy the nationwide shortage of truck parking.

In one of the most recent efforts completed pursuant to requirements of the Moving Ahead for Progress in the 21st Century (MAP-21) Act, the Federal Highway Administration (FHWA) conducted a nationwide truck parking survey. Commonly known as the Jason's Law Truck Parking Survey, the survey revealed some key findings. These include:

- Finding available and safe truck parking at night is a significant problem
- Adverse weather conditions have a significant impact on truck parking capacity
- States lack resources to fund parking projects
- Planning and zoning is a challenge for truck parking development
- Demand for truck parking is most acute on major freight corridors and in metropolitan areas
- Delivery needs and schedules tend to drive a high nighttime demand for truck spaces
- FMCSA hours-of-service regulations influence route planning and parking decisions

The primary source of truck parking is provided by private, commercial truck stops. These account for more than 88% of the 308,000 truck parking spaces in the U.S. Truck freight volumes are expected to increase by over 40% by 2045. This will increase the demand for truck parking on an already stressed resource.

Trucks primarily pickup products and deliver in metropolitan areas. Metro areas provide the labor force to produce goods and commodities and have the dense population which consumes large quantities of products. As such, the demand for commercial truck parking is high in close proximity to large metro areas.

## Legislative Background



The Fixing America's Surface Transportation (FAST) Act signed into law December of 2015 builds upon the truck parking focus and provisions of Jason's Law and MAP-21.

The FAST Act places a major emphasis on freight planning and investing in freight projects. Key provisions of the Act are the creation of the National Multimodal Freight Network (NMFN), a new National Highway Freight Program (NHFP), and direction to states for improvements to the National Highway Freight Network (NHFN).

Truck parking facilities are included as eligible projects under the NHFP funding program. The Act also provides that Surface Transportation Block Grant Program (STPBG) funds may be used for truck parking facilities as well.

## Industry Impact

The shortage of truck parking has a variety of negative consequences for individual truck drivers and the industry as a whole. For many drivers the inability to find appropriate parking leads them to continue driving past hours of service limits and or searching for parking in unsecured or unsafe areas. The lack of safe parking may be one more issue that leads drivers to leave or never join the industry as a career choice.

Commercial truck parking has traditionally faced reluctance due to real and perceived adverse impacts. These include air quality and excessive noise and lights due to idling, interchange congestion due to high volumes of trucks getting off/on major freight routes to fuel and park, safety and security (driver safety and cargo security), and social and crime issues that seem to gravitate into truck parking locations. As such, local agencies are reluctant to accept new truck parking locations and to allow expansion of existing sites.

Some possible policy solutions include:

- Encourage and incentivize private commercial truck stops to increase truck parking spaces
- Deployment of Intelligent Transportation Systems (ITS) solutions, i.e. information on truck parking availability to commercial drivers
- Encourage shippers and receivers to provide truck parking for pick-ups/deliveries
- Encourage businesses to expand shipping and receiving hours
- Encourage logistics parks and distribution center parks to provide a common truck parking
- Partner with businesses that experience encroachment in parking lots, i.e. large retail stores (Walmart, Target, etc.) to provide solutions for truck parking
- Develop a metric to measure commercial truck parking

## Carrier Response

Industry associations are actively involved in the discussion and the National Coalition on Truck Parking. This coalition includes U.S. and State DOT representatives as well as the American Trucking Association, the Owner-Operator Independent Drivers Association, the national association representing truck stops (NATSO), the Commercial Vehicle Safety Alliance and others. The coalition was formed with the goal of identifying immediate, near term and long term solutions to the parking shortage.

## FDOT Response

Florida DOT has completed studies to identify the extent of the parking shortage throughout the state and projects providing additional parking.

FDOT has begun the development of a Truck Parking Availability System to provide information to truck drivers on the availability of parking spaces at facilities throughout the state. When complete the system is envisioned to include public areas (rest areas, welcome centers, weight stations) and off system private facilities (private truck stops, gas stations). The system will cover Florida's four primary interstate corridors, I-4, I-10, I-75, and I-95. Information regarding parking availability will be delivered to drivers in a variety of ways, including roadside dynamic messaging and the state's traveler information system Florida 511.



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

## Defining the Issue

An Electronic Logging Device (ELD) is an electronic solution that enables professional truck drivers and commercial motor carriers to track hours of service (Record of Duty Status) easily. The new ELD rule will include technical and performance specifications that will define features and functions of these devices. ELD specifications typically include:

- Connect to the truck's engine to record if the truck is in motion
- Allow the driver to log in and select On-duty, Off-duty, or On-Duty Not Driving; drive segments must be automatically selected based on vehicle movement
- Graphically display a Record of Duty Status, so a driver can quickly see hours in a day
- Provide data in a format that's standardized and can be transmitted to law enforcement in a number of prescribed ways, such as wireless web services, USB, or Bluetooth 2.0
- Be provider-certified that the device meets the proper specifications
- Be listed on an FMCSA website

Electronic logging devices range from an annualized price of \$165 to \$832, with the most popular device used today priced at \$495/truck. With the finalized rules, ELDs are expected to drop to \$200 per unit without any additional options.

Carriers must retain up to eight supporting documents for every 24-hour period a driver using ELDs is on duty. Those documents must be retained for six months, and drivers must submit supporting documents to the motor carrier no later than 13 days after receiving them.

Those supporting documents must include:

- Driver name or carrier-assigned identification number, either on the document or on another document enabling the carrier to link the document to the driver, or the vehicle unit number if that number can be linked to the driver;
- Date;
- Location (including name of nearest city, town, or village); and
- Time.

Supporting documents may come from the following five categories:

- Bills of lading, itineraries, schedules, or equivalent documents that indicate the origin and destination of each trip;
- Dispatch records, trip records, or equivalent documents;
- Expense receipts;
- Electronic mobile communication records, reflecting communications transmitted through a fleet management system (FMS); and
- Payroll records, settlement sheets, or equivalent documents that indicates payment to a driver.



# Electronic Logging Device

## Legislative Background



On December 10, 2015 FMCSR 49 CFR Parts 385, 386, 390 and 395 effectively mandate the use of electronic logging devices within two years (December 2017 anticipated).

The minimum performance and design standards for hours-of-service electronic logging devices (ELC's); requirements for the mandatory use of these devices by drivers currently required to prepare Hours of Service records of duty status.

The mandate exempts drivers of trucks built before model year 2000, based on concerns over the lack of electronic feasibility to incorporate ELDs with older engines. Drivers currently using legacy on-board systems (Automatic On-Board Recording Devices or AOBDRs) will be given until December 2019 to transition to ELDs.

## Industry Impact

It is estimated that drivers will gain up to an extra 20 minutes per day since they will no longer have to spend time filling out paper logs. Electronic log devices will help drivers quickly assess remaining on-duty driving time, allowing for more efficient scheduling. Vehicle inspection reports made electronically will also save time. Electronic Logging devices will improve driver's ability to comply with Hours of Service rules, increase miles per gallon by monitoring motor speed, fewer speeding incidents, measurement of unproductive engine idling, a decrease in out-of-route miles and will help curb fuel spending.

According to eldfacts.com "The FMCSA believes the total annual cost of ELD adoption will be \$975 million, which includes all equipment for carriers and commercial truck inspectors, as well as inspector and driver training. To be fair to the business changes ELDs can impact, another \$604 million was budgeted for "extra drivers and CMVs needed to ensure that no driver exceeds HOS limits."

All in, the net benefits of ELDs outweigh the costs with expected paperwork savings of over \$1.6 billion annually, plus crash reduction costs of \$395 million.

## Carrier Response

Industry supplies of electronic logs have been in use over the past few years as larger truckload companies have adopted what appeared to be an inevitable circumstance. One carrier identified a significant learning curve which could place compliant drivers at risk of violation due to simple coding issues. Software providers are working to perfect devices and training to ensure a seamless transition two years from now.

Larger carriers report productivity improvements because electronic log books can feed other reporting systems within the company, smaller carriers have concerns over the burdensome implementation of technology, especially carriers with less than five trucks.

## Defining the Issue

Truck Driver health is an issue fast becoming a serious threat to the long haul trucking industry. Truck drivers face more health issues and challenges than the general public. There are a variety of factors contributing to the health conditions of truck drivers. First and foremost the sedentary nature of truck driving offers little opportunity for exercise during working hours.

In addition, many interstate routes find drivers traveling in “food deserts” or areas lacking in healthy food alternatives. Most truck stops and travel centers contain typical pre-packaged and processed food. This food is often sugar-laden, fatty, and high in calories. While truck stops are increasingly offering healthier alternatives, the typical food still dominates.

Long hours behind the wheel, the stress and anxiety of driving in all weather conditions, irregular schedules, and poor sleep patterns also contribute to negative health patterns.

There has historically been limited information on illness and injury in this population, which prompted the survey by the National Institute for Occupational Safety (NIOSH). The survey was conducted in 2010, with 1,670 long-haul truck drivers at 32 locations across the country. The data collected from this survey was being used to establish a picture of the health conditions, risk factors, and work practices for U.S. long-haul truck drivers, giving the trucking industry and researchers valuable information to guide health and safety efforts. The completed study was published in January of 2014 in the American Journal of Industrial Medicine.

Notable physical health findings of the study include:

- 69% of drivers surveyed were obese and 54% of drivers smoked (each statistic is twice the national adult average).
- 88% of long-haul truck drivers reported having at least one risk factor (hypertension, smoking, and obesity) for chronic disease, compared to only 54% of the general U.S. adult working population.

Long-haul truck drivers also suffer from stress and other mental health concerns. Many of the same factors impacting physical health, irregular schedules, long hours, and lack of sleep also impact mental health. The additional stressors of regulatory compliance, delivery deadlines, and driving in adverse weather conditions contribute to higher than average levels of mental stress and the accompanying health consequences. The NIOSH study reported that long-haul truck drivers face unrealistic deadlines that may contribute to risky behaviors and put them at greater risk of injury.

## Legislative Background



Motor Carrier drivers are required to complete a Commercial Driver Medical Examination (CDME) to become medically certified in accordance with Section 391.43 of the Federal Motor Carrier Safety Regulations. The results of the CDME determined whether a driver qualifies for unrestricted certification (2yrs), shortened certification (1yrs), or does not meet the medical requirements.

The purpose of the history and physical examination is to detect the presence of physical, mental, or organic conditions of such a character and extent as to affect the driver's ability to operate a commercial motor vehicle safely.

## Disqualifying Conditions in Commercial Driver Medical Examination (CDME)

Corrected vision in one eye worse than 20/40	Color vision deficiencies	Insulin-dependent or uncontrolled diabetes mellitus	Anticonvulsion medication for treatment of seizures or epilepsy	Untreated respiratory dysfunction	Supplemental oxygen use	Current alcoholism
Horizontal field of vision less than 70°	Unable to hear a forced whisper at 5 ft	Epilepsy	Blood pressure above 180/110	Implanted defibrillator	Unstable mental conditions and psychoses	Use of schedule 1 drugs or methadone

Source: <https://www.fmcsa.dot.gov/regulations/title49/section/391.43>

### Industry Impact

Truck drivers serve a vital role in our nation's economy, ensuring the safe and timely delivery of goods across the U.S. Gaining a better understanding of how to improve the lives of truckers both on the road and at home is vital to ensuring their continued service. Failure to do so will serve to exacerbate the related and growing problem of driver shortages.

### Carrier Response

In the US and Canada, more carriers are beginning to offer health and wellness programs for their drivers. As the driver population ages, progressive carriers realize they need to help their drivers stay healthy.

Asked why companies should take an interest in the health of their workers, Dave Dietrick, vice-president of human resources with Erb Group said simply: "It's the right thing to do. We have to be involved. We have to provide programs for them to become healthier."<sup>1</sup>

### Florida by the Numbers

Nearly 75 percent of drivers perceived their delivery schedules as too tight, which NIOSH said could be an incentive for them to be unsafe. Surveyed drivers reported "sometimes" or "often" taking the following risky behaviors:

- Driving when tired, in poor weather conditions or in heavy traffic (47% sometimes, 25% often)
- Violating hours-of-service rules (27% sometimes, 10% often)
- Speeding (26% sometimes, 5% often)

In following national health trends, healthier eating options increasing along the interstates in Florida. One example are the service plazas located on the Florida Turnpikes Mainline. Of the 8 service plazas, 3 now have Nature's Table Cafés, a fast food restaurant offering healthy dining options<sup>2</sup>.

Sources:

<sup>1</sup> "For the health of it", June 17, 2013, [www.trucknews.com](http://www.trucknews.com)

<sup>2</sup> Nature's Table Café. [www.naturestable.com](http://www.naturestable.com)

## Defining the Issue

Many analysts consider the motor carrier industry to be one of the leading economic indicators of the nation's economic health as the economy and freight movement generally follow a similar pace. Slower than expected economic growth, particularly in the manufacturing and retail sectors may provide a barometer for freight movement demand in 2016 that is lower than previous forecasts.

Successful economic development and economic competitiveness depends upon agile, reliable, and cost effective goods movement. Many factors impact the choices businesses make concerning their modal decisions including:

- the distances between destinations,
- specialized handling requirements,
- storage needs,
- speed to market factors,
- costs, and
- reliability.

With nearly 70% of goods moved by truck, motor carriers, the infrastructure they travel over, and other factors affecting their operation continues to be a crucial component of the nation's economic prosperity and future growth. Shifting populations and housing needs may have a dramatic impact on the economy and subsequent freight demands in the future. The U.S. experienced a 4.1% increase in population during 2010-2015, with the southern region realizing the highest population growth in Florida, Georgia, South Carolina, and Tennessee<sup>1</sup>.

Florida's economy depends on agile, responsible, and efficient motor carriers that deliver raw materials and components to manufacturers and processors, ship finished goods to customers across the country and around the world, and move agricultural products to every corner of the state and into every global market. The transportation infrastructure that supports these freight movements requires the right investments to ensure transportation capacity, travel times, and costs continue to support Florida's economic competitiveness, quality jobs, and widely shared prosperity for Florida's citizens.

## Industry Impact

Florida's economic base is becoming increasingly more diverse creating high quality jobs in technology fields, life sciences, manufacturing and engineering, regional and national headquarters, and higher paying sectors of the financial services industry.

The Florida economy depends on a world-class goods movement network, motor carriers are a key component of that successful system. Growth in E-commerce is changing consumer demands for goods delivery and fueling new distribution projects. Some retailers are using their stores as distribution and fulfillment centers to supply goods for in-store sales and customers placing orders on line. If the goal for retailers depends on how quickly goods are delivered to customers, this will influence the demand for more flexible and highly responsive distribution networks, how motor carriers will serve those distribution networks, and needs for logistics and warehouse space.

Land availability, population growth, and connections to intermodal facilities are helping to drive the logistics and distribution sector in Florida as well as other states around the country.

## FDOT Response

The Florida Department of Transportation (FDOT) Office of Maintenance is releasing a fully automated version of the Permit Application System (PAS), which will allow haulers to self-issue 90% of trip permits, anytime and without requiring interaction with the Permit Office.

## Florida by the Numbers

The motor carrier industry moves more than two-thirds of all the freight tonnage in the U.S. According to the American Trucking Association, that demand for goods movement requires “3 million heavy-duty trucks and over 3 million truck drivers”<sup>2</sup>. The nation’s major metro areas are significant hubs for motor carrier activity driven by concentrations of population, employment, and intermodal infrastructure. The increase in freight volumes in metro areas combined with the constrained funding to maintain and improve the freight infrastructure, particularly the roadway network, has resulted in increased congestion; delays in travel time; safety concerns; improvements needed for connections to other modes such as air, ports, rail, and waterways; increasing the cost of goods movement.

The motor carrier industry is essential to freight dependent industries and employment. The table below compares the U.S. employment concentrations in several significant freight dependent business clusters with employment concentrations in Florida.

Percentage of Employment in Select Freight Dependent Industry Sectors		
Industry Sectors	U.S.	Florida
Agriculture, forestry	1.07%	1.16%
Mining	0.73%	0.06%
Construction	5.29%	5.90%
Manufacturing	10.52%	4.92%
Wholesale & Retail Trade	18.31%	20.35%
Transportation & Warehousing	3.80%	3.37%
Accommodations & Food Service	10.84%	13.01%
<b>Total Employment in Sectors</b>	<b>50.56%</b>	<b>48.77%</b>

*Source: Florida Department of Economic Opportunity, Current Employment Statistics, November 2015*

Florida’s population grew by almost 1.5 million people from 2010 to 2015, reaching a total population of 20,217,272<sup>1</sup>. Job growth in the state reach nearly 1 million new jobs during this period, however the Florida Chamber of Commerce estimates the need for an additional 2 million jobs by 2030 for the state to maintain their 5% unemployment rate.

Sources:

<sup>1</sup> U.S. Census, December 2015, [www.census.gov](http://www.census.gov)

<sup>2</sup> American Trucking Association, [www.trucking.org/News\\_and\\_Information\\_Reports\\_Industry\\_Data.aspx](http://www.trucking.org/News_and_Information_Reports_Industry_Data.aspx)



# Infrastructure/ Congestion/ Funding



## Defining the Issue

Trucking itself is characterized by speed, flexibility, and versatility, and regularly performs the final leg for freight transported by air, rail, or water. Within the United States, there are approximately 4.1 million miles of public roadways which must be properly maintained and improved to ensure efficient movement of freight by the trucking industry.

However, these very same roadways are also shared by non-freight related traffic. Congestion along roadways lead to not only deterioration of roadway infrastructure over time but also longer driving times, increased safety risks, reduced reliability, and increased transportation costs.

In addition, the cost to maintain and improve roadways is expensive and reliant on public funding from federal, state, and local sources. A concern is that increased logistics costs are passed on to consumers, and the increased business costs and transportation inefficiency will degrade Florida's ability to compete in the regional, national, and global marketplaces.

## Legislative Background



The Fixing America's Surface Transportation (FAST) Act signed into law December of 2015 includes provisions relating to ITS and Data. Key provisions of the Act are the creation of the National Multimodal Freight Network (NMFN), a new National Highway Freight Program (NHFP), and direction to states for improvements to the National Highway Freight Network (NHFN).

The FAST Act provides funding for fiscal years 2016 through 2020, permitting \$305 billion from both the Highway Trust Fund and General Fund.

On the state side, in 2003, the Florida Legislature and the Governor established Florida's Strategic Intermodal System, or SIS. The SIS is a designated system composed of facilities and services of statewide and interregional significance.

The purpose of the SIS was to allow the state to make investment decisions strategically to ensure the traffic, both freight and non-freight related, can move effectively and efficiently.

In addition to the SIS, the Florida Legislature passed the freight-focused House Bill 599 in 2012, authorizing the Florida Department of Transportation to develop the Freight Mobility and Trade Plan. The purpose of this state freight plan was to define goals and prioritize investments for all transportation modes involved in freight movements including roadways.



# Infrastructure/ Congestion/ Funding

## Industry Impact

The American Transportation Research Institute (ATRI) has identified that the industry is impacted by congestion along public roadways. In 2013, impacts from congestion cost the trucking industry \$9.2 billion. The negative impacts of congestion, failing roadway infrastructure, and the need for a long-term transportation funding solution will continue to bring significant costs to the trucking industry moving into the future.

## Response

In 2015, ATRI conducted research regarding critical issues impacting the trucking industry. Their research identified three potential strategies:

- Advocate for long-term highway funding through an increase in the fuel tax or other user fees, and prevent additional diversion of revenue to non-highway projects;
- Utilize the congressionally-mandated National Freight Policy and National Freight Network as tools to ensure adequate investment in critical highway infrastructure; and,
- Create a new funding program to focus federal resources on truck bottlenecks on major freight routes.

The ability of current fuel tax revenues to fund transportation improvements has been declining primarily due to increased construction and materials cost and, to a lesser extent, improvements in fuel economy and stagnant fuel tax rates. However, research has demonstrated that the existing fuel tax is an efficient form of taxation, and as such many in the industry support increasing the fuel tax as a stable source of funding.

The FAST Act has further developed national freight policy, well as expanded the network to include other transportation modes as the National Multimodal Freight Network. This new network designation expands the amount of highways designated 41,000 miles. The FAST Act also includes two freight-focused funding programs including the Nationally Significant Freight and Highway Projects program.

## Florida by the Numbers

Florida's trucking industry is heavily dependent on the highway system. Florida has 121,759 centerline miles of public roadways, with 12,076 of those miles included in the State Highway System and over 4,365 miles designated as the highway portion of the Strategic Intermodal System (SIS). These highways link the majority of Florida's SIS hubs such as airports, spaceports, seaports, rail terminals, and other intermodal/freight facilities.

In 2011, the trucking industry was the predominate forms of freight travel in Florida, carrying 81% of the state's freight cargo in weight, and 75% of value. This trend is forecasted to continue into 2040.

Sources:

<sup>1</sup> *Freight Mobility and Trade Plan, FDOT, 2014*

# Driver Distraction



## Defining the Issue

The issue of distracted drivers is not exclusive to automobiles. Driver distraction is a critical concern to motor carrier operators, and especially long haul tractor trailer drivers. The use of technology in all vehicles is increasing, while there is no common definition in the research community, forms of distracted driving include:

- Visual distractions (i.e. looking away from the roadway)
- Auditory distraction (i.e. response to a ringing phone)
- Biomechanical distraction (i.e. manually adjusting the radio volume)
- Cognitive distraction (i.e. lost in thought) and
- Combinations of distractions such as eating or searching for a phone.

To combat the increase of distracted drivers, the Federal Motor Carrier Safety Administration is promoting the phase "No Call, No Text, No Ticket" as a friendly reminder to avoid driver distraction.

## Legislative Background

The Federal Motor Carrier Safety Administration (FMCSA) prohibits texting by commercial motor vehicle (CMV) drivers while operating in interstate commerce and imposes sanctions, including civil penalties and disqualification from operating CMVs in interstate commerce, for drivers who fail to comply with this rule.

Additionally, motor carriers are prohibited from requiring or allowing their drivers to engage in texting while driving. FMCSA amends its commercial driver's license (CDL) regulations to add to the list of disqualifying offenses a conviction under State or local traffic laws or ordinances that prohibit texting by CDL drivers while operating a CMV, including school bus drivers.

This rulemaking increases safety on the Nation's highways by reducing the prevalence of or preventing certain truck- and bus-related crashes, fatalities, and injuries associated with distracted driving. The rule can be found at 75 FR 59118.

Federal fines and penalties for texting while driving can result in driver disqualification. Penalties can be up to \$2,750 for drivers and up to \$11,000 for employers who allow or require drivers to use hand-held communication devices for texting while driving.

In 2013, the State of Florida passed a "Florida Ban on Texting While Driving Law" in statute 316.305, which addresses the prohibition of wireless communications devices. This law is only enforceable as a secondary action. The "Put it down Proclamation" was initiated in Florida to promote safe driving.



## Industry Impact

Research commissioned by the Federal Motor Carrier Safety Administration (FMCSA) shows the odds of being involved in a safety-critical event (crash, near-crash, unexpected lane change) are 23.2 times greater than for commercial motor vehicle drivers who text while driving versus drivers who do not text while driving.

Texting drivers took their eyes off the forward roadway for an average of 4.6 seconds which at 55 miles per hour, equates to a vehicle traveling 371 feet before a driver reaction. In circumstances where a crash happens, violations negatively impact Safety Measurement System (SMS) results.

## Carrier Response

To fight distracted driving, cellular carriers are devising ways to block incoming calls and texts when a phone is in a moving car. T-Mobile is leading the way with its new DriveSmart service. The company's DriveSmart service automatically disables a phone in a moving car by sensing switches between cell towers. When a vehicle has been moving for 10 seconds, calls are silently sent to voicemail. Text messages are answered with an automatic response, explaining that the recipient is driving. Other cell carriers could soon follow T-Mobile's lead. According to the New York Times, Sprint, Nextel and AT&T are exploring the technology, and Verizon Wireless has been working to offer a service similar to DriveSmart. In recent months, mobile app developers have introduced related products such as SafeCell, PhoneGuard and Drive Safely.

## FDOT Response

The Florida Department of Transportation (FDOT), in a public-private partnership with GEICO Insurance, unveiled a statewide safety campaign in June of 2015 to tackle the problem of distracted driving on Florida's roads. As part of a national effort to encourage drivers to pull into a safe location to use their phone for calling, texting and accessing mobile apps, Florida has designated 64 Rest Areas, Welcome Centers and Turnpike Service Plazas throughout the state as "Safe Phone Zones," more than any other state.

Also, the FDOT Office of Maintenance is requesting federal funding to move forward with GPS maps for routing overweight vehicles instead of paper maps.



Source: FDOT Office of Maintenance, 2016

<http://www.dot.state.fl.us/statemaintenanceoffice/restareas.shtm>

# Empty Backhaul



## Defining the Issue

In the trucking industry, backhaul is the return movement of a truck from its original destination to its original point of origin. When the truck is not hauling cargo during this movement, it is considered an empty backhaul. The Florida Chamber Foundation's Trade and Logistics Study<sup>1</sup> identified an imbalance of trade flows as one of five challenges facing Florida.

Historically, Florida has been the place where truckers brought consumer goods to the final destination thanks to the state's ever-growing consumer market. However, with a relatively small manufacturing sector coupled with the state's distance from other major U.S. consumer markets and production centers, those same truckers which bring goods to this state often return either partially loaded or completely empty. The issue of empty backhaul has been associated mostly with Florida's trucking and rail industries, but it also impacts all other freight movements along other modes.

## Legislative Background



During the passage of House Bill 599 in 2012, the Florida Legislature acknowledged that empty backhaul was a significant issue for Florida. Section 334.044(33)(a), Florida Statutes (F.S.), required that the Florida Freight Mobility and Trade Plan include "investments that capitalize on the empty backhaul trucking and rail market in the state".

Objective 3 of the Florida Freight Mobility and Trade Plan (FMTP) Policy Element focuses on minimizing costs along the supply chain. Of the five strategies which have been established to achieve this objective, Strategy 3.5 focuses on "support manufacturing and assembly that reduces empty backhauling". The sub-strategies associated with Strategy 3.5 support the development of ILCs as well as coordination with freight forwarders.

## Industry Impact

The issue of empty backhaul is prevalent enough that it has ranked fifth amongst the top ten outbound freight commodities for rail in 2014<sup>2</sup>. Empty backhaul tends to increase supply chain costs, as trucking and rail carriers need to pass along the cost of empty backhaul to shippers and customers.

## Response

The response to this issue has been to invest in infrastructure that will support industries that will create more outbound freight and thus reduce empty backhaul movements. Statewide prioritization of freight-related projects within Florida are guided by the objectives and strategies identified in the Policy Element of the Florida Freight Mobility and Trade Plan (FMTP).

These objectives and strategies were used to develop the prioritization criteria and scoring for freight-related projects. Empty Backhaul is one of the prioritization criteria in which projects are assessed to identify their ability to reduce the number of empty backhaul movements.

In addition, the Florida Legislature has also pushed for the development of Intermodal Logistics Centers (ILCs) and growth of the manufacturing industries in the state. For example, one of the key legislative directives was the creation of an ILC Infrastructure Support Program and allocation of \$5 million annually toward funding at ILC facilities that meet certain criteria.

Finally, another area of focus is the development of public- and private-sector partnerships to support freight-generating economic development, including site selection and development, cross-modal connection, land use protection, and marketing.

## Florida by the Numbers

In 2011, 146 million tons of freight was imported into Florida while only 85 million tons left the state. Forecasts for the year 2040 show a similar pattern with almost 208 million tons of freight being imported into the state while exports amount to around 173 million tons<sup>2</sup>. However, unlike in 2011, 2040 forecasts do suggest that the value of exports will be higher than imports with an increase of around \$47 million<sup>2</sup>.

### Sources:

<sup>1</sup> Florida Chamber Foundation, *Florida: Made for Trade. Florida Trade Logistics Study 2.0, 2013*

<http://www.flchamber.com/wp-content/uploads/MadeForTrade-FINAL-Single-1.pdf>

<sup>2</sup> FDOT, *Florida Freight Mobility and Trade Plan: Investment Element, 2014*

## Defining the Issue

Throughout history, the primary fuel of choice for motor vehicles has changed. Changes occur due to a host of factors. These include availability, new technology, regulations and costs. Alternative fuels are growing in availability and use as businesses and public agencies realize the benefits realized with their use. A variety of alternatives to diesel are being investigated for use in heavy trucks. These include cleaner diesel alternatives such as:

- bio diesel,
- algae based diesel,
- dimethyl ether,
- hybrid,
- electric technology,
- hydrogen fuel cells,
- natural gas, and
- propane.

Bio diesel is produced from a variety of fats and oils. It can be used in compression-ignition (diesel) engines with little or no modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics. One of the most common sources is soybean oil. Biodiesel reduced CO<sub>2</sub> emissions by 78% compared to petroleum diesel<sup>1</sup>.

Hydrogen Fuel cells are also being developed for use in heavy trucks. A hydrogen fuel cell directly converts the chemical energy in hydrogen to electricity powering an electric motor. Hydrogen electric engine trucks have more horsepower and double the torque of clean diesel and LNG trucks with zero emissions. The trucks are also quieter creating much less noise pollution<sup>2</sup>.

Another alternative fuel growing in popularity is compressed or liquefied natural gas (CNG/LNG). Natural gas is plentiful in North America and one of the cleanest burning hydrocarbons. Natural gas emits virtually no particulates when used as a transportation fuel and produces 25% less CO<sub>2</sub> emissions than oil and 50% less CO<sub>2</sub> emissions than coal.

Natural gas is fast becoming a popular alternative fuel for private and public fleets. It is used in 1 in 4 American transit buses and is increasingly seeing use in school bus fleets, delivery vehicles, and Over-the-road-Trucks. It is particularly appealing for commercial fleets due to its potential to reduce fuel expenses by up to 50% compared to traditional gasoline, lowered maintenance costs and ease of training for mechanics and maintenance personnel.

## Legislative Background



The Fixing America's Surface Transportation (FAST) Act signed into law December of 2015 included a provision to address one of the drawbacks of converting heavy trucks to use natural gas, the added weight of the LNG equipment. The modifications needed for a diesel truck to use natural gas could add up to 2,000 lbs. of weight to the truck. This additional weight lessens the amount of freight the truck can carry while maintaining weight standards. The FAST Act exempts the weight attributable to the natural gas propulsion system from the total vehicle weight calculations.

## Industry Impact

Alternative Fuels have the potential to drastically impact the motor carrier industry as they impact trucks, the very heart of the industry. It remains to be seen whether one of the alternatives listed above or a yet discovered technology will become the fuel of choice for the industry. Motor carriers will need to closely monitor alternative fuel advancements in order to make informed business decisions, as they become available.

## Carrier Response

Almost all of the major Heavy Truck manufacturers and large transport fleet owners are actively investigating fuel alternatives and watching advancements in technology. As with most business decisions the primary factor determining employment of new technology is cost.

In order for a motor carrier to adopt new fuels and technology they must be able to realize cost savings or other benefits sufficient to overcome the initial cost of purchasing new or retrofitting existing equipment. The current price of diesel is a large part of this decision making process.

When Diesel prices are lower there is less incentive for motor carriers to adopt alternatives. Conversely, increases in diesel prices or new regulations may also serve to speed up the adoption of alternative fuels.

## Florida by the Numbers

In 2011, Florida was home to two natural gas fueling stations. That number has now grown to 30, with more planned or under construction<sup>3</sup>.

The state also has a Natural Gas Fuel Fleet Vehicle Rebate program administered by the Department of Agriculture and Consumer Services. The program provides a rebate of up to \$25,000 for the cost of converting a vehicle to natural gas. Each applicant is eligible to receive up to \$250,000 per fiscal year on a first come first served basis.

Florida is also withholding state tax on natural gas until 2018 when the tax will be equal to that of a gallon of diesel (currently 21 cents)<sup>4</sup>.

### Sources:

<sup>1</sup> Biodiesel Facts, [www.biodiesel.org](http://www.biodiesel.org)

<sup>2</sup> TTSI Logistics, <http://ttsilogistics.com/sustainability/hydrogen.html>

<sup>3</sup> Florida Natural Gas Association, <http://floridagas.org>

<sup>4</sup> Florida Department of Agriculture and Consumer Services, [www.freshfromflorida.com](http://www.freshfromflorida.com)



Source: TTSI Logistics, [www.ttsilogistics.com](http://www.ttsilogistics.com)



# Regulatory Consistency/ Harmonization



## Defining the Issue

The U.S. Department of Transportation (USDOT) Federal Motor Carrier Safety Administration (FMCSA) and the Federal Highway Administration (FHWA) impose rules and regulations on the trucking industry for consistency across the country. Published in June 2015, the USDOT provided a report to Congress: **Comprehensive Truck Size and Weight Limits Study, Technical Reports Summary** in an effort to document the impacts on bridges, pavements, costs, modal shift potential, safety, enforcement and compliance.

States may regulate the movement of trucks not contrary to federal law. Several issues illuminate both supportive and competitive tools used by Florida and its neighboring states of Alabama, Georgia, Louisiana, Mississippi, and South Carolina. Key issue areas include:

- permitting of overweight and oversized trucks (both the process and differences among adjacent states),
- state motor fuel taxes (not adjusted to address inflation or compensate for improved efficiency of vehicles, and often revenue generated is used for non-transportation needs),
- insurance costs for drivers, owner-operators, and trucking companies, and
- commercial driver's licenses (CDL)

The Florida Department of Transportation (FDOT) Office of Maintenance is participating with the American Association of State Highway and Transportation Officials (AASHTO) and other government entities to address harmonization for a variety of permit conditions including time of travel, type/number of escorts, holiday travel, permit amendments, etc.

## Legislative Background

Permitting of overweight and oversized trucks is complex highway issue impacting other modes especially trucking and seaports. Trucks carrying a "non-divisible" load such as a sealed container or a heavy generator may be issued an overweight permit by a state for weights above the federally mandated minimum/maximum 80,000-pound gross vehicle weight (GVW) limit for travel on the National System of Interstate and Defense Highways and for those roads providing reasonable access to the System<sup>1</sup>.

The Fixing America's Surface Transportation (FAST) Act was signed in December of 2015, and included a provision to exempt the weight attributable to the natural gas propulsion system from the total vehicle weight calculations, up to a maximum of 82,000 -pound GVW on the Interstate System.

In Florida, a truck carrying a "non-divisible" load on these federal highways may apply for a permit to carry up to 100,000 pounds GVW<sup>2</sup>. By comparison, no "divisible" load such as aggregate may exceed 80,000 pounds GVW.

States and local governments also may set truck weight limits for roads under their jurisdictions. In 2010, Florida increased the maximum weight for trucks carrying divisible loads such as break-bulk and bulk cargoes on non-interstate roads including the Florida Turnpike from the legal limit of 80,000 pounds GVW<sup>3</sup> to a permitted limit of 88,000 pounds GVW. The permitted limit for non-divisible truckloads, or containers, remains the same on state highways at the 100,000-pound GVW maximum.





# Regulatory Consistency/ Harmonization

## Industry Impact

Differences in state regulations and motor fuel taxes is a significant issue to the trucking industry and its users. The inconsistencies can lead to loopholes, confusion, and inefficiency. The table below illustrates the different taxes impacting motor carriers that travel in or through the southeast U.S.

State	Gasoline	Diesel	Gasoline Total (State + Federal Excise at \$.184/Gal)	Diesel Total (State + Federal Excise at \$.244/Gal)
Alabama	20.87	21.85	39.27	46.25
Florida	36.42	33.67	54.82	58.07
Georgia	32.62	36.18	51.02	60.58
Louisiana	20.01	20.01	38.41	44.41
Mississippi	18.79	18.40	37.19	42.80
South Carolina	16.75	16.75	35.15	41.15

Source: American Petroleum Institute, October 2015

Insurance costs for drivers, owner-operators, and trucking companies means large trucking companies provide the only or best potential opportunities for younger drivers, as well as others looking for entry level jobs in the trucking industry, as they often choose to self-insure. Neither Florida or any neighboring state has supported an insurance subsidy to encourage greater entry level opportunities to counter the shortage of drivers.

Commercial Driver's Licenses (CDL) are issued by the states for those 21 years of age or older for engaging in interstate trucking. Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina have provisions for those who are qualified and between 18-20 years old to engage in intrastate movements of certain commercial vehicles with specific weights and sizes. If an opportunity to engage in short haul intrastate trips is encouraged, choosing truck driving as a career may be easier to offset the shortage of truck drivers.

## Carrier Response

A major concern is that the varied truck weight and size limits, costs of permits, enforcement, and penalties for permit violations in Alabama, Mississippi and Georgia as compared to Florida may create a competitive disadvantage for moving freight to and from a Florida seaport, or even simply exporting goods to other states. This causes transportation costs to be higher due to carriers shipping less weight/cargo per truck. Also noted was the disparity between non-divisible container and divisible bulk load weight limits. Comments included consolidation of more cargo on fewer trucks could reduce traffic, improve commuter travel, reduce transport costs, boost fuel efficiency and improve air quality. Fuel prices, insurance costs and availability, inconsistency of police reports of accidents provided by the states to the federal agencies, and enforcement of safety concerns were also mentioned.

Sources:

<sup>1</sup> 23 Code of Federal Regulations (CFR) Part 658.17

<sup>2</sup> CH 14-26.01311(6), F.A.C

<sup>3</sup> s.316.535(5), F.S.

# Truck Size & Weight



## Defining the Issue

Commercial vehicles are generally defined as those vehicles that either:

- has a gross vehicle weight rating of 10,000 pounds or greater,
- transports more than 15 passengers including the driver, or
- transports hazardous waste<sup>1</sup>.

Federal and state regulations enforce standards regarding size (i.e. height, length, and width) and gross weight of these vehicles. These regulations were put into place for the purpose of preserving the integrity of highways for mobility, productivity, and safety of both freight and non-freight related travel.

Commercial vehicles used by the trucking industry must follow these standards to ensure no costly disruption to freight movement. The trucking industry is segmented by various trucking modes, which are differentiated by cargo weight, cargo type, and ownership.

Trucks come in many sizes and designs to accommodate the cargo being carried. However, some trucks used for freight movements do not fit into the standards established. Trucks that do not adhere to the size or weight standards in place for the state they are traversing are considered to be "oversized" and/or "overweight". In order for these trucks to complete their journey, they must obtain special permits.

Pursuant to Rule 14-26, Florida Administrative Code, the Florida Department of Transportation (FDOT) dispurses oversize/overweight permits for a fee. Fees are dependent on several factors including: trip duration, size of the vehicle, weight, and distance to be traveled.

## Legislative Background



The Commercial Vehicle Size and Weight Program is administered through the Federal Highway Administration's (FHWA's) Office of Freight Management and Operations. Federal standards for commercial vehicles are focused on the vehicle's length, width, and weight, found under Code of Federal Regulations (CFR), 23 CFR Part 658.

These standards impacts those commercial vehicles using what is considered to be the National Network. For the purposes of the Commercial Vehicle Size and Weight Program, the National Network consists of the Interstate Highway System and other highways as certified by the states to the FHWA of which are identified under 23 CFR Part 658, Appendix A<sup>2</sup>. States may impose additional standards for commercial vehicles as long as they are consistent with those established by the federal government.

Chapter 316, Florida Statutes, contain the standards that commercial vehicles must adhere to while traveling within Florida including maximum size and weight limitations.

These standards are enforced by the Florida Highway Patrol, through the Office of Commercial Vehicle Enforcement (CVE) under their weight enforcement program. The primary purpose of this program is to protect the state highway system, including its system of bridges, from damage due to vehicles which are considered to be oversized and/or overweight.

Type	Size or Weight Limitation Exceeded
Oversized	Maximum width of vehicle or vehicle combination and load exceeds 102 inches on less than 12 foot wide travel lane
	Maximum height of vehicle or vehicle combination and load exceeds 13 feet and 6 inches or 14 feet for automobile transporters
	Maximum length: <ul style="list-style-type: none"> <li>■ Single-unit vehicle exceeds 40 feet</li> <li>■ Truck Tractor with semi-trailer which exceeds 48 feet with a kingpin distance which exceeds 41 feet</li> <li>■ Straight Truck with trailer when the combination exceeds 68 feet</li> <li>■ Truck Tractors hauling automobiles with semi-trailer exceeding 50 feet</li> <li>■ Front end overhang exceeds 3 feet</li> </ul>
Overweight	Gross weight of vehicle or vehicle combination and load exceeds those limits established under Section 316.535, Florida Statutes

Source: Florida Highway Patrol, 2013

## Industry Impact

If a truck is identified to be overweight, the penalty is \$.05 per pound in excess of the applicable legal limit. For oversized, penalties can reach up to \$1,000. The truck is also required to either correct these issues before travel can recommence or obtain an overweight/oversize permit.

If truck has obtained an overweight/oversize permit but then violates the conditions of the permit, additional penalties based on weight and size as mentioned above will be once more assessed. In addition, there are 11 types of violations that, if violated, will strip the truck of its special permit with the truck and potentially the driver being placed out of service<sup>1</sup>. For this reason, consistent enforcement is key.

This is costly to truck carriers and often adversely impacts other modes that are dependent on truck travel such as airports, rail terminals, and seaports. These costs can place Florida at a competitive disadvantage in comparison to other states that may have a more simplified approach to special permitting, penalties, and violations<sup>3</sup>.

## Florida by the Numbers

The CVE weight enforcement program has 20 fixed weigh station locations and mobile enforcement with portable scales throughout Florida. The Florida Highway Patrol reports that in 2011 more than 14,000 vehicles and over 5,000 drivers were placed out of service for violations.

### Sources:

<sup>1</sup> Florida Highway Patrol, *Commercial Motor Vehicle Manual*, 2013  
<http://www.flhsmv.gov/fhp/cve/2013TruckingManual.pdf>

<sup>2</sup> Federal Highway Administration, *Federal Size Regulations for Commercial Motor Vehicles*, 2004  
[http://www.ops.fhwa.dot.gov/freight/publications/size\\_regs\\_final\\_rpt/size\\_regs\\_final\\_rpt.pdf](http://www.ops.fhwa.dot.gov/freight/publications/size_regs_final_rpt/size_regs_final_rpt.pdf)

<sup>3</sup> Georgia Department of Transportation, *Oversize Permits*, 2016  
<http://www.dot.ga.gov/PS/Permits/OversizePermits#tab-2>

# Technology Implementation



## Defining the Issue

Innovation and technological advancements impact almost every area of society. This includes freight movement and the trucking industry. Advancements in technology will change the manner of how motor carriers operate in the future. A variety of advancements are already in development and testing. These include:

- automated vehicles,
- truck platooning, and
- electronic truck parking notifications.

These technologies have the potential to increase the efficiency and capability of motor carrier operations, but are not without concerns and may require further testing and potential changes in state policy.

Automated vehicle technology is increasingly being discussed in media and society. Apple, Google and Tesla are frequently mentioned in the news as they develop and test these technologies on public roadways. While these companies are receiving the bulk of attention, the trucking industry is quietly investigating the technologies application for freight movement.

An autonomous vehicle (AV) is any vehicle equipped with advanced sensors (radar, LIDAR, cameras, etc.) and computing abilities to perceive its surroundings and activate steering, braking, and acceleration without operator input. With issues such as a driver shortage, hours of service regulations, and safety it is only natural that motor carriers are interested in autonomous vehicle technology.

Truck platooning is a concept made possible by autonomous vehicle technology. The trucking industry is interested in the possibility of going from single trucks to convoys of trucks. These convoys would consist of one human driver in a lead truck followed by two or more autonomous trucks. The technology, which is being developed (and in some instances, deployed) for use right now, consists of a lead truck operated by a human driver followed in close formation by a small fleet of driverless vehicles "tethered" by a series of sensors.

The concept has been successfully tested in both Europe and Japan, and has demonstrated the potential for fuel savings due to the aerodynamic efficiencies gained by the trucks drafting with each other. Remaining questions about the technology include concerns about the safety and liability of truck platoons, how other vehicles will merge and interact with platoons and the potential for additional wear on roads and bridges with such a large concentration of weight. The Florida Department of Transportation (FDOT) Office of Maintenance is reviewing the impacts of truck platooning as it pertains to bridges.

While autonomous vehicles and truck platooning may be years off, technological advancements are being deployed today to address the truck parking shortage faced by the industry. These systems include sensors that track or measure parking availability at rest areas and transmit the information to dynamic message signs or mobile applications available to truck drivers. Examples of this technology in use include projects in Florida, Minnesota, Maryland and California.



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

## Legislative Background



In 2013, the National Highway Traffic Safety Administration announced a new policy allowing the testing, licensing, and regulation of autonomous vehicles. To date, four states, Nevada, California, Florida, and Michigan have enacted legislation permitting the use of autonomous vehicles. In 2012, Florida HB 1207 was signed into law. The bill provides a framework for autonomous vehicles in Florida. Specifically, the bill:

- Defines “autonomous technology” and “autonomous vehicle”
- Provides legislative intent regarding vehicles with autonomous technology
- Authorizes the operation of autonomous vehicles
- Provides requirements for autonomous vehicles
- Provides guidelines for testing autonomous vehicles
- Provides a framework for liability for autonomous vehicles
- Requires the Department of Highway Safety and Motor Vehicles to submit a report

## Industry Impact

The implementation of the technological advancements described in this paper has the potential to drastically alter the trucking industry. Advancements in automated vehicles and the deployment of truck platoons has the potential to mitigate impacts of a driver shortage, decrease accidents and increase efficiency of freight movement. Full utilization of this technology will require additional testing, changes in regulations and policy as well as public outreach and education.

## FDOT Response

The Florida Department of Transportation (FDOT) is engaged in an active effort to study and research the potential that automated vehicles may have and has established the Florida Automated Vehicles (FAV) Initiative. One study being conducted under this initiative is the AV/CV/ITS Freight Applications Pilot Study. The goal of this project is to demonstrate that AV technologies can offer increased safety and efficiency for freight operations. FDOT proposes that travel time reliability can be improved within the region surrounding the Miami International Airport by deploying AV technologies on a limited number of drayage operators’ fleet vehicles that agree to partner on the project. The project is comprised of three phases as follows:

- PHASE 1 — Connected vehicle (CV) technologies will be deployed to allow fleet operators and FDOT to better understand vehicle progression throughout delivery corridors and where bottlenecks occur at traffic signals
- PHASE 2 — Utilizing the same installed CV devices from Phase 1, the next phase will connect the freight vehicles to traffic signals through the back-end systems at the Miami-Dade County Traffic Management Center
- PHASE 3 — During non-peak congestion hours (potentially 12 to 5 a.m.), traffic signal priority will be granted to study vehicles in the pilot to improve delivery performance by providing the freight vehicle with a green signal

## Defining the Issue

When thinking of freight transportation, long distances usually come to mind. This holds true with large trucks as well. The image most people associate with a semi-truck is of one on the interstate completing a long haul route. For motor carrier operators however, success often depends on getting to the locations where they pick up and drop off their cargo. These segments of freight movement that occur on roadways between intra-regional highways and freight transportation hubs are known as the “last mile” in freight movements.

Most of these last mile trips occur in urban areas on the local roadway network designed and intended to support a multitude of transportation and land uses. These and other factors pose unique opportunities and challenges when planning for the last mile of freight movements.

Some motor carriers specialize in providing local or regional service within a single urban area or market. Nearly all economic activity in urban areas depends on the movement and delivery of goods through freight carriers and much of the visible freight activity in urban areas is the movement of deliveries destined for local businesses and homes.

Challenges associated with urban freight include balancing the demands placed on local roads by the variety of users with the needs of freight shippers constantly seeking to maximize efficiency and minimize costs.

Other issues associated with urban freight delivery include air and noise pollution generated by heavy trucks, lack of parking in delivery areas, and peak hour congestion. Potential strategies to counter these issues include:

- scheduling off peak hour deliveries,
- variation in delivery vehicles,
- consolidation of less than truckload (LTL) loads, and
- land use strategies such as creating freight villages or multiple small distribution centers located throughout an urban area.

For long haul motor carriers the last mile is equally as important as for intra urban carriers. When adequate connections are not available between the arterials and freight hubs, bottlenecks occur.

In recent years particular attention has been brought towards the issue of freight bottlenecks and the impact they have on freight movement. Examples include a local road used by heavy trucks to travel between the interstate and a port. The design and function of that local road and its intersections can greatly impact the trucks and their operation.



# Last Mile Connectivity

## Legislative Background



The Fixing America's Surface Transportation (FAST) Act signed into law December of 2015 builds upon the freight planning provisions of the Moving Ahead for Progress in the 21st Century Act (MAP-21). The FAST Act places a major emphasis on freight planning and investing in freight projects.

Key provisions of the Act are the creation of the National Multimodal Freight Network (NMFN), a new National Highway Freight Program (NHFP), and direction to states for improvements to the National Highway Freight Network (NHFN).

States are required to create a State Freight Plan within two years in order to use NHFP funding. These plans must be coordinated with the performance based planning process, include a freight investment plan and identify a list of priority projects. Last mile connector projects would be included in this effort.

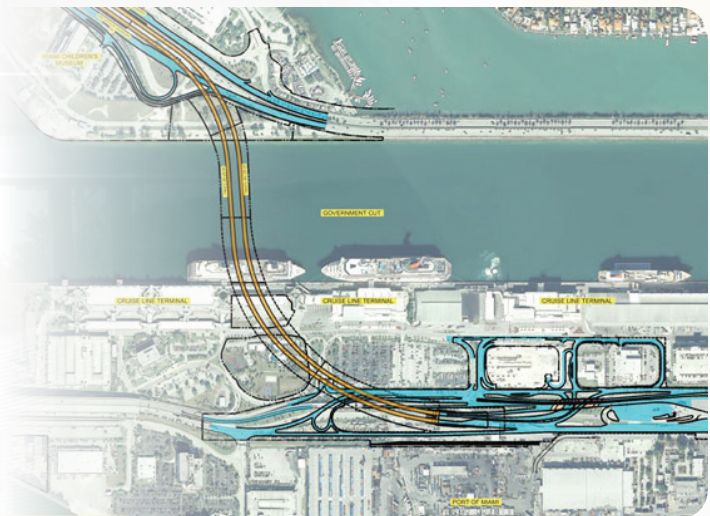
The Act also identifies eligible project categories for funding under the NHFP. These include, rail-highway grade separation, geometric design improvements, additional road capacity for highway freight bottlenecks, any project that improves the flow of freight on the NHFN.

## FDOT Response

The Florida Department of Transportation (FDOT) recently created a new five year program for identifying and funding last mile connector projects on the National Highway System and Florida's Strategic Intermodal System. The program identifies bottlenecks and other locations throughout the state in need of safety, operational or capacity improvements. Projects are identified by the FDOT Districts and then submitted to the central office for potential inclusion into the program. In the last three years, the department has funded over \$80 Million in freight connector projects.

The Port of Miami Tunnel is an excellent example of a project built to improve connectivity between freight modes. The Port of Miami Tunnel opened to traffic in August of 2015 and allows truck traffic to exit directly off Interstate 395 and onto the port, bypassing congested local streets. The tunnel services an estimated 16,000 vehicles each weekday that previously used downtown streets to access the port. Of these 16,000 vehicles, up to 28%, or 4,480 are estimated to be trucks.

FDOT has also noted the need to improve off-system connections between local freight hot spots and the Strategic Intermodal System (SIS).



Source: portofmiamitunnel.com



## Defining the Issue

There are a variety of challenges amidst an ever changing environment of economic trends, regulations, and technological advancements. The production and availability of appropriate data is fundamental to the ability to address these challenges. In addition, access to real time data is an integral tool giving logistics operators the information needed to maximize efficiencies in operations. Improvements in data are being implemented across the nation in a variety of ways. The use and implementation of Intelligent Transportation Systems (ITS) is a key strategy State Departments of Transportation are using to acquire, process, and distribute data on the transportation system.

The growth of high-speed networks, proliferation of mobile devices, advances in sensors, video and analytics are all trends are creating a dynamic and growing market for ITS. Nationwide, transportation officials are writing strategic plans with ITS to assist in planning for population growth, emergencies, extreme weather and the upgrade and maintenance of aging roads, bridges and highways. ITS solutions are strategically positioned to offer cost savings by helping state and local governments improve transportation systems, parking facilities and fleet operations and by improving the safety of our nation's transportation infrastructure system. ITS makes it possible to provide real time data to the driving public and relay information on:

- road conditions,
- parking availability,
- construction detours,
- accidents, and
- alternative routes.

One of the primary tools used in Florida to provide traffic and roadway data to roadway users is the Florida 511 system. Florida 511, is the State's travel information system that provides real time traffic information via telephone, a website or mobile application. The system provides information on roadway conditions such as:

- commuter travel times,
- construction,
- lane closures,
- crashes,
- congestion
- and severe weather affecting traffic.

The use of ITS and data is also being used to help remedy the shortage in truck parking across the country. These systems use a network of cameras or sensors to monitor parking availability at truck stops, automatically identifying available spaces in real time. This information is then provided to drivers and carriers about parking availability via websites, mobile applications, in-cab messaging, and variable message displays a few miles ahead of the rest area on the highway.

ITS data is also being used in various planning aspects to better support the movement of freight.



**FLORIDA'S SOURCE  
FOR TRAFFIC INFO**



Home - Traffic - My Florida 511 - Construction Info - Emergency Info

## Legislative Background



The Fixing America's Surface Transportation (FAST) Act signed into law December of 2015 includes provisions relating to ITS and Data. Key provisions of the Act are the creation of the National Multimodal Freight Network (NMFN), a new National Highway Freight Program (NHFP), and direction to states for improvements to the National Highway Freight Network (NHFN).

ITS, real-time information systems, and data collection and analysis are all eligible project categories under the NHFP funding program. The Act also creates the Advanced Transportation and Congestion Management Technologies Deployment Initiative funded at \$60 million per year. This program provides grants to eligible entities for developing model deployment sites for large scale installation and operation of advanced transportation technologies focused on improvements in safety, efficiency, system performance, and infrastructure return on investment.

## Industry Impact

Technical advancements in data and automation have the potential to drastically change the landscape of the freight industry. New information and communication technologies are improving data collection and allowing logistics companies and freight planners the ability to analyze freight routes, travel times, demand, and infrastructure capacity as never before. Public agencies are also working to collect, process and publish data facilitating efficient freight movement.

## FDOT Response

Florida DOT has completed studies to identify the extent of the parking shortage throughout the state and projects providing additional parking. FDOT has begun the development of a Truck Parking Availability System to provide information to truck drivers on the availability of parking spaces at facilities throughout the state. When complete, the system is envisioned to include public areas (rest areas, welcome centers, weight stations) and off system private facilities (private truck stops, gas stations). The system will cover I-4, I-10, I-75, and I-95. Information regarding parking availability will be delivered to drivers via roadside dynamic messaging and the state's traveler information system Florida 511.

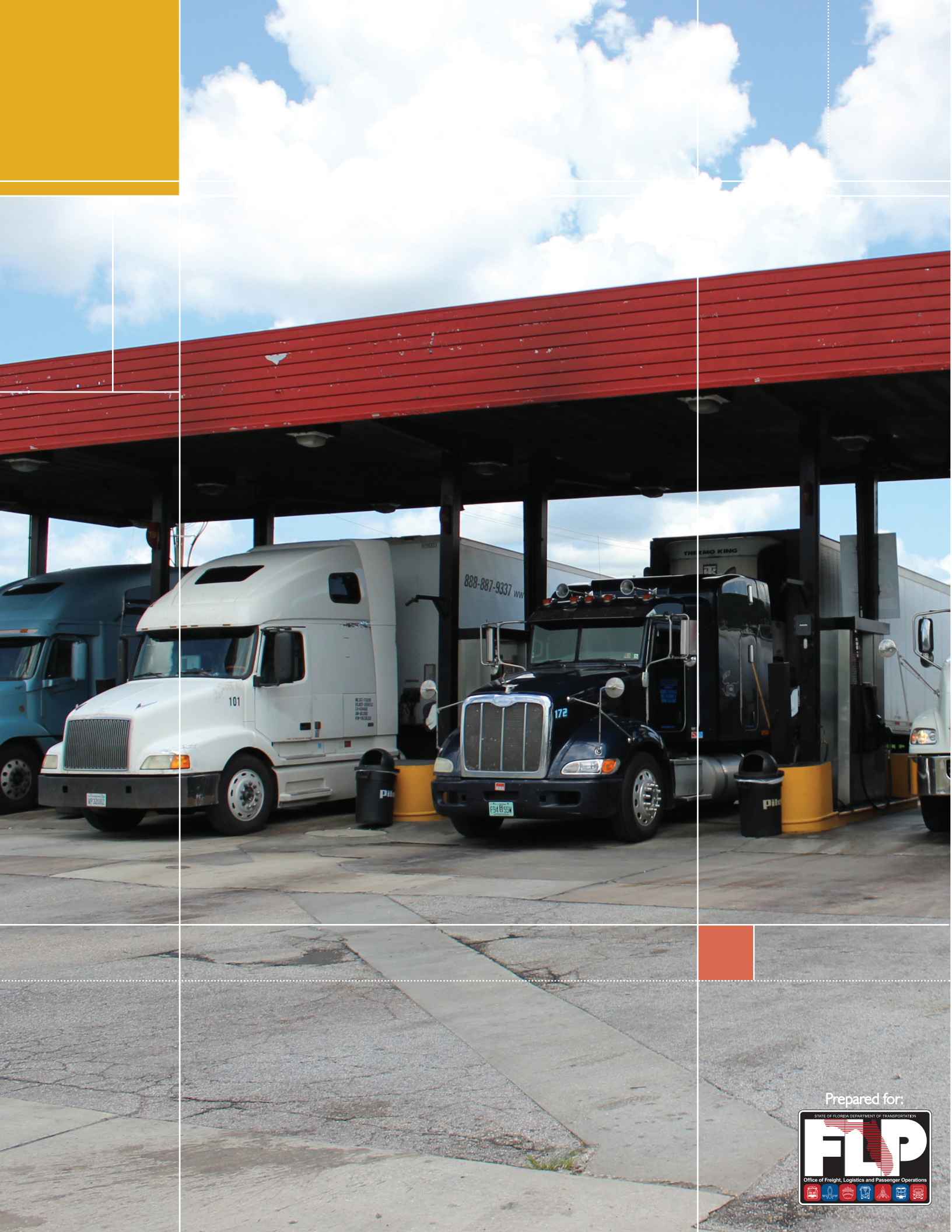
Two projects were recently completed by FDOT in Pasco County on I-75 rebuilding two rest areas with additional truck parking spaces than before. When combined the two projects added 59 truck parking spaces to the area at a cost of \$25.1 Million.

The FDOT Transportation Statistics Office produces the Multimodal Mobility Performance Measures Source Book to describe the performance of Florida's transportation system, and are working on freight travel demand model outputs to better understand goods movement impacts in Florida.



Source: University of Minnesota Center for Transportation Studies





Prepared for:

