JUNE 2, 2015

Centennial FDOT 1915 ★ 2015

BEST PRACTICES IN EVALUATING TRANSIT PERFORMANCE

FOR URBAN FIXED ROUTE SYSTEMS

Florida Department of Transportation, Freight Logistics and Passenger Operations, Transit Office

PRESENTATION AGENDA

Nina Verzosa

- Florida Transit Performance Management History

Corinne Donahue

- Purpose of the Study
- MAP-21 Requirements
- Study Tasks
  - National Best Practices
  - Florida Case Studies
- Findings
- Toolbox

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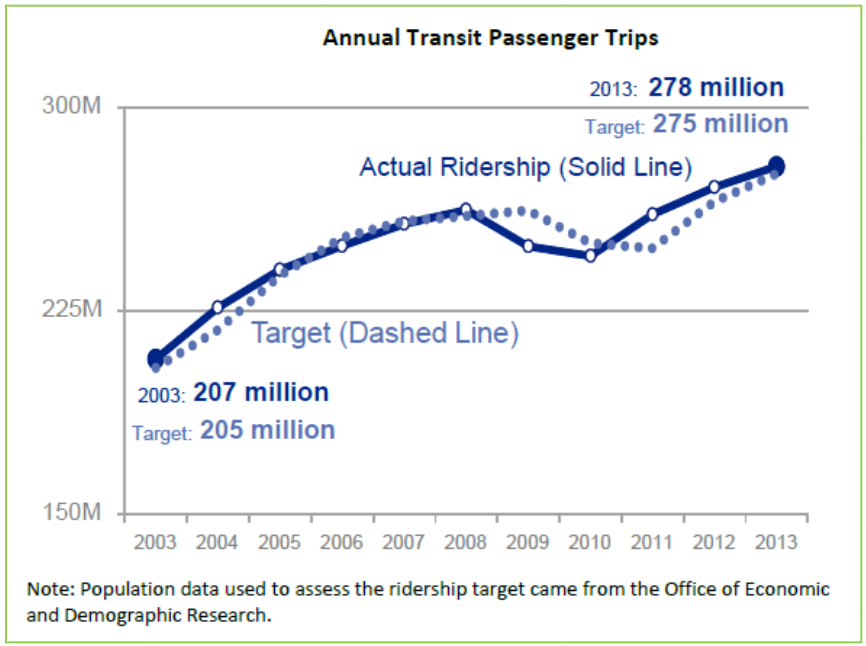
FLORIDA STATEWIDE PERFORMANCE MEASURES (PM)

- **FDOT**
  - Leader in the US for monitoring of transit performance measures since 1970s
  - Statewide Performance Management Reports
    - Florida Transit Handbook
    - Transportation Authority Monitoring and Oversight
    - Florida Transportation Plan Performance Report
    - MAP-21 Performance Report



FTIS - INTDAS

- Florida Transit Information System – Integrated National Transit Database Analysis System
- Combines individual NTD data files from multiple years into a single, standardized database, and provides customized tools for quick and easy data retrieval, visualization, and analysis.
- Peer comparison features
- **Free and available to all. This database has over 1,000 unique users worldwide in 10 countries.**

FLORIDA STANDARD VARIABLES

General Performance Indicators	Effectiveness Measures	Efficiency Measures
• Service area population • Service area size • Passenger trips • Passenger miles • Vehicle miles • Revenue miles • Vehicle hours • Revenue hours • Route miles • Total operating expense • Total maintenance expense • Total capital expense • Federal revenue • State revenue • Local revenue • Total employees • Transportation operating employee • Administrative employees • Vehicle available in maximum service • Vehicle operated in maximum service • Spare ratio • Total gallons consumed • Total energy consumed	SERVICE SUPPLY • Vehicle miles per capita SERVICE CONSUMPTION • Passenger trips per capita • Passenger trips per revenue mile • Passenger trips per revenue hour QUALITY OF SERVICE • Average speed • Average headway • Average age of fleet • Number of incidents • Number of vehicle system failures • Revenue miles between failures AVAILABILITY • Revenue miles per route miles • Weekday span of service • Route miles per square mile of service area	COST EFFICIENCY • Operating expense per capita • Operating expense per peak vehicle • Operating expense per passenger trip • Operating expense per passenger mile • Operating expense per revenue mile • Operating expense per revenue hour • Maintenance expense per revenue mile • Maintenance expense per operating expense OPERATING RATIOS • Farebox recovery • Local revenue per operating expense • Operating revenue per operating expense VEHICLE UTILIZATION • Vehicle miles per peak vehicle • Vehicle hours per peak vehicle • Revenue miles per vehicle mile • Revenue miles per (total) vehicle • Revenue hours per (total) vehicle LABOR PRODUCTIVITY • Revenue hours per employee • Passenger trips per employee ENERGY UTILIZATION • Vehicle miles per gallon • Vehicle miles per kilowatt-hour FARE • Average fare

- Variables used in the FDOT's annual transit performance analysis. Each of these variables was pre-computed based on a formula involving one or more original NTD variables
- Three categories:
  - General performance indicators
  - Effectiveness measures
  - Efficiency measures
- Used by FDOT since 1988

CURRENT AGENCY-LEVEL PM

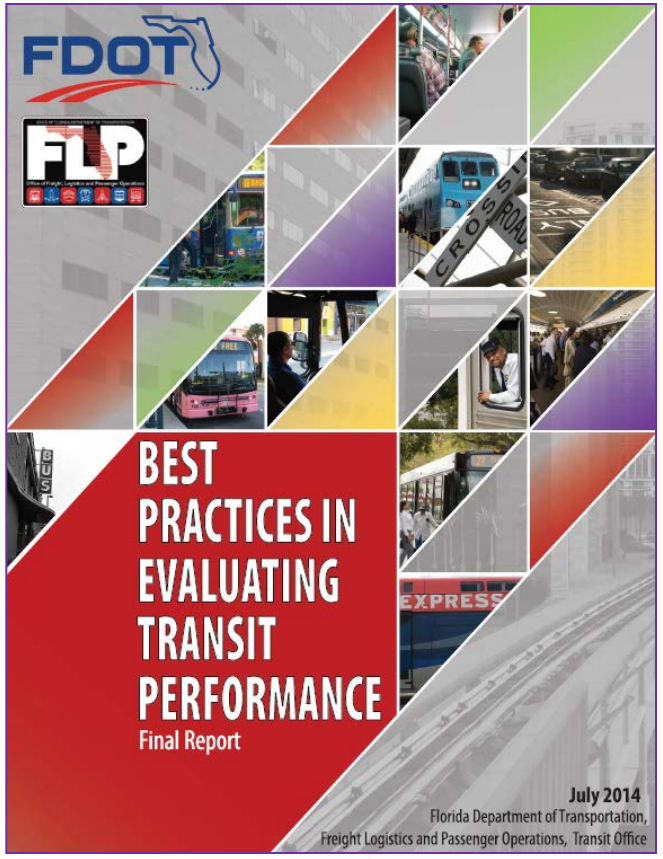
- **State Block Program Requirements**
  - Create Transit Development Plan
    - Establish goals and objectives
    - Evaluate existing services and plan for the future
    - Develop PMs in accordance with agency goals
      - Some include Asset Management and Safety PMs
  - Publish productivity PMs in local newspapers
    - Based on NTD and statewide measures
  - Other reports to local government – county commission, city, etc.

MAP-21 NEW REQUIREMENTS

- **FTA Rules anticipated in July/ August, no final rule yet**
- **Transit Agency**
  - Develop Asset Management Plan, Measures & Targets (State Of Good Repair)
    - Capital asset inventory, condition assessment, decision support tools, investment prioritization, etc.
  - Safety Plan, Measures and Targets
    - Method to identify/evaluate risks, strategies to minimize exposure, timeline for annual review of SP, performance targets, assigned safety officer, etc.
- **State**
  - In cooperation with Transit Agencies, develop rural transit-related performance measures and performance targets, include in long-range plan
- **MPO**
  - In cooperation with Transit Agencies, develop urban transit-related performance measures and performance targets, include in long-range plan

PURPOSE OF STUDY

- **Best Practices in Evaluating Transit Performance**
  - Recommend a toolbox of performance measures, useful for monitoring performance at an agency level
  - Identify existing measures utilized by Florida transit agencies
  - Identify specific measures that may meet the requirements of MAP-21

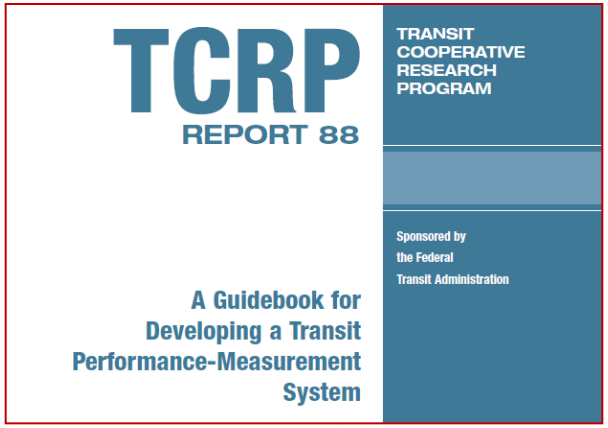


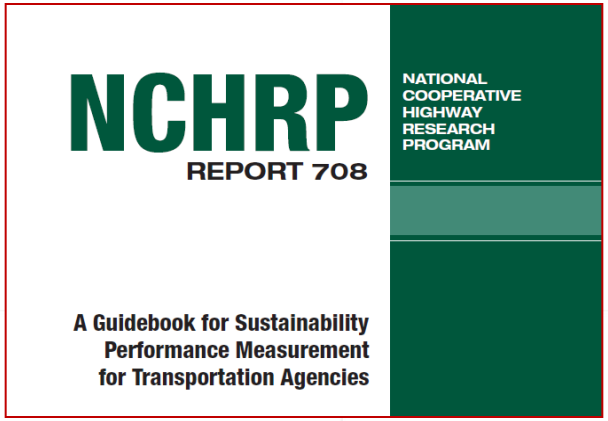
STUDY TASKS

- Literature review of previously conducted studies – National Case Studies identifying best practices and overview of MAP-21 requirements
- Survey FL transit agencies to understand existing best practices for collection and use of performance measures specific to Florida
- Identify 4 Florida Case Studies that have unique and successful methods
- Develop Toolbox for transit agencies

NATIONAL BEST PRACTICES

- **Literature Review:**
  - TCRP Report 88, 141
  - NCHRP Report 446, 708, Digest 361
- **Findings:**
  - Agencies must have clear goals & objectives **FIRST**
    - Develop performance measure system to achieve goals & objectives
    - Reports provide several examples of goals & appropriate measures





NATIONAL BEST PRACTICES

NCHRP RRD 361

- conducted state DOT interview
- FDOT was a case study
- provides a list of characteristics of good performance measures
  - Trackable over Time
  - Storytelling Potential
  - Meaningful for Types of Service Measured
  - Relation to Statewide Public Transportation Goals
  - Available Data

NATIONAL CASE STUDIES

- **Six Case Studies:**
  - Large, Medium, Small transit agencies
- Washington Area Metropolitan Transit Authority (WMATA)
- Denver Regional Transportation District (RTD)
- Capital Metro, Austin, TX
- Lane Transit District (LTD), Eugene, OR
- Transfort, Fort Collins, CO
- Merced County Transit, Merced, CA

NATIONAL CASE STUDIES - WMATA

Goals and Indicators- Metro's Strategic Business Plan

Goals	Performance Indicators
Build and maintain a premier safety culture and system	• Customer and employee injury rates • On-time performance • Customer satisfaction • Operating expense on budget • Connecting communities • Crime rates • Escalator availability • Capital funds invested • Meet board-established service criteria
Meet or exceed customer expectations by consistently delivering quality service	
Improve regional mobility and connect communities	
Ensure financial stability and invest in our people and assets	

Source: WMATA, Momentum: The Next Generation of Metro

NATIONAL CASE STUDIES - RTD

RTD Denver Performance Measurement Standards

Goal	Objectives	Performance Measures
To meet the present transportation needs of the District by providing cost-effect and efficient transportation service	• Maintain cost recovery ratios • Increase ridership • Increase farebox and EcoPass revenue • Improve route efficiency • Monitor selected internal functions for efficiency • Maintain cost effective and efficient transportation services • Hire and train competent personnel	• Operating cost recovery ratio • Overall ridership increase • Fare revenue • EcoPass revenue • Total operating revenue • Number of audits • Bus operator – vacancies • Bus operator – over headcount • Bus mechanic – vacancies • Bus mechanic – over headcount • Stock-out level

Source: RTD, compiled from 2012 Adopted Budget

NATIONAL CASE STUDIES - TRANSFORT

Transfort's Current Transit Performance Measures

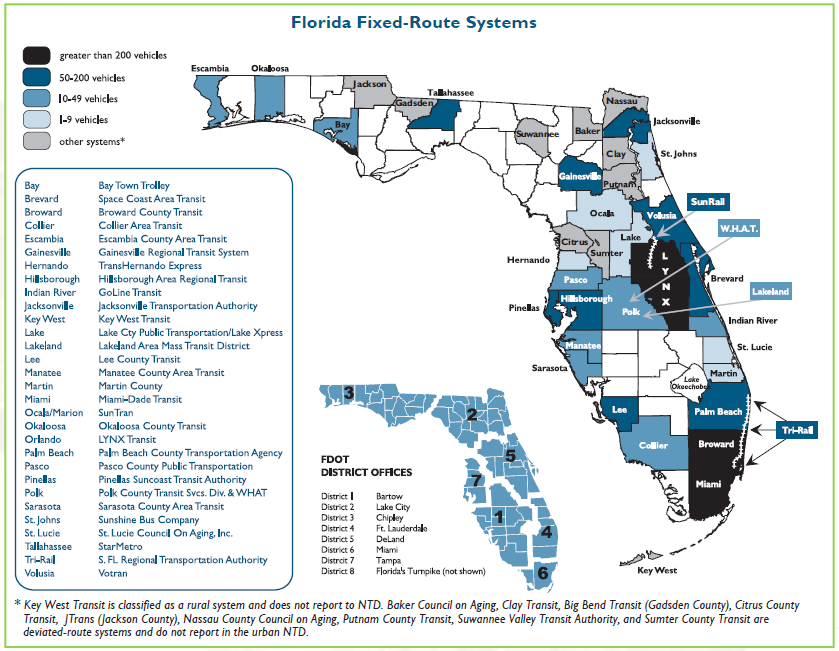
Category	Performance Measures
On-Time Performance	• On-time performance • Percent of routes scheduled to clock headways • Delay ratio
Distribution of Transit Amenities	• Percentage of stops with shelter and benches • Fleet cleaning • Passenger environment
Transit Security	• Passenger safety • Ratio of police officers to transit vehicles • Number of vehicles with specified safety devices

Source: Transfort, Service Standards and Policies

NATIONAL CASE STUDIES - SUMMARY

- Large transit agencies do not necessarily have more performance measures than small agencies
  - **It is the quality of the measure, not the quantity**
- All agencies use 'On-time Performance' as a measure
- More than 50% use measures related to safety/accidents, customer satisfaction, amount of service provided, and cost-effectiveness
- All agencies link performance measures to goals & objectives
- Performance data shared with other agencies/departments
- All agencies review annually or bi-annually

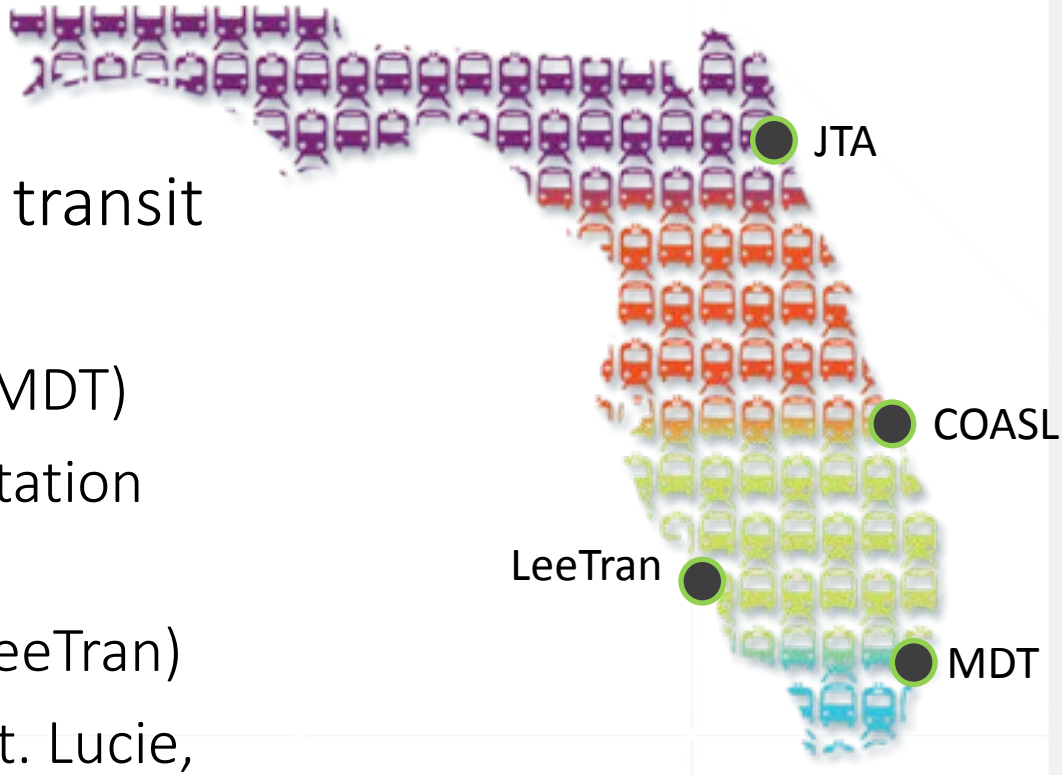
FLORIDA URBAN FIXED ROUTE TRANSIT AGENCY SURVEY



- **Agency survey conducted in Dec. 2013 of urban fixed route providers**
  - What data collected and measured at agencies, how collected, & how often performance measures are reported

FLORIDA CASE STUDIES

- **Four Case Studies:**
  - Large, Medium, Small transit agencies
    1. Miami Dade Transit (MDT)
    2. Jacksonville Transportation Authority (JTA)
    3. Lee County Transit (LeeTran)
    4. Council on Aging of St. Lucie, Inc. (COASL)



FLORIDA CASE STUDIES - MDT

MIAMI-DADE COUNTY TRANSIT

Route-Level On-Time Performance Scorecard

Name	Period	Actual	Target	Variance
On-time Performance/Schedule Adherence – Bus (2)	Mar '14	83.72% (1,352/1,615)	78.00%	5.72%
On-time Performance/Schedule Adherence – Bus (3)	Mar '14	76.34% (4,645/6,085)	78.00%	-1.66%
On-time Performance/Schedule Adherence – Bus (9)	Mar '14	78.73% (3,005/3,817)	78.00%	0.73%
On-time Performance/Schedule Adherence – Bus (10)	Mar '14	79.26% (1,754/2,213)	78.00%	1.26%

Source: MDT Department Scorecard FY 13-14

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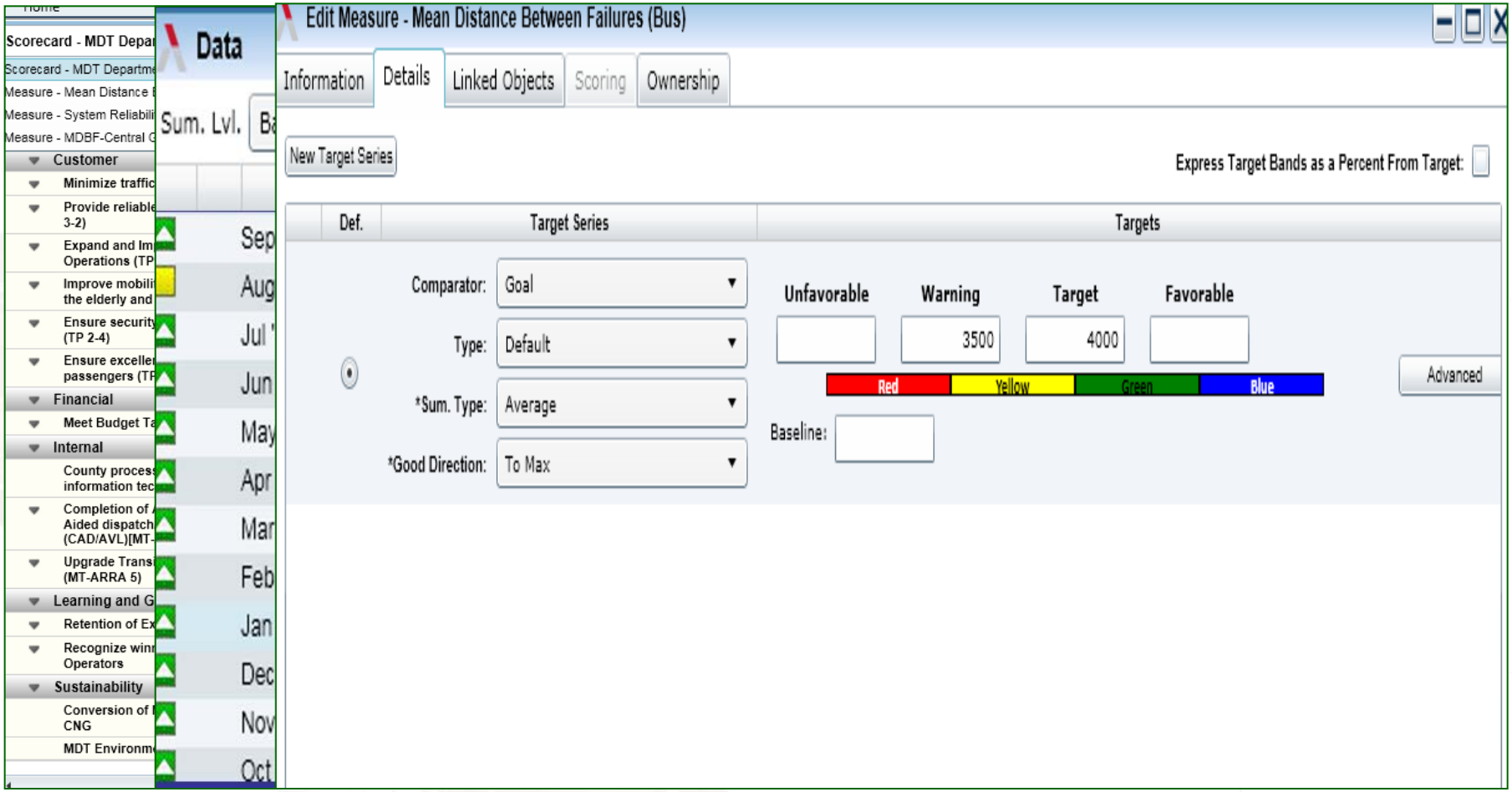
FLORIDA CASE STUDIES - MDT

MIAMI-DADE COUNTY TRANSIT



FLORIDA CASE STUDIES - MDT

MIAMI-DADE COUNTY TRANSIT

MDT's Customer Perspective – Objectives and Performance Targets

Customer		
Objective	Measure	FY-To-Date Target
Minimize traffic congestion	Percentage completion a design project	N/A
Provide reliable transit service	Peak vehicle requirement – weekday	100%
	On-time performance (Metrorail)	95%
	On-time performance– weekday – bus (Overall system)	78%
	Mean distance between failures (Bus)	4,000
	Mean distance between disruptions (Rail)	39,000
	Mean distance between disruptions (Mover)	1,500
Expand and improve public transportation – operations	Average daily boardings – Rail	295,000
	Average daily boardings – Bus	1,205,000
	Average daily boardings – Mover	150,000
	Total monthly boardings – Bus	N/A
Improve mobility of low income individuals, the elderly and the disabled	On-time performance (STS)	80%
	Total Monthly boardings (STS)	N/A
Ensure security at public transit facilities	Security post inspections	3,000
Ensure excellent customer service for passengers	All complaints per 100K boardings for bus, rail, mover	12
	All complaints per boardings for paratransit – monthly	N/A

Source: MDT Department Scorecard FY 13-14

FLORIDA CASE STUDIES - JTA

Fixed Route - Selected Performance Review Measures

Measures	
Operational Measures	**Financial Measures**
Service • Service Area Population • Service Area Population Density • Passenger Trips • Passenger Miles • Average Passenger Trip Length • Revenue Miles • Revenue Hours • Directional Route Miles **Employee** • Total Employee FTEs (full-time equivalents) • Revenue Hours Per Employee FTE • Passenger Trips Per Employee FTE	**Efficiency** • Operating Expenses per Capita • Operating Expenses per Passenger Trip • Operating Expenses per Revenue Mile • Operating Expenses per Revenue Hour • Fare Revenue per Passenger • Farebox Recovery Rate **Expenses and Revenue** • Operating Expenses • Maintenance Expenses • Fare Revenue

Source: JTA Transit Development Plan

FLORIDA CASE STUDIES - JTA

MPO Involvement

- MPO looks to JTA to take the lead in establishing measures
- Actively collaborates with JTA in establishing, monitoring, and reporting PM
- Highlights collaboration and consistency

FLORIDA CASE STUDIES - LEETRAN

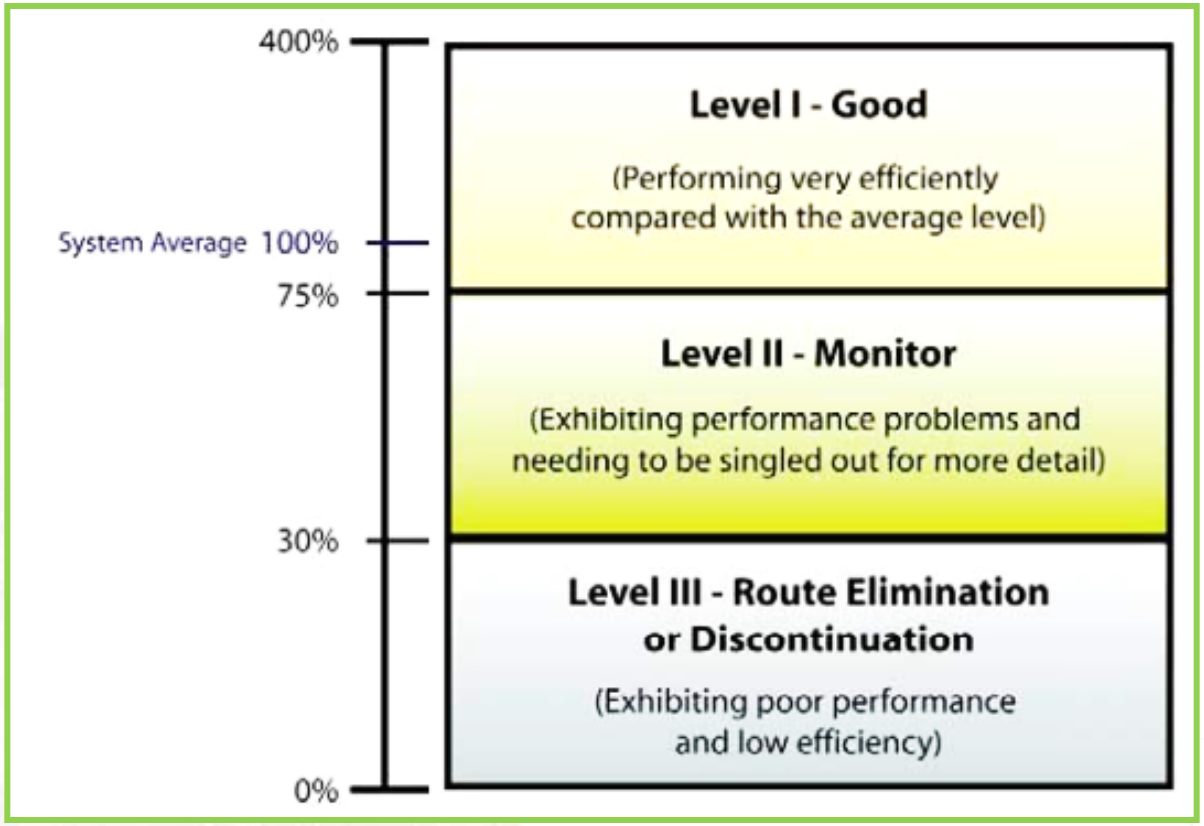
LeeTran's Goals, Objectives, and Initiatives

Goal	Objective	Initiative
1. Increase the Market Share for Transit	1.1 Increase the number of one-way fixed-route passenger trips by an average of five percent annually, from 3 million in FY 2008/09 to 5 million in FY 2020/21	1.1 Continue to maintain existing LeeTran Service levels.
	1.2 Meet the fixed-route performance measures included in Objective 43.1 and Policy 43.3.1 in the Lee Comprehensive Plan, which states that the County will maintain **operating standards of 14 passengers per revenue vehicle hour, 1.3 passengers per revenue vehicle mile, and farebox revenues at a minimum of 20% of operating expenses**.	1.2 Implement new and expanded services prioritized in the Lee MPO LRTP, the LeeTran TDP, and Vision Plan
		1.3 Implement the performance monitoring program that addresses performance standards for fixed-route service.
		1.4 Develop a Marketing and Education Program by March 2012.
		1.5 Expand marketing and educational efforts to local universities and colleges.
		1.6 Explore opportunities for marketing hybrid vehicles and other environmentally-friendly transit technologies.
		1.7 Develop and distribute marketing materials that integrate the opinion and transit needs of community business leaders.

Source: Lee County Transit TDP

FLORIDA CASE STUDIES - LEETRAN

Evaluation Levels



Source: Lee County Transit TDP

FLORIDA CASE STUDIES - COASL

COASL Goals and Objectives with Corresponding Performance Measure

Goal	Objectives	Unit of Measure
2. Increase the availability and use of public transportation services through mobility enhancements, expanded fixed-route service, and more inter-country fixed bus routes.	Increase the number of fixed-route passenger trips by 50% between FY 2010 and FY 2019.	Percent increase in fixed-route rider
	Increase the number of inter-county bus routes from one to three by 2019.	Number of inter-county bus routes
	Add at least one vanpool to the commuter services program each year through the 2019 TDP planning horizon.	Number of new vanpools
	By 2019, reduce demand for paratransit by 25 % as fixed-route services are improved for customers to utilize.	Percent decrease in paratransit trips

Source: Regional Transit Development Plan for the Port St. Lucie Urbanized Area 2010-2019

FLORIDA CASE STUDIES - COASL

Route Manifest Evaluations

Council on Aging of St. Lucie, Inc., Transit Division, 1505 Orange Avenue, Fort Pierce, FL 34950 **Date:** _____

Treasure Coast Connector + **Route # 2 Residential** -- Manifest Evaluations

Vehicle # _____ (5 Route Trips)	Vehicle # _____ (6 Route Trips)	Vehicle # _____	Comments:
		(Both Routes 2 & 3)	
		Ending Mileage _____	
		Beginning Mileage _____	
		Total Actual Mileage _____	
Actual Mileage _____ (Beg Miles – End Miles)	Actual Mileage _____ (Beg Miles – End Miles)		
Revenue Mileage _____ (Both Revenue & Actual the same)	Revenue Mileage _____ (Actual Mileage-5)	**Vehicle #** _____ (Both Routes 2 & 3	
Fuel _____ (Gallons Used for the Day)	Fuel _____ (Gallons Used for the Day)	Ending Mileage _____	
		Beginning Mileage _____	
		Total Actual Mileage _____	
Vehicle Hours 11.25 Revenue Hours 11	Vehicle Hours 11.25 Revenue Hours11		

Calculations by Road Supervisor

Replacement Vehicle # _____ Replacing Vehicle # _____ Vehicle # _____ (Summary Reported Above)

Ending Mileage _____	Ending Mileage _____
Beginning Mileage _____	Beginning Mileage _____
Actual Mileage _____	Actual Mileage _____
Revenue Mileage _____	Revenue Mileage _____
Fuel (Gallons Used)_____	Fuel (Gallons Used)_____

On Time Performance: (Number of stops 6 minutes or more late divided ____ - 100 equals On Time Performance _____%
Total Number of Timepoints 139

On Time Performance _____%
Total Number of Passengers _____ **Total Number of Daily Passes** _____
Total Number of Wheelchair Passengers _____
Total Number of Bikes _____
Total Number of Transfers from CT_____ **Total Number of Monthly Passes** _____
Total Number of Promotions _____

/FORMS/TCC + East West Route 2 Residential Manifest Evaluations

2/26/2014

FLORIDA CASE STUDY SUMMARY

Goal	Objectives	Measures
Enhance Overall Effectiveness and Efficiency	Maximize transit service effectiveness	Fixed Route Ridership
		Average Fixed Route Weekday Ridership
		Fixed Route Farebox Recovery Ratio
		Fixed Route Customers per Revenue Hour
		Community Shuttle Ridership
		Average Community Shuttle Weekday Ridership
		Community Shuttle Customers per Revenue Hour
		Connexion Customers per Revenue Hour
		Skyway Ridership
		Average Weekday Skyway Ridership
		Skyway Customers per Revenue Hour
	Maximize transit service efficiency and minimize operational costs (to the extent possible without degrading service)	Fixed Route Operating Expense per Revenue Mile
		Fixed Route Operating Expense per Passenger Trip
		Community Shuttle Operating Expense per Revenue Mile
		Community Shuttle Operating Expense per Passenger Trip
		Connexion Operating Expenses per Revenue Mile
		Connexion Operating Expenses per Passenger Trip
		Skyway Operating Expense per Revenue Mile
		Skyway Operating Expense per Passenger Trip
	Deliver high quality projects on schedule and within budget	Percentage of Projects Completed on Schedule
		Percentage of Projects Completed within Budget
	Minimize transportation related environmental impacts	Emissions per Revenue Mile
	Maintain compliance with regulatory requirements	Critical Action Plans Implemented/Critical Action Plans Recommended
		Disadvantaged Business Enterprise (DBE) Percentage

- Link performance measures to goals and objectives
- Utilization of tools or software for data collection, analysis, and reporting that match the resource and capabilities
- Most agencies collect safety and asset management data and report performance measures that can be used to comply with MAP-21 requirements.
- Quality of measures counts

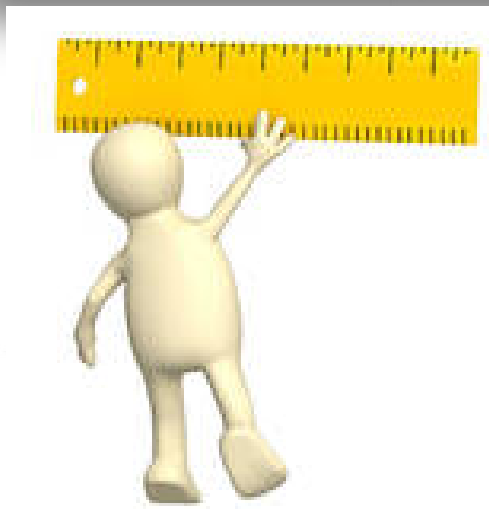
RECOMMENDED TOOLBOX PM CATEGORIES

1. Service Effectiveness
2. Service Efficiency
3. Labor Productivity
4. **Safety and Security**
5. **Vehicle Utilization and Asset Management**

- Categories are based upon national review and FL transit agency survey feedback.
- The 5 categories are a compilation of TCRP, NCHRP, Florida Standard Variables (FSV), and TDP methods.

TOOLBOX APPLICATION

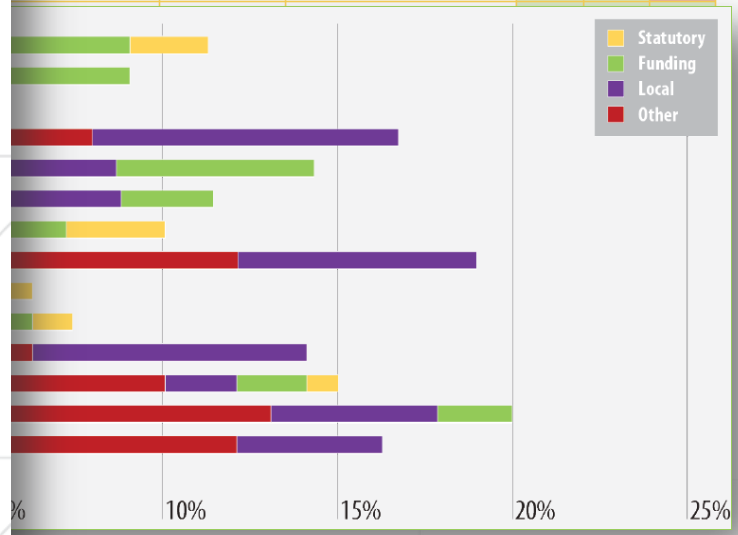
- Highlights most common and effective PM for transit
- Offers unique approaches for tracking and monitoring PM
- Identifies potential data sources and collection techniques for each PM
- Addresses MAP-21 Safety/Security and Asset Management requirements



TOOLBOX

PM CATEGORY-SERVICE EFFICIENCY

Sample Goals	Criteria	Measure	Data Collection: Data Elements Needed	Data Collection: Possible Data Source/ Technology	Formula	Purpose of Measure	Ease of Data Collection by Size of Agency
				a, CAD, AVL	Revenue miles/ Service area size	Coverage of revenue service	
				ther secondary sources			
				ebox, Smartcards, ting	Fare revenue/ total operating expenses	Percentage of direct operating costs that are recovered through the fares paid by the riders	
				uments, including operations e data, etc.			



CASE STUDY 3: LEE COUNTY TRANSIT (LEETRAN)

Lee County Transit (LeeTran) serves over 4 million riders annually on over 400 miles of roadway in Lee County, and employs approximately 240 persons to run its fleet of 50 buses; 10 trolleys; and 42 Americans with Disabilities Act (ADA) compliant vans. The agency goals and objectives adopted by LeeTran were prepared based on the review and assessment of existing conditions, feedback received during the public involvement process, and the review of local transportation planning documents. They are consistent with the goals and objectives found in the 2035 MPO Long Range Transportation Plan for Collier and Lee Counties and the Transportation Element of the Lee County Comprehensive Plan.

LeeTran utilizes a performance monitoring program to track the efficiency of the transit system. The monitoring program utilizes specific route-level data and compares each route's performance with all other regular local service routes. LeeTran uses an Evaluation Form created in excel spreadsheets to calculate and evaluate performance measures.

LeeTran collects data using different sources, such as Transman Fleet Management (TMT) software to collect data on the number of system failures. LeeTran collects a variety of performance measures to comply with the new MAP-21 requirements pertaining to safety and asset management/state of good repair.

Safety and Asset Management/State of Good Repair Performance Measures
Customer Accidents
Number of Accidents
Number of Collisions
Number of Fatalities
Number of Incidents
Number of Injuries
Average Age of Fleet (in years)
Mechanics per 1,000 revenue miles
Missed trips due to operation failures
Number of repeat breakdowns per month
Number of repeat repairs per month
Percent of stops with shelters and benches
Revenue miles between roadcalls
Revenue miles between incidents
Total roadcalls

DISCUSSION

- **Thank you!**

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