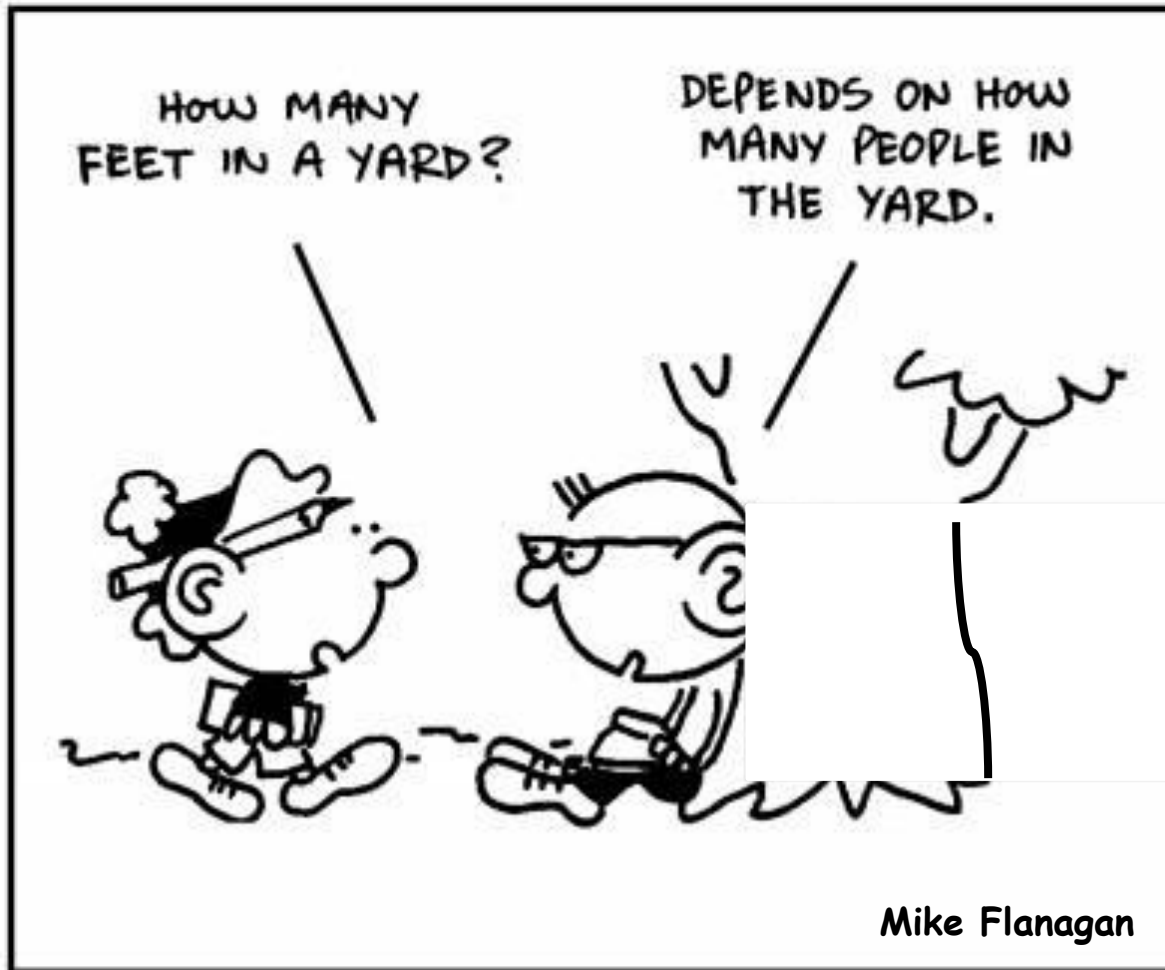


Performance Management

Rob Lynch
Training Coordinator
Small Urban and Rural Transit Center



Performance Measurement

- What is it?
 - Process of quantifying the goals and objectives of a transit system
 - A way to
 - manage
 - evaluate
 - communicate



Why Measure Performance?

- Federal reporting (NTD)
- ADA compliance documentation
- Grant applications
- External Reporting
- Municipal budgeting and reporting
- Insurance and liability
- **AGENCY NEEDS!**

Why Measure Performance?

- Benefits
 - Service Monitoring (Poor, minimal, good, excellent)
 - Internal Communications
 - Self-Improvement
 - Decision-Making



Why Measure Performance?

- Benefits
 - Mandated Reporting
 - Assess past, present & future performance
 - Provide trend analysis
 - Indicate problem areas
 - Planning for the future



Performance Measures

- Challenges (or why some people don't like to use performance measures...)
 - May not like the results
 - Data collection may be costly
 - Risk that someone may use the results against you



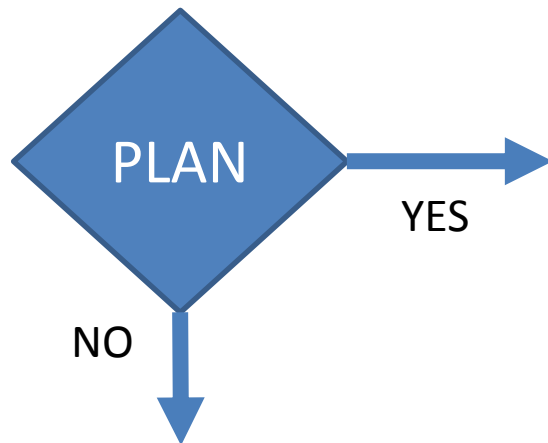
Why Measure Performance?

“For the purpose of transit service planning, **tracking performance** at the individual route level **enables transit planners to make good decisions.**”

Best Practices in Transit Service Planning, USF-CUTR

PM program tied to strategic plan...

- Strategic plan must be linked to performance measures in order to monitor whether or not:
 - Plans are being achieved
 - Corrective action needs to take place



PM program tied to strategic plan...

- Use system mission, goals and objectives to define performance measures

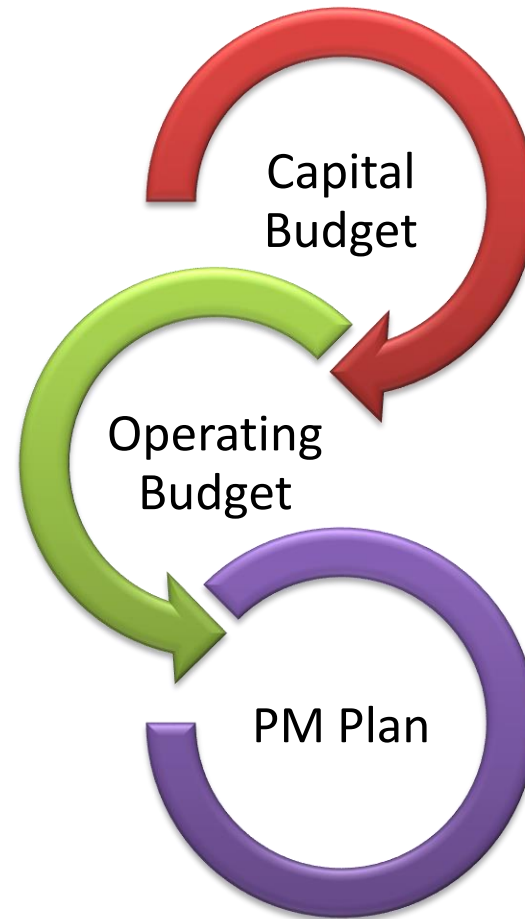
Service expansion?

Service contraction?

Service consolidation?

PM program tied to financials...

- Linking the performance measurement plan to the operational and capital budgets ensures the resources needed to support the plan are available



PM program tied to people...

- Implement planned strategies to improve an agency's effectiveness by:
 - Goal Setting
 - Leadership Development
 - Team Building
 - Employee Feedback Surveys & Meetings
 - Education Programs & Staff Training
 - Coaching & Counseling Employees
 - Developing Reward & Recognition Programs

Data Collection

- Data must be collected
 - Accurately
 - Timely
 - Consistent



Data Collection

- Collecting data
 - Ride checks (oldest, most widely used)
 - ITS (i.e.: APC, fare collection, etc.)
 - Driver's logs

Data Collection

- Collecting data
 - Passenger surveys (demographics, trip purpose, likes/dislikes)
 - Agency data (scheduling, maps, logs, reports, financials, farebox, etc.)

Developing/Improving a Program

- Develop a measurement program
 1. Define goals & objectives *****
 2. Generate management support
 3. Identify key personnel and stakeholders
 4. Select performance measures



Developing/Improving a Program

- Develop a measurement program
 5. Test and implement program
 6. Monitor and report performance
 7. Integrate into decision making
 8. Review and update annually



STEP 1: Goals and Objectives

- Good strategic goals:
 - Improves communication
 - Reduces micromanagement
 - Encourages employee innovation
 - Communicates the right message to the public

Goals and Objectives

- Well written goals are **S M A R T**
 - **S**pecific-easy to understand, no interpretation needed
 - **M**easurable-easy to determine if accomplished
 - **A**ttainable-a challenge, but within reason
 - **R**elevant-linked to the agency's mission
 - **T**ime limited-must have a timetable

Goals and Objectives

- Objectives
 - Steps towards achieving a goal
 - Typically 2-3 objectives for each goal
 - Should be aligned with performance measures
 - Measurable
 - Specific

Examples of Service Goals

- At least 90% of all stops should be on time (0 min. early to 5 min. late)
- Rural area demand response service should maintain an average speed of at least 25 miles per hour and intra-urban area demand response service an average of 15 miles per hour

UWM Transit Planning Study

Examples of Service Goals

- The system's vehicle hours per year should not be increased by more than 10% over the amount for the previous year
- All fixed route services should maintain a minimum of 1.0 passenger per vehicle mile
- There should be a minimum of 8,000 miles between road calls per vehicle

UWM Transit Planning Study

Broward Co., FL - 5-Year Plan

Goal #4: “Develop cost effective transit alternatives”

Monitor 25 Performance Measures/Indicators

- Operating Expense per Capita
- Operating Expenses per Passenger Trip
- Operating Expense per Revenue Mile
- Operating Expenses per revenue Hour
- Passenger Trips per Capita
- Passenger Trips per Revenue Mile
- Passenger Trips per Revenue Hour
- Farebox Recovery

UWM Transit Planning Study

Broward Co., FL - 5-Year Plan

Goal #4: “Develop cost effective transit alternatives”

Monitor 25 Performance Measures/Indicators

- Service Area Population
- Passenger Trips
- Operating Expense
- Revenue Miles
- Route Miles
- Total Employees
- Revenue Hours per Employee
- Passenger Trips per Employee
- Maintenance Expense
- Vehicle Local Revenue

UWM Transit Planning Study

Broward Co., FL - 5-Year Plan

Goal #4: “Develop cost effective transit alternatives”

Monitor 25 Performance Measures/Indicators

- Local Contribution
- Directly-Generated Non-Fare Revenue
- Passenger Revenue
- Average Age of Fleet
- Vehicle Available in Max. Service Local Contribution
- Vehicle Operated in Max. Service Directly-Generated Non-Fare Revenue
- Revenue Miles per Vehicle in Max. Service Passenger Revenue

UWM Transit Planning Study

STEP 2: Generate Support

- Educate the decision makers
- Create a limited number of measures for orientation to the program
- Communicate intentions
- Give the opportunity for input and participation

Transit Boards

City Commissioners

Students

County Commissioners

City Mayors

Community Leaders



Activists

MPO Staff

Town Supervisor

Business Leaders

Educators

Tribal Council

Legislators



Transit Boards

- Primary Responsibilities of a Board of Directors:
 - Safety
 - Legal concerns
 - Stewardship
 - Public advocacy



Transit Boards

- Annual goals & objectives with quarterly reviews & presentations to the board of directors (or governing body) to ensure plan moves from paper to implementation
- Educating the board of directors helps them articulate the goals of the agency externally and work in support of the agency's vision and mission

Just a little tip...

Spend some time orientating your board members on the use of performance measures and indicators!

$$\sqrt{t} e^{-at} \rightarrow \frac{1}{2} (a^2 + \omega^2)^{-3/4} \cos\left(\frac{3}{2} \arctan\left(\frac{\omega}{a}\right)\right)$$

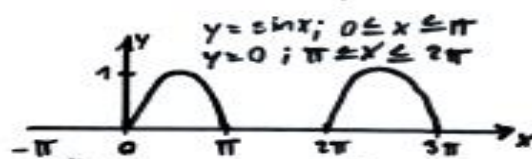
$$t^{\nu-1} e^{-at} \rightarrow \Gamma(\nu) (a^2 + \omega^2)^{-\nu/2} \cos\left(\nu \arctan\left(\frac{\omega}{a}\right)\right)$$

$$\int_0^1 (1 + 2x \cos a + x^2)^{-1} dx = \frac{a}{2 \sin a} \quad (0 < a < \frac{\pi}{2})$$

$$\int_0^1 x^\alpha (1-x)^\beta dx = 2 \int_0^1 x^{2\alpha+1} (1-x^2)^\beta dx = \frac{\Gamma(\alpha+1) \Gamma(\beta+1)}{\Gamma(\alpha+\beta+2)} = B(\alpha+1, \beta+1)$$

$$B(x, y) = \frac{\Gamma(x) \Gamma(y)}{\Gamma(x+y)} \quad \int \frac{dx}{\sqrt{1-x^2}} = \begin{cases} \frac{2}{\sqrt{\Delta f}} \arctan \frac{\sqrt{x}}{\sqrt{1-x}} & ; \Delta f < 0 \\ \frac{1}{\sqrt{\Delta f}} \ln \frac{\sqrt{1-x} - \sqrt{\Delta f}}{\sqrt{1-x} + \sqrt{\Delta f}} & ; \Delta f > 0 \end{cases}$$

$$y = \sin x; 0 \leq x \leq \pi$$

$$y = 0; \pi \leq x \leq 2\pi$$


$$y = \frac{1}{\pi} + \frac{1}{2} \sin x - \frac{2}{\pi} \left(\frac{\cos 2x}{1 \cdot 3} + \frac{\cos 4x}{3 \cdot 5} + \frac{\cos 6x}{5 \cdot 7} + \frac{\cos 8x}{7 \cdot 9} + \frac{\cos 10x}{9 \cdot 11} + \frac{\cos 12x}{11 \cdot 13} \right)$$

$$\int_a^b f(x) dx = F(x) \Big|_a^b = F(b) - F(a); \quad f(x) = \int f(x) dx + C; \quad F'(x) = f(x)$$

$$\int_a^b \dots dx = (b-a) f(\xi); \quad (a < \xi < b) \quad \int \sin x dx = -\cos x \Big|_{2\pi}^{2\pi} = -\cos 2\pi = -\cos 0 = -1$$

STEP 3: Identify Stakeholders

- Before you develop your list of performance measures, remember there are different measures, depending on who is looking at them
 - Staff?
 - FTA/NTD?
 - Riders?
 - Governing board?



Internal Stakeholders

AGENCY



Board members

Maintenance

Planners

Directors

IT Staff

Drivers

Managers

Finance

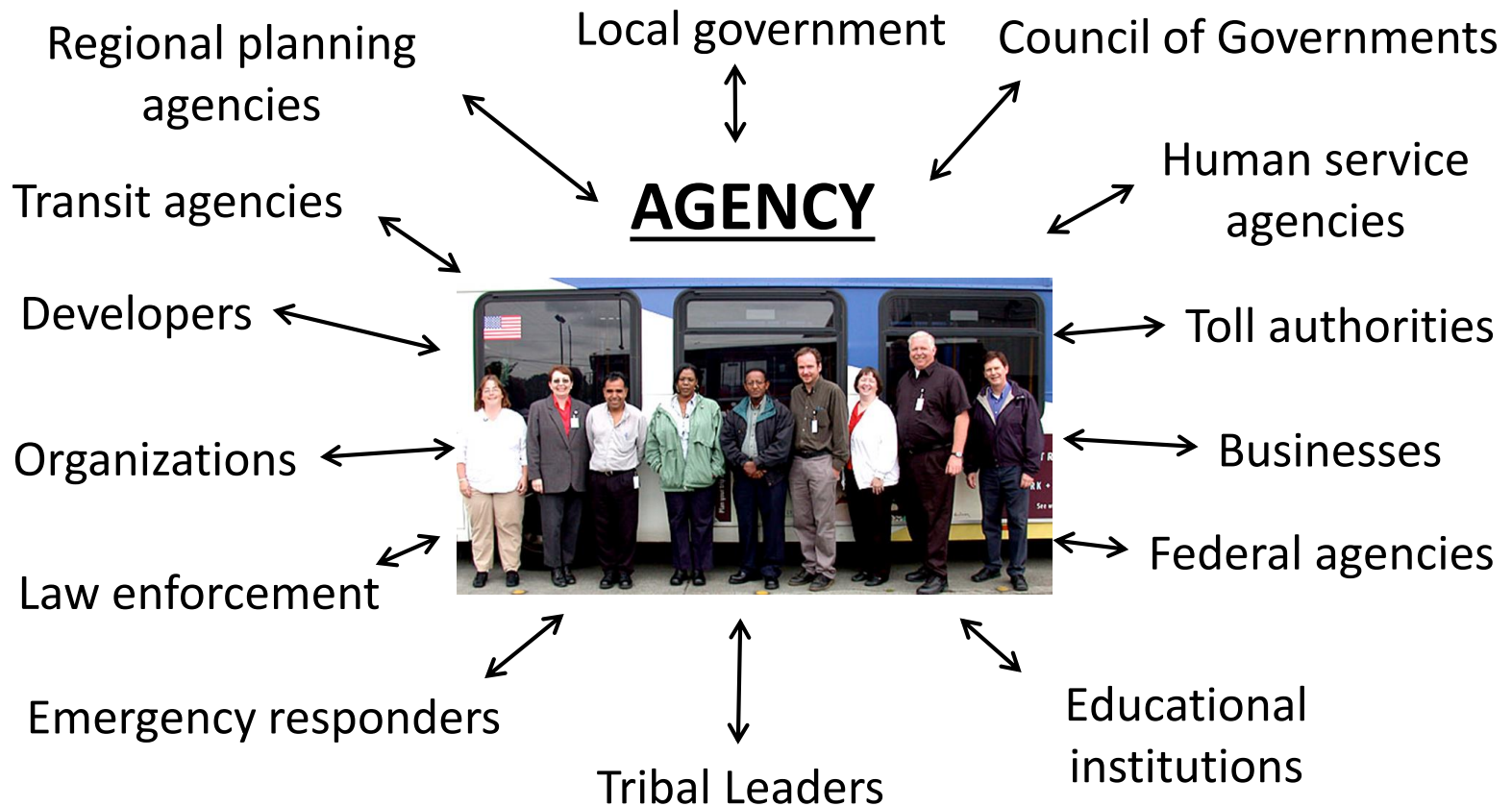
Reservationists

Customer Service

Dispatchers

Schedulers

External Stakeholders

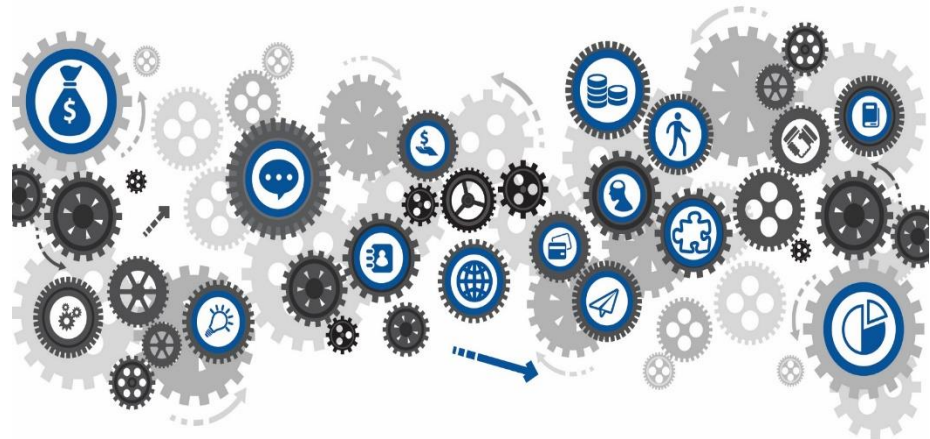


STEP 4: Select performance measures

- Determine PM categories
- Review industry performance measures
- Consider data collection costs and constraints
- Develop targets and standards
- Develop stakeholder consensus

Efficiency PM's

- The relationship of inputs to outputs
- “***Doing things right***”
- Examples
 - Cost/hour
 - Miles/vehicle
 - Farebox recovery

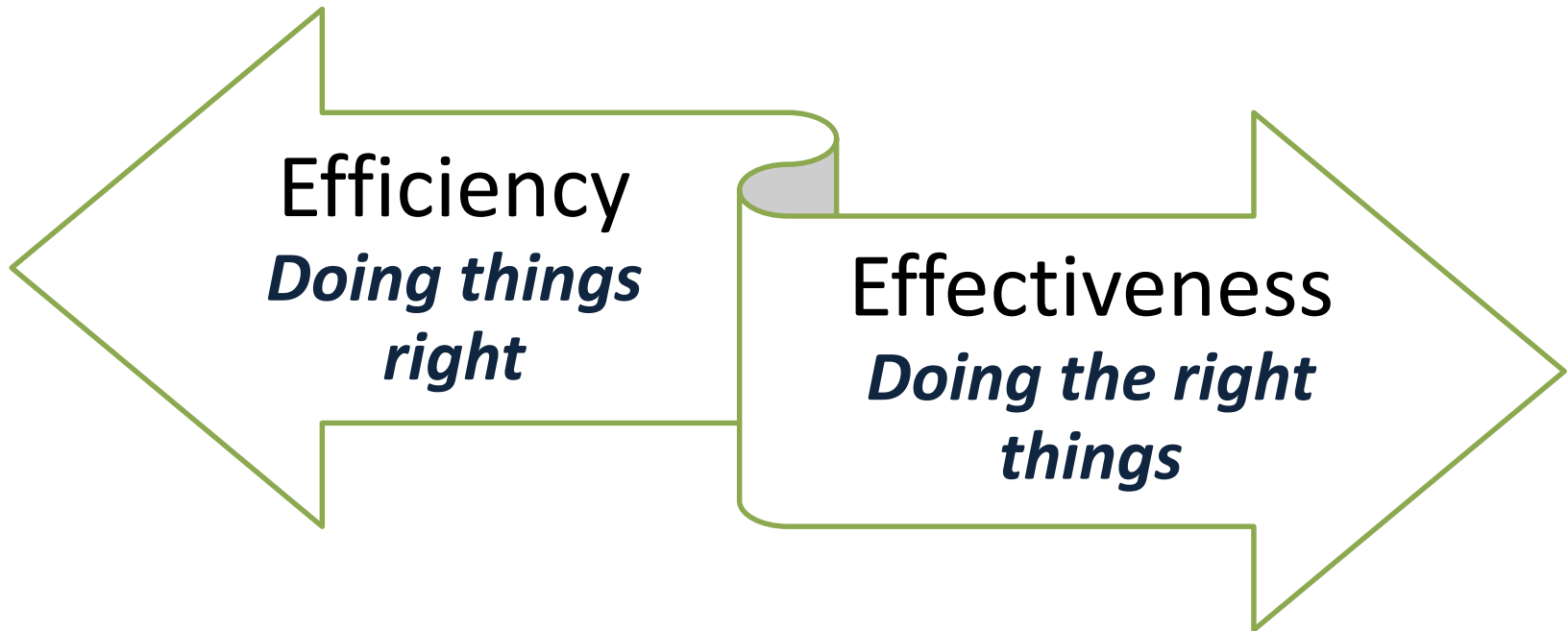


Effectiveness PM's

- The relationship of inputs to objectives
- ***“Doing the right things”***
- Examples
 - Passengers/hour
 - On-time performance
 - Complaints/
1000 passengers
 - Missed transfers



Performance Measures



Balance

Performance measures

Variables to consider...

- Route frequency
 - High?
 - Low?
- Day of the week?
Weekends?
- Peak or off-peak periods?



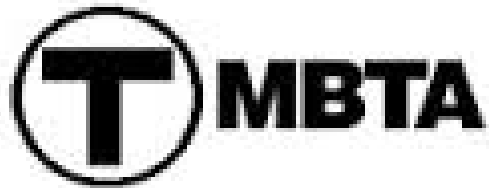
Performance measures

- Routes
- Jurisdictions
- Special programs (i.e.: college UPASS)
- Days of the week
- Hours of the day



the FUN, FAST
& FREE way to
get around
Downtown in
15 minutes!





YORK
REGION
TRANSIT

Examples of PM Standards

- Chicago Transit Authority
 - Passenger trips per hour: 30 when service interval is 30 minutes
- Milwaukee County
 - Minimum ridership 22 passengers per hour for weekday service
- Mass. Bay Transportation Authority
 - Passengers per mile:
 - 2.5 during peak periods
 - 1.5 during off-peak periods

Examples of PM Standards

- York Region Transit
 - Passengers per hour: ave. - 25, min. – 8
- RTD – Denver
 - Passengers per hour
 - 15 minute headways: 25-39
 - 10 minute headways: 40+
- FTA recommendations...
 - Passengers per mile:
 - 2.5 for high frequency lines
 - 1.2 for low frequency lines

STEP 5: Test and implement program

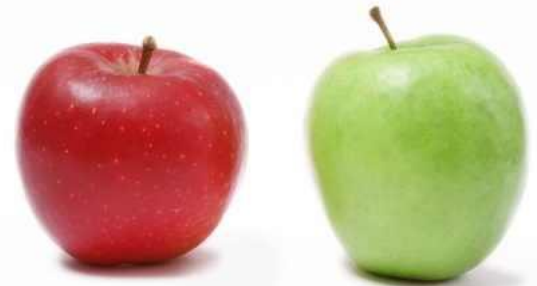
- Develop a pilot program
- Test data collection and analysis capabilities
- Make staff assignments
- Implement the “tested” program
- Review technological improvements and developments for data collection

STEP 6: Monitor and Report Performance

- Establish a reporting schedule
- Monitor milestones
- Check results
- Develop reporting mechanisms

Reporting performance

- Transit managers should frequently discuss PM's with their board
 - Tolerances, trade-offs
 - Setting fares, contracts, etc.
 - Policy decisions
- Peer system's PM results
 - Tendency to compare
 - Every system is unique



Sample Peer Comparison

System	Population	Ridership	Vehicles	Expense/Hour	Trips/Hour	Trips/Capita
River Valley	9,400	36,500	6	\$34.40	4.31	3.88
Hard Rocks	11,200	52,400	6	\$41.30	5.35	4.68
Mountain Ride	4,500	13,400	7	\$26.10	2.35	2.98
DART	5,800	12,600	3	\$22.70	2.62	2.17
VAST	7,300	25,600	4	\$27.30	3.52	3.51



Monitor and Report Performance

- Missed Runs
- System % Missed Runs
- Complaints
- Complaints/1000 pass
- Complaint Types
- Missed Transfers
- System % Missed Transfers
- Telephone Calls
- Ave. Calls per Day
- Social media
 - Likes
 - Friends
 - Followers
 - Video views
 - Email subscribers
- Total Passengers
- Vehicle Miles
- Revenue Hours
- Accidents/100K Miles

STEP 7: Integrate into decision making

- Analyze and compare results with agency goals and objectives
- For measures not meeting goals, identify action items for improving performance
- For measures consistently exceeding goals, revisit targets and milestones

STEP 8: Review and update

- Periodically evaluate your program
- Is an update necessary, based on results and program effectiveness?
- If an update is necessary, go back to STEP 1 and repeat the process

Case Study: Livermore, CA

- Agency formed in 1986
- Service area – 40 square miles
- Urban fixed route
- ADA demand-response
- 65 buses, 12 demand-response vehicles
- Governed by board of directors
 - City council members
 - County supervisors



Case Study: Livermore, CA

- PM program uses 9 performance measures
- System-wide measures, working towards route by route evaluations
- One set of PMs for fixed route; one set of PMs for demand response
- Collects data monthly
- Boarding surveys every 2-3 years
- Plan revisions on an annual basis



Case Study: Livermore, CA

- Monitoring and reporting
 - Contract with private operator
 - Operator provides monthly reports
 - Private operator has contractual incentives and penalties depending on performance
 - If targets are not met...
 - Staff investigates
 - Formal explanation to board

Resources

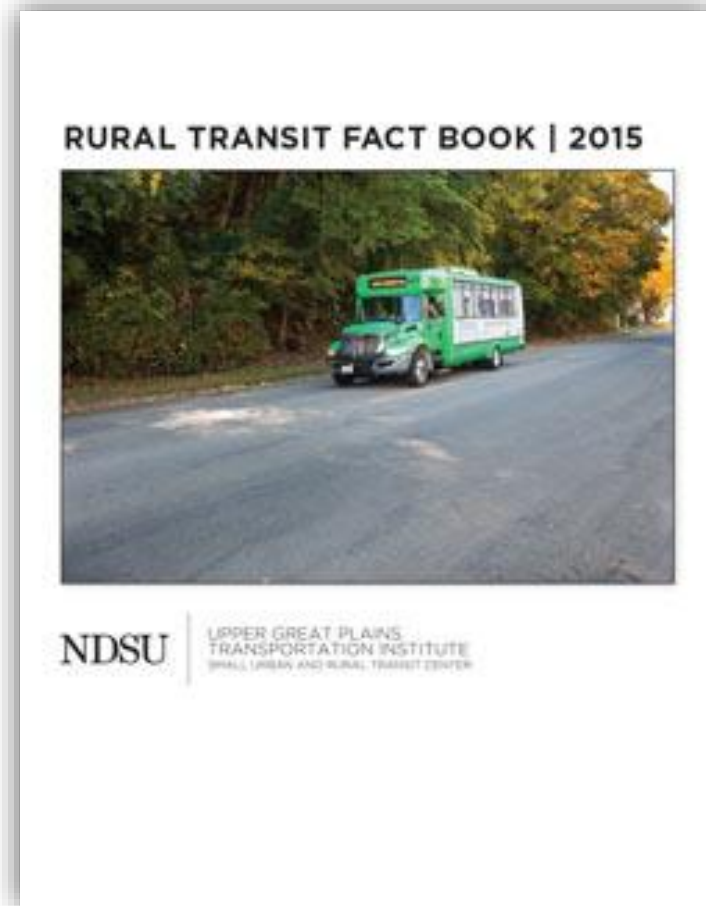
- Transportation Research Board
- Transit Cooperative Research Program

TCRP Report 88

A Guidebook for Developing a Transit Performance-Measurement System

tcrponline.org

Resources



surtc.org/transitfactbook

Small Urban and Rural Transit Center

Upper Great Plains Transportation Institute
North Dakota State University
Fargo, ND

www.surtc.org