

# Performance Measures for Transportation Planning

## Part 1

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# Overview

## Performance Measurement in Transportation Planning

## Module Outcomes

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Describe performance measurement and its benefits

Relate transportation performance measures to goals and objectives

Identify the difference between outputs and outcomes

Describe quantitative and qualitative outcomes and their use in developing performance targets

# What is Performance Measurement?

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Use of statistical evidence to determine progress toward specific defined organizational objectives.

## Benefits

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Align long range transportation plans, transportation improvement programs with strategic direction

Integrate intermodal system plans

Communicate, cooperate & build consensus

Demonstrate program value

## Why System Performance Measurement?



**Committee on Transportation and Infrastructure**  
***The Surface Transportation Authorization Act of 2009***  
***Summary of “A Blueprint for Investment and Reform”***  
***Chairman James Oberstar – June 18, 2009***

“Federal Transportation programs have no performance metrics”.

“The Surface Transportation Act of 2009 will require States and local governments to establish transportation plans with specific performance standards, measure their progress annually in meeting these standards; and periodically adjust their plans as necessary to achieve specific objectives”.

## What Others are saying.....

AASHTO: “Back to Basics – Accountability for Results” report

[http://www.transportation1.org/policy\\_reform/intro.html](http://www.transportation1.org/policy_reform/intro.html)

### 3. Plan and Select Projects Based on a State-Driven Performance Management Approach

To align project selection with the national objectives, AASHTO supports the development of a state-driven performance management process in which each state DOT, and its MPOs, would focus federal funding on meeting national performance goals. Each state would adopt performance targets relating to the national goals in their long-range planning process.

## Emerging Federal Perspective

- A small set of national goals or performance areas, likely set by Congress;
- National performance measures established by U.S. DOT, in consultation with partners;
- National performance targets for some, or all, of the national goals;
- State set performance targets for all of the national goal areas;
- Regular reporting of results by DOTs and MPOs; and
- Use of performance-based planning to support DOT and MPO decision-making.

# Florida DOT says:



## Why We Need Mobility Performance Measures

- Mobility performance measures are "yardsticks" that transportation agencies use to measure their operating results and assess investment options.
- Historically, the Florida Department of Transportation (FDOT) has used highway level of service (LOS) as the primary tool for assessing transportation system performance.

**Mobility Performance Measures**

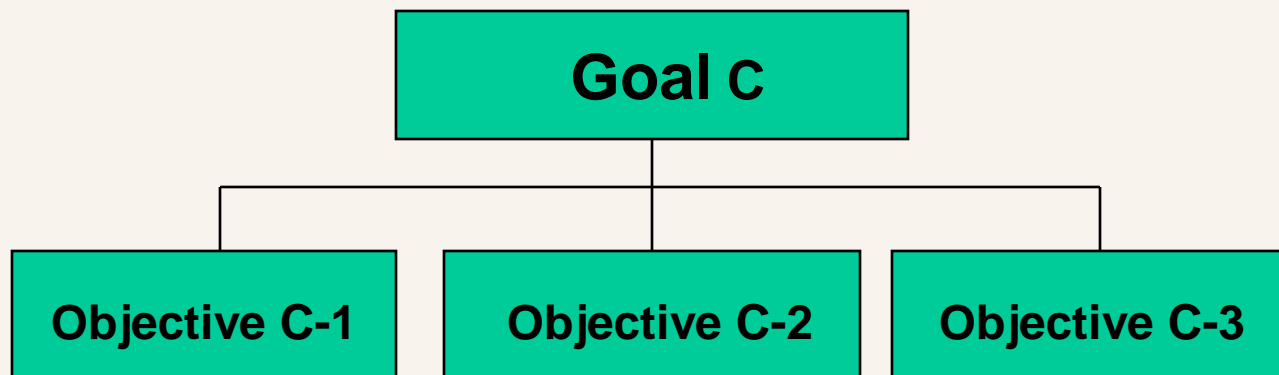
MPM 1-5

# Start with Goals and Objectives

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Goals: Generalized statements which broadly relate the physical environment to values

Objectives: Specific, measurable statements related to the attainment of goals



## **Develop Goals which:**

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Embody the vision for the region

Establish a foundation in the Plan

Link to the Congestion Management Process and the  
Transportation Improvement Program

Allow for a tracking mechanism

## Examples of Goals include....

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Accessibility

Mobility

Economic Development

Quality of Life

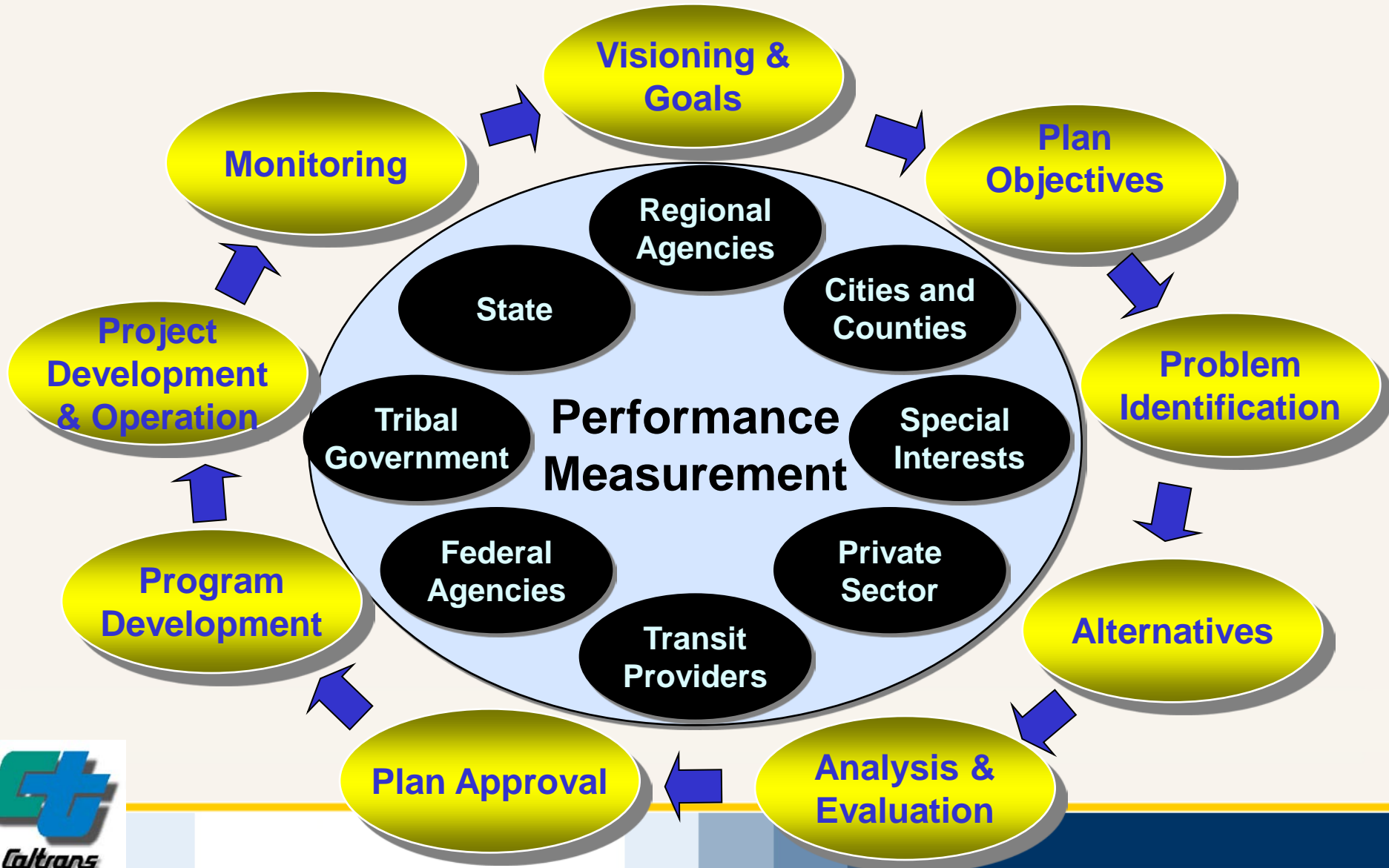
Environment

Safety

Operational Efficiency

System Condition

# Putting Them To Use...



# Example of Goal and Objectives

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Goal: Improve *the operation* of the transportation systems and services to enhance emergency response, minimize travel times and maximize service quality of all modes.....

Objectives:

- Maintain commercial vehicle and auto per capita travel times at 2005 levels.
- Increase the number of transit routes with a headway of 60 minutes or less by 15%

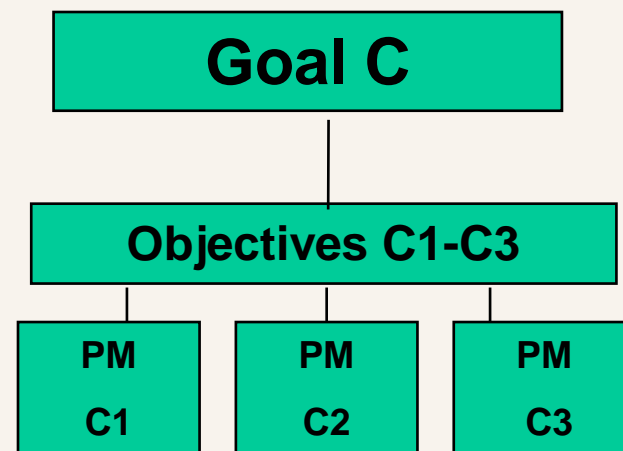
Source: Pikes Peak Area COG 2011

# Add the Performance Measures

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Objectives need performance measures

They reveal the extent to which alternative actions or plans will lead to the attainment of an objective



Build a Hierarchy

# Examples of Performance Measures

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- Objective 1:** Reduce accident exposure  
**Measure:** Percent of passenger miles on facilities with lowest accident exposure
- Objective 2:** Minimize energy consumed  
**Measure:** Gallons of fuel consumed
- Objective 3:** Facilitate linked trip making  
**Measure:** Average wait time at transit stops

## Characteristics of Performance Measures

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Measure the Extent of an Action

Evaluate Strategy Effectiveness

Establish in a Cooperative Fashion



## When Selecting Measures....

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Be measurable and provide for cost-effective data collection

Have a clear and intuitive meaning

Be comparable across time and geographical areas  
(facilities, corridors, subareas)

Have a relationship to actual system operations

## Types of Measures

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### Output

- Reflect scale or scope of activities
- Reflect efficiency in creating a product
- Reflect quantity of resources used

### Outcome

- Reflect an agency's success in meeting goals/objectives
- Reflect a focus on benefits/beneficiaries

## Example: Output and Outcome Measures for Safety Goal

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### Output

1. Tons of salt applied
2. Money spent on alcohol education programs

### Outcome

1. Number of ice-related crashes
2. Percent of crashes that are alcohol-related



# DVRPC – Transportation Plan

## Vision

A safe, convenient and seamless multi-modal passenger and freight system that is sufficient in its capacity, attractive and affordable to its users, accessible and equitable for all citizens and visitors to locations throughout the region and incorporating sound growth management, urban revitalization, environmental and economic development planning principles.

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## Goals

Improve Safety

Reduce Congestion

Improve Mobility

Enhance the Environment

Rebuild the Infrastructure

Link Transportation Investments to Long Range Plan Goals

*Source: Delaware Valley Regional Planning Commission*



**TRACKING PROGRESS TOWARD 2030**

## Example Measures to support an Accessibility Goal

- Mode Split by facility or route
- Percent of users with option of more than one modal choice
- Average trip length
- Average travel time to destination by mode
- Percent of population within 'X' miles of employment
- Number of counties in State with countywide transit systems

## Example Measures to support a Mobility Goal

- Percent of VMT which occurs on facilities with V/C greater than 'X'
- Origin-destination travel times by mode
- Number and percent of lane miles congested
- VMT per capita
- On-time performance of transit
- Number of commuters using park-and-ride lots
- Bicycles per boarding

## Example Measures to support a System Preservation Goal

- Percent of lane-miles by pavement condition
- Percentage of bridges rated good or better
- Age distribution of transit fleet
- Percentage of state truck highway system rated good or better
- Percent of VMT on roads with deficient ride quality
- Percent of contracts planned for letting that were actually let

# Performance Measurement and the Congestion Management Process

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## Examples (relating to operations)

- Customer satisfaction
  - Extent of congestion
  - Delay – non-recurring
  - Delay – recurring
  - Incident duration
  - Reliability
  - Speed
  - Throughput – person, vehicle
  - Travel time – trip, reliability
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- CMP Guidebook will be available at:  
<http://www.fhwa.dot.gov/planning/>

## Objectives-driven Planning for the Congestion Management Process

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**Objectives** = specific, measurable statements relating to the attainment of system performance

**Examples** (all relating to a goal of congestion reduction):

- Over the next 3 – 5 years, reduce the clearance time of traffic incidents on freeways and major arteries in the region from a current average of X minutes to an average of Y minutes.
- Over the next 3 – 5 years, reduce the variability in travel time on freeways and major arteries in the region such that 95% of trips (19 out of 20) have travel times no more than 1.5 times the average travel time for a specific time of day.
- By 2012, enhance connectivity among transit services so that transfers between transit modes (rail, bus) and operators are seamless and can occur with one “smart card”

## Examples of Operations Performance Measures

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### Develop Key Outcome Measures

- Travel time index
- Extent of congestion
- Buffer index

### Uses

- Tracking national trends; performance measures for FHWA Performance Plans
- Educating state and local governments on use of performance measures

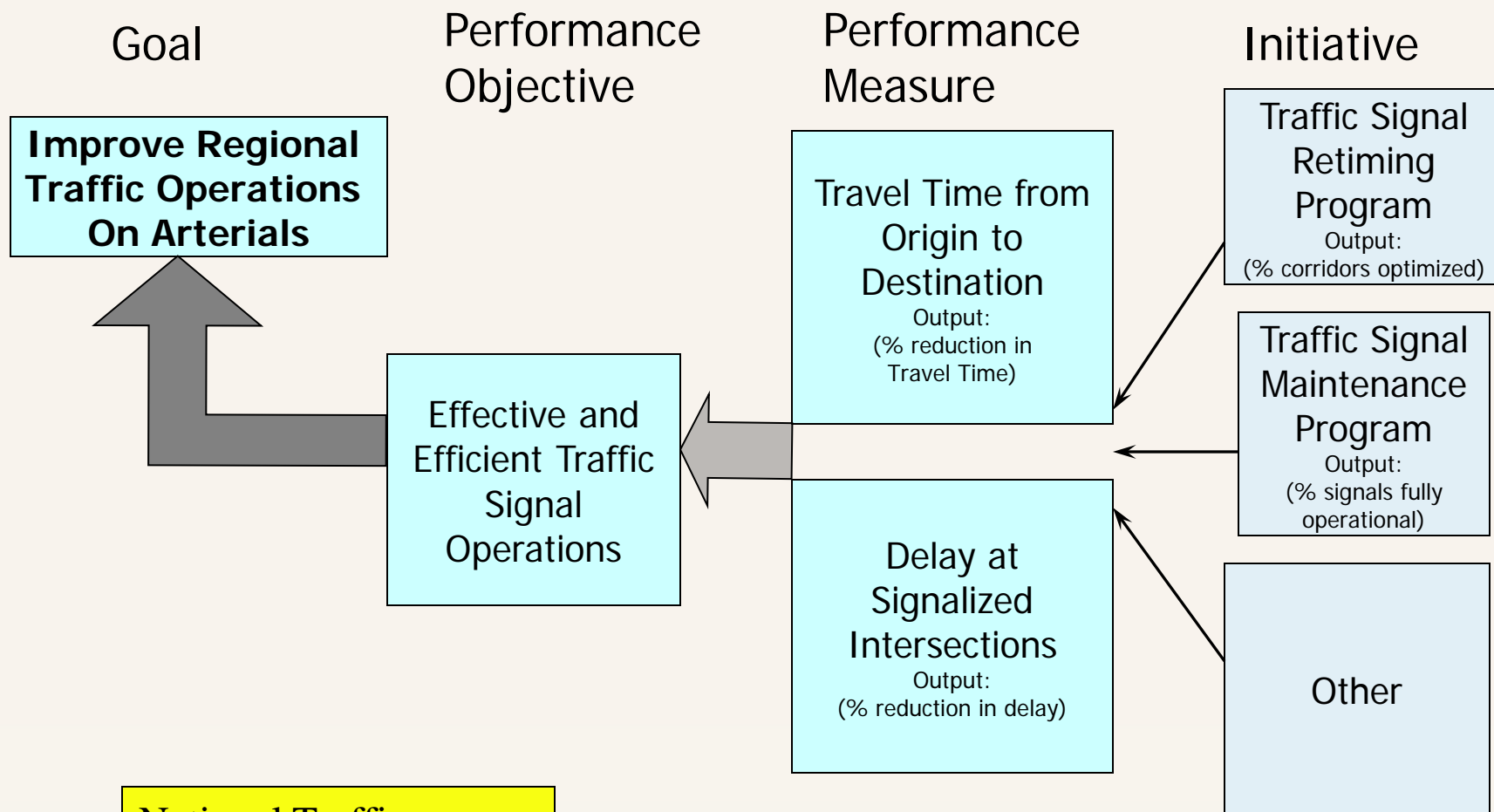
## Examples of Performance Measure Variations

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### Travel Time

- Average Travel Time (LOS, contours, etc.)
- Average Peak Period Travel Time by Functional Class
- Average Travel Speed
- Origin/Destination Travel Time
- Percent of Time Average Speed Below

# Example of Traffic Operations Hierarchy



National Traffic Operations Council

## Examples of Transit Operational Measures

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Passengers/revenue vehicle mile

Passenger/revenue vehicle hour

Peak Passengers/seat

Average vehicle speed/travel time per mile

Percentage of on-time arrivals

## Noteworthy Practices

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### Metropolitan Planning

North Jersey Transportation Planning Authority

Newark, NJ

[www.njtpa.org](http://www.njtpa.org)

Metropolitan Transportation Commission

San Francisco, CA

[www.mtc.ca.gov](http://www.mtc.ca.gov)

## North Jersey Transportation Planning Authority (NJTPA) Eight Goal Categories

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Accessibility

Reliability

Sustainability

Intermodality


Highway Mobility

Transit Mobility

Walk/Bike Mobility

Freight Mobility

North Jersey Transportation  
Planning Authority



## Performance Objectives – Draft 2035 Plan Metropolitan Transportation Commission – San Francisco

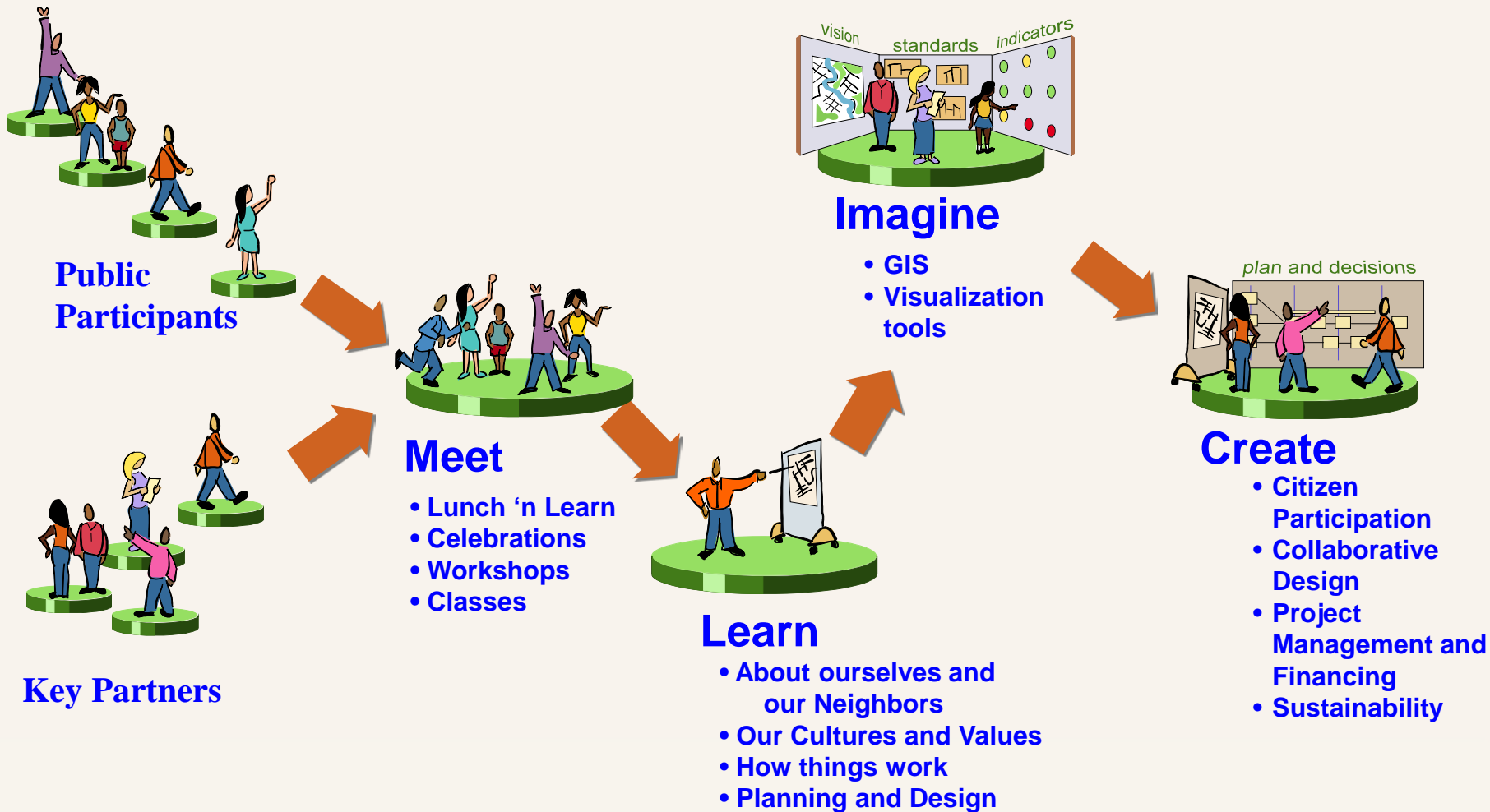
- Improve Maintenance
- Reduce Collisions and Fatalities
- Reduce Congestion
- Reduce Vehicle Miles-of-Travel
- Reduce Emissions
- Improve Affordability of Transportation for Low-Income Households

## Examples of Quantitative Performance Measures

- Reduction in recurrent delay
- Reduction in non-recurrent delay
- Reduction in vehicle miles-of-travel
- Reduction in emissions (e.g., carbon dioxide, particulate matter)
- Cost per low income household served (transit)

*Source:* Metropolitan Transportation Commission Draft 2035 Plan

# Public Participation



## Statewide Planning Examples

### Maryland Department of Transportation

- Annual Attainment Report on Transportation System Performance
- <http://www.mdot.maryland.gov/Planning/Index.html>

### Washington Department of Transportation

- Annual Performance Report
- [www.wsdot.wa.gov/accountability](http://www.wsdot.wa.gov/accountability)

## Maryland Department of Transportation Annual Reporting

### Why Are We Here?

- **Legislative requirements**
- **Department of Budget and Management (DBM)**
- **Prepare for data audits**
- **Reduce redundant efforts**
- **Ensure transfer of data**
- **Minimize variation in submissions across modes / Authority**

# Annual Performance Report to Washington State Transportation Commission

## Number and Type of Incident Responses

### Incidents Lasting 15 to 90 Min

### Incidents > 90 min to Clear

### Case Study / Economic Analysis

Source: WSDOT Grey Notebook – June 30, 2003

#### Response Types

April to June 2003

Total Incident Responses = 9,501

- 951 Collisions
- 8,550 Non-Collisions\*

	April	May	June
Fatality Collisions	8	6	16
Injury Collisions	94	102	108
Non-injury Collisions	192	200	227
Disabled Vehicles	1,590	1,798	1,766
Abandoned Vehicles	528	524	607
Debris	331	421	422
Fire	3	8	19
Hazardous Materials	2	4	12
Other	154	174	190

\*Some non-collisions fall into more than one of the above categories.

#### Service Actions for Non-Collision Responses

##### Service Actions Taken for Non-Collision Responses

April to June 2003

	April	May	June
Traffic Control	202	279	263
Provided Fuel	247	235	199
Changed Flat Tire	199	206	211
Minor Repair	97	135	104
Pushed Vehicle	91	101	160
Towed Vehicle	25	23	31
Cleared Debris	299	377	353

## Resources

FHWA Operations Performance Measurement

[http://ops.fhwa.dot.gov/perf\\_measurement/index.htm](http://ops.fhwa.dot.gov/perf_measurement/index.htm)

TRB – Technical Guidance for Deploying National Level Performance Measures

<http://trid.trb.org/view.aspx?id=1101991>

TRB Performance Measurement Committee

<http://www.trb-performancemeasurement.org/>

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QUESTIONS??

