

# Performance Measurement

Transportation Systems Management and Operations



# Agenda

1. What is Performance Measurement
2. Why Performance Measurement
3. Performance Measurement Key Elements
4. Existing Performance Measures
  - Outlined by MAP-21/ FAST Act
    - MAP-21 vs FAST Act
  - Outlined by NDOT
  - Outlined by MPOs
5. Performance Measures for TSMO
6. Data Acquisition
7. Cost Benefit Analysis
8. Group Exercise 1
9. Lunch Break
10. Existing ITS Dashboard – RTC FAST
11. Group Exercise 2
12. Vision, Mission and Goals
13. Moving Forward

# What is Performance Measurement

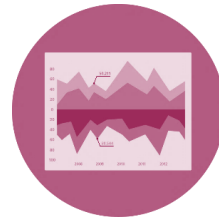
## Capability Maturity Model (CMM) Dimensions



**Business  
Processes**



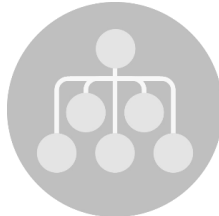
**Systems &  
Technology**



**Performance  
Measures**



**Culture**



**Organization &  
Staffing**



**Collaboration**

Source: FHWA – Improving TSMO White Paper

# Why Performance Measurement



Source: FHWA – Improving TSMO – CMM Workshop White Paper – Performance Measurement

# Performance Measurement Key Elements

## Measures Definition:

Divisions will identify their definitions for performance measurement management based on MAP-21/ FAST Act, legislative and MPOs requirements.

## Measures Utilization Strategies:

Developing a strategy for internal and external reporting, coordination projects and efforts with other divisions, comprehensive performance management program, analysis of outcome measures and use them for TSMO business case materials.

## Data Acquisition:

Availability of data, identify existing data and the data that needs to be acquired (either locally or through outsourcing)

Source: FHWA – Improving TSMO – CMM Workshop White Paper – Performance Measurement

# Existing Performance Measures

Outlined by MAP-21/ FAST Act

## Purpose

A State shall develop a risk-based asset management plan for the National Highway System to **improve** or **preserve** the condition of the **assets and** the **performance** of the system.

## Plan

A State asset management plan shall **include strategies** leading to a program of projects that would make progress toward **achievement** of the **State targets** for asset condition and performance of the National Highway Systems and supporting the progress toward the achievement of the **national goals**.

## National Goals



Safety



Infrastructure conditions



Congestion reduction



System reliability



Environmental sustainability



Reduce project delivery delay

Source: Moving Ahead for Progress in the 21st Century Act"

# Existing Performance Measures

Outlined by MAP-21/ FAST Act

- 1** National Highway Performance Program
- 2** Highway Safety Improvement Program
- 3** Congestion Mitigation and Air Quality Program
- 4** National Freight Movement Program

Source: Moving Ahead for Progress in the 21st Century Act

# Existing Performance Measures

## MAP-21 vs FAST Act

Except as specified below, the FAST Act makes no changes to the performance management provisions established by MAP-21.

### Freight performance measure

The State must describe in its next performance report to DOT the **actions it will take to achieve targets** if the State has failed to meet them within 2 years after establishment of targets.

### Performance period adjustment

Adjusts the timeframe for States and metropolitan planning organizations to make **progress toward meeting their performance targets** under the National Highway Performance Program and clarifies the **significant progress timeline** for the Highway Safety Improvement Program performance targets.

### Interstate system condition

Adjusts the **timeframe for review for triggering the penalty** by removing the requirement that this decline in condition level is shown during “2-consecutive reporting periods” to trigger the penalty.

Source: <https://www.fhwa.dot.gov/fastact/factsheets/performancegmtfs.cfm>



# Existing NDOT Performance Measures

Outlined by NDOT

- Budget Performance Measures
  - 33 separate measures
- Departmental Performance Measures
  - 15 separate measures reported to Legislators via AB 595
- NDOT Stewardship Performance Measures
  - 44 separate measures between the various NDOT divisions

Source: Nevada Department of Transportation

# Existing NDOT Performance Measures

- Budget Performance Measures
  - Project Delivery - Projects Designed and Advertised on Schedule
  - Highway Operations and Emergency Management - Emergency Plans Completed with Training
  - Projects Completed Within Established Timeline and Budget
  - Project Neon Bonding – Completed within Cost Range and Schedule

Source: Nevada Department of Transportation

# Existing NDOT Performance Measures

- Departmental Performance Measures

- Reduce Work Place Accidents
- Improve Employee Satisfaction
- Streamline Project Delivery: Schedule and Estimate From Bid Opening to Construction Completion
- Maintain State Highway Pavement and Bridges
- Streamline Permitting Process

Source: Nevada Department of Transportation

# Existing NDOT Performance Measures

- NDOT Stewardship Performance Measures

- Bridge
- Construction
- Design
- Environment
- Planning
- Operations
- Safety

*Source: Nevada Department of Transportation*

# RTC Performance Measures FAST

## Traffic Incident Data Current and Past (thru 2009)



## ITS Coverage Existing, Under Construction and Planned



## Congestion Freeway Speed



## Ramp Meter Location and Status



Source: Southern Nevada Regional Transportation Commission

# RTC Performance Measures FAST

## Traffic Flow Meters

Status, Travel Times,  
Speed



## DMS

Location, Status, Message and Travel Time



## Bluetooth Readers

Location, Travel Time, Speed



Source: Southern Nevada Regional Transportation Commission

# Performance Measures for TSMO

## Tasks

- Develop goals
- Identify relevant performance measures
- Identify methods and time frames for data collection

## Task Details:

- Works with MPOs for both data acquisition and performance measures alignment with TSMO goals
- Identify available existing data
- Identify existing projects involving performance measurement
- Evaluate viability of data collection

# Data Acquisition

- Required data to enhance performance measures
- Means of data acquisition
- Coordination and information sharing with internal and external stakeholders
- Data alignment with performance measurement definitions, strategies and programs



Source: FHWA – Improving TSMO – CMM Workshop White Paper – Performance Measurement



# Cost Benefit Analysis (CBA)

- A **systematic approach** to estimating the strengths and weaknesses of alternatives and comparing benefits and costs of a decision, policy or project.
- Used to determine options that provide the **best approach to achieve benefits** while preserving savings. The CBA is also defined as a systematic process for calculating.
- Should be used to **differentiate** between the use of different performance measures or data.

# Group Exercise 1

Please refer to the Group Exercise 1 sheet

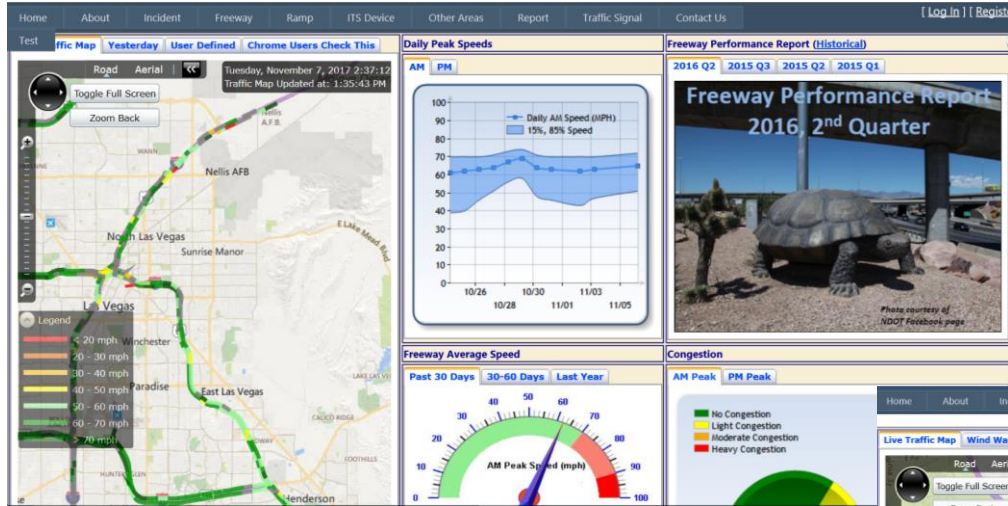
- What's data?
- What are performance measures?
- What's inefficient data?
- What else do you need?



The background of the slide is composed of several overlapping geometric shapes in shades of orange and red. A large, dark orange triangle points downwards from the top center. To its right, a red triangle points upwards towards the top center. Below these, there are more orange shapes, including a large triangle on the left and a smaller one on the right. The overall effect is a modern, abstract design.

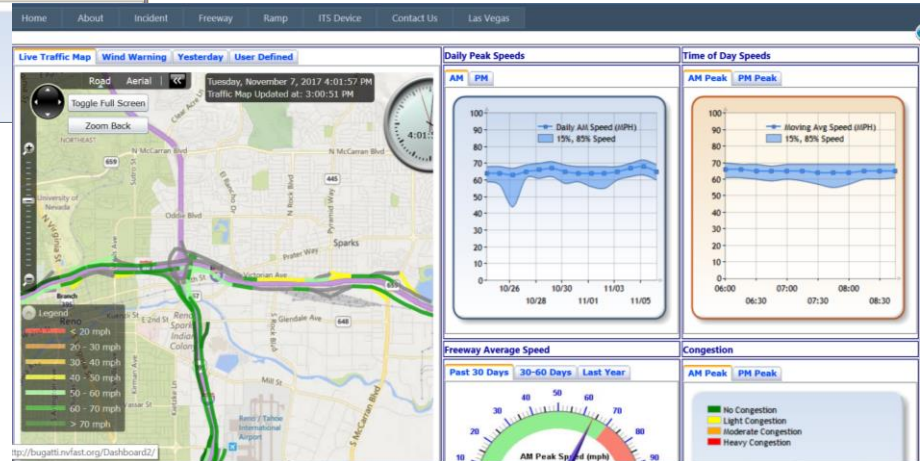
# Lunch Break

# Existing ITS Dashboards – RTC Fast



Las Vegas Valley

Reno Area



# Group Exercise 2

What additional data could be used within the existing dashboard to improve mobility?



# Vision, Mission and Goals



Deliver efficient transportation solutions for all modes of transportation through the integration of planning, design, operations, and maintenance activities for a safe and connected Nevada.



Provide, operate, and conserve a transportation system that enhances safety, quality of life and economic development for all users through innovation, collaboration, and performance-based decision making.



**Safety** - Reduce crashes and fatalities through the continuous improvement of traffic management systems and procedures.

**Reliability** - Maintain consistent travel times across all transportation systems.

**Mobility** - Implement innovative projects that optimize the operations and maintenance of the transportation system in Nevada.

**Customer Service** - Provide timely and accurate travel information to internal and external customers to enable them to make informed mobility decisions.

**Collaboration** - Proactively manage and operate an integrated transportation system through coordination and cooperation between NDOT divisions and partnering agencies.

**Sustainability** - Develop a transportation system through sustainable design, operations and maintenance that enhances reliability and efficiency.

**Integration** - Prioritize TSMO as a core objective in NDOT's planning, design, construction, operations, and maintenance activities.

# Moving Forward ...

- **FHWA TSMO Workshop, December 12<sup>th</sup> 2017**
- **Next TCT Meeting**
  1. Preferably third week of January 2018
  2. Action items:
    - Think about other possible performance measures.
    - Identify any required data for improving existing performance measures or developing new measures.
    - Review and comment on the Vision, Mission and Goals.



# Thank you

If you'd like to find out more visit:  
[www.atkinsglobal.com](http://www.atkinsglobal.com)



# Back-up slides

# Existing Performance Measures

## Outlined by MAP-21/ FAST Act

### Purposes

- (1) To provide support for the condition and performance of the National Highway System
- (2) To provide support for the construction of new facilities on the National Highway System
- (3) To ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in an asset management plan of a State for the National Highway System

### State performance management

- (1) A State shall develop a risk-based asset management plan for the National Highway System to improve or preserve the condition of the assets and the performance of the system. “
- (2) PERFORMANCE DRIVEN PLAN.—A State asset management plan **shall include strategies** leading to a program of projects that would make progress **toward achievement of the State targets for asset condition and performance of the National Highway Systems and supporting the progress toward the achievement of the national goals.**

# Existing Performance Measures

## Outlined by MAP-21/ FAST Act

### 1- National Highway Performance Program

- a) Minimum standards for States to use in developing and operating bridge and pavement management systems;
- b) Measures for States to use to assess: the condition of pavements on the Interstate system, the condition of pavements on the National Highway System (excluding the Interstate), the condition of bridges on the National Highway System, the performance of the Interstate System, and the performance of the National Highway System (excluding the Interstate System);
- c) Minimum levels for the condition of pavement on the Interstate System, and d) the data elements that are necessary to collect and maintain standardized data to carry out a performance-based approach.

### 2- Highway Safety Improvement Program

- a) Measures to assess serious injuries and fatalities per vehicle mile travelled
- b) number of serious injuries and fatalities

### 3- Congestion Mitigation and Air Quality Program

- a) Traffic congestion
- b) On-road mobile source emissions

### 4- National Freight Movement

# Existing Performance Measures

## MAP-21 vs FAST Act

Except as specified below, the FAST Act makes no changes to the performance management provisions established by MAP-21.

### **Freight performance measure**

MAP-21 required DOT to establish performance measures in a number of areas, including the assessment of freight movement on the Interstate System. MAP-21 also required each State to set performance targets for these measures. The FAST Act now requires that if the Administrator determines that a State has failed to meet (or to make significant progress toward meeting) its freight performance targets within two years after the establishment of the targets, the State must describe in its next performance report to DOT the actions it will take to achieve these targets.

### **Performance period adjustment**

The FAST Act adjusts the timeframe for States and metropolitan planning organizations to make progress toward meeting their performance targets under the National Highway Performance Program and clarifies the significant progress timeline for the Highway Safety Improvement Program performance targets.

### **Interstate system condition**

Under MAP-21, if the condition of a State's Interstate pavements (excluding bridges) fell below a minimum condition level established by DOT, the State was required to dedicate certain funds for use on Interstate maintenance. To trigger this penalty, the condition needed to fall below the minimum level for two consecutive reporting periods. The FAST Act adjusts the timeframe for review for triggering the penalty by removing the requirement that this decline in condition level is shown during "2-consecutive reporting periods" to trigger the penalty.

# Budget Performance Measures

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## **Budget Area - Project Neon Bonding**

Project Neon Cost Range

Project Neon Schedule

## **Budget Area - Upgrade Fueling System**

Fueling System Cost Range

Fueling System Schedule

## **Budget Area - Construction of Roadways and Facilities**

Roadway Congestion

Projects Constructed within Cost Range

Projects Constructed within Schedule

## **Budget Area - Maintenance of Roadways and Facilities**

Deficient Bridges

NDOT Facilities that Comply with Code

State-Maintained Pavements Needing Preservation

## **Budget Area - Project Delivery**

Number of Fatalities on Nevada's Streets and Highways

Projects Designed and Advertised on Schedule

Scheduled Projects Advertised On Time Within Cost Range

Scheduled Projects Completed On Time Within Cost Range

## **Budget Area - Equipment Repair and Maintenance in Fleet Management**

Fleet in Compliance with Condition Criteria

Budget Area - Multi-Modal, Aviation, Transit, Rail, Bicycle and Pedestrian Programs

Increase in implementation of Multi-Modal Options

## **Budget Area - Develop Transportation Projects and Identify Funds**

Utilize Full Federal Obligation Authority

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## **Budget Area - Highway Operations and Emergency Management**

Emergency Plans Completed with Training

Incident Clearance Responsiveness in Las Vegas Area

## **Budget Area - District Communications, Permitting, and Right of Way**

Customer Satisfaction - Debris Removal

Customer Satisfaction - Maintaining Roadway Surface

Permits Issued or Rejected within 45 days

## **Budget Area - General Administration**

Agreements Fully Executed within 45 days

Compliance with FHWA Requirements for DBE Percentage

Employees Receiving Training During the Year

Working Days Flights Unavailable

## **Budget Area - Personnel and Payroll**

Employees Incurring Workplace Injuries and Illnesses

Employees Requiring Medical Attention

Overall Rating Based on Employee Satisfaction Survey

## **Budget Area - Fiscal**

Timely Billings for FHWA Reimbursement

## **Budget Area - Information Technology**

Customer Satisfaction

Helpdesk Timely Resolution of Issues

Projects Completed Within Established Timeline and Budget

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# Departmental Performance Measures

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Reduce Work Place Accidents  
Provide Employee Training  
Improve Employee Satisfaction  
Streamline Agreement Execution Process  
Improve Customer & Public Outreach  
Reduce and Maintain Traffic Congestion On State Maintained Roads  
Streamline Project Delivery: Schedule and Estimate From Bid Opening to Construction Completion  
Maintain State Highway Pavement  
Maintain NDOT Fleet  
Maintain NDOT Facilities  
Emergency Management, Security, and Continuity of Operations  
Reduce Fatal & Severe Injury Crashes  
Streamline Project Delivery: Schedule and Estimate for Bid Advertisement  
Maintain State Bridges  
Streamline Permitting Process

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# Stewardship Performance Measures

Bridge*	Percentage of Structural Deficient bridge deck area on the NHS.
Bridge	Category 1-5 roads refers to FHWA classifications when related to bridges.
Bridge	Percentage of Structural Deficient bridge deck area on Category 1 roads.
Bridge	Percentage of Structural Deficient bridge deck area on Category 2 roads.
Bridge	Percentage of Structural Deficient bridge deck area on Category 3 roads.
Bridge	Percentage of Structural Deficient bridge deck area on Category 4 roads.
Bridge	Percentage of Structural Deficient bridge deck area on Category 5 roads.
Civil Rights	% DBE Commitment As Compared to the Total Commitment.
Civil Rights	Average # of days between DBE app and final decision.
Construction	% of state projects completed within 10% of original construction AEB including contingencies (as compared to completed project amount) (DBB only).
Construction	% of state projects completed within 10% of the original assigned project working days. (DBB only)
Construction	% of projects with less than 3% Change Order cost increase. (DBB only)
Construction	% of projects at or below the budgeted cost for Construction Engineering.
Design/Admin	% of projects advertised within 2 weeks of date on processing memo.
Design	% of projects whose Engineer's Estimate is within +/- 10% of best available estimate at the time of October snapshot.
Design	% of projects whose Engineer's Estimate with within 10% of contract award amount
Design	% of projects with two or fewer supplemental notices.
Environment	% of EAs completed within 18 months
Environment	% of EISs completed within 48 months
Environment	Develop new measure related to Storm water Management
Federal-aid	% of resolutions from FHWA Program Reviews on schedule
Finance	Total inactive obligations as a percent of annual apportionment
Finance	Dollar value of accrued unbilled balance on projects

Planning	% of LPA projects obligated that were programmed in the first year of the original STIP
Planning	% of LPA total dollars obligated that were programmed in the first year of the original STIP
LPA	% of LPA agreements executed within 120 calendar days of project kickoff meeting.
LPA	% of LPA agreements that are forwarded to the LPA for execution within 30 calendar days of receipt of comments on the draft agreement.
LPA	% of LPA projects completed within 10% of the original assigned project working days.
LPA	% of LPA projects completed within 10% of original construction estimate including contingencies (as compared to completed project amount) (DBB only).
Operations	% of incidents where vehicles are removed from travel lane within 30/60/90 times frames
Operations	% days in a season that has a daily peak period delay that does not exceed the average delay by more than 10%.
Planning	% of State projects obligated that were programmed in the first year in the original STIP
Planning	% of State project total dollars obligated that were programmed in the first year in the original STIP
Planning	# of STIP amendments and modifications
Planning	% of anticipated FHWA revenues programmed over the 4 years of the STIP
Planning	% of SPR and PL funds expended based on work program
ROW	% of parcels acquired or with Right of Entry within 24 months of ROW setting
Safety*	# of fatalities
Safety*	Rate of fatalities
Safety*	# of serious injuries
Safety*	Rate of serious injuries
Safety	% of HSIP funds obligated
System Preservation	% of category 1 state maintained roads in "Good" condition based on smoothness (IRI)
System Preservation	% of category 2 state maintained roads in "Good" condition based on smoothness (IRI)
System Preservation	% of Category 1 state maintained roads in "Poor" condition based on smoothness (IRI)