

# Transportation System Performance Measures

Presentation to the  
California Transportation Commission  
May 26, 2005



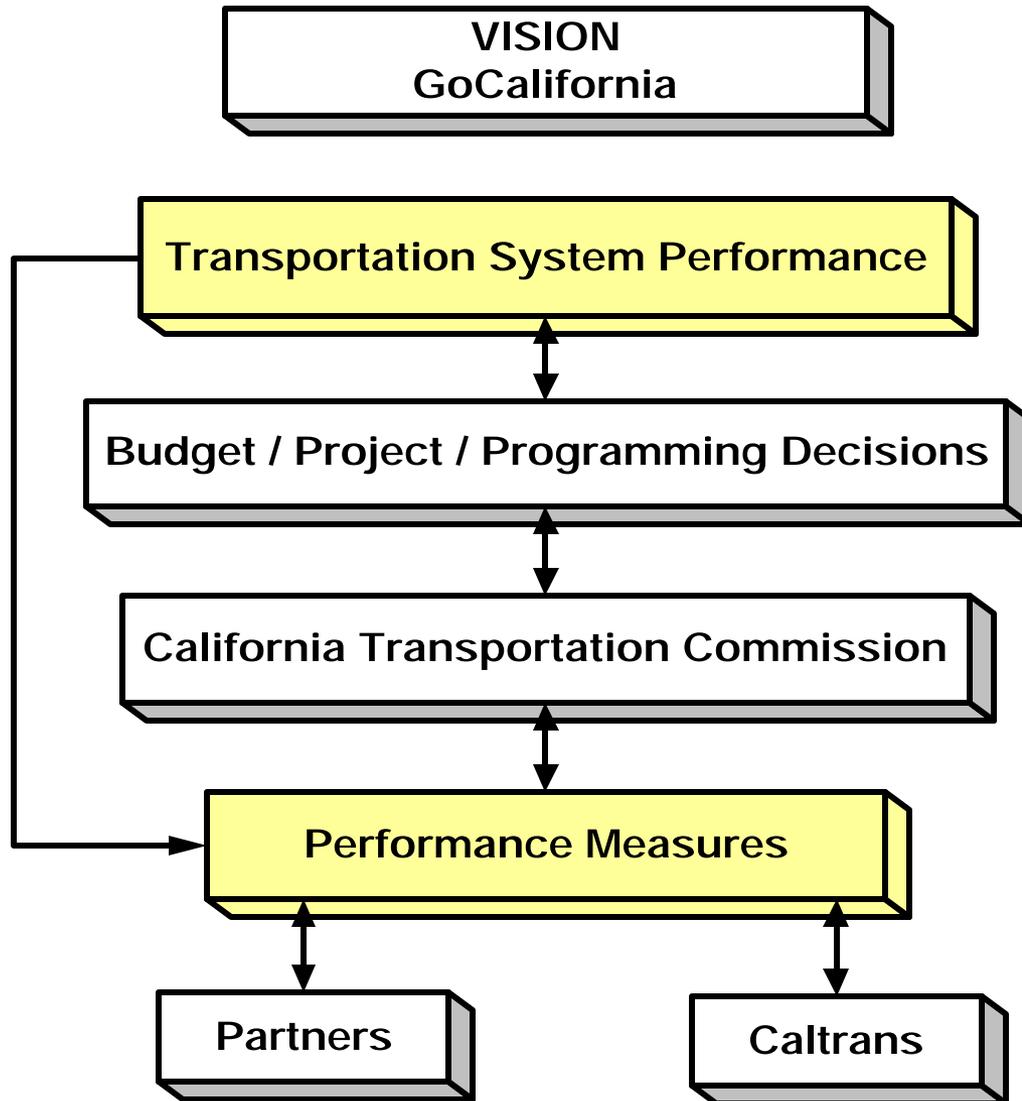
# Why System Performance Measures?

System monitoring and evaluation provides the basis and foundation for all transportation investment decisions.

Performance measures:

- ✓ Guide investment decisions
- ✓ Ensure best return on investment

# Where do performance measures fit?



# What has been done to date?

- Responded to Performance Improvement Initiative's Expert Review Panel recommendations
- Assembled stakeholder team
- Reached consensus on system outcomes
- Conducted workshop in conjunction with December 2004 CTC meeting
- Completed state-of-the-system prototype report

# Measuring Progress Through Transportation System Performance Outcomes

- **Coordinated  
Transportation  
and Land Use**
- Economic  
Development
- **Environmental  
Quality**
- Equity
- **Mobility/  
Reliability/  
Accessibility**
- **Productivity**
- Return on  
Investment
- **Safety**
- **System  
Preservation**

# System Outcomes and Key Indicators

- **Mobility/Reliability/Accessibility** – Minimize time and cost and maximize choice and dependability. Reach desired destinations within reasonable time and cost and with reasonable choice, dependability, and ease.
  - ✓ Travel Time (Mobility)

Travel time within key regional & interregional corridors	
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# System Outcomes and Key Indicators

- Mobility/Reliability/Accessibility

- ✓ Travel Delay (Mobility)

Total passenger hours of delay in key travel corridors	
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“Speeds of 35 miles per hour or less lasting 15 minutes or longer during peak commute periods.”

# System Outcomes and Key Indicators

- Mobility/Reliability/Accessibility
  - ✓ On-Time Performance (Reliability)

% on-time performance in key corridors (transit)	
Variability in travel time in key travel corridors (highways)	

# System Outcomes and Key Indicators

- Mobility/Reliability/Accessibility

- ✓ Availability of Modal Choices (Accessibility)

Modes available in key travel corridors and at key transportation centers	
% of workers within "x" minutes of their jobs	
Modal split	
% conventional highways with min. 4' paved shoulders (bicycle travel)	
% jobs within quarter/half mile of transit station	
% of population within quarter/half mile of transit station/bus corridor	

# System Outcomes and Key Indicators

- **Productivity** – Maximize throughput or efficiency (system-wide).
  - ✓ Throughput

# System Outcomes and Key Indicators

- Productivity

- ✓ Throughput

% of vehicles traveling through a corridor versus carrying capacity (highway)	
% of people traveling through a corridor versus carrying capacity (all modes)	
Passenger per vehicle service mile/service hour	
Passenger miles per train mile	
% trucks by axle (5-axle and greater in key corridors)	
Commercial airport capacity by type and demand	

# System Outcomes and Key Indicators

- **Safety** – Reduce fatalities, injury, and property loss of system users and workers. Facilitate perception of personal safety.
  - ✓ Traveler Safety

Injuries, fatalities and collisions – rates and totals	
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# System Outcomes and Key Indicators

- **System Preservation** – Preserve the publicly owned transportation system at a specified state of repair or condition. Physical condition of the system.
  - ✓ Asset Condition (Hwy, Streets, & Roads)

Pavement – % distressed lane miles and smoothness	
Bridges - % structurally deficient or functionally obsolete	
Roadside – level of service	

# System Outcomes and Key Indicators

- System Preservation

- ✓ Asset Condition (Transit/Rail)

Vehicle fleet age and mileage	
Miles between service calls	
% equipment available for service	
Guideway condition (rail and structures)	

# System Outcomes and Key Indicators

- Coordinated Transportation and Land Use – Ensure transportation decisions promote and support job/housing proximity.

\* Included in Mobility/Reliability/Accessibility as an Accessibility measure.

% of workers within "x" minutes of their jobs*	
% jobs within quarter/half mile of transit station*	
% of population within quarter/half mile of transit station/bus corridor*	
Others to be developed	

# Key Corridors - North State and Bay Area

- Interstates
  - ✓ **Interstate 5** (entire state)
  - ✓ Interstate 80
  - ✓ Interstate 205/580
  - ✓ Interstate 680
  - ✓ **Interstate 880**
- Focus Routes
  - ✓ **State Route 99**
  - ✓ US 101
  - ✓ US 395
  - ✓ State Route 58
  - ✓ State Route 152/156
  - ✓ **State Route 299**

Note: Routes in “bold” are included in the prototype report.

# Key Corridors - Southern California and San Diego

- Interstates
  - ✓ **Interstate 10**
  - ✓ Interstate 15
  - ✓ Interstate 110
  - ✓ Interstate 210
  - ✓ Interstate 405
  - ✓ Interstate 710
- Focus Routes
  - ✓ Interstate 905 and State Routes 86, 111, 7
- Other Freeways
  - ✓ State Route 60
  - ✓ State Route 91

Note: Routes in “bold” are included in the prototype report.

# Why a Prototype Report?

- To develop appropriate performance measures
- To determine data availability and quality
- To determine usefulness of data to effectively measure performance
- To establish and improve data collection

# Prototype Report Content

- Performance Outcome Areas – Statewide View
- Performance Outcome Areas – Regional View
- Conclusions, Findings, and Recommendations for the Annual State-of-the-System Report

# Next Steps

- Continue refining outcomes and indicators
- Develop graphical data presentation (charts, graphs, “dashboard”)
- Address data challenges
- Report on time-series basis
- Set statewide and regional targets
- Benchmark against other states
- Provide analysis of performance

# Sample Information

## System Outcome: Mobility (Travel Delay)

Total Person Hours of Delay – State Highways

Corridor – I-5 from I-5/I-405 interchange in Irvine to the I-405/I-5 interchange in the San Fernando Valley.

<b>Segment (Peak Direction)</b>	<b>Peak Period Person Hours of Delay (Speed &lt;60 mph)</b>	<b>Severely Congested Peak Period Person Hours of Delay (Speed &lt; 35 mph)</b>
I-405 (Irvine) to SR-22 (Orange Crush)	1,430	464
SR-22 (Orange Crush) to SR-91	1,023	821
SR-91 to SR-60	5,855	5,211
SR-60 to I-110 (Downtown LA)	1,299	1,207
I-110 (Downtown LA) to SR-134 (Burbank)	1,511	1,323
SR-134 (Burbank) to I-405 (San Fernando Valley)	1,406	1,033

# Sample Information

## System Outcome: Productivity (Goods Movement)

Percentage of Daily Vehicle Volumes That Are Trucks (by Number of Axles).

Corridor - I-5 from I-5/I-405 interchange in Irvine to the I-405/I-5 interchange in the San Fernando Valley:

	<b>Average Annual Daily Traffic (AADT)</b>	<b>All Trucks</b>	<b>Less than 5 Axles</b>	<b>5 or More Axles</b>
<b>Volume</b>	237,395	17,673	9,200	8,473
<b>Percentage of Total</b>	100%	7.4%	52.1%	47.9%

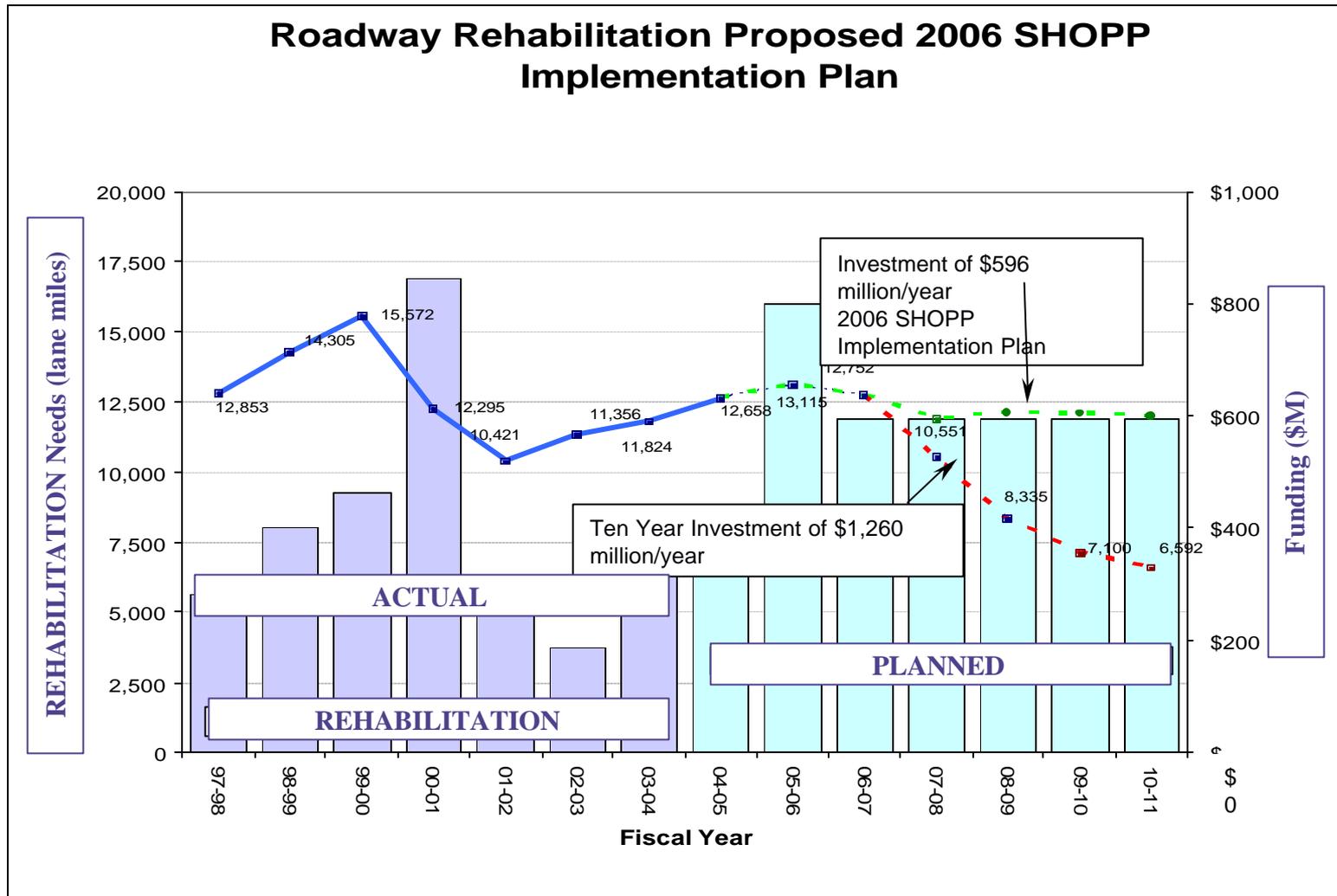
# Sample Information

## **System Outcome: System Preservation (State Highways)**

State Highways: The number of distressed lane miles measures the number of lane miles in poor structural condition or with bad ride quality.

<b>Indicator</b>	<b>Number of Lane Miles and Percentage of System</b>
<b>Number and Percentage of Distressed Lane Miles on State Highways</b>	11,824/24%

# Data Presentation Format



# Sample Information

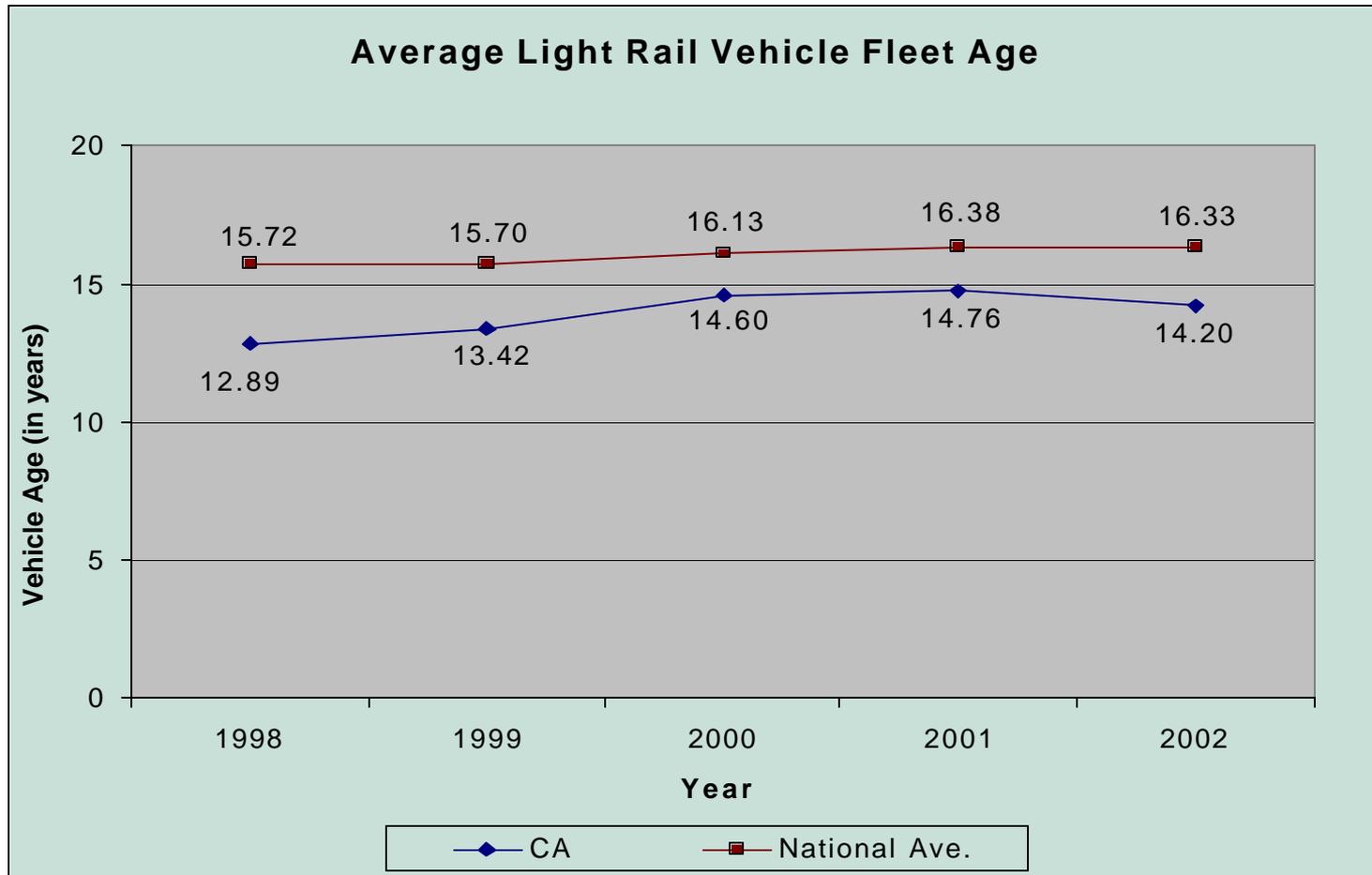
## System Outcome: System Preservation (Mass Transportation)

Condition of Service Vehicles – Age of Vehicle Fleet and the Number of Vehicle Miles per Mechanical Failure.

<b>Mode</b>	<b>Average Fleet Age (in years)</b>	<b>Vehicle Miles per Mechanical Failure</b>
<b>Bus (Largest 15)</b>	6.4	3,788.6
<b>Heavy Rail</b>	5.0	23,596.4
<b>Light Rail</b>	14.2	4,490.2
<b>Commuter Rail</b>	9.8	Not available
<b>Intercity Rail (Locomotives)</b>	7.8	Not available
<b>Intercity Rail (Vehicles)</b>	8.1	Not available
<b>Ferryboat</b>	14.5	Not available

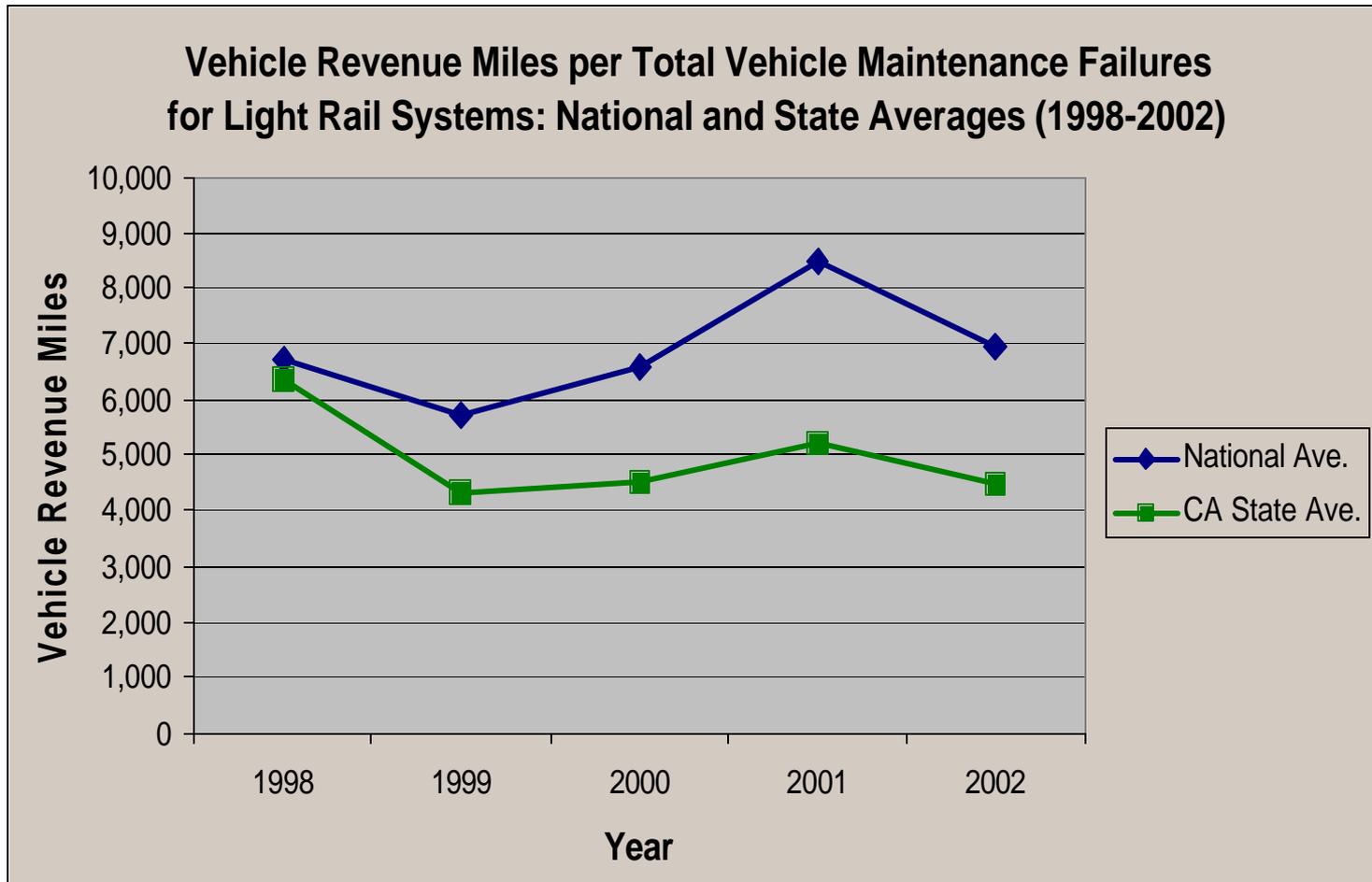
(Data source: Federal Transit Administration National Transit Database)

# Data Presentation Format



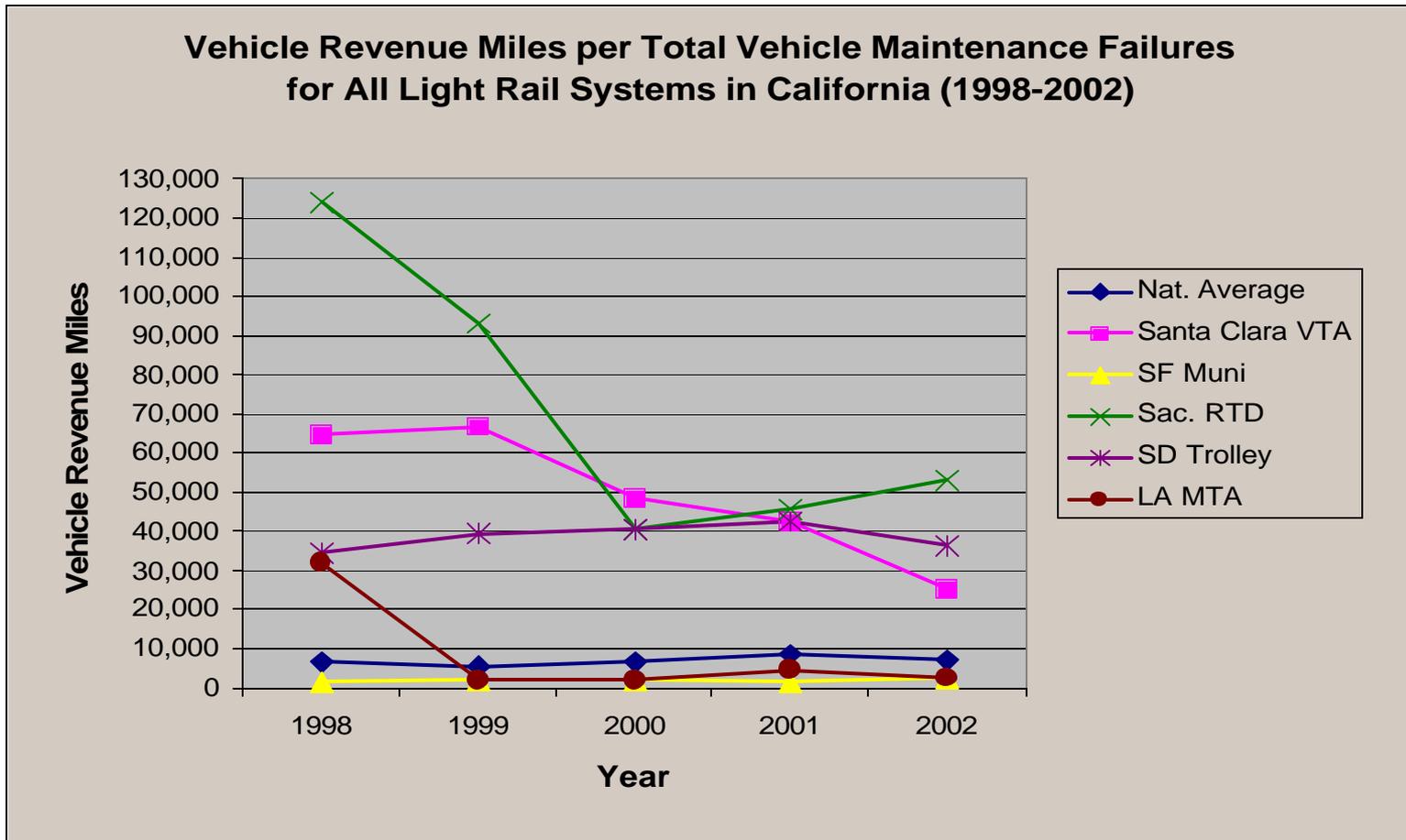
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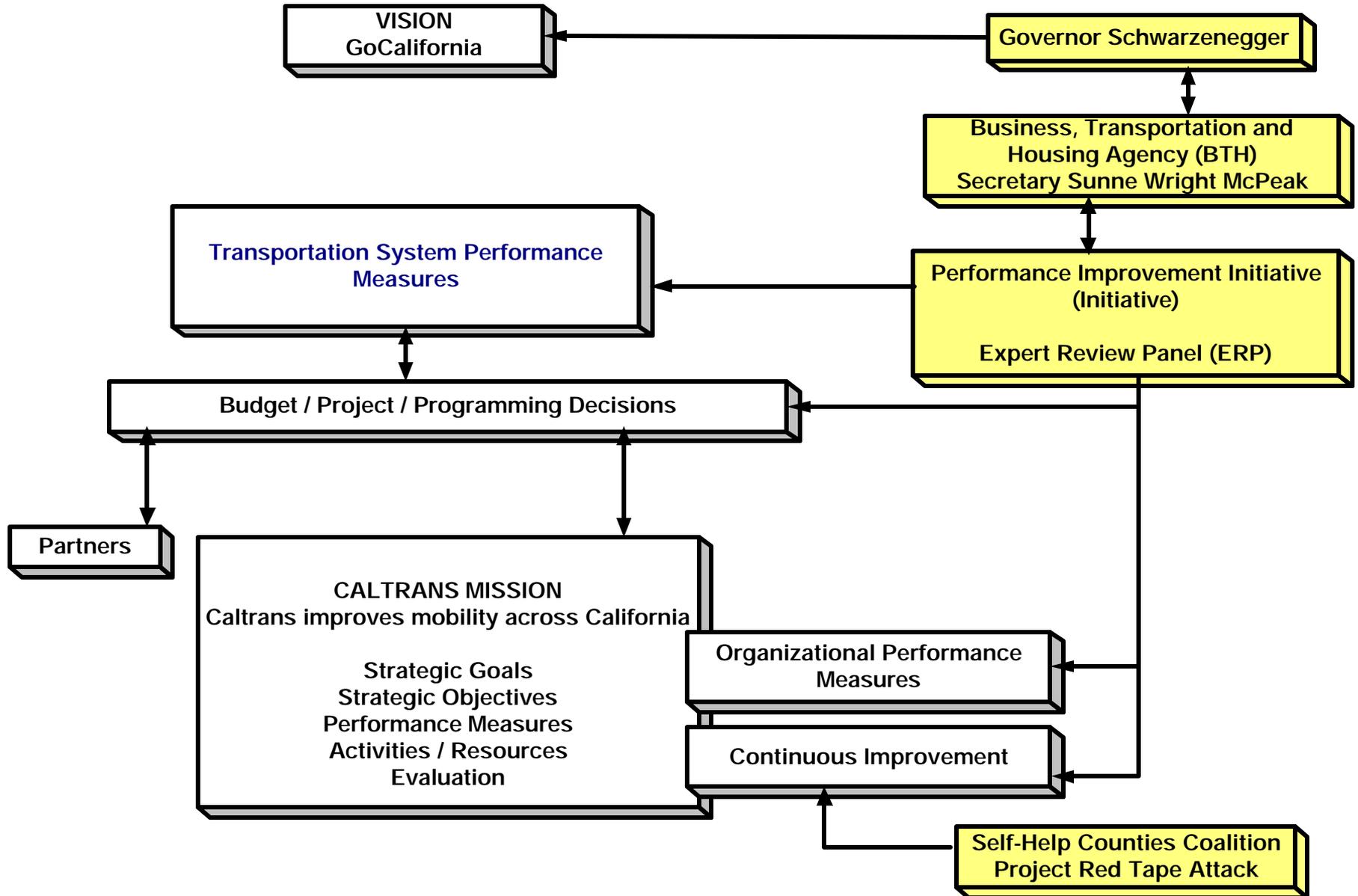
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# Data Presentation Format



(Data source: Federal Transit Administration National Transit Database)

# How does this all fit together?



# How can this information be used?

- Guide investment decisions
  - ✓ State Highway Operations and Protection Plan (SHOPP)
  - ✓ Interregional Transportation Improvement Program (ITIP)
  - ✓ Regional Transportation Improvement Program (RTIP)
- Long-range planning
  - ✓ California Transportation Plan (CTP)
  - ✓ Interregional Transportation System Plan (ITSP)
  - ✓ Regional Transportation Plans (RTP)
  - ✓ California Aviation System Plan (CASP)
  - ✓ Strategic Business Plans for Intercity Rail Corridors

# **Transportation System Performance Measures HANDOUT**

(Complete Set of System  
Outcomes and Key Indicators)



## **Measuring Progress Through Transportation System Performance Outcomes**

- Coordinated Transportation and Land Use
- Economic Development
- Environmental Quality
- Equity
- Mobility/ Reliability/ Accessibility
- Productivity
- Return on Investment
- Safety
- System Preservation

## System Outcomes and Key Indicators

- ☺ Indicator included in prototype report.
- ☹ Indicator not included in prototype report. Needs further development.

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## System Outcomes and Key Indicators

- **Coordinated Transportation and Land Use** – Ensure transportation decisions promote and support job/housing proximity.

\* Included in Mobility/Reliability/Accessibility as an Accessibility measure.

% of workers within "x" minutes of their jobs*	☺
% jobs within quarter/half mile of transit station*	☺
% of population within quarter/half mile of transit station/bus corridor*	☺
Others to be developed	☹

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## System Outcomes and Key Indicators

- **Economic Development** – Contribute to California’s economic growth.  
(measure under development)

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## System Outcomes and Key Indicators

- **Environmental Quality** – Maintain and enhance the quality of the natural and human environment.

✓ Air Quality

Days exceeding national/state standards	☺
Others to be developed	☹

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## System Outcomes and Key Indicators

- **Environmental Quality** – Maintain and enhance the quality of the natural and human environment.

✓Energy Consumption

Fossil fuel use ratio to passenger miles traveled	☺
Others to be developed	☹

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## System Outcomes and Key Indicators

- **Environmental Quality** – Maintain and enhance the quality of the natural and human environment.

✓Health of Ecosystems

Net gain/loss of wetlands, in acres, from transportation projects.	☹
Number of wildlife corridors and fish passages restored/connected on/under transportation corridors.	☹
Net gain/loss of threatened and endangered habitat from transportation projects.	☹

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## System Outcomes and Key Indicators

- **Environmental Quality** – Maintain and enhance the quality of the natural and human environment.

✓Noise

Number of residential units exposed to aircraft generated noise exceeding standards	☺
Others to be developed	☹

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## System Outcomes and Key Indicators

- **Environmental Quality** – Maintain and enhance the quality of the natural and human environment.

✓Water Quality (under development)

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## System Outcomes and Key Indicators

- **Equity** – Ensure no person, on the ground of race, color, or national origin, be excluded from participation in, be denied benefits of, or be subjected to discrimination. Ensure no disproportionate impact based on income and ethnic group. Ensure equitable sharing of benefits and accessibility for people with disabilities.

(measure under development)

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## System Outcomes and Key Indicators

- **Mobility/Reliability/Accessibility** – Minimize time and cost and maximize choice and dependability. Reach desired destinations within reasonable time and cost and with reasonable choice, dependability, and ease.

✓Travel Time (Mobility)

Travel time within key regional & interregional corridors	
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## System Outcomes and Key Indicators

- **Mobility/Reliability/Accessibility**

- ✓ Travel Delay (Mobility)

Total passenger hours of delay in key travel corridors	☺
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"Speeds of 35 miles per hour or less lasting 15 minutes or longer during peak commute periods."

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## System Outcomes and Key Indicators

- **Mobility/Reliability/Accessibility**

- ✓ On-Time Performance (Reliability)

% on-time performance in key corridors (transit)	☺
Variability in travel time in key travel corridors (highways)	☺

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## System Outcomes and Key Indicators

- **Mobility/Reliability/Accessibility**

- ✓ Availability of Modal Choices (Accessibility)

Modes available in key travel corridors and at key transportation centers	☺
% of workers within "x" minutes of their jobs	☺
Modal split	☺
% conventional highways with min. 4' paved shoulders (bicycle travel)	☹
% jobs within quarter/half mile of transit station	☺
% of population within quarter/half mile of transit station/bus corridor	☺

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## System Outcomes and Key Indicators

- **Productivity** – Maximize throughput or efficiency (system-wide).

- ✓ Throughput

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## System Outcomes and Key Indicators

- **Productivity**

- ✓Throughput

% of vehicles traveling through a corridor versus carrying capacity (highway)	😊
% of people traveling through a corridor versus carrying capacity (all modes)	😐
Passenger per vehicle service mile/service hour	😊
Passenger miles per train mile	😊
% trucks by axle (5-axle and greater in key corridors)	😊
Commercial airport capacity by type and demand	😐

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## System Outcomes and Key Indicators

- **Return on Investment** – Benefit-cost analysis or best return on investment (includes life-cycle costing).  
(measure under development)

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## System Outcomes and Key Indicators

- **Safety** – Reduce fatalities, injury, and property loss of system users and workers. Facilitate perception of personal safety.

✓Traveler Safety

Injuries, fatalities and collisions – rates and totals
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## System Outcomes and Key Indicators

- **Safety**

✓Worker Safety

Injuries and fatals – rates and totals
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## System Outcomes and Key Indicators

- **Safety**

- ✓ Crime statistics at transportation facilities

Crime statistics at transportation facilities	☹
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## System Outcomes and Key Indicators

- **System Preservation** – Preserve the publicly owned transportation system at a specified state of repair or condition. Physical condition of the system.

- ✓ Asset Condition (Hwy, Streets, & Roads)

Pavement – % distressed lane miles and smoothness	☺
Bridges - % structurally deficient or functionally obsolete	☺
Roadside – level of service	☺

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## System Outcomes and Key Indicators

- **System Preservation**

- ✓ Asset Condition (Transit/Rail)

Vehicle fleet age and mileage	☺
Miles between service calls	☺
% equipment available for service	☺
Guideway condition (rail and structures)	☹

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## System Outcomes and Key Indicators

- **System Preservation**

- ✓ Asset Condition (Aviation)

General aviation runway pavement condition	☺
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- ✓ Asset Condition (Pedestrian & Bicycle Facilities)

Pedestrian and bicycle facility condition	☹
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