

"The obligation of any component is to contribute its best to the *system*, not to maximize its own production, profit, or sales ... "

- Dr. W. Edwards Deming



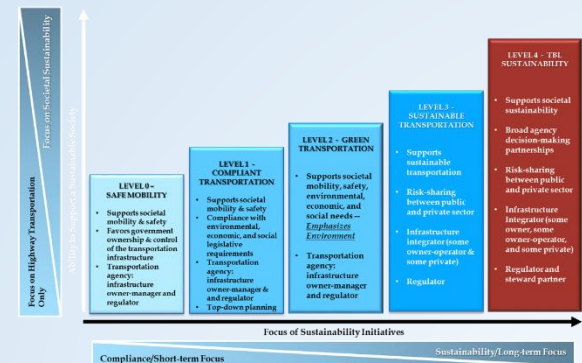
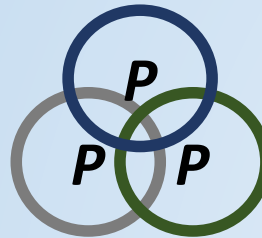
<http://1drv.ms/1JxP8IA>

# Sustainability as an Organizing Principle for DOTs

Sacramento CA, June 2015

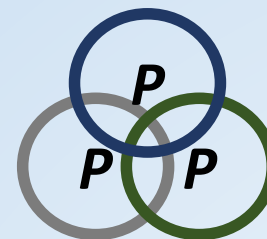
Σ Gary R. McVoy, Ph.D.  
McVoy Associates, LLC

<http://1drv.ms/1JxP8IA>



# Sustainability as an Organizing Principle for DOTs

- **Objective: A Sustainable Society...**
  - **Why, What, How**
- Organizational Framework Assessment
  - Means & methods
- Process Measurement
  - Rating tools
- Outcome Measurement
  - Valuation tools
- Improving Organizations, Processes, and Outcomes
- Contextual Example - Caltrans Strategic Mgt. Plan





## NCHRP REPORT 750

Strategic Issues Facing Transportation

Volume 4



50+ years out

## Sustainability as an Organizing Principle for Transportation Agencies

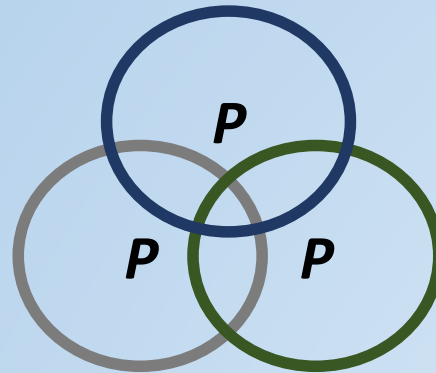
[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_750v4.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_750v4.pdf)

# Why



# “Transportation in support of a more sustainable society”

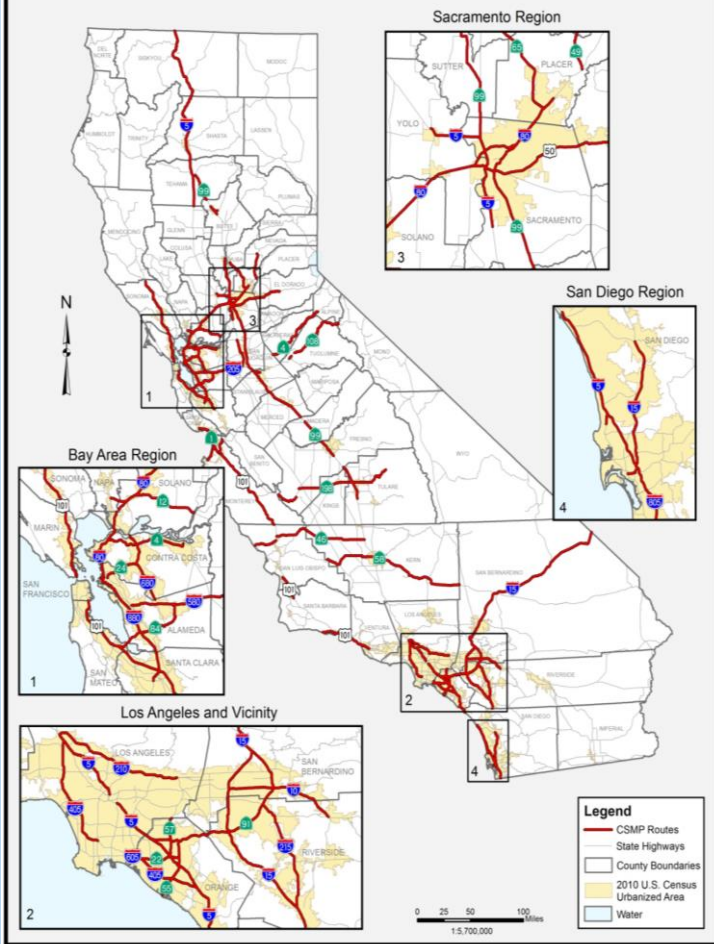
## What



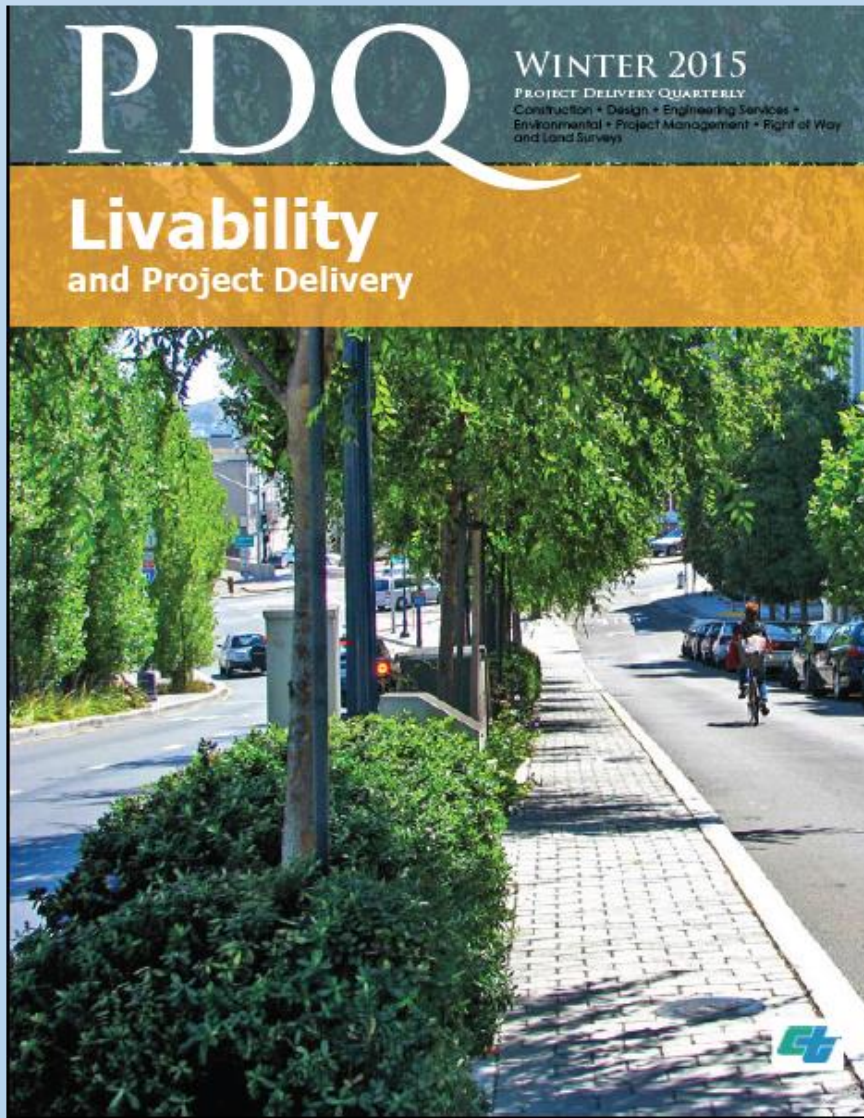
## How!

<b>\$</b>	Governance and Policymaking	Decision-making	Enterprise Management
	Consensus on Needs and Goals	Planning and Programming	Service and Product Delivery
	Regulation and Rulemaking		
	Outreach and Communications	Budgeting and Resource Allocation	
	Compliance and Dispute Resolution		
	Education, Training, and Culture Change		

# Corridor System Management Plan (CSMP) Routes







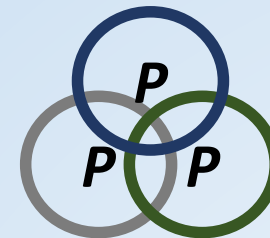
**Livability,** a component of sustainability, describes the degree to which the environment improves human quality of life. Transportation facilitates improved livability when they support accessible multimodal travel options, economic development, ecological quality, social equity, public health and safety, and vibrant public spaces which encourage positive social interactions.

**Karla Sutliff**

Project Delivery Deputy Director  
(Chief Engineer – Caltrans)


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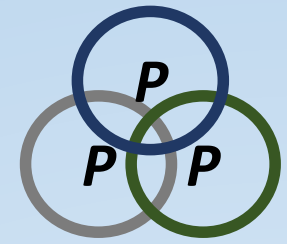
# Transportation Agency functions (How)

	<b>Governance and Policymaking</b>	<b>Decision-making</b>	<b>Enterprise Management</b>
 <p><b>High-Level Functions</b></p>	Consensus on Needs and Goals	Planning and Programming	Service and Product Delivery
	Regulation and Rulemaking		
	Outreach and Communications	Budgeting and Resource Allocation	
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	Education, Training, and Culture Change		

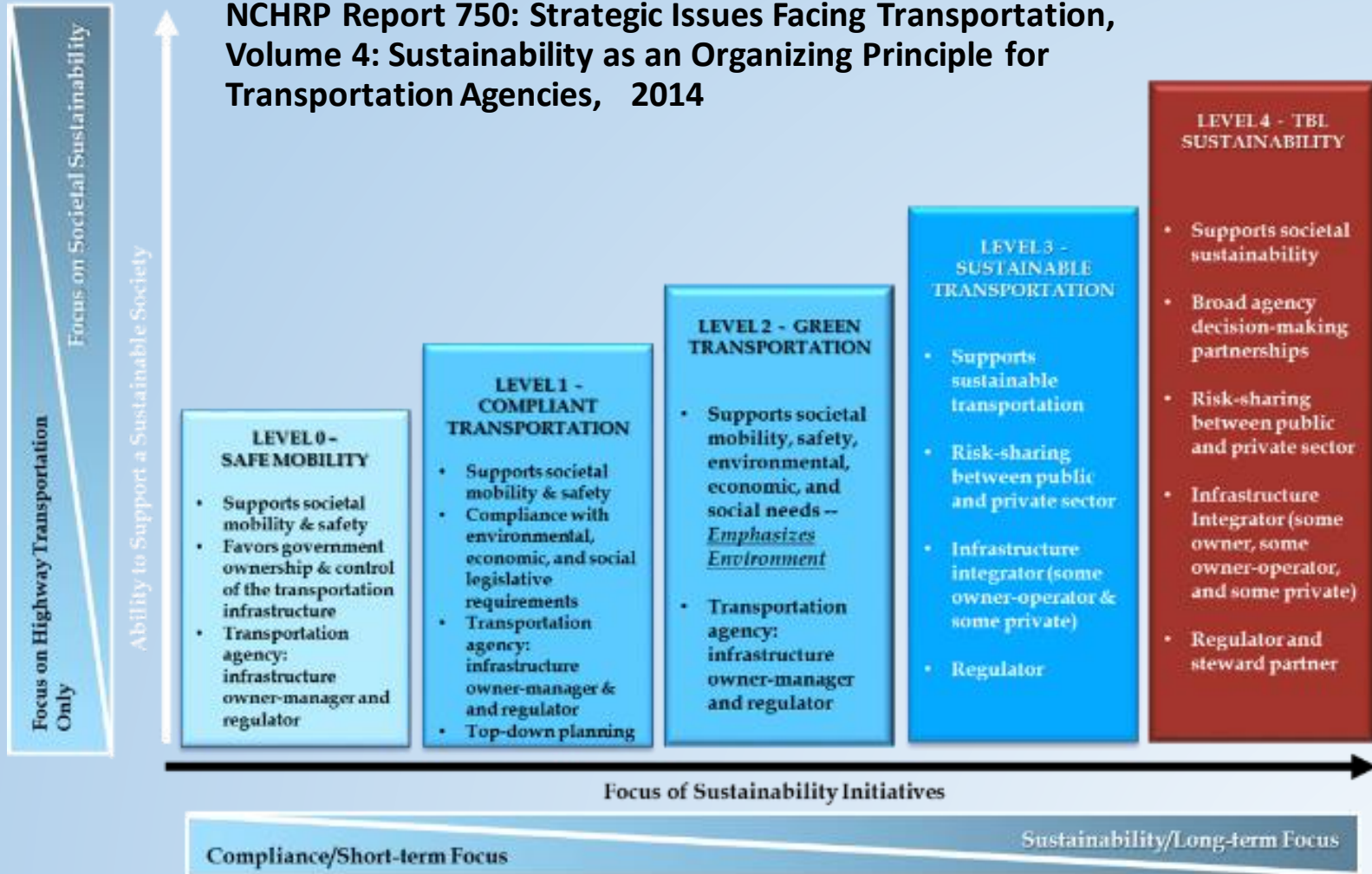
NCHRP Report 750: Strategic Issues Facing Transportation,  
 Volume 4: Sustainability as an Organizing Principle for Transportation Agencies

[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_750v4.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_750v4.pdf)

# Transportation Agency Sustainability Maturity Model



NCHRP Report 750: Strategic Issues Facing Transportation, Volume 4: Sustainability as an Organizing Principle for Transportation Agencies, 2014



# Benchmarking Tool (Conversation Starter)

Maturity level	Characteristics	Score
<b>Safe Mobility</b>	<ul style="list-style-type: none"> <li>• Support societal mobility</li> <li>• Favors government ownership &amp; control of the transportation infrastructure</li> <li>• Transportation agency as infrastructure owner–manager &amp; regulator</li> </ul>	8 to 11
<b>Compliant Transportation</b>	<ul style="list-style-type: none"> <li>• Support societal mobility</li> <li>• Compliance with environmental, economic, and social legislative requirements</li> <li>• Transportation agency as infrastructure owner–manager &amp; regulator</li> <li>• Top-down, planning</li> </ul>	12 to 19
<b>Green Transportation</b>	<ul style="list-style-type: none"> <li>• Support societal mobility &amp; environmental, economic, and social needs—<i>emphasizes environment</i></li> <li>• Transportation agency as infrastructure owner–manager &amp; regulator</li> </ul>	20 to 27
<b>Sustainable Transportation</b>	<ul style="list-style-type: none"> <li>• Support sustainable transportation</li> <li>• Favors partnerships between public and private sector</li> <li>• Transportation agency as infrastructure coordinator &amp; regulator</li> </ul>	28 to 36
<b>Support TBL Sustainability</b>	<ul style="list-style-type: none"> <li>• Support societal sustainability</li> <li>• Agnostic on issues of ownership or control of transportation infrastructure—whatever is most sustainable</li> <li>• Transportation agency as transportation system steward</li> </ul>	37 to 40

[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_750v4.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_750v4.pdf)



**NEW YORK STATE  
DEPARTMENT OF  
TRANSPORTATION**


# Sustainability as an Organizing Principle Survey, per NCHRP 750 Volume 4 /

## Observations following NYSDOT 3/13/15 Workshop and Debrief

April 4, 2015  
GmcvoyLLC@gmail.com



**NCHRP REPORT 750**  
Strategic Issues Facing Transportation  
Volume 4



**Sustainability as an Organizing Principle for Transportation Agencies**

[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_750v4.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_750v4.pdf)

**Sustainability Maturity Model Survey**  
as adapted by Panel Chair, Gary McVoy from Appendix F. NCHRP Report 750 Vol. 4; Sustainability as and Organizing Principle for Transportation Agencies



**NCHRP Report 750, Vol. 4 Sustainability as an Organizing Principle for Transportation Agencies**

**Appendix F: Transportation Agency Sustainability Maturity Rating Tool**

Excel Spreadsheet as updated from 8 Oct. 12

7/13/2014

## Edited questions were regrouped by topic to better illustrate progression

### 3. Needs

- Needs driven by political decision makers and major stakeholders
- Needs shaped by political decision makers and major stakeholders, **and assessment of public sentiment**
- Needs driven by **public sentiment, performance, and TBL sustainability (Triple Bottom Line - economic, social, environmental) consideration**
- Cross-agency decision makers, stakeholders, and the public participate actively** in needs determination and goal-setting

### 4. Goals

- Goals constrained by funding and regulations (including environmental)
- Goals focus on sustainable (TBL - Triple Bottom Line - economic, social, environmental) transportation services and programs
- Goals and policies focus on TBL sustainability, i.e. goals and policies advance economic, social and environmental considerations

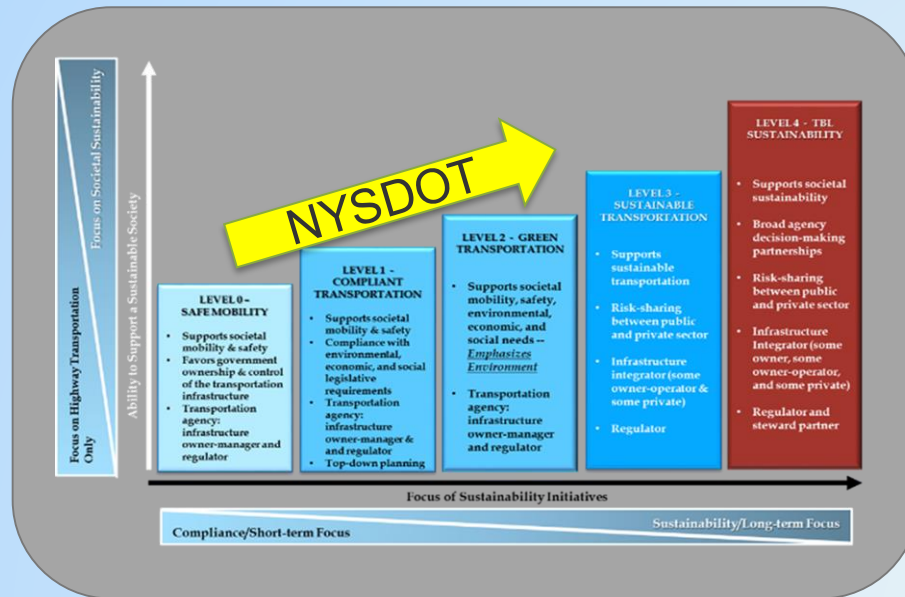
### 5. Public Participation

- Public participation limited to formal regulated processes
- Some formal outreach and consensus-building
- Significant formal outreach and consensus-building
- Substantial transparency and active outreach and two-way public dialogue
- Active two-way public engagement and consensus in strategic decisions

### 6. Environment

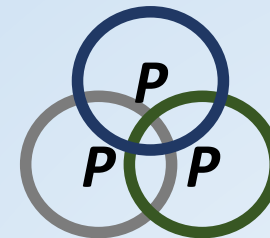
## Observations on NYSDOT Maturity Model Pilot:

1. Progress seems bounded by external factors, e.g.. Budget, Laws and Regs, Current staffing, Expectations
2. Wider dissemination may have added additional insights into how the agency as a whole understands sustainability.
3. Survey alone is insufficient – prompting dialog is the key



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# Maturity Level / Goals / Metrics

<p><b>Level 0</b> <b>Safe Mobility</b></p>	<ol style="list-style-type: none"> <li>1. Mobility</li> <li>2. Safety</li> <li>3. Economic development</li> </ol>	<p><b>AADT / Speed</b> <b>Crash rates / Fatalities</b> <b>Stakeholder Satisfaction</b></p>
<p><b>Level 1</b> <b>Compliant Transportation</b></p>	<ol style="list-style-type: none"> <li>1. Mobility</li> <li>2. Safety</li> <li>3. Economic development</li> <li>4. Environmental</li> <li>5. Public participation</li> </ol>	<p><b>AADT / Speed / delay</b> <b>Crash rates / Fatalities</b> <b>Stakeholder Satisfaction</b> <b>NEPA / Project delay</b> <b>Compliance</b></p>

<p>Level 2 Green Transportation</p>	<ol style="list-style-type: none"> <li>1. Mobility</li> <li>2. Accessibility</li> <li>3. Safety</li> <li>4. Economic development</li> <li>5. Environmental</li> <li>6. Public participation</li> </ol>	<p>AADT / Congestion / Emissions Transit Ridership Crash rates / Fatalities</p>
<p>Level 3 Sustainable Transportation</p>	<ol style="list-style-type: none"> <li>1. Sustainability (Green)</li> <li>2. Mobility</li> <li>3. Accessibility</li> <li>4. Safety</li> <li>5. Economic Development</li> <li>6. Connectivity</li> <li>7. System efficiency</li> <li>8. Public Participation</li> </ol>	
<p>Level 4 TBL Sustainability</p>	<ol style="list-style-type: none"> <li>1. Sustainability (TBL):             <ol style="list-style-type: none"> <li>1. Mobility and safety</li> <li>2. Accessibility</li> <li>3. Connectivity</li> <li>4. System efficiency</li> </ol> </li> <li>2. Public Participation</li> </ol>	<p>Decision Valuation BCA</p>

# Transportation Effects

<b><u>Economic</u></b>	<b><u>Environmental</u></b>	<b><u>Societal</u></b>
Congestion	Air Pollution	Impact Inequity
Mobility	Carbon Emission	Property value
Crash Savings	Habitat Loss	Health
Facility Benefits	Water Quality	Cohesion
Consumer Benefits	Hydrologic	Livability
Improved Commerce	Noise	Aesthetics

Source: Adapted from "Sustainable Transportation and TDM: Planning That Balances Economic, Social and Ecological Objectives;" Victoria Transport Policy Institute (An independent Canadian research organization)

5

# Goals / Metrics : “SMART”

- **S = Specific:** clear and focused to avoid misinterpretation. Should include measure assumptions and definitions and be easily interpreted.
- **M = Measurable:** can be quantified and compared to other data. It should allow for meaningful statistical analysis. Avoid "yes/no" measures except in limited cases, such as start-up or systems-in-place situations.
- **A = Attainable:** achievable, reasonable, and credible under conditions expected.
- **R = Realistic:** fits into the organization's constraints and is cost-effective.
- **T = Timely:** doable within the time frame given.

University of California <http://www.orau.gov/pbm/documents/overview/uc.html>

# Maturity Level / Goals / Metrics

Level 0 Safe Mobility	<ol style="list-style-type: none"> <li>1. Mobility</li> <li>2. Safety</li> <li>3. Economic development</li> </ol>
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<p>AADT/ Speed Crash rates / Fatalities Stakeholder Satisfaction</p> <p>AADT/ Speed / delay Crash rates / Fatalities Stakeholder Satisfaction Project delay Compliance</p>
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<b>Level 2 Green Transportation</b>	<ol style="list-style-type: none"> <li>1. <b>Mobility</b></li> <li>2. <b>Accessibility</b></li> <li>3. <b>Safety</b></li> <li>4. <b>Economic development</b></li> <li>5. <b>Environmental</b></li> <li>6. <b>Public participation</b></li> </ol>
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<p><b>AADT / Congestion / Emissions</b></p> <p><b>Transit Ridership</b></p> <p><b>Crash rates / Fatalities</b></p> <p><b>Stakeholder Satisfaction</b></p> <p><b>NEPA / Appearances / Inform / Comply</b></p>	<p>~Ratings 1.0</p>
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Level 3 Sustainable Transportation	<ol style="list-style-type: none"> <li>1. Sustainability (Green)</li> <li>2. Mobility</li> <li>3. Accessibility</li> <li>4. Safety</li> <li>5. Economic Development</li> <li>6. Connectivity</li> <li>7. System efficiency</li> <li>8. Public Participation</li> </ol>
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<p>Appearances / Ratings 2.0 / TBL Valuation 1.0</p> <p>AADT/ Congestion Transit / Paratransit Crash rates / Fatalities Stakeholder Satisfaction Multi-modal System Congestion / Inform / Engage</p> <p>Ratings 3.0 / AADT / Crash rates Stakeholder Satisfaction Demand satisfaction Valuation BCA Inform / Engage / Involve in valuations for BCA</p>	
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# National and State Level Rating Systems

System	Sponsor	Scope	Organization	Review	link
<b>Envision™</b>	Institute for Sustainable Infrastructure	Infrastructure	<b>checklist</b> includes 60 credits in five categories (Quality of Life, Leadership, Resource Allocation, Natural World and Climate and Risk);	Fee-based review	<a href="http://www.sustainableinfrastructure.org/rating/">http://www.sustainableinfrastructure.org/rating/</a>
<b>GreenLITES</b>	New York State DOT	Highways	<b>checklist</b> includes 180 criteria planning through operations and maintenance	Self-assessment	<a href="https://www.dot.ny.gov/programs/greenlites">https://www.dot.ny.gov/programs/greenlites</a>
<b>INVEST</b>	FHWA (USDOT Federal Highway Administration)	Highways	<b>checklist</b> includes 64 Criteria planning through operations and maintenance	Self-assessment	<a href="https://www.sustainablehighways.org/">https://www.sustainablehighways.org/</a>
<b>GreenRoads™</b>	Greenroads Foundation	Highways	<b>checklist</b> includes 48 criteria focused on design and construction	Fee based review	<a href="https://www.greenroads.org/">https://www.greenroads.org/</a>
<b>STARS</b>	North American Sustainable Transportation Council (STC)	Multi-Modal Transportation	<b>checklist</b> includes 29 credits planning through operations	Fee-based review	<a href="http://www.transportationcouncil.org/">http://www.transportationcouncil.org/</a>
<b>TIGER</b>	USDOT	Transportation - All Modes	<b>Benefit / Cost</b> - dollar based valuation across many aspects of the Triple Bottom Line	Grant Program Application	<a href="http://www.dot.gov/policy-initiatives/tiger/tiger-bca-resource-guide-2014">http://www.dot.gov/policy-initiatives/tiger/tiger-bca-resource-guide-2014</a>



# INVEST

ECONOMIC • SOCIAL • ENVIRONMENTAL

# INVEST

Self-assessment tool for transportation sustainability

- Voluntary
- Web based
- Best practices for highways
- Includes planning, project development, operations and maintenance



U.S. Department of Transportation  
Federal Highway Administration



# INVEST: Sustainability throughout the Transportation Lifecycle



Affected Triple Bottom Line Principles



Voluntary • Private • Free • Flexible • Practical



## NYS DOT Tool

- measure performance,
- foster improvement



## Earth Day Award Cycle



## Programmatic approach:

- Applies to all projects
- Recognizes Operations for innovations and best practices
- Promotes optional planning tools



## Duplicated elsewhere

<https://www.dot.ny.gov/programs/greenlites>





# ENVISION™

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

## Collaboration



## ISI Founders (2010)

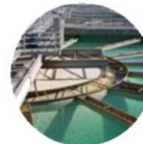


## What Types Of Infrastructure Will Envision™ Rate?



### ENERGY

Geothermal  
Hydroelectric  
Nuclear  
Coal  
Natural Gas  
Oil/Refinery  
Wind  
Solar  
Biomass



### WATER

Potable water  
distribution  
Capture/Storage  
Water Reuse  
Storm Water  
Management  
Flood Control



### WASTE

Solid waste  
Recycling  
Hazardous  
Waste  
Collection &  
Transfer



### TRANSPORT

Airports  
Roads  
Highways  
Bikes  
Pedestrians  
Railways  
Public Transit  
Ports  
Waterways



### LANDSCAPE

Public Realm  
Parks  
Ecosystem  
Services



### INFORMATION

Telecommunications  
Internet  
Phones  
Satellites  
Data Centers  
Sensors



# Checklist Systems: *General Characteristics*

1. “Best Practice” Driven (*Beyond avoidance!*)
2. Process oriented ~ no quantification
3. Limited number of practices
4. One size ~ fits all
5. Excel based – no rollup / no comparables
6. Limited knowledge management
7. Variable taxonomy

# Sustainability Rating Checklist Utility

Broaden thinking	4
Demonstrate credibility	5
Communicate ideas	4
Contrast alternatives	3
Rate projects	4
Rank projects	2
Stimulate / Structure dialog	3
“SMART” / “HARD”	3
Adaptable / Expandable / Flexible	2

# Checklist Systems ~ Next Steps

1. “Context Sensitivity”
  - Importance
  - Opportunity
2. “Quantification”
  - Project results
  - Program results
3. “Knowledge Management”
  - Links to project examples
  - Linkage to guidance



# CHECKLISTS ~ 2.0: Context and Opportunity

<b>SUSTAINABILITY CHECKLIST TOOL: DECISION AND SCORING AID</b>					
		<b>Refinement with PROJECT STAGE ----&gt;</b>			
<b>Scoping</b>		<b>30%</b>	<b>50%</b>	<b>70%</b>	<b>Final</b>
<b>Importance</b>	<b>Opportunity</b>	<b>Utility</b>	<b>Degree</b>	<b>Absolute &amp; Relative Scores</b>	
<b>0-3</b>	<b>0-3</b>	<b>I x O</b>	<b>0-5</b>	<b>U x D</b>	
e.g. ~0 for habitat in Downtown Manhattan vs. ~3 for habitat at Nature Preserve	e.g. ~1 for storm water retention in Downtown Manhattan vs. Greenfield	0-3~unimportant and difficult vs. 6-9 ~important and easy to accomplish	0 ~ not done 1~ std. practice 2~ well done 3~ exceptional 4~ zero impact 5~ restorative	Total score = summation vs. (?) project adjusted score = Total / A x E	

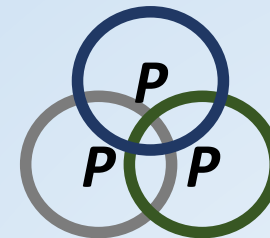
# CHECKLISTS ~ 3.0: Programmatic Approach

## Data Bases / Knowledge Management

SUSTAINABILITY CHECKLIST ON <i>DATA BASE PLATFORM</i>									
	Refinement with PROJECT STAGE ---->								
Scoping	30%	50%	70%	Final					
Importance	Opportunity	Utility	Degree	Absolute & Relative Scores	<b>Units</b>	<b># Units</b>	<b>Project eg's</b>	<b>Guidance</b>	<b><i>http:xyz</i></b>
0-3	0-3	1 x O	0-5	U x D					
e.g. ~0 for habitat in Downtown Manhattan vs. ~3 for habitat at Nature Preserve	e.g. ~1 for storm water retention in Downtown vs. Greenfield	0-3~unimportant and difficult vs. 6-9 ~important and easy to accomplish	0~ not done 1~std. practice 2~well done 3~exceptional 4~zero impact 5~restorative	Total score = summation vs. (?) project adjusted score = Total / Ax E	<b>Acres</b>		<b>X...</b>	<b>Y...</b>	<b>Z...</b>
					<b>Tons</b>				
					<b>Meters</b>				

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# Goals / Metrics : “HARD”

- Heartfelt, you’ve got to have an emotional attachment to your goal, it has to scratch an existential itch.
- Animated, goals need to be motivated by a vision, picture or movie that plays over and over in your mind.
- Required, it needs to feel so urgently necessary that you have no other choice but to start acting on them right here, right now.
- Difficult, goals need to drag you out of your comfort zone, activating your senses and attention.

Mark Murphy, *Hard Goals*:

<https://www.leadershipiq.com/books/hard-goals-the-secret-to-getting-from-where-you-are-to-where-you-want-to-be/>



# Maturity Level / Goals / Metrics

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Level 2 Green Transportation	<ol style="list-style-type: none"> <li>1. Mobility</li> <li>2. Accessibility</li> <li>3. Safety</li> <li>4. Economic development</li> <li>5. Environmental stewardship</li> <li>6. Public participation</li> </ol>

<p>AADT / Speed Crash rates / Fatalities Stakeholder Satisfaction</p>	
<p>AADT / Speed / delay Crash rates / Fatalities Stakeholder Satisfaction Project delay Compliance</p>	
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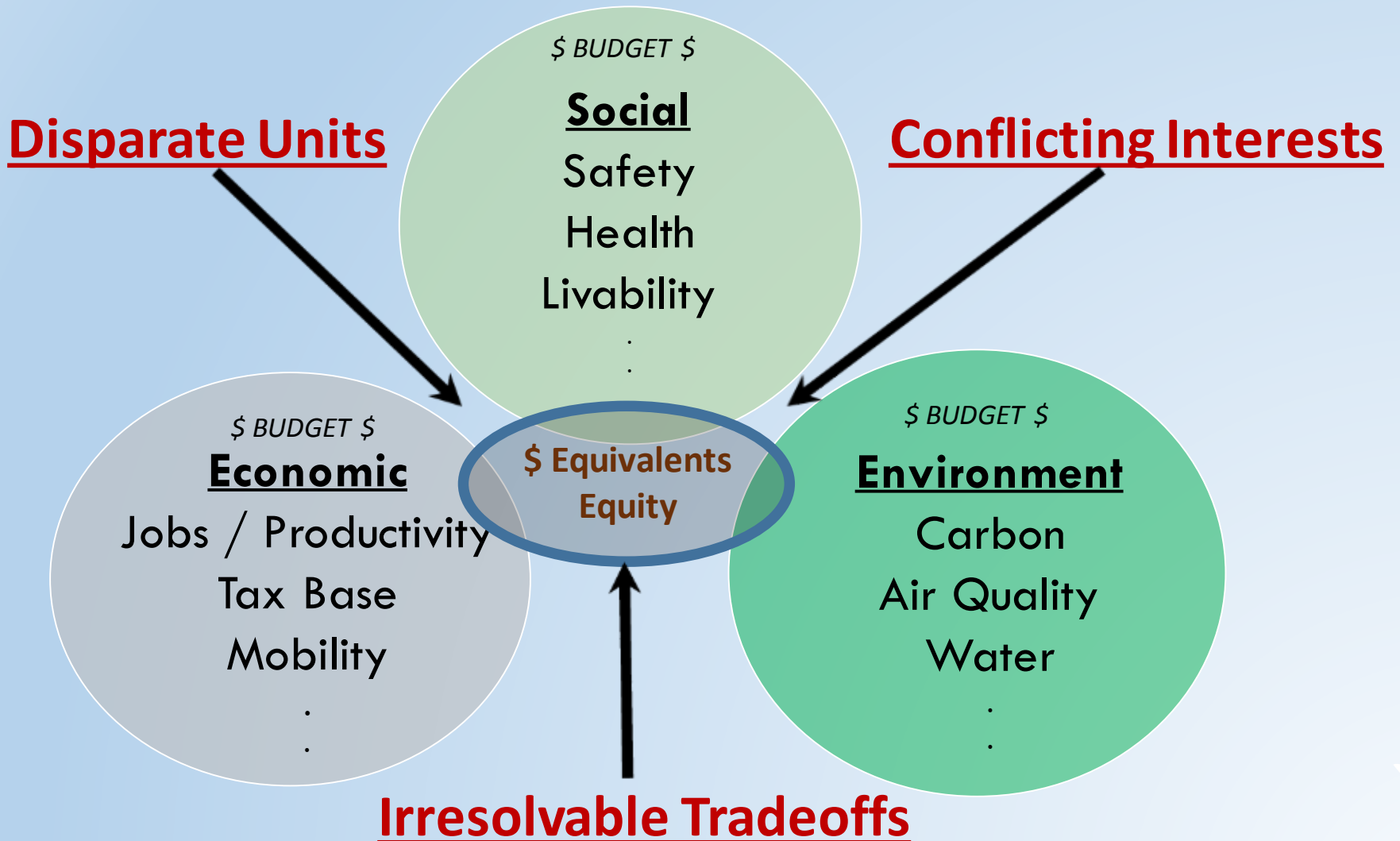
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<p><b>Ratings 2.0 / TBL Valuation 1.0</b></p> <ul style="list-style-type: none"> <li>• AADT / Congestion / Emissions</li> <li>• Transit / Paratransit Ridership</li> <li>• Crash rates / Fatalities</li> <li>• Stakeholder Satisfaction</li> <li>• Multi-modal \$</li> <li>• Congestion / Hours of delay</li> <li>• Inform / Engage</li> </ul>
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Level 4 TBL Sustainability	<ol style="list-style-type: none"> <li>1. Sustainability (TBL): <ol style="list-style-type: none"> <li>1. Mobility and safety</li> <li>2. Accessibility</li> <li>3. Connectivity</li> <li>4. System efficiency</li> </ol> </li> <li>2. Public Participation</li> </ol>
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<p>Ratings 3.0 / TBL Valuation 2.0  AADT / Crash rates / Fatalities  Stakeholder Satisfaction BCA  Demand satisfaction  Valuation BCA  Inform / Engage / Involve in valuations for BCA</p>
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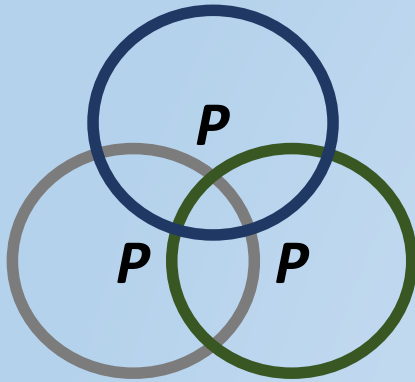
# \$\$\$ -- “The Dismal Science” -- \$\$\$



# Example: USDOT - TIGER

The screenshot shows a Windows Internet Explorer browser window displaying the USDOT TIGER Grants website. The address bar shows the URL <http://www.dot.gov/tiger>. The search bar contains the text "usdot tiger". The website header features the United States Department of Transportation logo and navigation links for "About DOT", "Our Activities", and "Areas of Focus". The main content area includes a breadcrumb trail: [Home](#) > [Policy Initiatives](#) > [Tiger](#). The primary heading is "TIGER Grants", followed by a sub-heading "Program Details". A list of program focus areas is provided: [Driven by Performance](#), [Innovation & Project Acceleration](#), [Safety & State of Good Repair](#), [Livability & Sustainability](#), and [Planning Activities](#). A large graphic on the right side of the page reads "TIGER GRANTS". Below this graphic is a "SHARE" button and a "Related Links" section containing [Application Resources \(FAQ\)](#), [Lessons Learned Webinar](#), and [TIGER 2012 Notice of Funding Availability](#). At the bottom of the page, a "Related Documents" section is partially visible, along with a "[ + ] Feedback" button. The main text at the bottom of the page reads: "On June 22, the U.S. Department of Transportation awarded nearly \$500 million from the".

# Tiger Criteria ~ Triple Bottom Line (TBL)



**TABLE 3 U.S. DOT TIGER Considerations**

<b>Long-Term Outcome</b>	<b>Type of Societal Benefits</b>
Livability	Land Use Changes that reduce VMT Accessibility Property Value Increases
Economic Competitiveness	Travel Time Savings Operating Cost Savings
Safety	Prevented Accidents (property damage), Injuries and Fatalities
State of Good Repair	Long Term Replacement Maintenance & Repair Savings Reduced VMT from not closing bridges
Environmental Sustainability	Environmental benefits from reduced emissions

Source: Federal Register Volume 77, No. 20, January 2012.



# TIGER BENEFIT-COST ANALYSIS (BCA) RESOURCE GUIDE

## How to Use This Guide

This BCA Resource Guide is a supplement to the *2015 Benefit-Cost Analysis Guidance for Tiger Grant Applicants* also found on this site (<http://www.dot.gov/tiger/guidance>). It provides technical information that Applicants will need for monetizing benefits and costs in their Benefit-Cost Analyses, as well as guidance on methodology and a selection of frequently asked questions from past TIGER grant applicants.

This guide is divided into three sections:

### I. Recommended Monetized Values

For the purposes of providing as fair an “apples-to-apples” comparison as possible, applicants should use standard monetization values recommended in this section, which represent some of the values that are accepted for common practice at the U.S. Department of Transportation.

Cost/Benefit Category	Recommended Monetized Value(s)		
Value of Emissions	<b>Emission Type</b>	<b>\$ / short ton (\$2013)</b>	<b>\$ / metric ton (\$2013)</b>
	Carbon dioxide (CO <sub>2</sub> )	(varies)*	(varies)*
	Volatile Organic Compounds (VOCs)	\$1,813	\$1,999
	Nitrogen oxides (NO <sub>x</sub> )	\$7,147	\$7,877
	Particulate matter (PM)	\$326,935	\$360,383
	Sulfur dioxide (SO <sub>x</sub> )	\$42,240	\$46,561
	* See “ <b>Social Cost of Carbon (3%)</b> ” values below.		

Cost/Benefit Category	Recommended Monetized Value(s)		
<b>Value of Travel Time</b>	<b>Recommended Hourly Values of Travel Time Savings (2013 U.S. \$ per person-hour)</b>		
	<b>Category</b>	<b>Surface Modes* (except High-Speed Rail)</b>	<b>Air and High-Speed Rail Travel</b>
	<b>Local Travel</b>		
	Personal	\$12.50	
	Business	\$24.40	
	All Purposes **	\$13.00	
	<b>Intercity Travel</b>		
	Personal	\$17.50	\$33.20
	Business	\$24.40	\$60.70
	All Purposes **	\$19.00	\$44.30
Truck Drivers	\$25.80		
Bus Drivers	\$26.70		
Transit Rail Operators	\$46.30		
Locomotive Engineers	\$38.70		
Airline Pilots and Engineers	\$84.20		

Cost/Benefit Category	Recommended Monetized Value(s)
Value of Statistical Life (VSL)	\$9,400,000 per fatality (\$2013)

Cost/Benefit Category	Recommended Monetized Value(s)			
Value of Injuries	AIS Level	Severity	Fraction of VSL	Unit value (\$2013)
	AIS 1	Minor	0.003	\$ 28,200
	AIS 2	Moderate	0.047	\$ 441,800
	AIS 3	Serious	0.105	\$ 987,000
	AIS 4	Severe	0.266	\$ 2,500,400
	AIS 5	Critical	0.593	\$ 5,574,200
	AIS 6	Not survivable	1.000	\$ 9,400,000

# TBL Valuation System Characteristics

1. Stimulates and facilitates communication
2. Currently bound by BCA conventions
3. Precision tends to trump accuracy
4. Precedents and examples limited
5. Highly complex and technical
6. Limited knowledge management
7. Unused, suspect, and uncomfortable



# TBL Valuation Utility

Broaden thinking	5
Demonstrate credibility	5
Communicate ideas	5
Contrast alternatives	4
Rate projects	4
Rank projects	4
Stimulate / Structure dialog	4
“SMART” / “ <b>HARD</b> ” <i>(Heartfelt, Animating, Required, Difficult)</i>	5
Adaptable / Expandable / Flexible	~5

# TBL Valuation System: Next Steps

1. “Context Sensitivity”
  - Importance
  - Sense of scale
2. “Quantification”
  - Project results
  - Program results
3. “Knowledge Management”
  - Links to project examples
  - Linkage to public outreach

# Example Combination – San Francisco



**MAKING A  
COMPELLING  
CASE**

---

**PERFORMANCE-DRIVEN  
INVESTMENTS IN THE  
MAP-21 ERA**

**Dave Vautin**  
METROPOLITAN TRANSPORTATION COMMISSION  
SSTI WEBINAR - MAY 30, 2014

Image Source: <https://www.flickr.com/photos/ag06/9461330130>

# Example Combination – San Francisco

## PRIMARY ELEMENTS OF PROJECT PERFORMANCE ASSESSMENT



### TARGETS ASSESSMENT

*Determine impact on targets  
adopted by MTC and ABAG*

Analyzed all 1000 uncommitted  
projects









### BENEFIT-COST ASSESSMENT

*Compare benefits & costs*

Analyzed most significant projects  
(approximately 100 in total)



# Example Combination – San Francisco

<b>ECONOMY</b>	 <p><b>ECONOMIC VITALITY</b></p> <p>Increase gross regional product</p>	 <p><b>TRANSPORTATION SYSTEM EFFECTIVENESS</b></p> <p>Increase non-auto mode share and reduce VMT per capita</p> <hr/> <p>Maintain the transportation system</p>
<b>ENVIRONMENT</b>	 <p><b>CLIMATE PROTECTION</b></p> <p>Reduce per-capita greenhouse gas emissions from cars and light-duty trucks</p>	 <p><b>HEALTHY AND SAFE COMMUNITIES</b></p> <p>Reduce premature deaths from exposure to particulate emissions</p> <hr/> <p>Reduce injuries and fatalities from collisions</p> <hr/> <p>Increase average daily time spent walking or biking</p>
<b>EQUITY</b>	 <p><b>ADEQUATE HOUSING</b></p> <p>House all of the region's projected housing growth</p>	 <p><b>EQUITABLE ACCESS</b></p> <p>Decrease housing and transportation costs as a share of low-income household budgets</p>

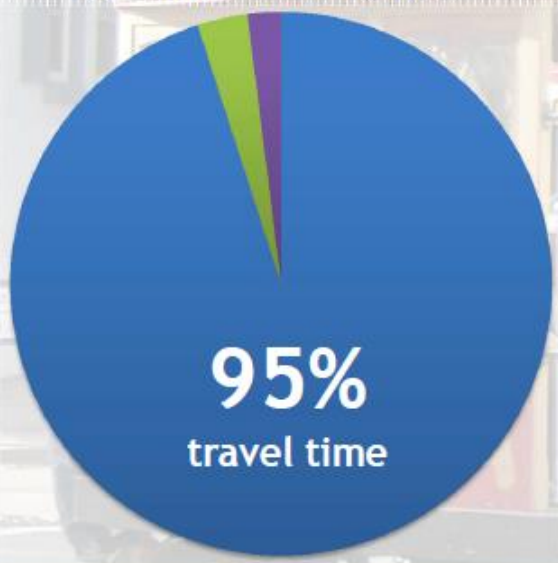


# Example Combination – San Francisco

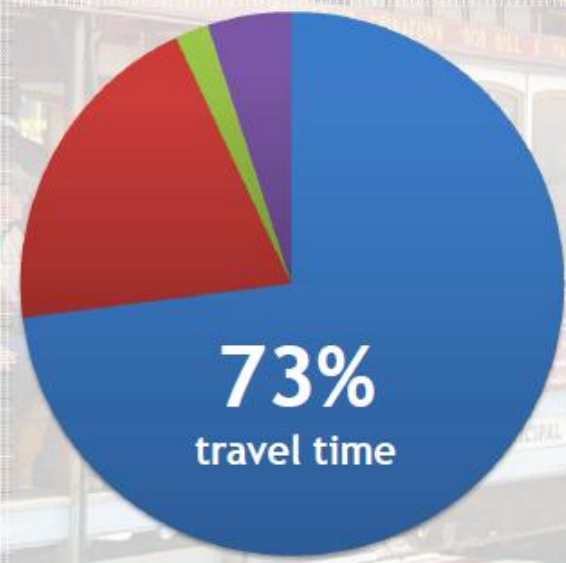
5

## Is it possible to quantify “non-traditional” benefits?

Benefit Distribution for a Typical ROADWAY Project



Benefit Distribution for a Typical TRANSIT Project



Note that negative benefits (disbenefits) are not shown.

“Other” benefits include: collision reduction, noise reduction, and health benefits from active transportation.

■ Travel Time ■ Travel Cost  
■ Air Pollutants ■ Other

# Example Combination – San Francisco



## Targets Assessment

*Assessed qualitatively using target scores (max score of +10).*

1. Climate Protection
2. Adequate Housing
3. Particulate Matter
4. Collisions
5. Active Transportation
6. Open Space
7. Equitable Access
8. Economic Vitality
9. Non-Auto Mode Share/VMT
10. State of Good Repair



## Benefit-Cost Assessment

*Assessed quantitatively using MTC Travel Model One.*

### **BENEFITS**

- Travel time (including recurring & non-recurring delay)
- Travel cost (auto operating/ownership, parking)
- Emissions (CO<sub>2</sub>, PM<sub>2.5</sub>, ROG, NO<sub>x</sub>)
- Collisions (fatalities, injuries, property damage)
- Health impacts due to active transport
- Noise

### **COSTS**

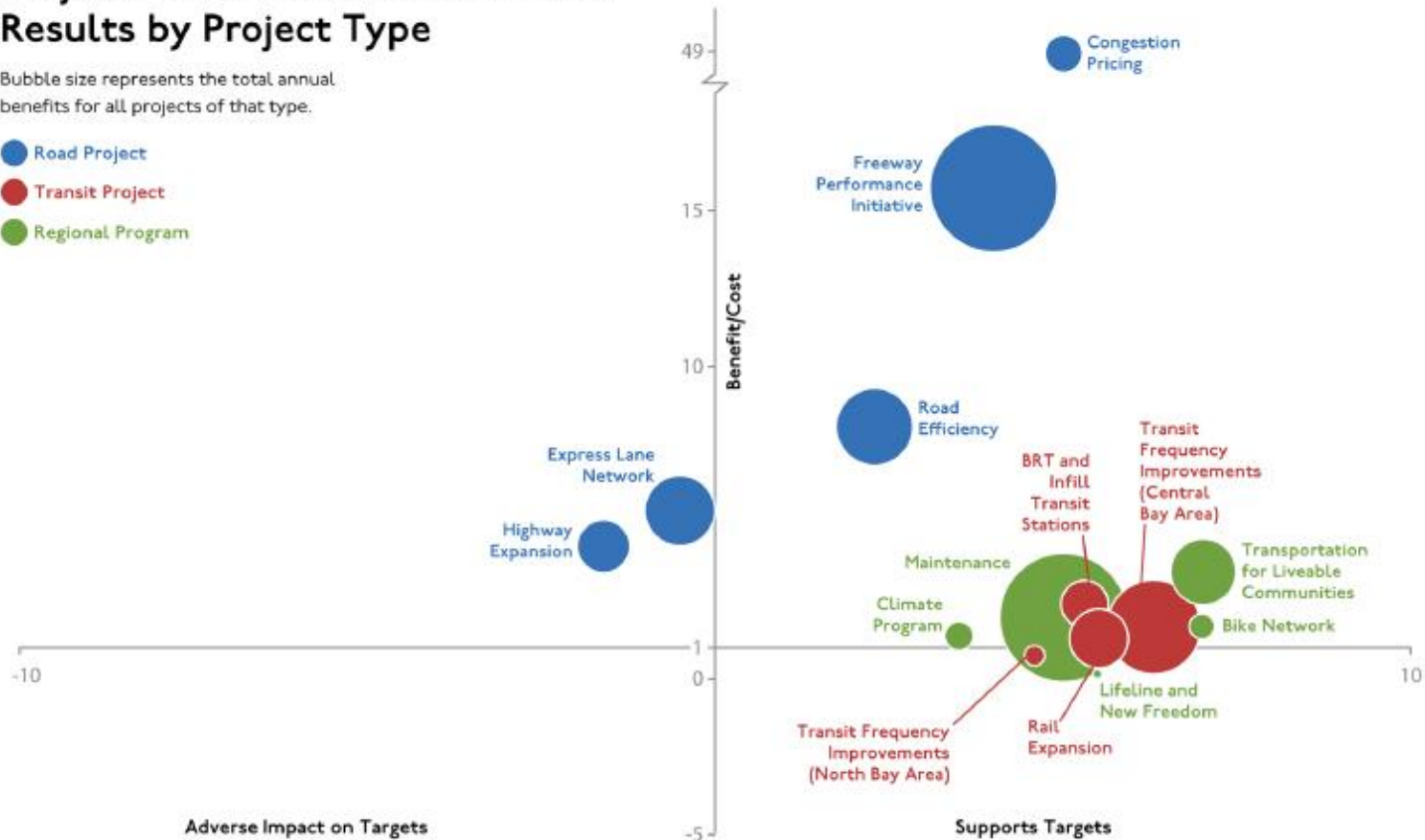
- Capital costs
- Net operating and maintenance (O&M) costs

# Example Combination – San Francisco

## Project Performance Assessment: Results by Project Type








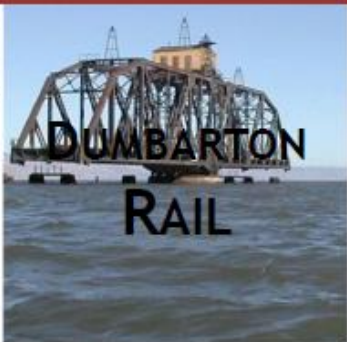
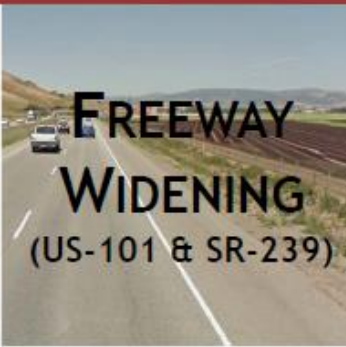
Bubble size represents the total annual benefits for all projects of that type.

- Road Project
- Transit Project
- Regional Program





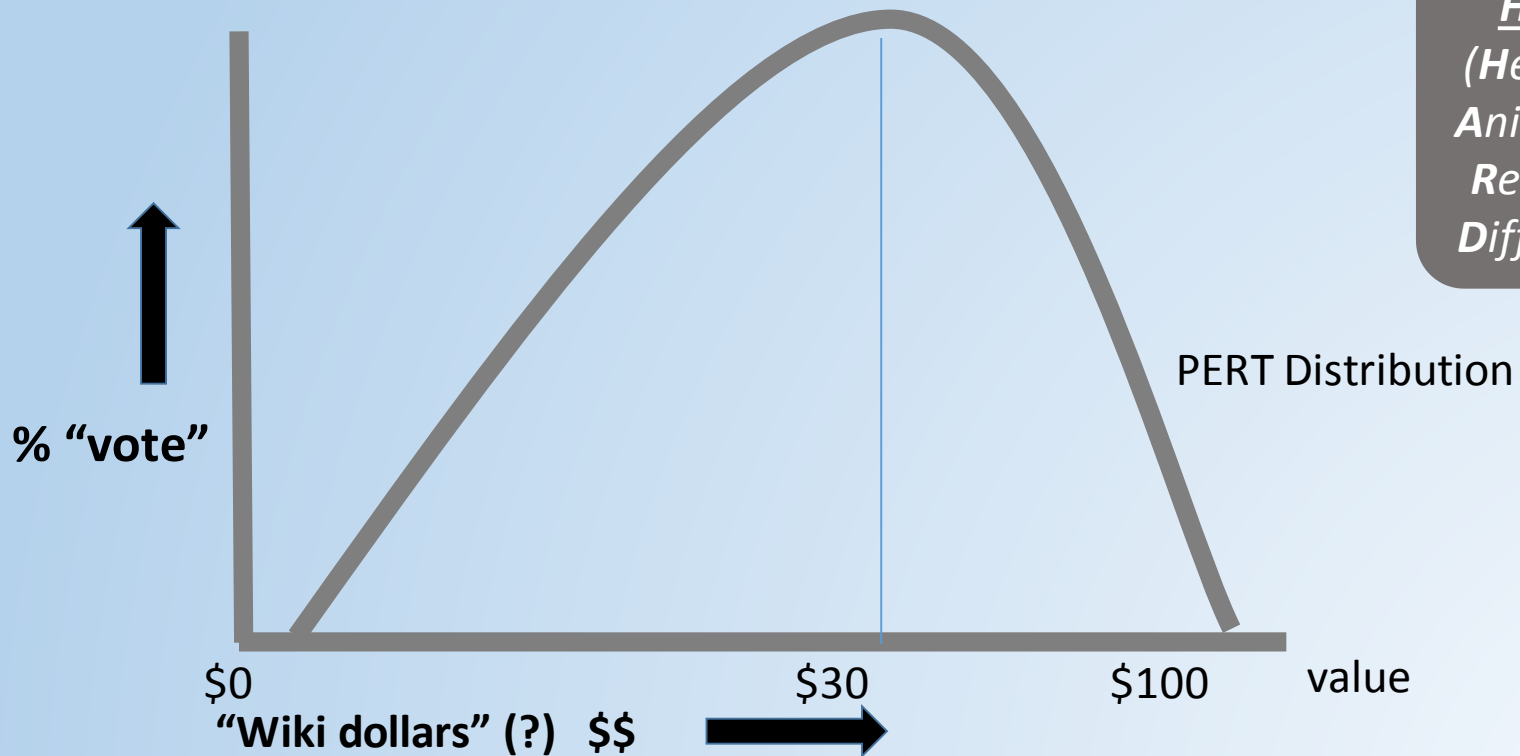
# Example Combination – San Francisco

<p><b>SAMPLE HIGH-PERFORMING PROJECTS</b></p> <p><i>PRIORITIZED FOR REGIONAL FUNDING</i></p>	 <p><b>BART METRO</b></p>	 <p><b>URBAN BRT SYSTEMS</b></p>	 <p><b>CALTRAIN</b></p>
	 <p><b>BART EXTENSION SAN JOSE</b></p>	 <p><b>SF CONGESTION PRICING</b></p>	 <p><b>FREEWAY PERFORMANCE INITIATIVE</b></p>
<p><b>SAMPLE LOW-PERFORMING PROJECTS</b></p> <p><i>REQUIRED COMPELLING CASE FOR INCLUSION IN PLAN</i></p>	 <p><b>SMART EXPANSION</b></p>	 <p><b>DUMBARTON RAIL</b></p>	 <p><b>FREEWAY WIDENING (US-101 &amp; SR-239)</b></p>

# Theoretical -- Community input / values...

Low                      Most Likely                      High

**Value of a Paratransit Ride?**

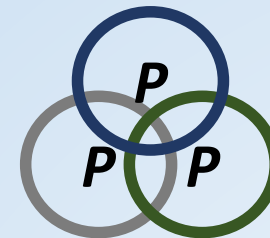


***HARD***  
*(Heartfelt  
Animating  
Required  
Difficult...)*



# Sustainability as an Organizing Principle for DOTs

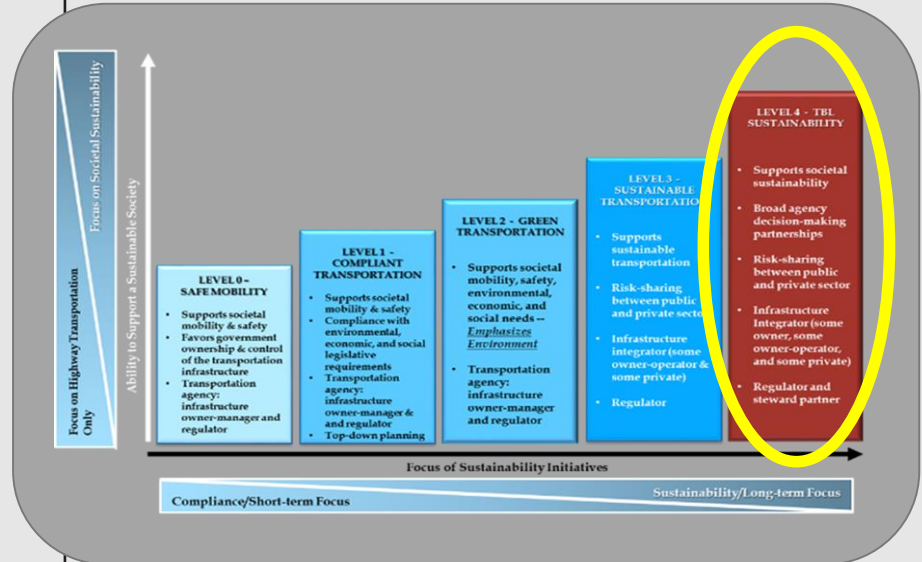
- Objective: A Sustainable Society...
  - Why, What, How
- Organizational Framework Assessment
  - Means & methods
- Process Measurement
  - Rating tools
- Outcome Measurement
  - Valuation tools
- **Improving Organizations, Processes, and Outcomes**
- Contextual Example - Caltrans Strategic Mgt. Plan



# Maturity Level / Results / Metrics

Level 0 Safe Mobility	1. Mobility 2. Safety 3. Economic development
Level 1 Compliant Transportation	1. Mobility 2. Safety 3. Economic development 4. Environmental compliance 5. Public participation
Level 2 Green Transportation	1. Mobility 2. Accessibility 3. Safety 4. Economic development 5. Environmental 6. Public participation
Level 3 Sustainable Transportation	1. Sustainability (Green) 2. Mobility 3. Accessibility 4. Safety 5. Economic Development 6. Connectivity 7. System efficiency 8. Public Participation

AADT/ Speed  
Crash rates / Fatalities  
Stakeholder Satisfaction



Crash rates / Fatalities  
Stakeholder Satisfaction  
Multi-modal \$  
Congestion/ Hours of delay  
Inform/Engage

<b>Level 4 TBL Sustainability</b>	<b>1. Sustainability (TBL):</b> 1. <b>Mobility and safety</b> 2. <b>Accessibility</b> 3. <b>Connectivity</b> 4. <b>System efficiency</b> <b>Public Participation</b>
---	---

**Ratings 3.0 / TBL Valuation 2.0**

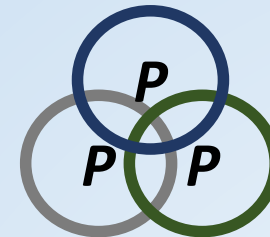
- **AADT / Crash rates / Fatalities**
- **Stakeholder Satisfaction BCA**
- **Demand satisfaction**
- **Valuation BCA**
- ***Involve in valuations for BCA***

# Use of publically vetted \$ equivalent TBL metrics + Best Practices has potential to:

- Broaden thinking
- Improve communications
- Increase transparency
- Facilitate networking
- Improve sensitivity analysis
- Be more consistent with financing questions
- Be helpful in a political context (?)
- Be “**HARD**” (Heartfelt, Animating, Required, Difficult...)

# Sustainability as an Organizing Principle for DOTs

- Objective: A Sustainable Society...
  - Why, What, How
- Organizational Framework Assessment
  - Means & methods
- Process Measurement
  - Rating tools
- Outcome Measurement
  - Valuation tools
- Improving Organizations, Processes, and Outcomes
- **Contextual Example - *Caltrans Strategic Management Plan***



# Caltrans Strategic Management Plan -



**Good**  
Better  
Best...





## Our Mission

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

### Safety and Health

Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.

### Stewardship and Efficiency

Money counts. Responsibly manage California's transportation-related assets.

### Sustainability, Livability and Economy

Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.

### System Performance

Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

### Organizational Excellence

Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability.

## Our Vision

A performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and teamwork.

Integrity ■ Commitment ■ Teamwork ■ Innovation

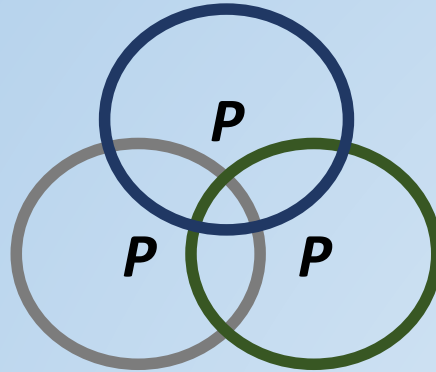
# Why



## Our Mission

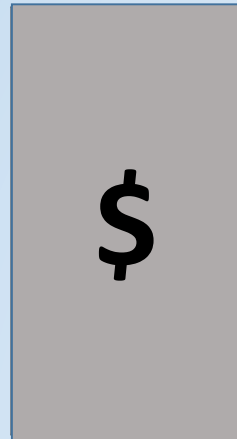
Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

## What



*“Transportation in support of a more sustainable society”*

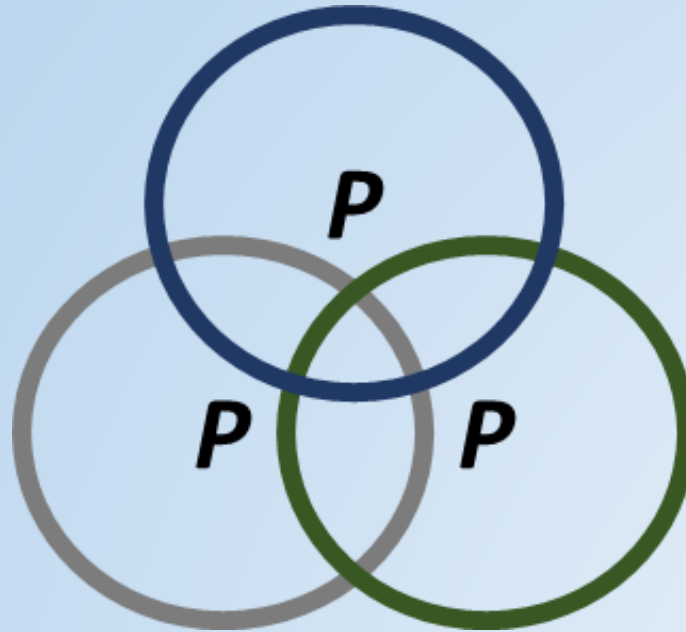
## How!



Governance and Policymaking	Decision-making	Enterprise Management
Consensus on Needs and Goals	Planning and Programming	Service and Product Delivery
Regulation and Rulemaking		
Outreach and Communications	Budgeting and Resource Allocation	
Compliance and Dispute Resolution		
Education, Training, and Culture Change		

## **Safety and Health**

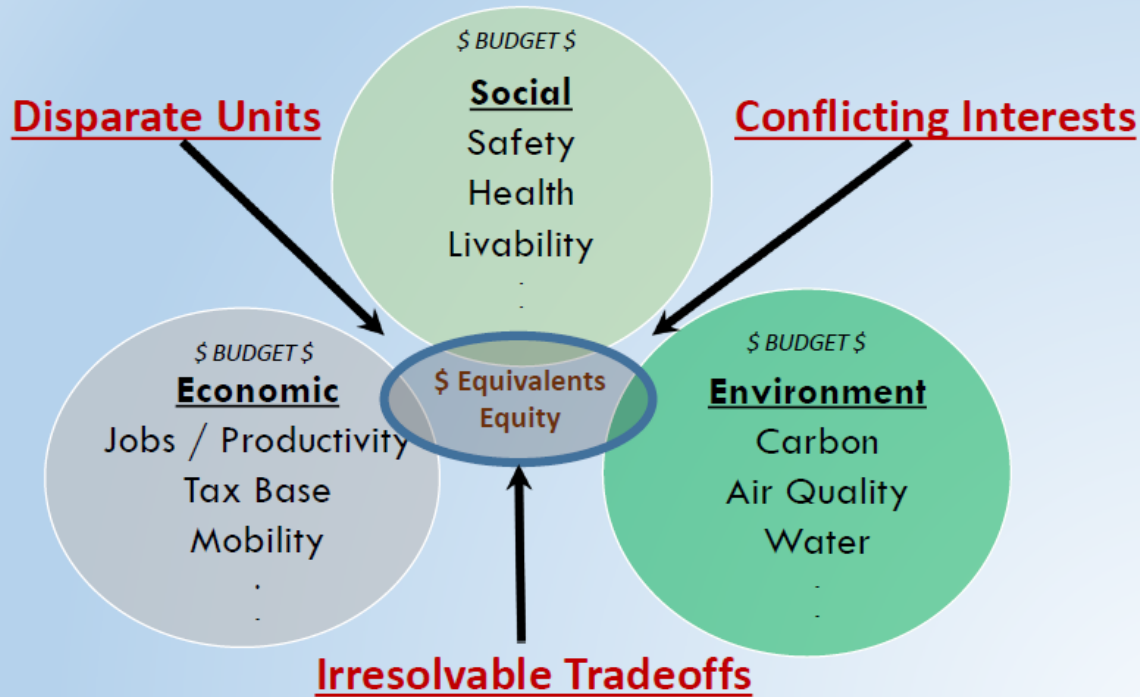
**Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.**



# Stewardship and Efficiency

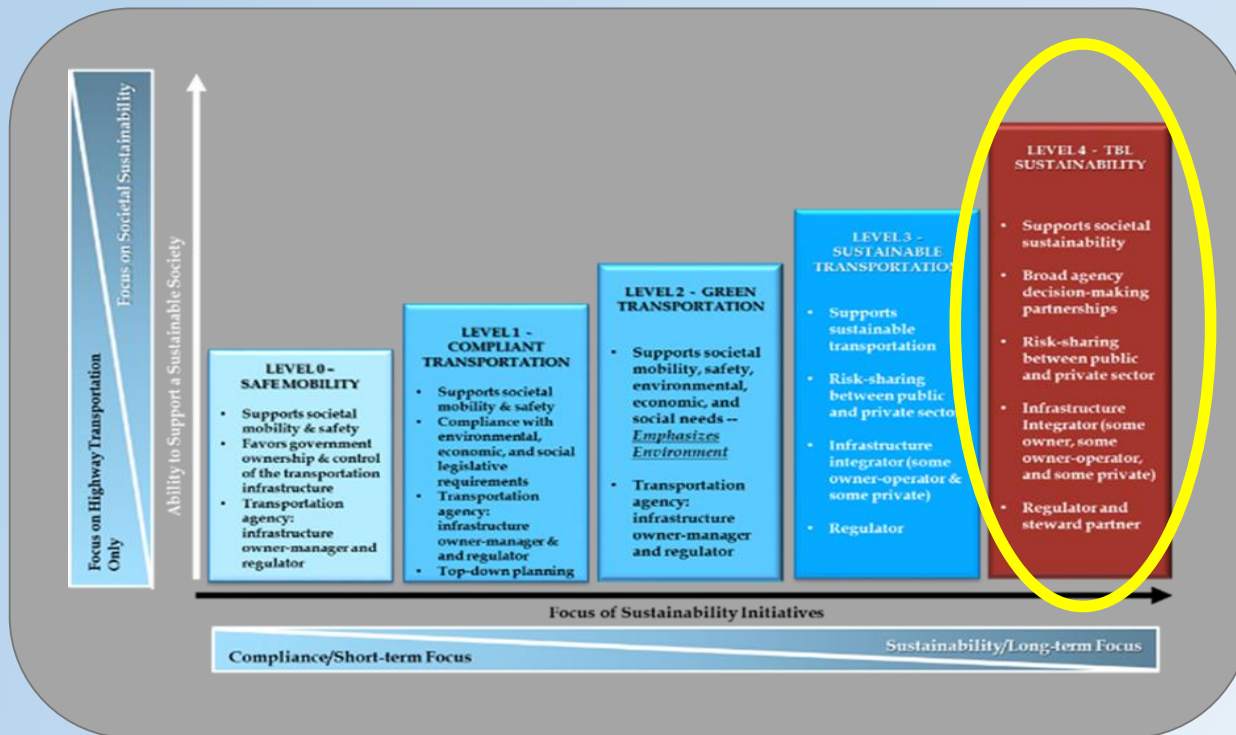
Money counts. Responsibly manage California's transportation-related assets

\$\$\$ -- "The Dismal Science" -- \$\$\$



# Sustainability, Livability and Economy

Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.

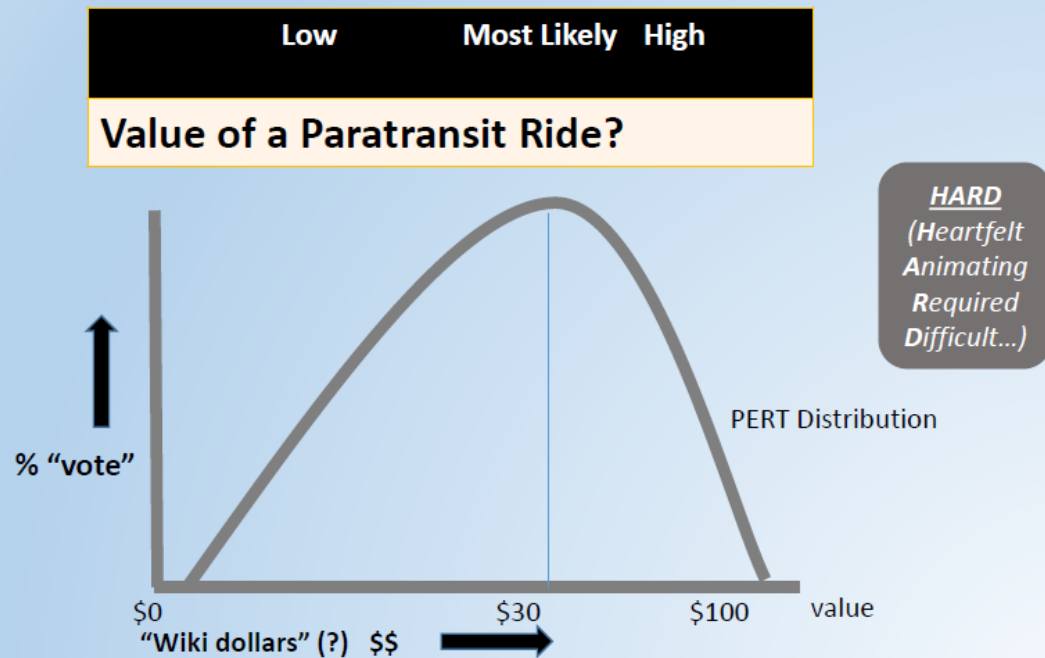




# System Performance


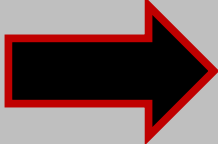
Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

## Community input / values...



# Organizational Excellence

Be a national leader in delivering quality service through excellent employee performance, public communication and accountability.

	<b>Governance and Policymaking</b>	<b>Decision-making</b>	<b>Enterprise Management</b>
  <p><b>High-Level Functions</b></p>	Consensus on Needs and Goals	Planning and Programming	Service and Product Delivery
	Regulation and Rulemaking		
	Outreach and Communications	Budgeting and Resource Allocation	
	Compliance and Dispute Resolution		
	Education, Training, and Culture Change		

## Our Vision

A performance-driven, transparent and accountable Organization that values its people, resources and Partners, and meets new challenges through Leadership, innovation and teamwork.

## Goals / Metrics : “HARD”

- Heartfelt, you’ve got to have an emotional attachment to your goal, it has to scratch an existential itch.
- Animated, goals need to be motivated by a vision, picture or movie that plays over and over in your mind.
- Required, it needs to feel so urgently necessary that you have no other choice but to start acting on them right here, right now.
- Difficult, goals need to drag you out of your comfort zone, activating your senses and attention.

Mark Murphy, *Hard Goals*:

<https://www.leadershipiq.com/books/hard-goals-the-secret-to-getting-from-where-you-are-to-where-you-want-to-be/>

# Caltrans Strategic Management Plan -



Good

**Better**

Best...

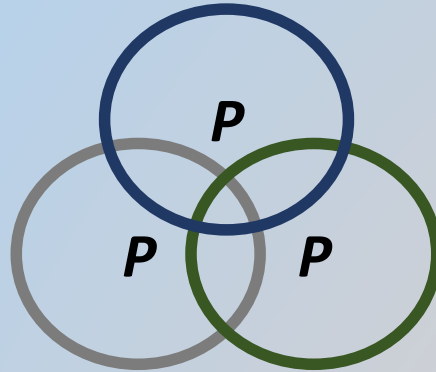
# Why



## Our Mission

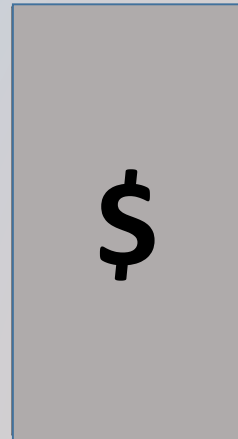
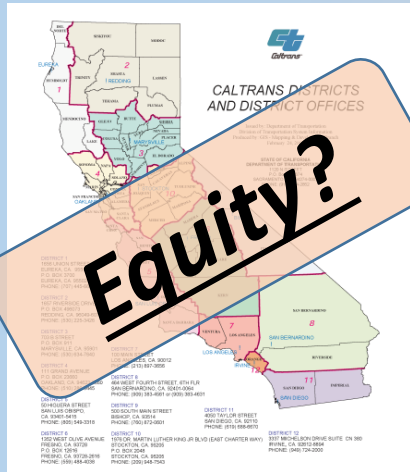
Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

# What



*“Transportation in support of a more sustainable society”*

# How!



Governance and Policymaking	Decision-making	Enterprise Management
Consensus on Needs and Goals	Planning and Program Development	Service and Product Delivery
Regulation and Rulemaking		
Outreach and Communications	Budgeting and Resource Allocation	
Compliance and Dispute Resolution		
Education, Training, and Culture Change		

**Control?**

# Goals / Metrics : “SMART”

## Resources?

- **S = Specific:** clear and focused to avoid misinterpretation. Should include measure assumptions and definitions and be easily interpreted.
- **M = Measurable:** can be quantified and compared to other data. It should allow for meaningful statistical analysis. Avoid "yes/no" measures except in limited cases, such as start-up or systems-in-place situations.
- **A = Attainable: achievable, reasonable, and credible under conditions expected.**
- **R = Realistic:** fits into the organization's constraints and is cost-effective.
- **T = Timely:** doable within the time frame given.

University of California <http://www.orau.gov/pbm/documents/overview/uc.html>



## Goal 1: Safety and Health

\$ ?

Strategic Objectives	Performance Measures	Targets
Zero worker fatalities.	Number of work zone-related worker fatalities per calendar year.	Zero work zone-related worker fatalities per calendar year.
Reduce user fatalities and injuries by adopting a "Toward Zero Deaths" practice.	Number of auto travel fatalities per 100 million vehicle miles traveled.	Maintain 0.5 or less fatalities per 100 million vehicle miles traveled on the State Highway System every year.
	Number of fatalities for bicycle, pedestrian, and transit modes of travel.	10% reduction in number of fatalities in a calendar year in each of the following mode types: car, transit, pedestrian, and bicyclist.
Promote community health through active transportation and reduced pollution in communities.	Increase and improvement in opportunities for safe and accessible active transportation.	100% of funds of allocated vs. programmed.  100% of projects being allocated for construction awarded within six months.
	Percent reduction of transportation system-related air pollution for criteria pollutant emissions.	85% reduction (from 2000 levels) in diesel particulate matter emissions statewide by 2020.  80% reduction (from 2010 levels) in NOx emissions in South Coast Air Basin by 2023.

**What gets measured is what gets done –  
as resources allow, albeit at the expense of what doesn't get measured...**

## Goal 2: Stewardship and Efficiency

\$ ?

Strategic Objectives	Performance Measures	Targets
Effectively manage transportation assets by implementing the asset management plan, embracing a fix-it-first philosophy.	Percentage of distressed lane miles on the State Highway System.	By 2020, no more than 12% of total system area of pavement is distressed.*
	Bridge Health Index.	By 2020, maintain 95 or better rating on Bridge Health Index.*
	Measure of ITS elements health, system operability, and equipment workability.	By 2020, maintain 90% or better ITS elements health.*
Efficiently deliver projects and services on time and on budget.	Percentage of planned projects delivered in the fiscal year.	Deliver 100% of planned projects for each fiscal year.

**What gets measured is what gets done –  
as resources allow, albeit at the expense of what doesn't get measured...**

## Goal 3: Sustainability, Livability and Economy

1/2

\$ ?

Strategic Objectives	Performance Measures	Targets
<p><b>PEOPLE:</b> Improve the quality of life for all Californians by providing mobility choice, increasing accessibility to all modes of transportation and creating transportation corridors not only for conveyance of people, goods, and services, but also as livable public spaces.</p>	<p>Percentage increase of non-auto modes for:</p> <ul style="list-style-type: none"> <li>• Bicycle</li> <li>• Pedestrian</li> <li>• Transit</li> </ul>	<p>By 2020, increase non-auto modes:</p> <ul style="list-style-type: none"> <li>• Triple bicycle;</li> <li>• Double pedestrian; and</li> <li>• Double transit.</li> </ul> <p>(2010-12 California Household Travel survey is baseline.)</p>
<p><b>PLANET:</b> Reduce environmental impacts from the transportation system with emphasis on supporting a statewide reduction of greenhouse gas emissions to achieve 80% below 1990 levels by 2050.</p>	<p>Per capita vehicle miles traveled.</p> <hr/> <p>Percent reduction of transportation system-related air pollution for:</p> <ul style="list-style-type: none"> <li>• Greenhouse gas (GHG) emissions</li> <li>• Criteria pollutant emissions</li> </ul>	<p>By 2020, achieve 15% reduction (3% per year) of statewide per capita VMT relative to 2010 levels reported by District.</p> <hr/> <ul style="list-style-type: none"> <li>• 15% reduction (from 2010 levels) of GHG to achieve 1990 levels by 2020.</li> <li>• 85% reduction (from 2000 levels) in diesel particulate matter emissions statewide by 2020.</li> <li>• 80% reduction (from 2010 levels) in NOx emissions in South Coast Air Basin by 2023.</li> </ul>

**What gets measured is what gets done –  
as resources allow, albeit at the expense of what doesn't get measured...**

## Goal 3: Sustainability, Livability and Economy

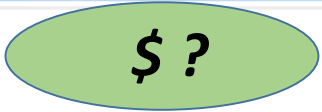
2/2

\$ ?

Strategic Objectives	Performance Measures	Targets
	<p>Percent reduction of pollutants from Caltrans design, construction, operation, and maintenance of transportation infrastructure and building for:</p> <ul style="list-style-type: none"> <li>• Greenhouse gas (GHG) emissions</li> <li>• Criteria air emissions</li> <li>• Water pollution</li> </ul>	<p>By 2020, reduce Caltrans' internal operational pollutants by District from 2010 levels (from planning, project delivery, construction, operations, maintenance, equipment, and buildings) including:</p> <ul style="list-style-type: none"> <li>• 15% reduction by 2015 and 20% reduction by 2020 of Caltrans' GHG emissions per EO-B-18-12.</li> <li>• 10% reduction in water pollutants.</li> </ul> <p>By 2020, 85% reduction (from 2000 levels) in diesel particulate matter emissions statewide. By 2023, 80% reduction (from 2010 levels) in NOx emissions in South Coast Air Basin.</p>
<p><b>PROSPERITY:</b> Improve economic prosperity of the State and local communities through a resilient and integrated transportation system.</p>	<p>Freight system competitiveness, transportation system efficiency, return on transportation investment.</p>	<p>By 2020, 10% increase in freight system efficiency.</p>

**What gets measured is what gets done – as resources allow, albeit at the expense of what doesn't get measured...**

## Goal 4: System Performance



Strategic Objectives	Performance Measures	Targets
Improve travel time reliability for all modes.	Travel time reliability on four commute directions (SR-57, US-110, I-80 and I-210).	By 2020, improve buffer time index (BTI) reliability ranking by one level (unreliable to moderately reliable or moderately reliable to reliable) on four commute directions (SR-57, US-110, I-80, and I-210).
	Average endpoint on-time performance (OTP) for intercity rail.	By 2020, achieve 90% on-time performance.
Reduce peak period travel times and delay for all modes through intelligent transportation systems, operational strategies, demand management, and land use/ transportation integration.	Rate of growth in Daily Vehicle Hours of Delay (DVHD) statewide.	By 2020, reduce to an 8% rate of growth in Daily Vehicle Hours of Delay (DVHD) under 35 miles per hour on urban State highways.
	Average all stations on-time performance (OTP) for intercity rail.	By 2020, achieve 90% average on-time performance.
Improve integration and operation of the transportation system.	Percentage of 25 top integrated corridors with real-time multimodal system information available to the public.	By 2020, provide real-time multimodal system information to the public on 50% of the top integrated corridors.

**What gets measured is what gets done – as resources allow, albeit at the expense of what doesn't get measured...**



## Goal 5: Organizational Excellence

1/2

\$ ?

Strategic Objectives	Performance Measures	Targets
Promote a positive work environment and implement a management system to maximize accomplishments, encourage innovation and creativity, and ensure staff performance is aligned with Department and State strategic goals.	Percentage of employees who indicate that they work in a positive environment.	By 2016, establish a baseline number through a survey and achieve a 5% increase in responses each subsequent year through 2020.
	Percentage of Caltrans employees who agree, or strongly agree, that employees are encouraged to try new ideas and new ways of doing things to improve Caltrans.	By 2016, percentage to reach 75%. Maintain level at least at 75% through 2020.
Continuously increase customer satisfaction.	Percentage of external survey respondents who said Caltrans was doing a good or excellent job in meeting their needs.	By 2016 (or next survey date), increase to 75% the percentage of external survey respondents (general public and external stakeholders) who rate Caltrans as doing a good or excellent job at meeting survey respondents' needs.
Improve internal and external communication to better demonstrate professionalism and service levels to the public and stakeholders.	Percentage of Caltrans employees who rate Caltrans management as good or very good at being open and honest in communications with employees.	By December 2015, conduct survey to show target of 50% of Caltrans employees who rate Caltrans management as good or very good at being open and honest in communications with employees.
		Through 2020, increase rating 5% annually.

**What gets measured is what gets done –  
as resources allow, albeit at the expense of what doesn't get measured...**

## Goal 5: Organizational Excellence

2/2

\$ ?

	Percentage of stakeholders who feel that overall Department communication, professionalism, and service levels have improved.	Conduct baseline survey followed by annual survey to show target of 5% annual increase of employees and stakeholders who feel that overall the Department's communication, professionalism, and service levels have improved.
	Percentage of stakeholders who give positive feedback on <i>The Mile Marker</i> .	Conduct baseline survey followed by annual survey to show target of 5% annual increase in the number of people (employees, stakeholders, and public) who provide positive feedback about <i>The Mile Marker</i> , including specific outcomes for performance journalism (e.g., transparency, use of plain language, etc.)
Improve partnerships with agencies, industries, municipalities, and tribal governments.	Percent increase in the number of partners who agree or strongly agree that Caltrans is a collaborative partner.	By 2016 (or next survey date), increase to 75% the percentage of partners who agree or strongly agree that Caltrans is a collaborative partner.  Through 2020, maintain or increase the percentage every year.

**What gets measured is what gets done –  
as resources allow, albeit at the expense of what doesn't get measured...**

# Caltrans Strategic Management Plan -



Good  
Better  
**Best...**

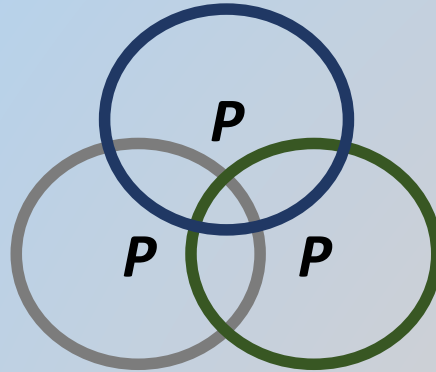
# Why



## Our Mission

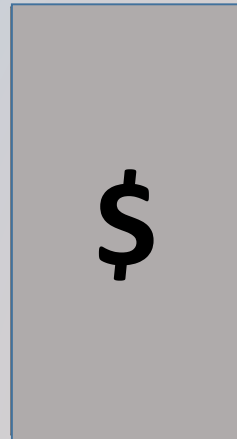
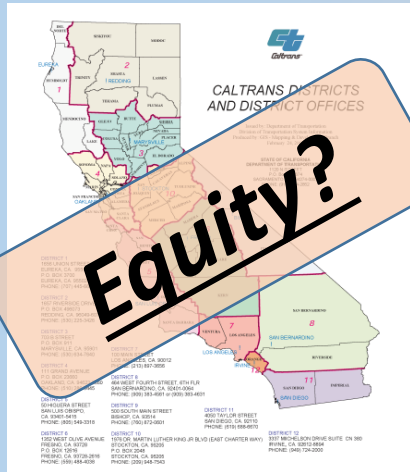
Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

# What



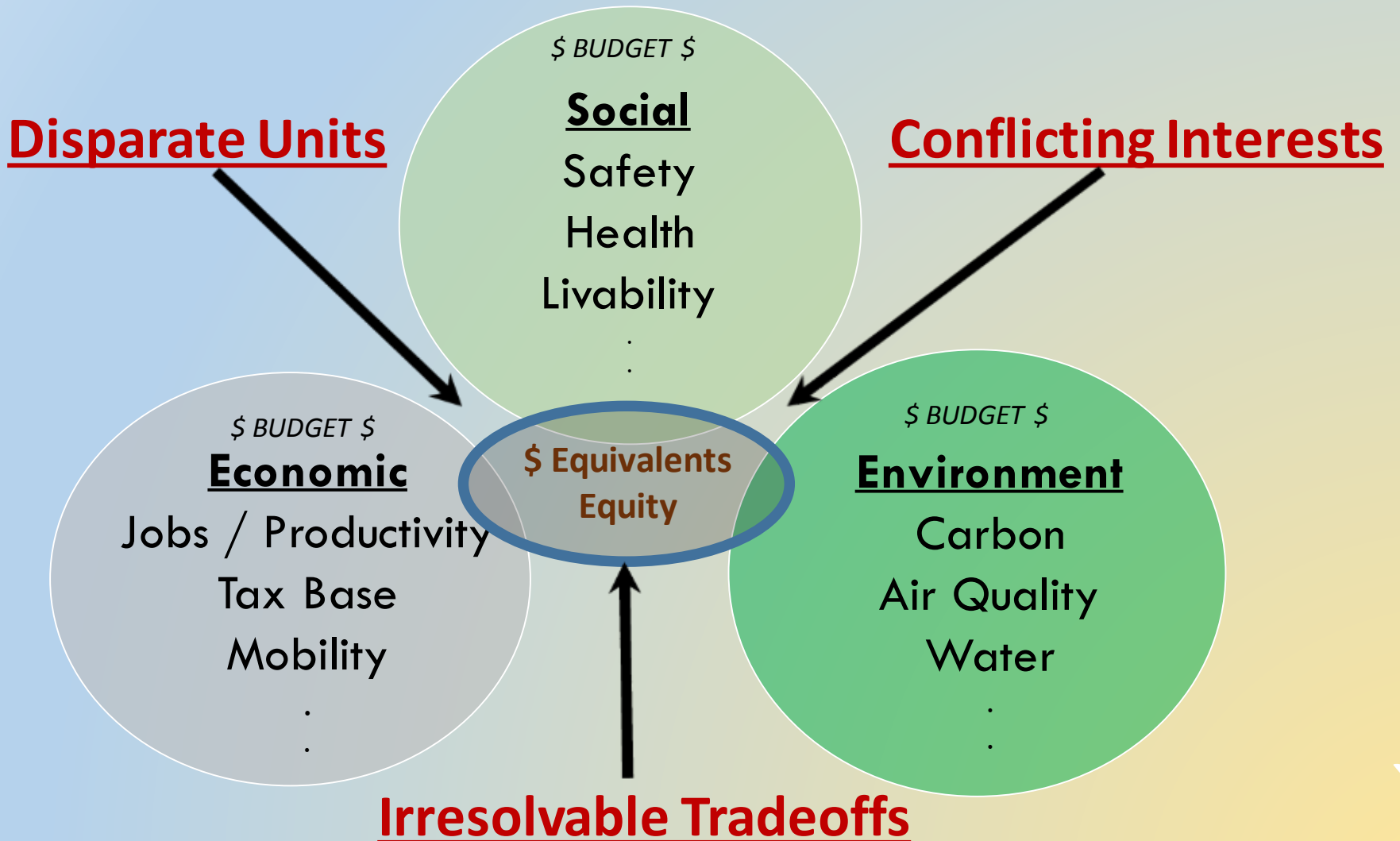
*“Transportation in support of a more sustainable society”*

# How!



Governance and Policymaking	Decision-making	Enterprise Management
Consensus on Needs and Goals	Planning and Programming	Service and Product Delivery
Regulation and Rulemaking		
Outreach and Communications	Budgeting and Resource Allocation	
Compliance and Dispute Resolution		
Education, Training, and Culture Change		

# \$\$\$ -- "The Dismal Science" -- \$\$\$





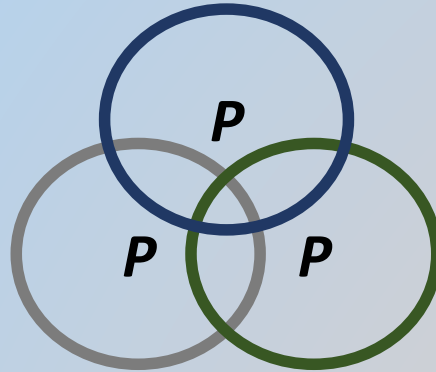
# Why



## Our Mission

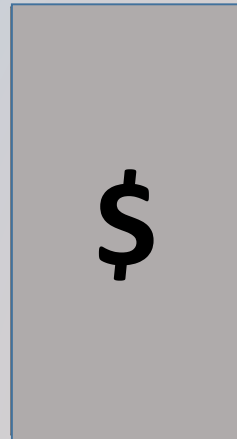
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## What



*“Transportation in support of a more sustainable society”*

## How!



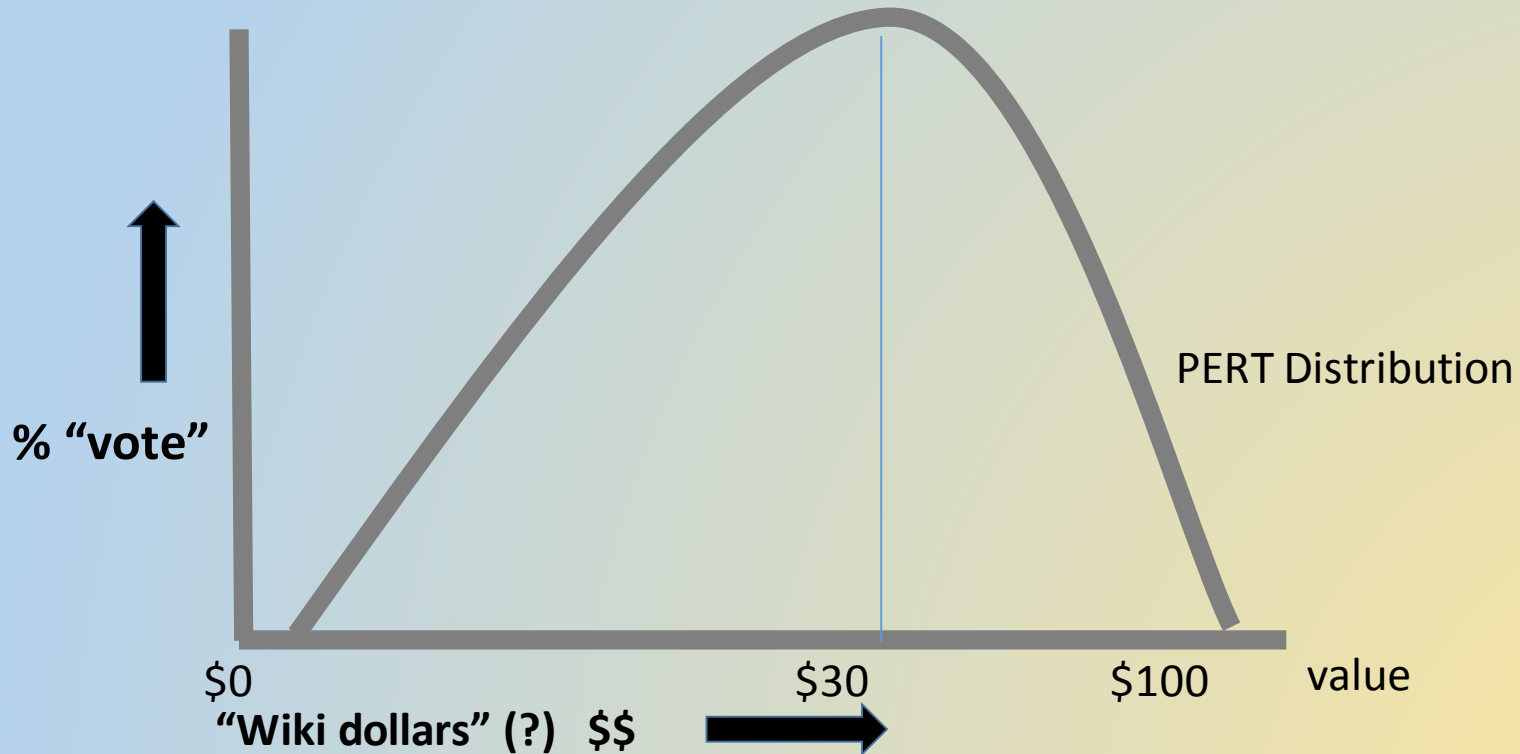
Governance and Policymaking	Decision-making	Enterprise Management
Consensus on Needs and Goals	Planning and Program Management	Service and Product Delivery
Regulation and Rulemaking		
Outreach and Communications	Budgeting and Resource Allocation	
Compliance and Dispute Resolution		
Education, Training, and Culture Change		

**Control?**

# Community input / values...

Low      Most Likely      High

**Value of a Paratransit Ride?**

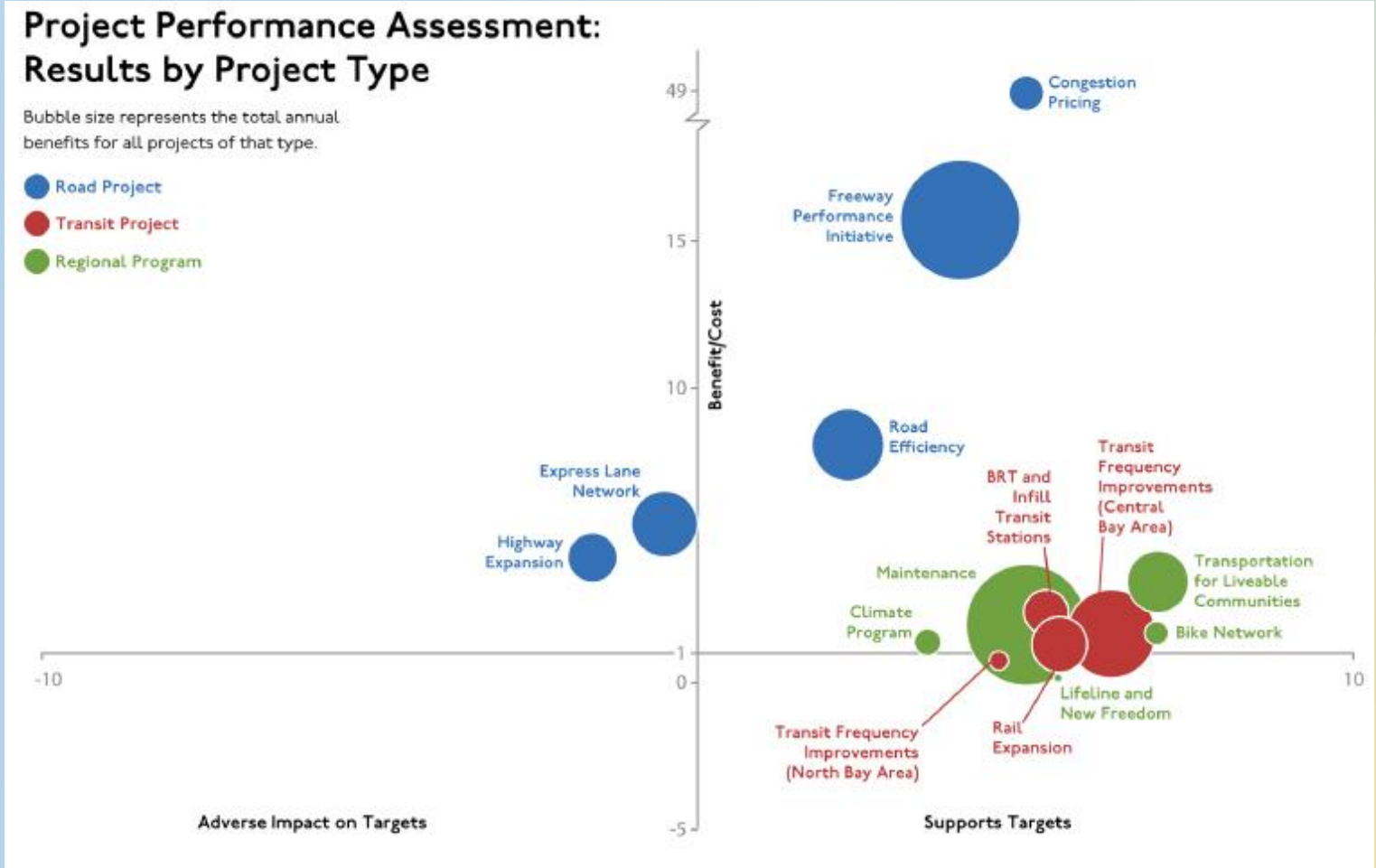


# Goals / Metrics : “SMART”





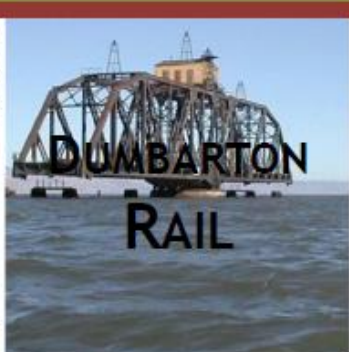
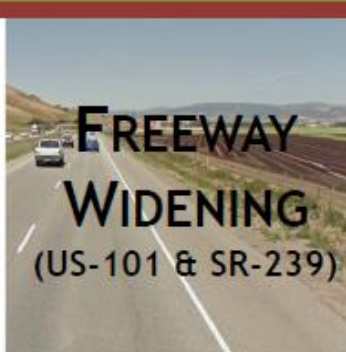
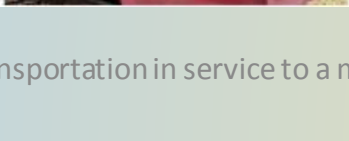
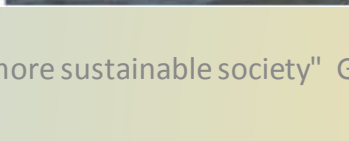
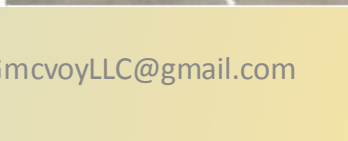
- **S = Specific:** clear and focused to avoid misinterpretation. Should include measure assumptions and definitions and be easily interpreted.
- **M = Measurable:** can be quantified and compared to other data. It should allow for meaningful statistical analysis. Avoid "yes/no" measures except in limited cases, such as start-up or systems-in-place situations.
- **A = Attainable: achievable, reasonable, and credible under conditions expected.**
- **R = Realistic:** fits into the organization's constraints and is cost-effective.
- **T = Timely:** doable within the time frame given.

University of California <http://www.orau.gov/pbm/documents/overview/uc.html>

# Example Combination – San Francisco



# Example Combination – San Francisco

<p><b>SAMPLE HIGH-PERFORMING PROJECTS</b></p> <p><i>PRIORITIZED FOR REGIONAL FUNDING</i></p>	 <p><b>BART METRO</b></p>	 <p><b>URBAN BRT SYSTEMS</b></p>	 <p><b>CALTRAIN</b></p>
<p><b>SAMPLE LOW-PERFORMING PROJECTS</b></p> <p><i>REQUIRED COMPELLING CASE FOR INCLUSION IN PLAN</i></p>	 <p><b>BART EXTENSION IN SAN JOSE</b></p>	 <p><b>SF CONGESTION PRICING</b></p>	 <p><b>FREEWAY PERFORMANCE INITIATIVE</b></p>
	 <p><b>SMART EXPANSION</b></p>	 <p><b>DUMBARTON RAIL</b></p>	 <p><b>FREEWAY WIDENING (US-101 &amp; SR-239)</b></p>



## Our Vision

A performance-driven, transparent and accountable Organization that values its people, resources and Partners, and meets new challenges through Leadership, innovation and teamwork.

## Goals / Metrics : “HARD”

- Heartfelt, you’ve got to have an emotional attachment to your goal, it has to scratch an existential itch.
- Animated, goals need to be motivated by a vision, picture or movie that plays over and over in your mind.
- Required, it needs to feel so urgently necessary that you have no other choice but to start acting on them right here, right now.
- Difficult, goals need to drag you out of your comfort zone, activating your senses and attention.

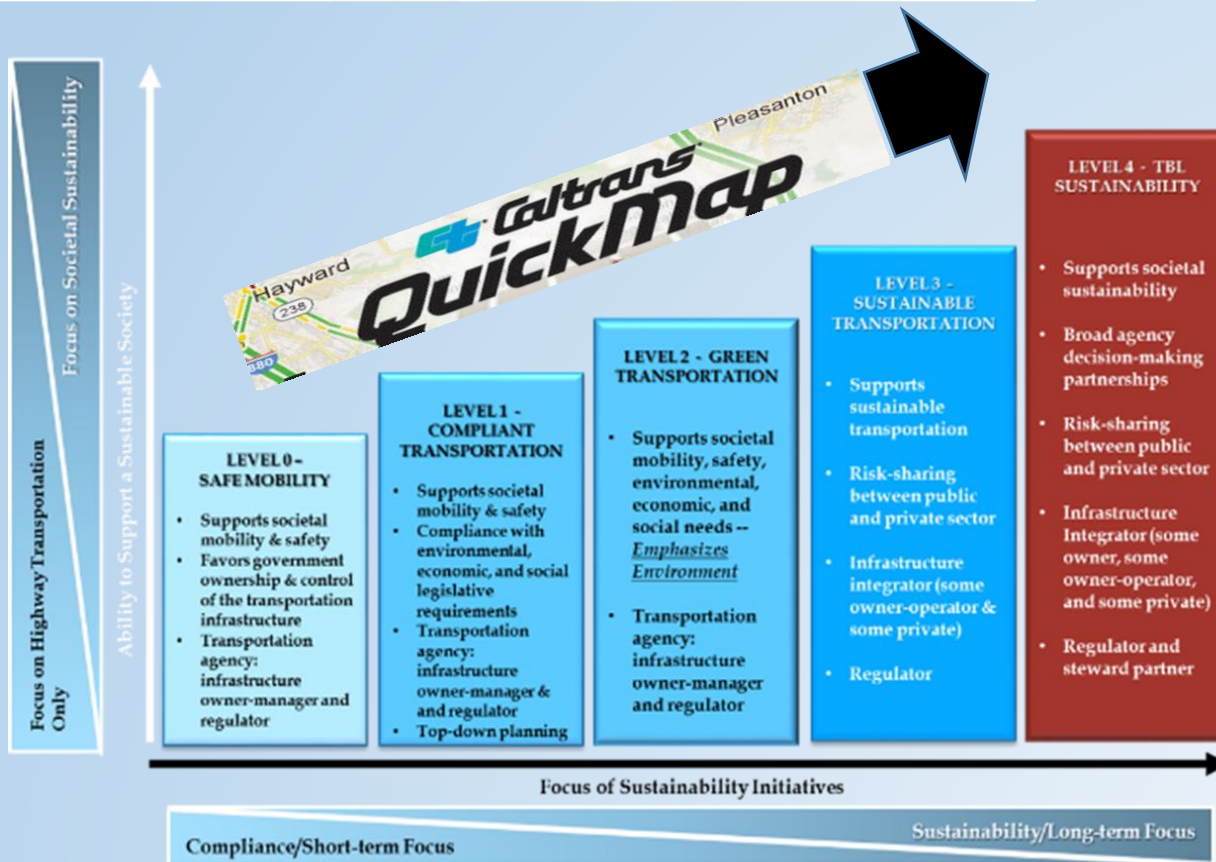
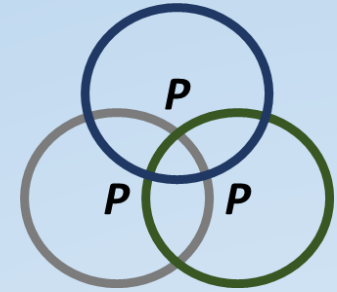
Mark Murphy, *Hard Goals*:

<https://www.leadershipiq.com/books/hard-goals-the-secret-to-getting-from-where-you-are-to-where-you-want-to-be/>



# Our Mission

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.



# Additional Slides

# Cost vs. value

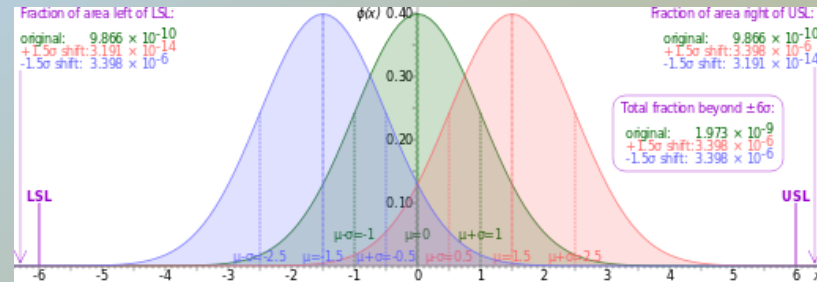
$c < v?$

$c < 2v?$

$c < 10v?$

$c < 100v?$

# \$ vs. \$



[http://commons.wikimedia.org/wiki/File:6\\_Sigma\\_Normal\\_distribution.svg](http://commons.wikimedia.org/wiki/File:6_Sigma_Normal_distribution.svg)

6 sigma cost vs 2 significant digits value, e.g.

\$154,856,769 project worth / \$100m, \$1,500m, \$5,500m, .....?

(NB: “Don’t know” is the wrong answer....)

- First do the right project, then do the project right ...
- Don't measure with a micrometer, & then cut with an ax...



"The obligation of any component is to contribute its best to the *system*, not to maximize its own production, profit, or sales ... "

- Dr. W. Edwards Deming

