

Sustainability as a Basis for Transportation Program Assessment, Analysis, and Outreach.



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**PARSONS
BRINCKERHOFF**

How sustainability valuation can help MPO's

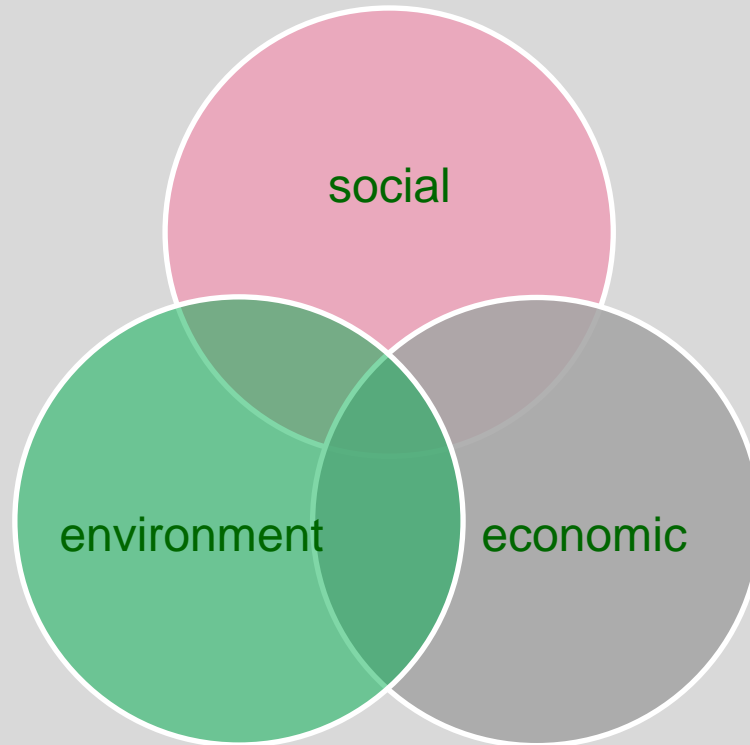
- Set priorities
- Engage diverse constituencies
- Forge consensus
- Document decisions
- Make good use of MAP-21 Metrics
- Position worthy projects for supplemental funding

Sustainability – The Prime Directive...

Meeting the needs of the present
without compromising the future...

-- Brundtland 1987

Sustainability - The Triple Bottom Line...



Triple Bottom Line & Transportation

<u>Economic</u>	<u>Environmental</u>	<u>Societal</u>
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)

Optimization

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

-- Dr. Edward Deming

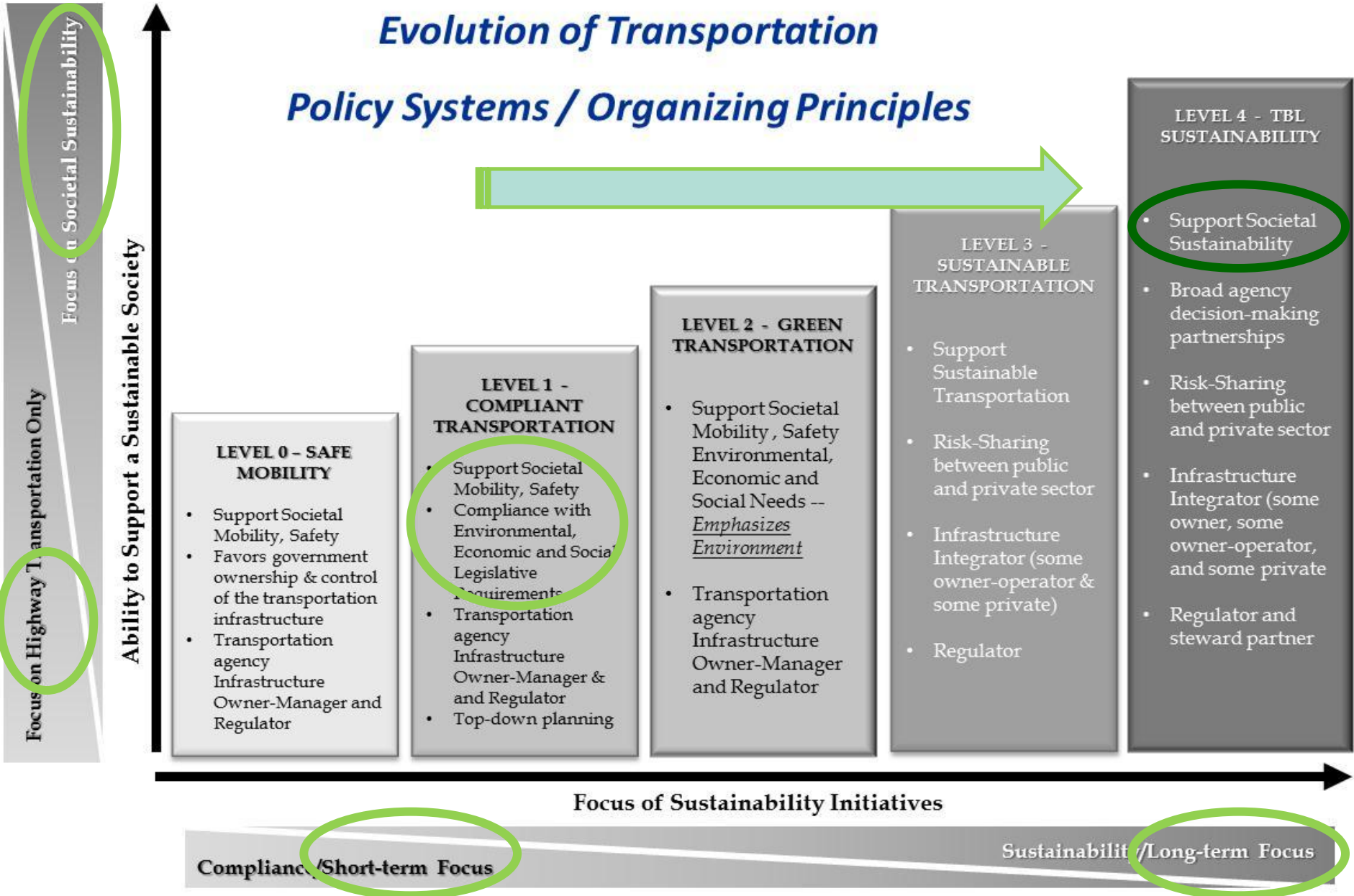
Optimization -- Moving Beyond Statutes



- Began with National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Clean Air and Clean Water Acts, and many others in 1970's
- “Avoid, Minimize, Mitigate” – *Is it Enough?*
- Environmental Stewardship Initiatives – AASHTO Late '90's
- 21st Century: Sustainability – *How to Define it, How to Measure it, How to Achieve it?*

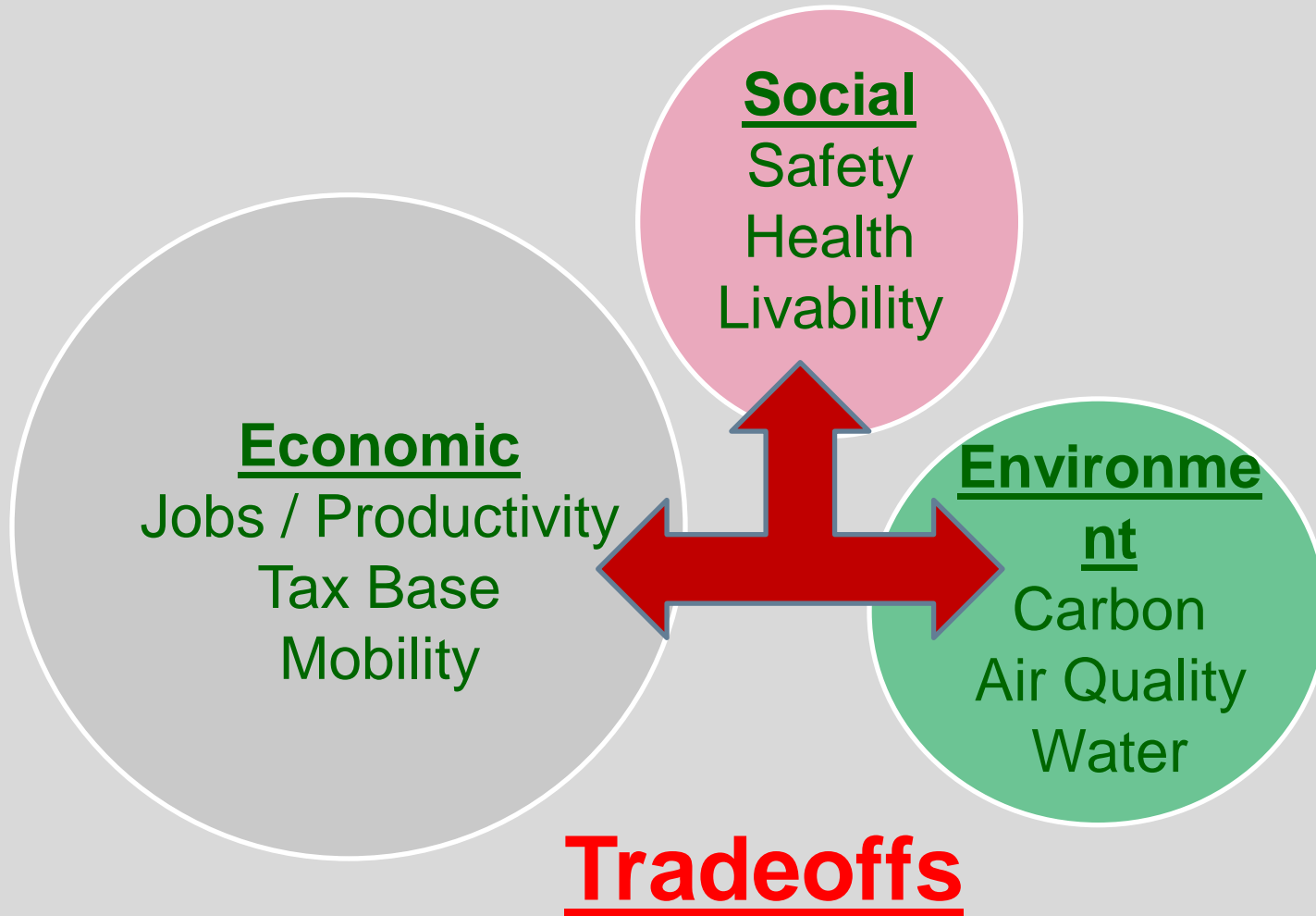
Evolution of Transportation

Policy Systems / Organizing Principles

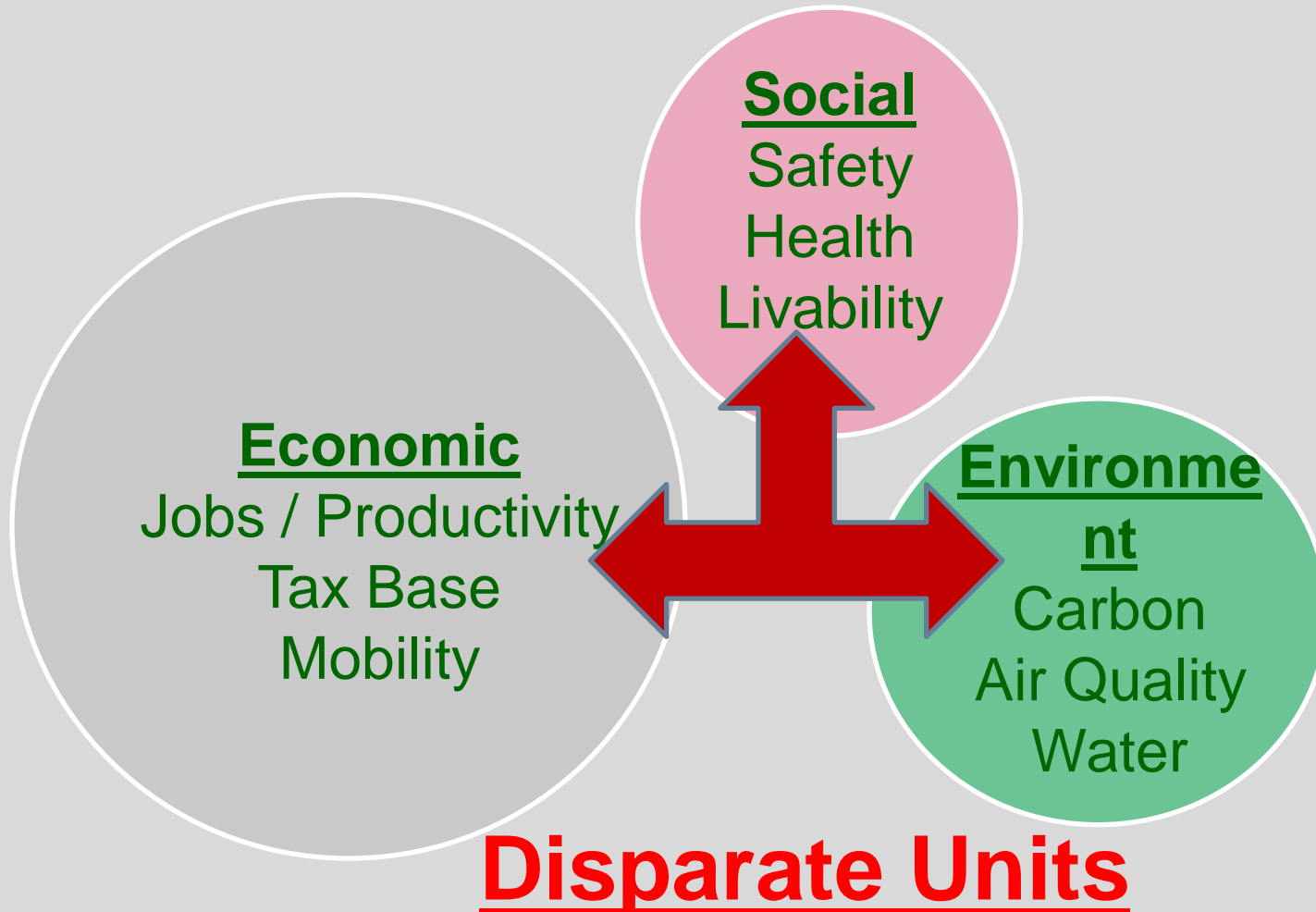


From: NCHRP 20-83 (07) - *Sustainable Transportation Systems and Sustainability as an Organizing Principle for Transportation Agencies* (Contractor – BAH's work product)

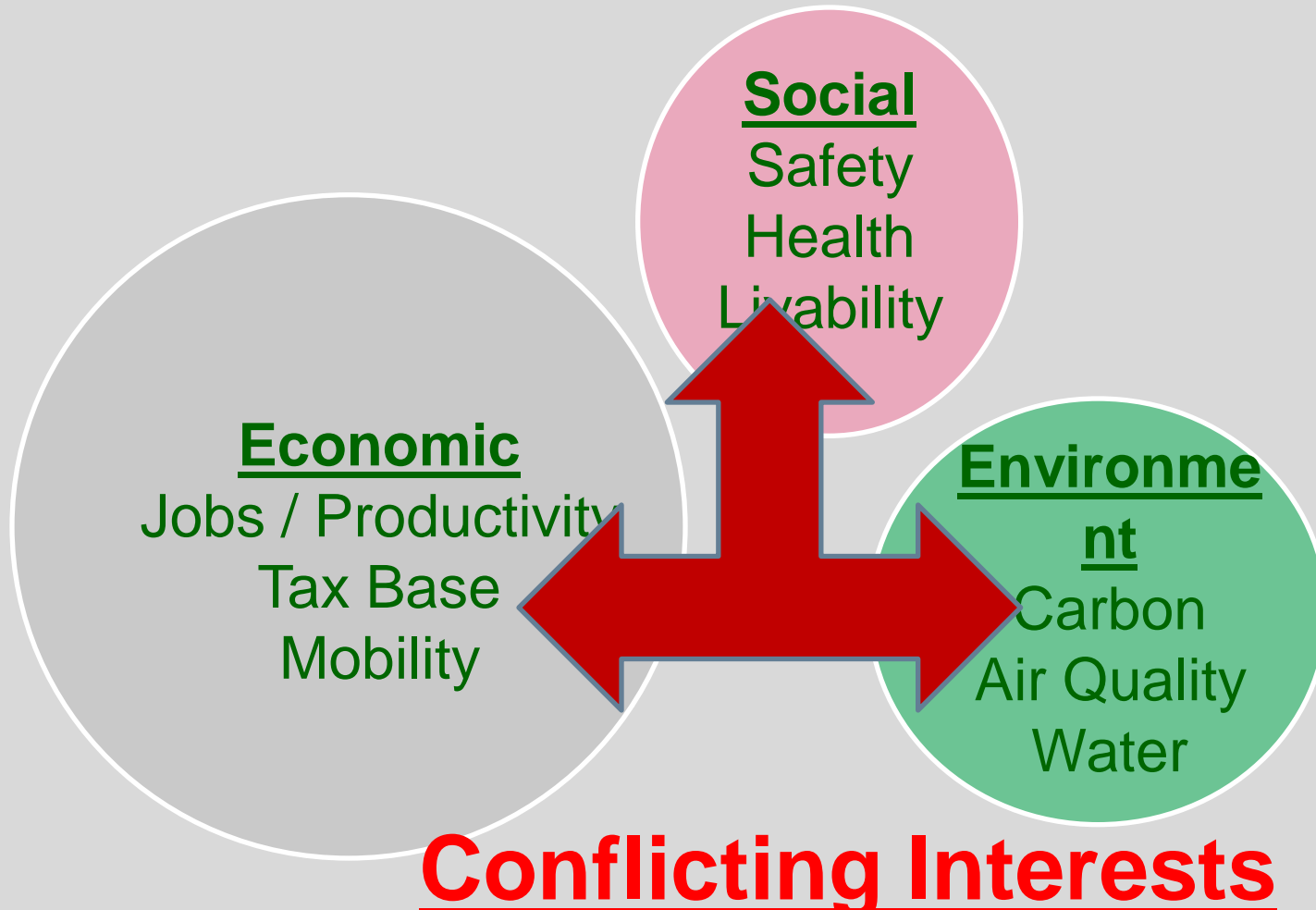
Transportation in Support of a Sustainable Society: Optimization / Prioritization?



Transportation in Support of a Sustainable Society: Assessment / Communication?



Transportation in Support of a Sustainable Society: Fairness / Transparency?



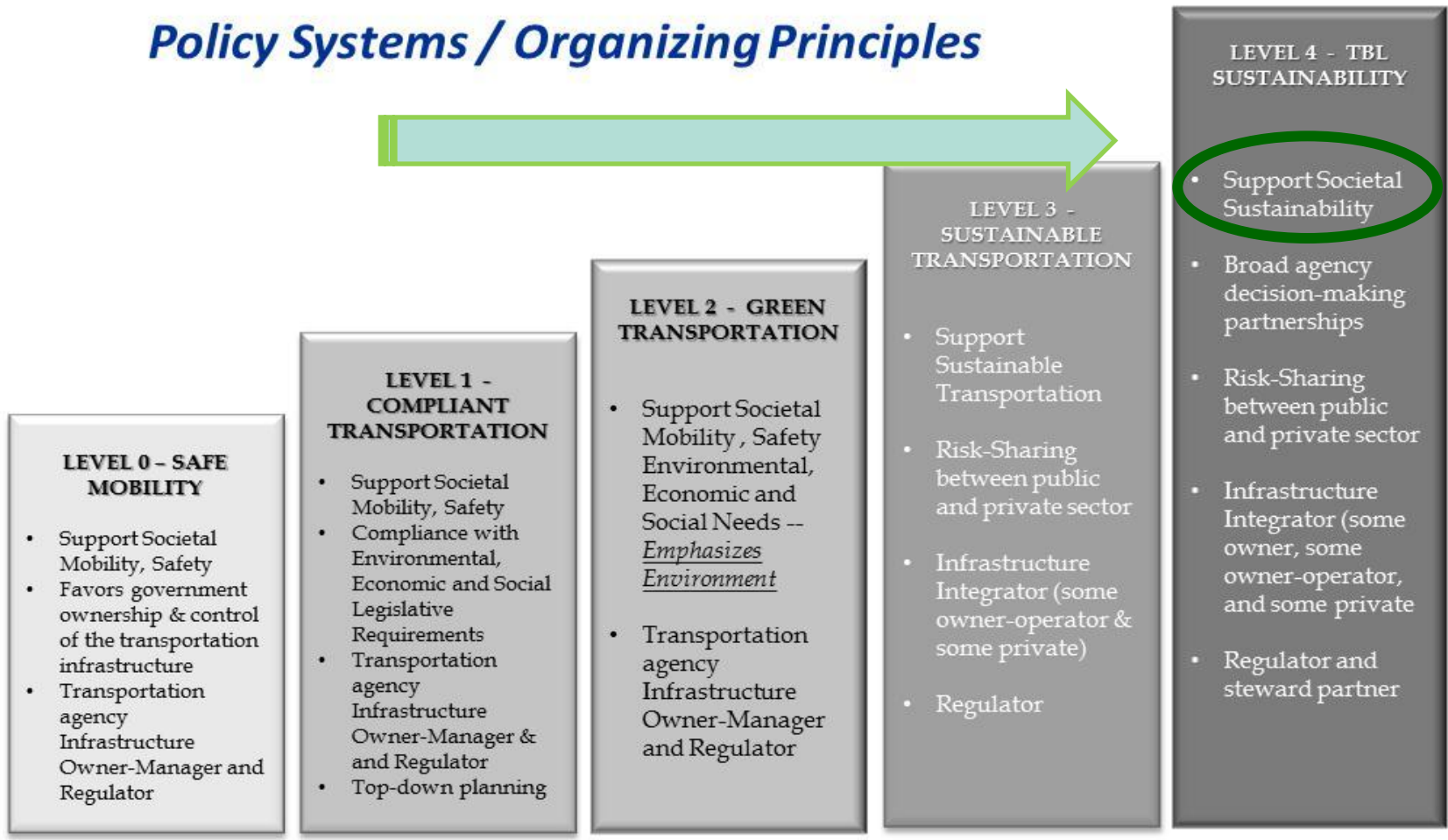
Evolution of Transportation

Policy Systems / Organizing Principles

Focus on Highway Transportation Only

Ability to Support a Sustainable Society

Focus on Societal Sustainability



Focus of Sustainability Initiatives

Compliance/Short-term Focus

Sustainability/Long-term Focus

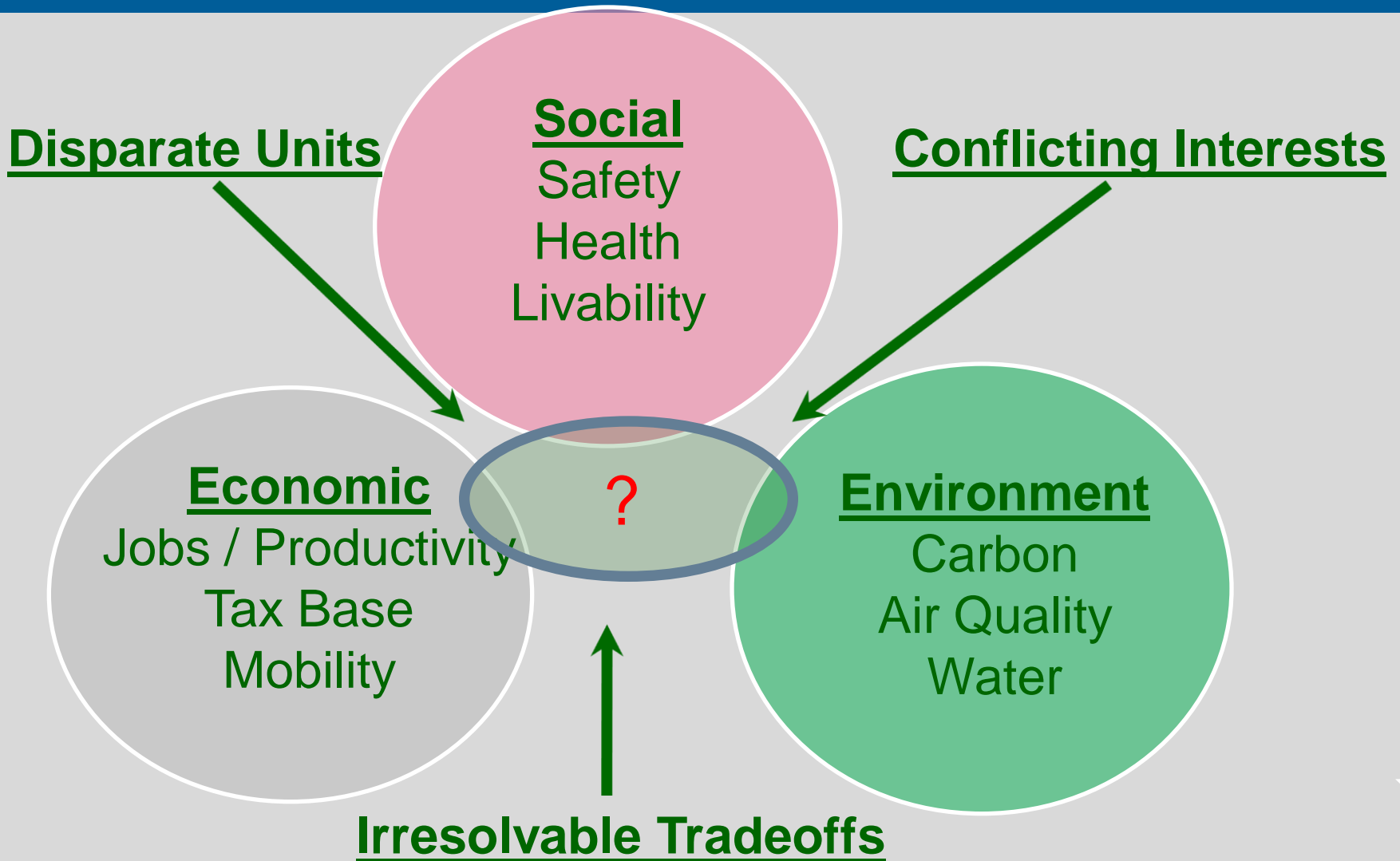
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Breaking Down Issues - Common Ground Values



Example: USDOT - TIGER

The screenshot shows a Windows Internet Explorer browser window displaying the USDOT TIGER Grants website. The browser's 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 a search bar with a "GO" button. Navigation links include "About DOT", "Our Activities", and "Areas of Focus". The main content area is titled "TIGER Grants" and includes a "Program Details" section with a bulleted list of categories: "Driven by Performance", "Innovation & Project Acceleration", "Safety & State of Good Repair", "Livability & Sustainability", and "Planning Activities". A prominent headline reads "FY 2012 TIGER Awards in 34 states, District of Columbia". Below this, a paragraph begins with "On June 22, the U.S. Department of Transportation awarded nearly \$500 million from the". To the right of the main text is a large "TIGER GRANTS" logo, a "SHARE" button, and a "Related Links" section containing links for "Application Resources (FAQ)", "Lessons Learned Webinar", and "TIGER 2012 Notice of Funding Availability". At the bottom right, there is a "Related Documents" section and a "[+] Feedback" button.

TIGER Grants | Department of Transportation - Windows Internet Explorer
http://www.dot.gov/tiger
Google usdot tiger
United States Department of Transportation
About DOT Our Activities Areas of Focus
Home > Policy Initiatives > Tiger
TIGER Grants
Program Details

- Driven by Performance
- Innovation & Project Acceleration
- Safety & State of Good Repair
- Livability & Sustainability
- Planning Activities

FY 2012 TIGER Awards in 34 states, District of Columbia

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Tiger Criteria

TABLE 3 U.S. DOT TIGER Considerations

Long-Term Outcome	Type of Societal Benefits
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.

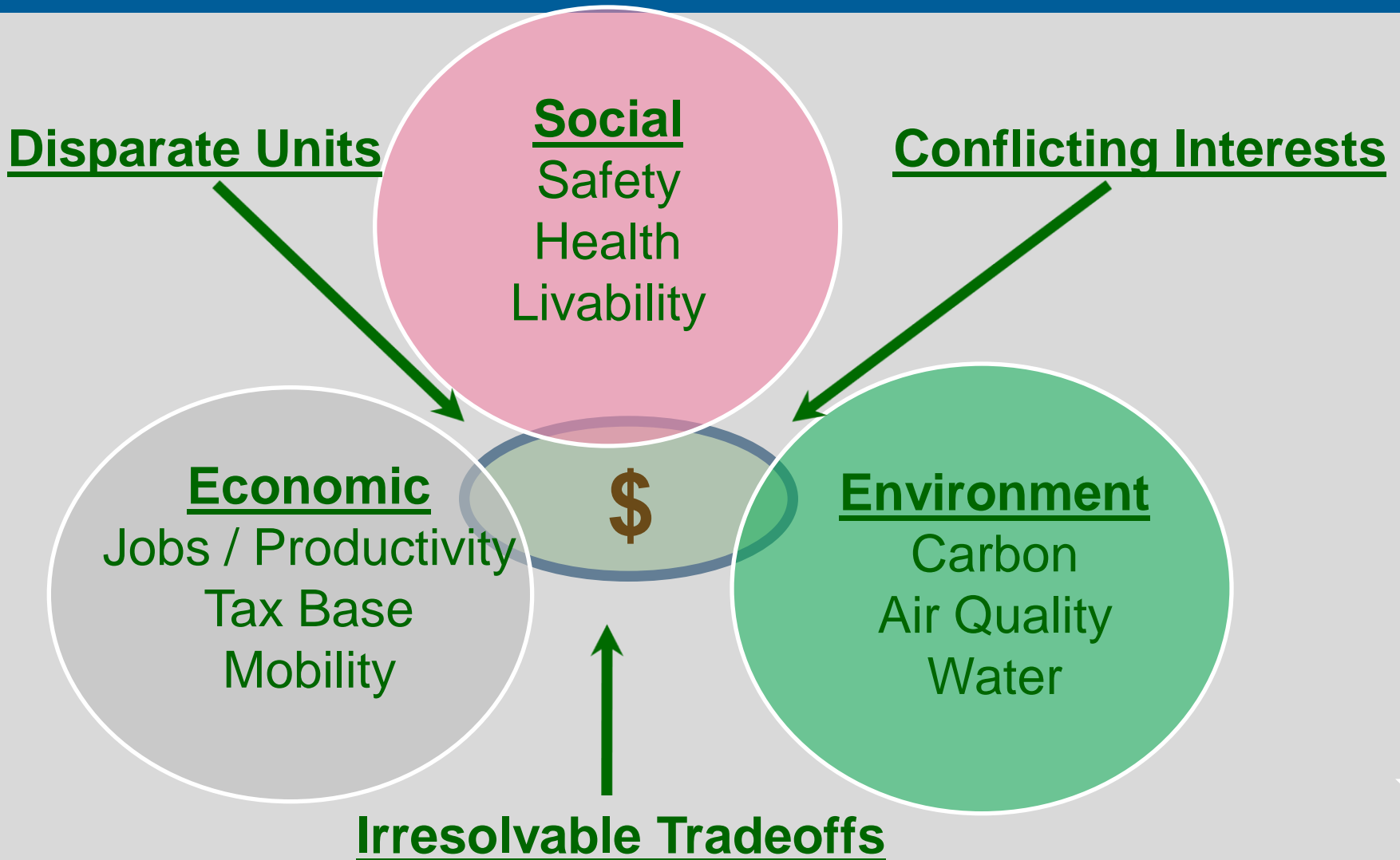
TIGER - \$ / Sustainability

Federal Register/Vol. 77, No. 20/Tuesday, January 31, 2012/Notices

4877

Long-Term Outcome		Types of Societal Benefits
Livability	<u>Social</u>	Land Use Changes that reduce VMT Accessibility Property Value Increases
Economic Competiveness	<u>Economic</u>	Travel Time Savings Operating Cost Savings
Safety	<u>Social</u>	Prevented Accidents (property damage), Injuries, and Fatalities
State of Good Repair	<u>Economic</u>	Long-Term Replacement Maintenance & Repair Savings Reduced VMT from not closing bridges.
Environmental Sustainability	<u>Environment</u>	Environmental Benefits from Reduced Emissions

Breaking Down Issues / Common Ground Values



\$ benefits

Cost/Benefit Category	Recommended Monetized Value(s)		
Value of Travel Time	Recommended Hourly Values of Travel Time Savings (2009 U.S. \$ per person-hour)		
	Category	Surface Modes* (except High-Speed Rail)	Air and High-Speed Rail Travel
	Local Travel		
	Personal	\$12.00	
	Business	\$22.90	
	All Purposes **	\$12.50	
	Intercity Travel		
	Personal	\$16.70	\$31.90
	Business	\$22.90	\$62.60
	All Purposes **	\$18.00	\$44.30
Truck Drivers	\$23.70		
Bus Drivers	\$23.60		
Transit Rail Operators	\$38.90		
Locomotive Engineers	\$33.00		
Airline Pilots and Engineers	\$73.30		

And costs - including human lives

Table 1. Recommended Monetized Values

Cost/Benefit Category	Recommended Monetized Value(s)																															
Value of Statistical Life (VSL)	\$6,200,000 per fatality (\$2011)																															
Value of Injuries	<table border="1"> <thead> <tr> <th>AIS Level</th> <th>Severity</th> <th>Fraction of VSL</th> <th>Unit value (\$2011)</th> </tr> </thead> <tbody> <tr> <td>AIS 1</td> <td>Minor</td> <td>0.003</td> <td>\$ 18,600</td> </tr> <tr> <td>AIS 2</td> <td>Moderate</td> <td>0.047</td> <td>\$ 291,400</td> </tr> <tr> <td>AIS 3</td> <td>Serious</td> <td>0.105</td> <td>\$ 651,000</td> </tr> <tr> <td>AIS 4</td> <td>Severe</td> <td>0.266</td> <td>\$ 1,649,200</td> </tr> <tr> <td>AIS 5</td> <td>Critical</td> <td>0.593</td> <td>\$ 3,676,600</td> </tr> <tr> <td>AIS 6</td> <td>Unsurvivable</td> <td>1.000</td> <td>\$ 6,200,000</td> </tr> </tbody> </table>				AIS Level	Severity	Fraction of VSL	Unit value (\$2011)	AIS 1	Minor	0.003	\$ 18,600	AIS 2	Moderate	0.047	\$ 291,400	AIS 3	Serious	0.105	\$ 651,000	AIS 4	Severe	0.266	\$ 1,649,200	AIS 5	Critical	0.593	\$ 3,676,600	AIS 6	Unsurvivable	1.000	\$ 6,200,000
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Emissions

Cost/Benefit Category	Recommended Monetized Value(s)		
Value of Emissions	Emission Type	\$ / long ton (\$2007)	\$ / metric ton (\$2007)
	Carbon dioxide (CO ₂)	(varies)*	(varies)*
	Volatile Organic Compounds (VOCs)	\$1,300	\$1,280
	Nitrogen oxides (NO _x)	\$5,300	\$5,217
	Particulate matter (PM)	\$290,000	\$285,469
	Sulfur dioxide (SO _x)	\$31,000	\$30,516
	<p>* See “Social Cost of Carbon (3%)” values below.</p>		

Including Carbon

Cost/Benefit Category	Recommended Monetized Value(s)							
Social Cost of Carbon (3%)	<table border="1"> <thead> <tr> <th>Year</th> <th>3% SCC (2007\$)</th> </tr> </thead> </table>		Year	3% SCC (2007\$)	<table border="1"> <thead> <tr> <th>Year</th> <th>3% SCC (2007\$)</th> </tr> </thead> </table>		Year	3% SCC (2007\$)
	Year	3% SCC (2007\$)						
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	2010	21.40	2031	33.40				
	2011	21.90	2032	34.10				
	2012	22.40	2033	34.70				
	2013	22.80	2034	35.40				
	2014	23.30	2035	36.00				
	2015	23.80	2036	36.70				
	2016	24.30	2037	37.30				
	2017	24.80	2038	37.90				
	2018	25.30	2039	38.60				
	2019	25.80	2040	39.20				

Gaps = Sub-optimization

<u>Economic</u>	<u>Environmental</u>	<u>Societal</u>
Congestion 	Air Pollution 	Impact Inequity
Mobility 	Carbon Emission 	Property value 
Crash Savings 	Habitat Loss	Health
Facility Benefits 	Water Quality	Cohesion
Consumer Benefits	Hydrologic	Livability
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Source: Adapted from "Sustainable Transportation and TDM: Planning That Balances Economic, Social and Ecological Objectives;" Victoria Transport Policy Institute (An independent Canadian research organization)

How sustainability valuation can help MPO's

- Set priorities
- **Engage diverse constituencies**
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Zero value for a “sense of place” / habitat?



“priceless” objects?



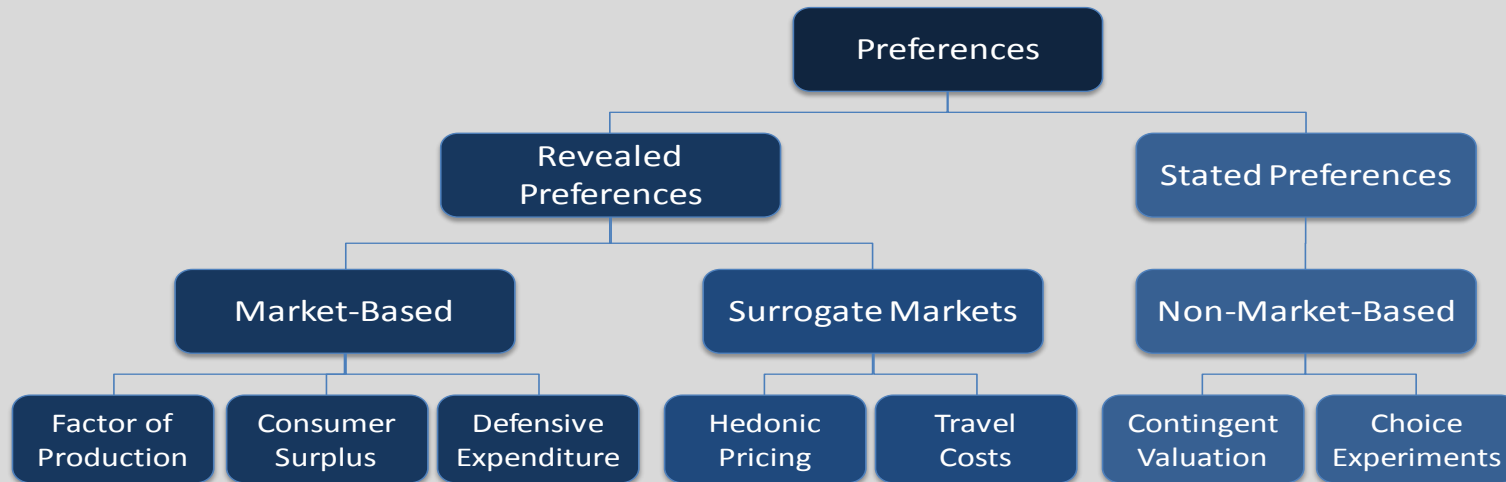
Appraised / bought & sold...



Paid for...

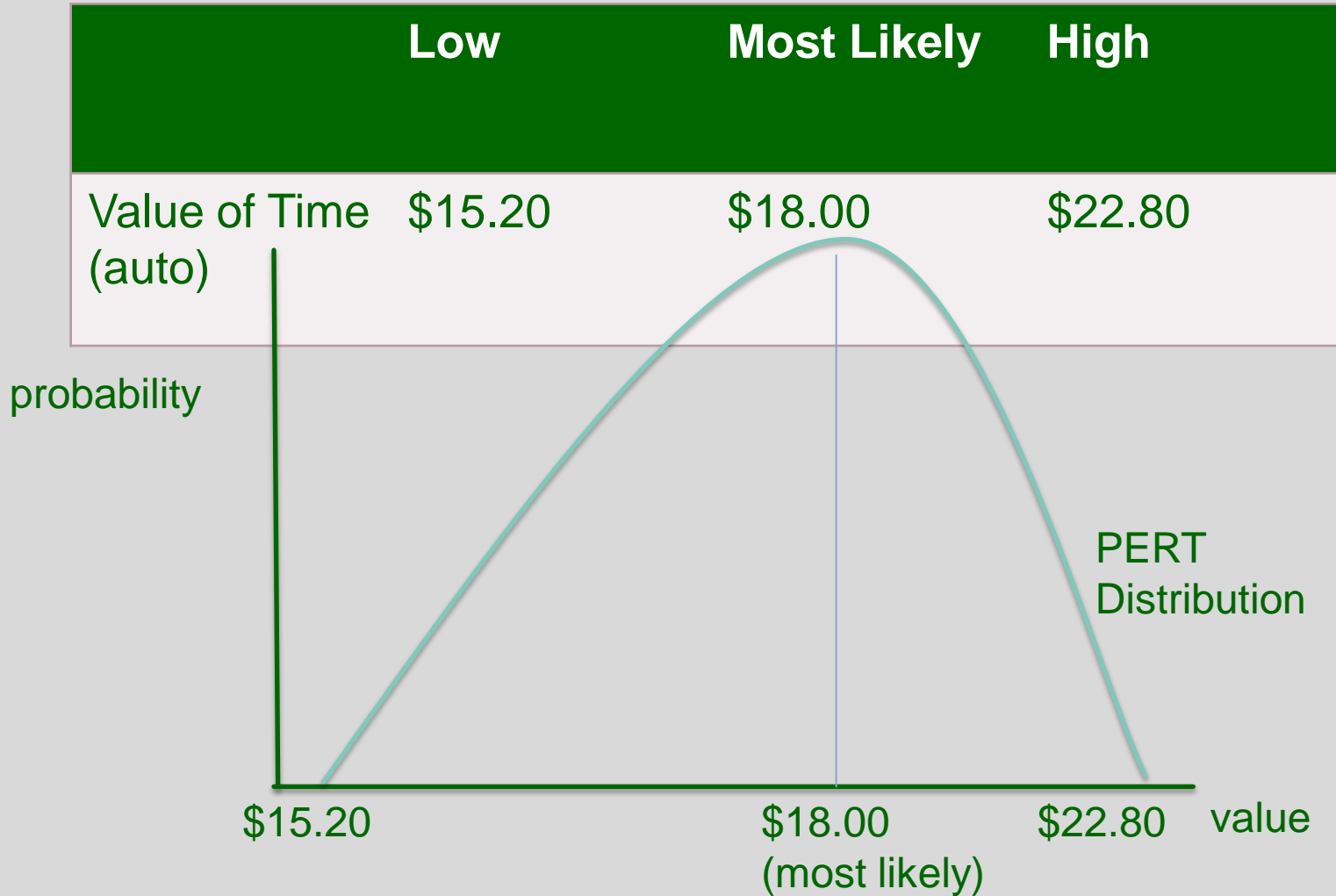


Valuation Methods



- **Factor of Production:** land, labor, capital, natural resources, etc
- **Consumer (Producer) Surplus:** willingness to pay vs. price
- **Defensive Expenditures:** cost to prevent adverse effects
- **Hedonic Pricing:** surrogate valuation, e.g.. real estate market
- **Travel Cost:** willingness to pay to get there
- **Contingent Valuation:** surveys, questionnaires, and interviews
- **Choice Experiments:** menu of alternatives

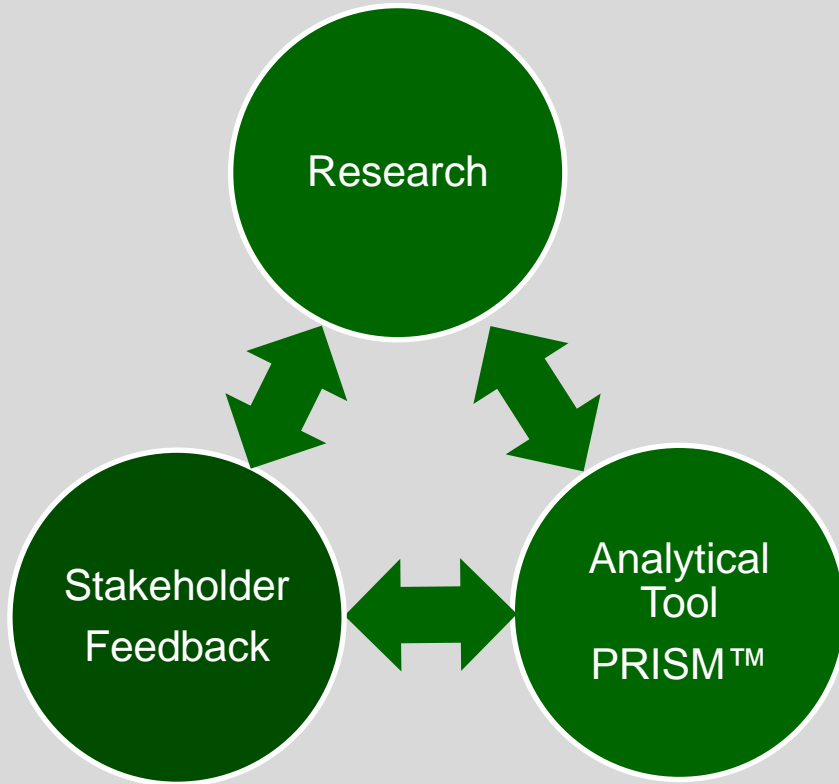
Community input to determine ranges of value,



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Making the case – Building Support



Extensive Research

- Surrogate Market Methods
- Non-market methods

Research

PRISM™

- Cost and project information
- Selection of category variables.
- Assign unit values based on research
 - Effect quantity
 - Value per quantity
 - Monte Carlo ability (most probable, low, high)
- Discount rates

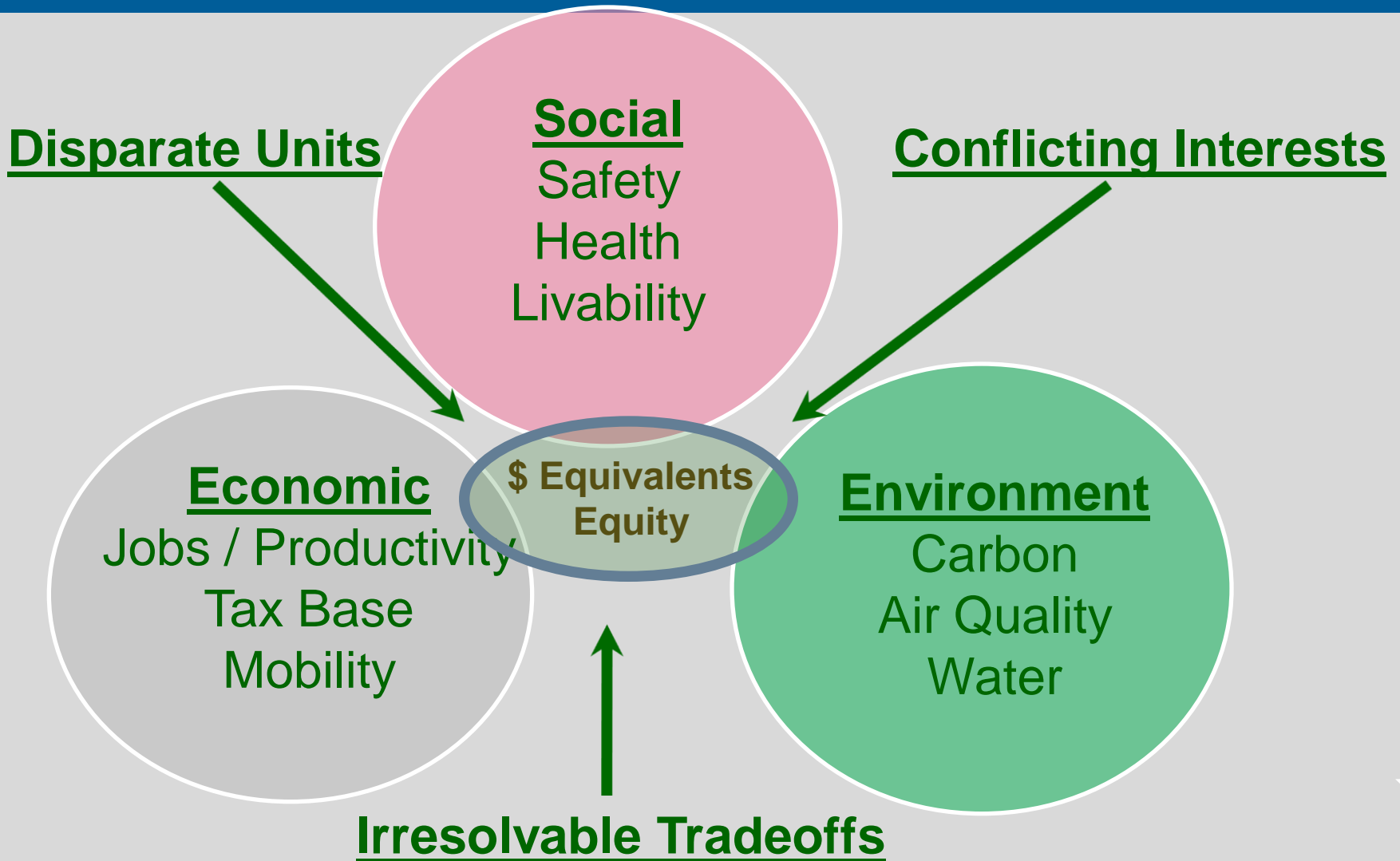
Analytical Tool
PRISM™

Stakeholder Feedback

- Workshops and Interviews
- Web surveys
- Ability to publish / interact on web.

Stakeholder
Feedback

Breaking Down Issues - Common Ground Values



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Example: Sustainable Return on Investment in Maintenance

MAINTENANCE -- TRIPLE BOTTOM LINE TABULATION																					
Program	Activity	Cycle (yrs)			#	# YR TARGET	# STATE FORCES	# CONTRACT	CAPITAL \$	STATE CASH \$	LIFECYCLE \$	MOBILITY \$	JOBS \$	AIR \$	WATER \$	HABITAT \$	SAFETY \$	ACCESS \$	LIVABILITY \$	BENEFIT / COST	
Bridges	Bridge Cleaning							X	x	y									X		
	Bridge Painting								X	x	y									X	
	Deck Sealing								X	x	y									X	
	Deck Treatment								X	x	y									X	
	Joints								X	x	y									X	
	Bearing Restoration								X	x	y									X	
	Punch list From Inspection								X	x	y									X	
	Environmental Protection										y	x	x	x						X	
	Storm Water Facility										y	x	x	x						X	
	Stream Channel										y	x	x	x						X	
	Check for Invasive Species										y	x	x	x						X	
	Regulatory Cost (Fines)								x		y	x	x	x						X	
	Safety									x	y				x	x	x			X	
	Public Parking / Access										y				x	x	x			X	
	Historic / Cultural Signing										y				x	x	x			X	
Pavement																					
Drainage																					
Signals & Lighting																					
Roadside																					
Guiderail																					
Signs																					
SNOW & ICE																					
Facilities																					
\$\$ TOTAL																					

Minnesota DOT Corridor Investment Strategy

Data Requested	Safety	Bicycle/Pedestrian Health	Noise	Travel Time	Travel Time Reliability	Vehicle Operation Costs	Lifecycle Costs	Agricultural Land	Induced Economic Activity	Emissions	Wetland Effects	Runoff
Vehicle Miles Traveled	✓		✓			✓				✓		
Vehicle Hours Traveled				✓	✓							
Average Bus Headways				✓								
Average Bus Occupancy				✓								
Bicycle Miles Traveled		✓		✓								
Pedestrian Miles Traveled		✓										
Annual Number or Rate of Crashes	✓											
Average Speeds			✓							✓		
Annual Average Daily Traffic			✓									
Quantity of Wetlands Affected											✓	
Quantity of Agricultural Land Affected								✓				
Site Area Acres												✓
Site Composition by Ground Cover Type												✓
Contribution to Combined Sewer Outflow												✓
Initial Construction Costs							✓		✓			
Operating and Maintenance Costs							✓					
Rehabilitation Costs							✓					
Infrastructure Replacement Costs							✓					
Expected Lifecycle of Major Capital Items							✓					

Other impacts may be included the PRISM B/C calculation provided analysis has already been done to estimate the benefits. Examples: Brownfield site cleanup benefits, energy supply impacts, “green” technology lifecycle cost savings, impact to species habitat, etc.

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map -21

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MAP-21

Moving Ahead for Progress in the 21st Century Act

President Obama signed into law MAP-21 on July 6, 2012. MAP-21 funds surface transportation programs at over \$105 billion for fiscal years (FY) 2013 and 2014, and is the first long-term highway authorization enacted since 2005.

LEARN MORE





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USDOT Implementation of MAP-21 Transportation Performance Measures (TPM)

BACKGROUND

Moving Ahead for Progress in the 21st Century (MAP-21) requires the Secretary of the U.S. Department of Transportation (USDOT) to establish, within 18-months, transportation performance measures in the areas of the National Highway Performance Program (NHPP), Highway Safety Improvement Program (HSIP), the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and National Freight Movement (Freight).

Section 150 of Title 23 establishes national goals for:

- 1) Safety,
- 2) Infrastructure condition,
- 3) Congestion reduction,
- 4) System reliability,
- 5) Freight movement and economic vitality,
- 6) Environmental sustainability, and
- 7) Reduced project delivery delays.



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TIMING

USDOT, through both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), have provided industry and stakeholders with projected timelines for these rules.

FHWA will develop three performance measure rules:

- 1) Safety,
- 2) Pavement & Bridge Conditions, and
- 3) Other (congestion, air quality, freight, performance of the Interstate and non-interstate NHS).

The NPRM for each category of measures will be released in three-month intervals with the first released by the end of 2013. After a 90-day comment period, final rules will be promulgated, again in three-month intervals. The first notice is expected in the 4th quarter of 2014 and the last in early 2015. (Note: this schedule is an estimate and may change). USDOT will establish one effective date for all measures.

Performance Metric Integration for Trade Off Analysis

<u>MAP-21 Metrics</u>	<u>TIGER B/C (\$) Valuation</u>		
•Pavement Condition,			YES
•Bridge Condition,			YES
•Passenger and Freight Mobility,			YES
•Congestion,			YES
•Air Emissions,			YES
•Safety			YES

MAP - 21 Performance Metrics / Tradeoffs

	Quantity	Value /	Total value	Total Cost	Benefit / Cost
<u>Safety</u>					A
-Lives	# / year	\$9.12M	X	X	
-Crashes	# / year	by type	X	X	
<u>Emissions</u>					B
- NOx	Tons / year	\$5.3 k	X	X	
-PM	Tons / year	\$290k	X	X	
-CO2	Tons / year	by year	X	X	
<u>Congestion</u>					C
- <u>Delay</u>	Hours / year	\$12.50	X	X	
- <u>Reliability</u>	Hours / year	\$12.50	X	X	

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Related Documents [+] Feedback

Example: USDOT / FTA - New Starts



U.S. Department
of Transportation

**Federal Transit
Administration**

PROPOSED NEW STARTS AND SMALL STARTS POLICY GUIDANCE

January 9, 2013

Evolution of Transportation

Policy Systems / Organizing Principles

Focus on Highway Transportation Only

Focus on Societal Sustainability

Ability to Support a Sustainable Society

LEVEL 0 - SAFE MOBILITY

- Support Societal Mobility, Safety
- Favors government ownership & control of the transportation infrastructure
- Transportation agency Infrastructure Owner-Manager and Regulator

LEVEL 1 - COMPLIANT TRANSPORTATION

- Support Societal Mobility, Safety
- Compliance with Environmental, Economic and Social Legislative Requirements
- Transportation agency Infrastructure Owner-Manager & and Regulator
- Top-down planning

LEVEL 2 - GREEN TRANSPORTATION

- Support Societal Mobility, Safety Environmental, Economic and Social Needs -- Emphasizes Environment
- Transportation agency Infrastructure Owner-Manager and Regulator

LEVEL 3 - SUSTAINABLE TRANSPORTATION

- Support Sustainable Transportation
- Risk-Sharing between public and private sector
- Infrastructure Integrator (some owner-operator & some private)
- Regulator

LEVEL 4 - TBL SUSTAINABILITY

- Support Societal Sustainability
- Broad agency decision-making partnerships
- Risk-Sharing between public and private sector
- Infrastructure Integrator (some owner, some owner-operator, and some private)
- Regulator and steward partner

Focus of Sustainability Initiatives

Compliance/Short-term Focus

Sustainability/Long-term Focus

From: NCHRP 20-83 (07) - Sustainable Transportation Systems and Sustainability as an Organizing Principle for Transportation Agencies (Contractor – BAH's work product)

Tools & Data Sources

Transportation Benefit-Cost Analysis

Benefits

The benefits of transportation projects are commonly defined as reductions in transportation costs. However, on this website, benefits are defined as all of the effects of the project/program on its users or the society at large, even those effects that are negative (sometimes referred to as disbenefits). Benefits and disbenefits are measurable and have economic value.

These are the benefits most commonly considered in benefit-cost analysis of transportation projects:

- Travel time or delay reductions
- Vehicle cost savings
- Accident reductions
- Air Emission and greenhouse gas reductions
- Parking costs savings from projects that reduce vehicle ownership and use

Note that all of these benefits are actually reductions in the costs of transportation.

PUBLIC TRANSPORTATION TAKES US THERE

economy • environment • energy • quality of life

TRANSIT BENEFITS | ADVOCATE | COMMUNITY ORGANIZING | **TOOLS & CALCULATORS** | RESOURCES

TRANSIT BENEFITS CALCULATOR

Welcome to the Center for Transportation Excellence's Transit Benefit Calculator and Database. We have developed this tool to allow transit supporters to measure the benefits of actual or proposed transit investments in their community. Please fill out all known information as well as search parameters for the

ACT NOW

Contact Officials

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Search: Go

Transportation Cost and Benefit Analysis Techniques, Estimates and Implications [Second Edition]

USDOT - TIGER

The screenshot shows a Windows Internet Explorer browser window displaying the USDOT TIGER Grants website. The browser's 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 is titled "TIGER Grants" and includes a "Program Details" section with a bulleted list of categories: "Driven by Performance", "Innovation & Project Acceleration", "Safety & State of Good Repair", "Livability & Sustainability", and "Planning Activities". A prominent headline reads "FY 2012 TIGER Awards in 34 states, District of Columbia". Below this, a paragraph begins with "On June 22, the U.S. Department of Transportation awarded nearly \$500 million from the". To the right of the main text is a large "TIGER GRANTS" logo, a "SHARE" button, and a "Related Links" section containing links for "Application Resources (FAQ)", "Lessons Learned Webinar", and "TIGER 2012 Notice of Funding Availability". At the bottom right, there is a "Related Documents" section and a "[+] Feedback" button.

TIGER Grants | Department of Transportation - Windows Internet Explorer
http://www.dot.gov/tiger
Google usdot tiger
Favorites PB Remote Access Portal -... Google TIGER Grants | Departm... Safety - Transportation Be... Governor Andrew M. Cuo... A Guidebook for Sustainab...
United States Department of Transportation
About DOT Our Activities Areas of Focus
Home > Policy Initiatives > Tiger
TIGER Grants
Program Details

- Driven by Performance
- Innovation & Project Acceleration
- Safety & State of Good Repair
- Livability & Sustainability
- Planning Activities

FY 2012 TIGER Awards in 34 states, District of Columbia

On June 22, the U.S. Department of Transportation awarded nearly \$500 million from the

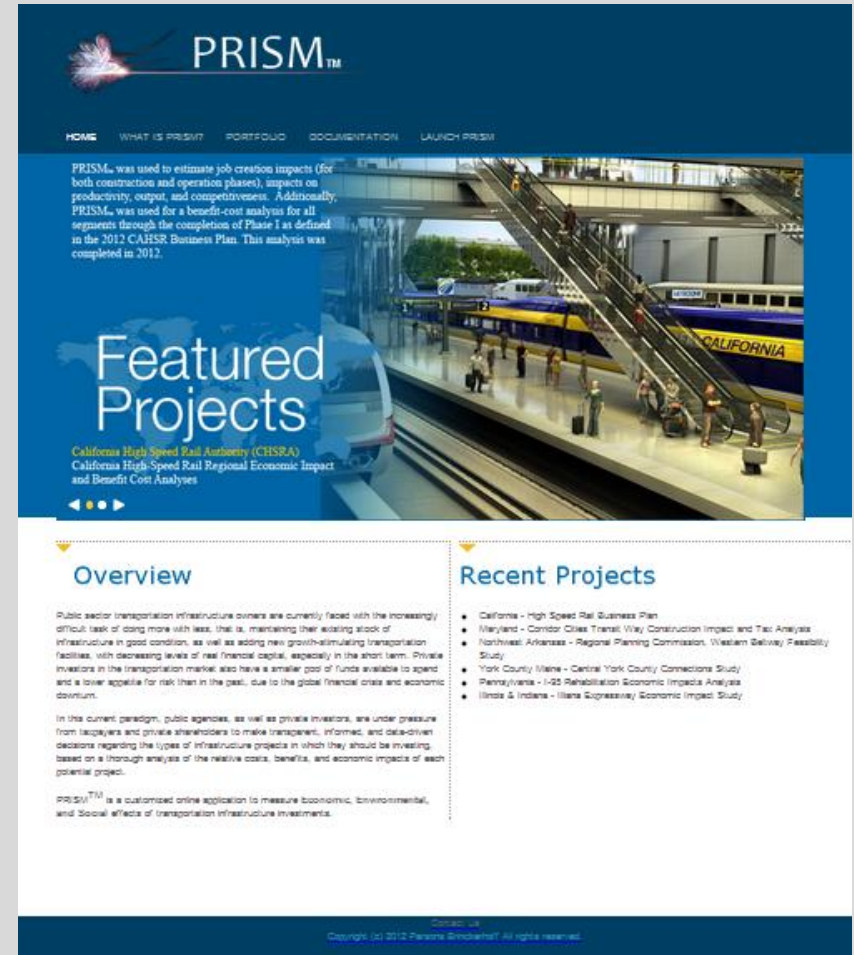
TIGER GRANTS
SHARE
Related Links

- Application Resources (FAQ)
- Lessons Learned Webinar
- TIGER 2012 Notice of Funding Availability

Related Documents [+] Feedback

Analysis Tool - PRISM™

- Developed in 2007
- Estimates the economic, environmental, and social effects of transport infrastructure
- Easy-to-use, flexible and transparent online tool - <http://prism.pbworld.net/>
- Customized uniquely for any region / project
- Original model architects
- Seamless interface with the travel demand model



The screenshot displays the PRISM website interface. At the top, the PRISM logo is accompanied by a navigation menu with links for HOME, WHAT IS PRISM?, PORTFOLIO, DOCUMENTATION, and LAUNCH PRISM. Below the navigation, a featured project section highlights the California High-Speed Rail Authority (CHSRA) project, titled "California High-Speed Rail Regional Economic Impact and Benefit Cost Analysis". The featured image shows a modern train station with a blue and yellow train and a person with a bicycle. Below this, the "Overview" section discusses the challenges of maintaining infrastructure and the need for data-driven decisions. The "Recent Projects" section lists several other studies, including those for Maryland, Northwest Arkansas, York County, Maine, Pennsylvania, and Illinois & Indiana. The footer contains copyright information for Parsons Brinckerhoff, dated 2012.

PRISM - State DOTs

Client	Project
Maine DOT / Maine Turnpike Authority	York County Connector Study
Minnesota DOT	CIMS Initiative US 14 Economic Analysis
Illinois DOT	Illiana Expressway (TIER 1, 2012 & TIER 2, 2013)
Indiana DOT	Illiana Expressway (TIER 1, 2012 & TIER 2, 2013)
Pennsylvania DOT	I-95 Corridor Study
Rhode Island DOT	Sakonnet River Bride Tolling Study
Connecticut DOT	Platform Improvement Project
Maryland DOT / Maryland Transit Authority	Corridor Cities Transitway

PRISM - Transit Agencies

Client	Project
New Orleans Regional Transit Authority (NORTA)	Streetcar Expansion Project
Rhode Island Public Transit Authority (RIPTA)	Streetcar Expansion Project
South Florida Regional Transit Authority (SFRTA)	Layover Relocation
Miami-Dade Transit	Enhanced Bus Service
Northern New England Passenger Rail Authority (NNEPRA)	Downeaster Service Optimization
Stark Area Regional Transit Authority (SARTA)	Fuel Cell Bus Fleet
Regional Transportation Commission (Nevada)	Rapid Transit Corridor
Wilmington Area Planning Council (WILMAPCO)	Station Relocation
National Capital Region Transportation Planning Board	Metrorail Station Access
SANDAG	NCC I-5 Economic Impact Analysis

Potential applications:

- **Prioritize projects in a capital plan**
- **Progress Projects**
 - **Public / Political**
 - **Commercial / Financial**
 - **Regulatory / Environmental Justice**
- **Assess Programs**
- **Communicate / Set Priorities**

Sample Benefit Categories / Standard Values

- **Direct transit user benefits**
 - Travel time
 - Reliability
 - Branding
 - Stations/stop amenities
 - Vehicle amenities
 - Productivity
- **Reduced automobile travel**
 - Reduced congestion
 - Parking cost savings
 - Accident cost savings
 - Reduced air and noise pollution
 - Energy conservation
 - Reduced vehicle ownership
 - Reduced vehicle operating costs
 - Oil import cost savings

Sample Benefit Categories

- **Statewide and local economic benefits**

- Result from the direct, indirect and induced multiplier effects of local, state, and federal monies spent on public transit
- Transportation efficiency enabled regional economic growth including wider economic impacts (i.e., agglomeration effects).

- **Livability benefits - explicit**

- Estimated via changes in property values
 - New development on vacant property
 - Redevelopment of existing property
 - Premium on existing property due to transit
 - Development of the air rights on top of and adjacent to the stations

- **Accessibility values**

- Mobility for non-drivers
- Facilitates access to jobs, medical care, and education
- Vital transportation link for senior citizens and persons with disabilities

- **Option values**

- The value people place on having a service available, even if they do not currently use it .

- **Health (walking)**

- **Equity values**

- All should have access

Easy to use

The screenshot shows a web browser window displaying the PRISM Regional Infrastructure Scenario Model. The browser title is "PRISM - Regional infrastructure Scenario Model - Windows Internet Explorer". The address bar shows the URL "http://prism.pbworld.net/prism/tblv/scenario?scenarioId=550". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The browser's toolbar includes "Google", "Search", "More >>", and "Sign In". The browser's status bar shows "PRISM - Regional infras..." and "http://144.171.11.40/cmsfe...".

The main content area features a banner with the PRISM logo and the text "Regional Infrastructure Scenario Model". Below the banner is a navigation menu with buttons for "INPUTS", "COST", "DISCOUNTED COST", "RESULTS N/A", "SAVE", and "SUBMIT".

The "INPUTS" tab is active, showing the following form fields:

Scenario Name: Description:

1 of 4 Steps

Activity / Project Type	
Construction /Implementation Start Year	<input type="text" value="2020"/>
O&M Start Year	<input type="text" value="2026"/>
O&M End Year (end of analysis period)	<input type="text" value="2050"/>
Base Year (Financial)	<input type="text" value="2011"/>
Cost Discount Rate(%)	<input type="text" value="5.00%"/>

Web based, Transparent, Flexible

PRISM - Regional Infrastructure Scenario Model - Windows Internet Explorer

http://prism.pbworld.net/prism/tblv/impacted?scenarioId=550#

File Edit View Favorites Tools Help

PRISM - Regional infras... x http://144.171.11.40/cmsfe...

Google Search More >> Sign In

PRISM - Regional Infrastructure Scenario Model

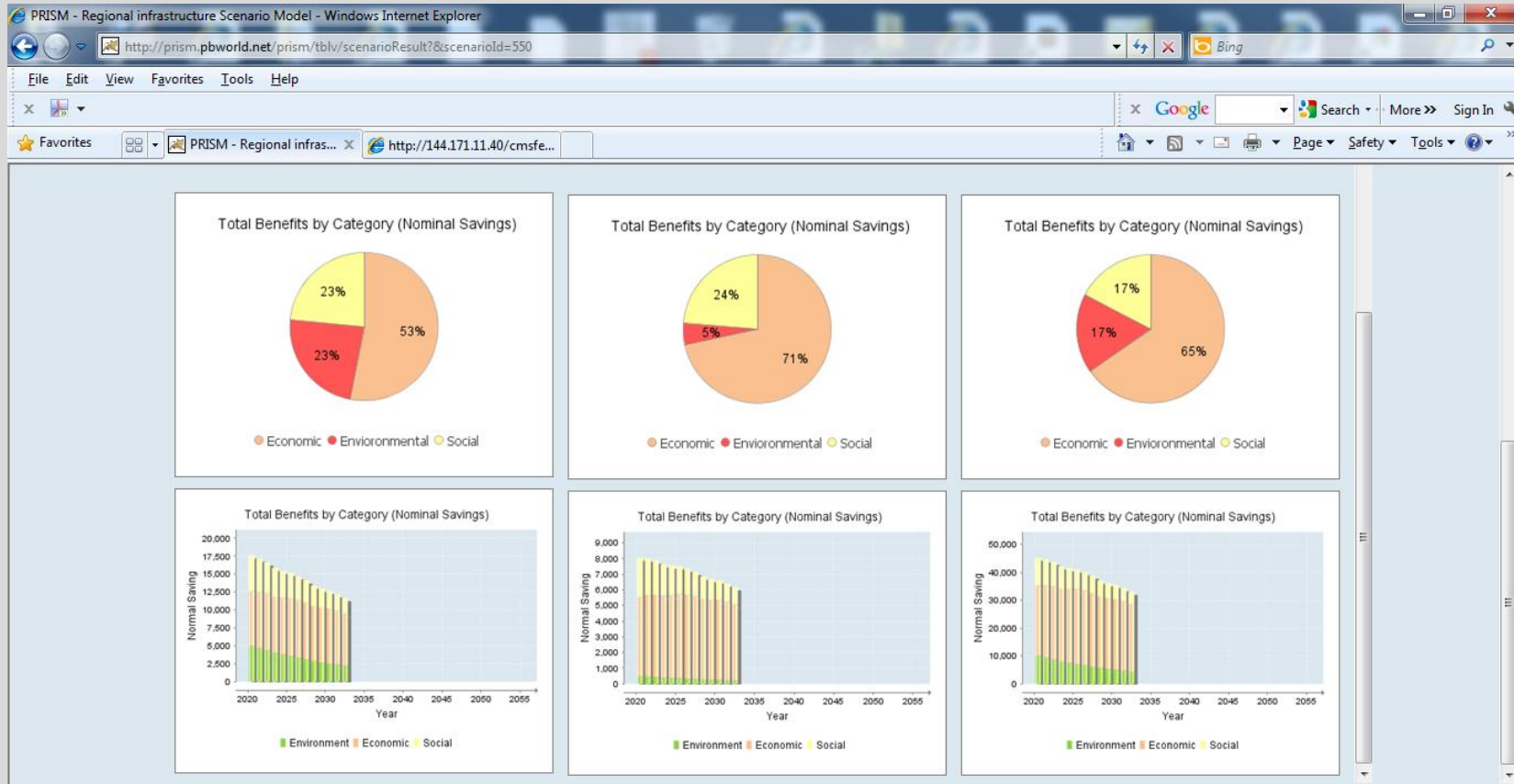
Scenario: Traffic Lane Construction

3 of 4 Steps

UNITS IMPACTED YEARLY IMPACT UNIT VALUES IMPACT DISCOUNT RATE SAVE BACK NEXT

Environment		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Air Quality														
Criteria Pollutants														
PM2.5	10 tons	100	100	100	100	100	100	100	100	100	100	100	100	100
Economic		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Value of Travel Time Savings														
Commuter Travel Cost Savings (Peak)														
Medium Income Wages	15\$ per Hour	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200
Social		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
cultural/community resources														
cultural community access														
impacted	1000 visits	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

Adaptable / Interactive



Quantifying, Monetizing -- Prioritizing

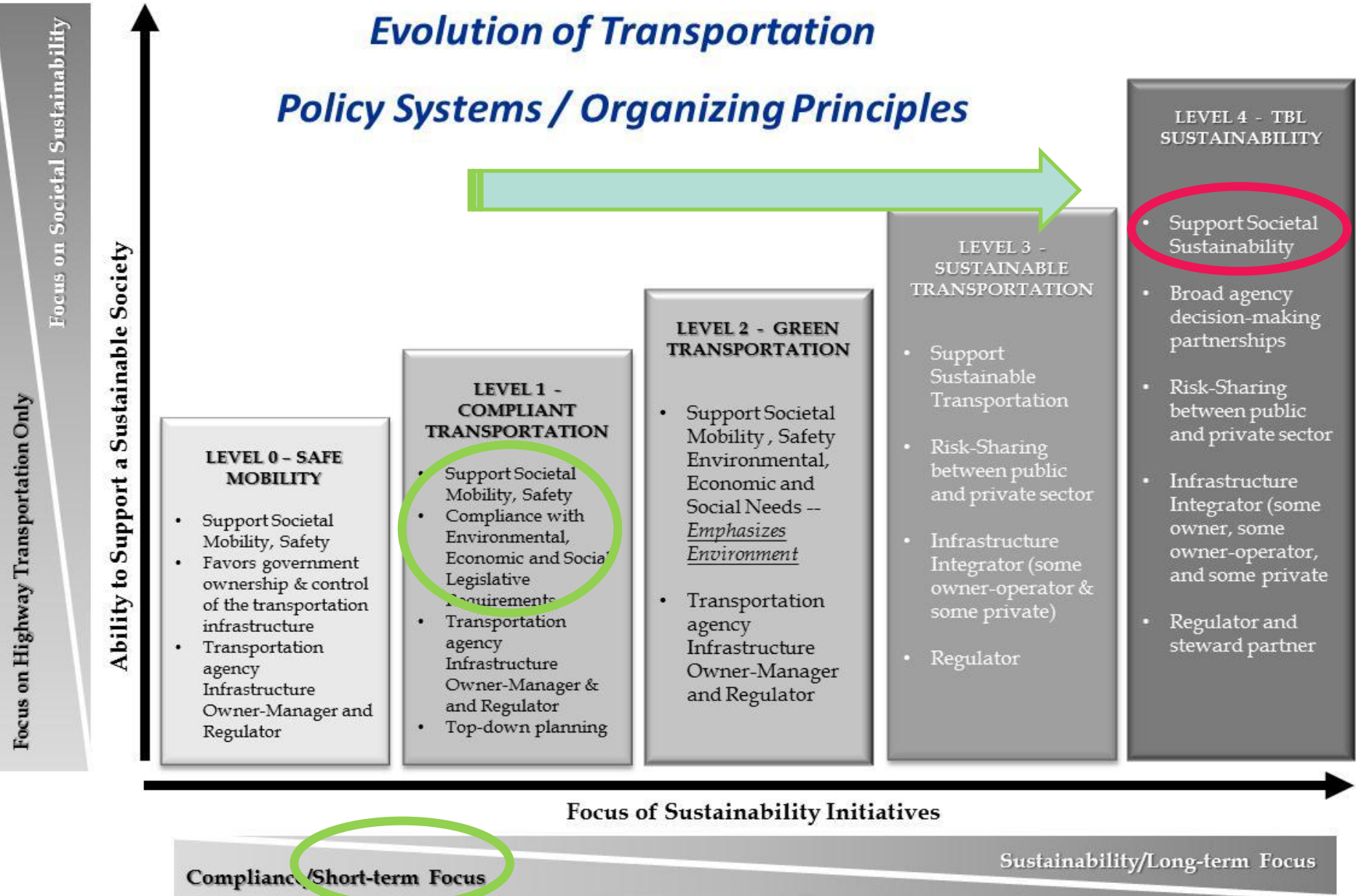
- **Analytical**
- **Transparent**
- **Flexible**
- **Defensible**
- **Comprehensive**

How sustainability valuation can help MPO's

- ✓ Set priorities
- ✓ Engage diverse constituencies
- ✓ Forge consensus
- ✓ Document decisions
- ✓ Make good use of MAP-21 Metrics
- ✓ Position worthy projects for supplemental funding

Evolution of Transportation

Policy Systems / Organizing Principles



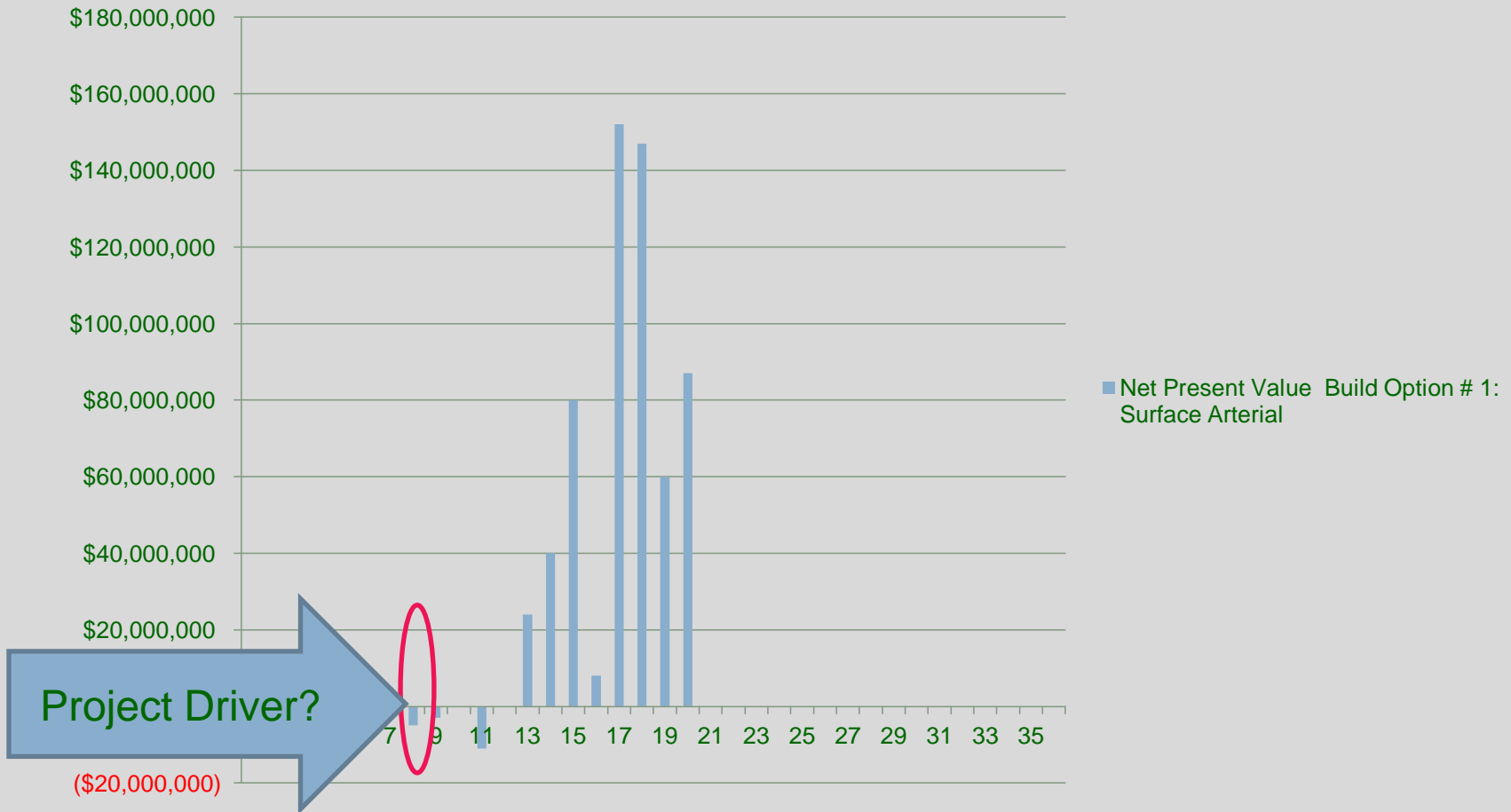
From: NCHRP 20-83 (07) - *Sustainable Transportation Systems and Sustainability as an Organizing Principle for Transportation Agencies* (Contractor – BAH's work product)



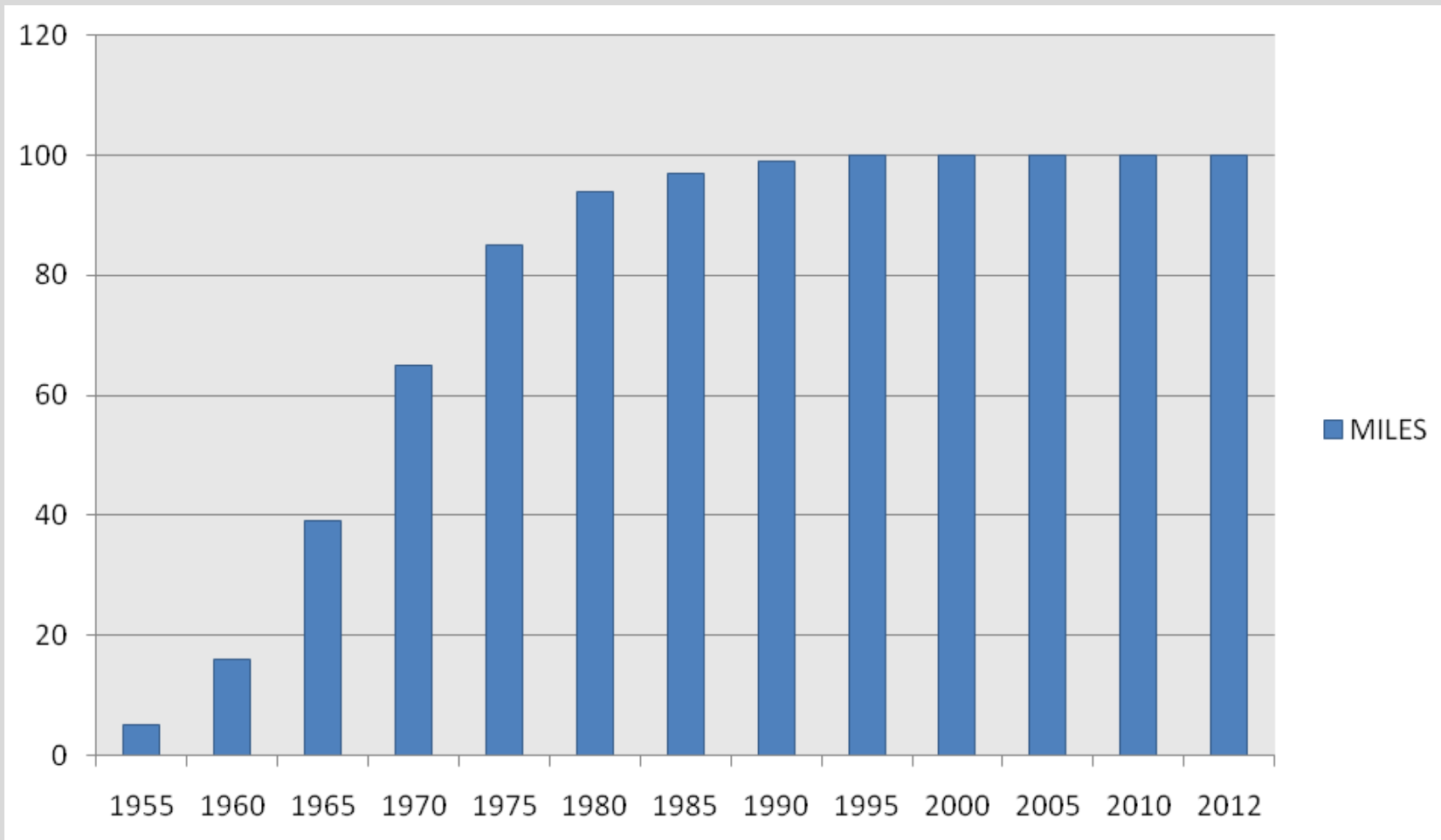
mcvoygr @ pbworld.com
AMPO - 10/22/13

Relative Value as a Conversation Starter...

Net Present Value Build Option # 1: Surface Arterial



Context – Interstate development – not...



Source: <http://www.publicpurpose.com/hwy-intmiles.htm>