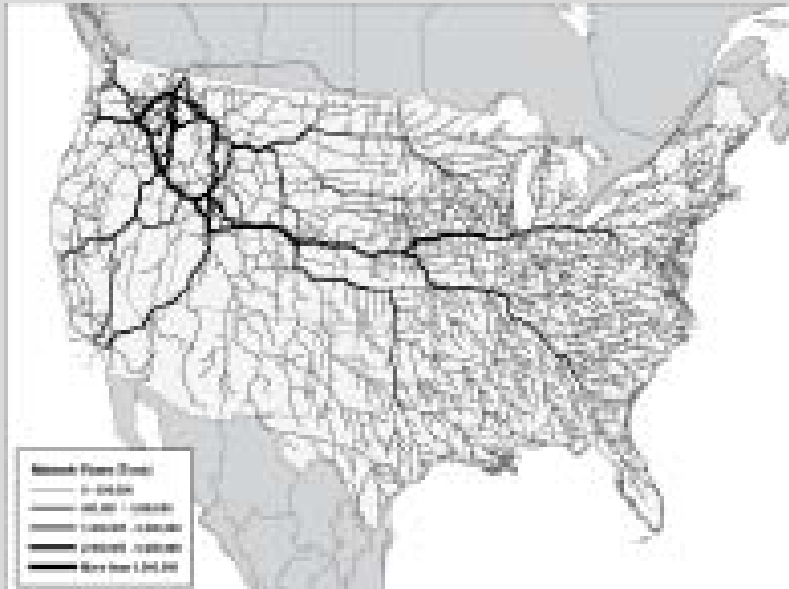


Reducing transportation to dollars and applying common sense



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- Redevelopment agencies
- State Community Resources

COMPASS

Disclaimer: Graphic is an illustration of the variety of organizations needed to collaborate in a regional plan. Not all organizations are reflected.

Gary R. McVoy, Ph.D.
 mcvoygr@pbworld.com

Reducing transportation to dollars and applying common sense - 1/23/2014

- Price, Value & Decision making
- Applicability to transportation

- How dollar valuations can help
 - Set priorities
 - Engage constituencies
 - Forge consensus
 - Document decisions
 - Make good use of MAP-21 Metrics

Price, Value & Decision making



- Hunting
- Fishing
- Licenses**
- Wildlife
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- Purchase A License, Tag, Permit:**
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- Even if we can't afford everything, I want to know what we need to accommodate all that future growth!
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- “Roads? Where we're going, we don't need roads.”
(From [*Back to the Future*](#)) Will you need roads in your future?

Vision - COMPASS Board, October 15, 2012

The *Communities in Motion 2040* Vision provides new housing and jobs along transit corridors and in **major activity centers** with a strong focus on maintaining the region's **recreation and open space** areas. New growth would be comprised of **a variety of housing** types, served by infrastructure, nearby services, **and outside of prime farmland or environmental constraints**. This vision supports local **comprehensive plan goals** and densities, and includes **entitled developments** as of July 2012. This vision would support **high capacity transit** for State Street (Highway 44) and a route parallel to Interstate-84, as well as **multimodal infrastructure and services** throughout the region. Key goals include walkability, preserving farmland, minimizing congestion, increasing transportation options, improving jobs-housing balance, better access to parks, and maintaining environmental resources. (Adopted by the COMPASS Board October 15, 2012)

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- new housing and jobs in **major activity centers**
- strong focus on **recreation and open space**
- growth comprised of **a variety of housing types**
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Communities in Motion 2040: Long-Range Plan Elements



Economic Development

- Jobs/housing balance
- Population near major activity centers



Housing

- Housing affordability
- Housing + transportation affordability
- Housing mix



Land Use

- Day and night population
- Land use mix
- Population density
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Transportation

- Average distance from housing to transit
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Community Infrastructure

- Cost of new residential infrastructure
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Communities in Motion 2040: Performance Measures



2040 -- Goals / Performance Measures

APPROVED_Goals_And_All_July15_2013_e.xlsx - Microsoft Excel

Home Insert Page Layout Formulas Data Review View PDF-XChange 4

A2 Goals/ Performance Measures

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R																				
1		Transportation				Land Use				Housing	Community Infrastructure		Health	Economic Development		Open Space	Farm Land																					
2	Goals/ Performance Measures	1.1 Enhance the transportation system to improve accessibility to jobs, schools, and services; allow the efficient movement of people and goods; and ensure the reliability of travel by all modes, considering social, economic, and environmental impacts.				1.2 Improve safety and security for all transportation modes and users.				1.3 Protect and preserve existing transportation systems and	1.4 Develop a transportation system with high connectivity that preserves capacity on the regional system and encourages walk and bike trips.		2.1 Coordinate local land use planning, transportation planning, and development to maximize the use of existing infrastructure, increase the effectiveness of investment, and retain or enhance the vitality of the local		2.2 Recognize and more clearly define and support the regional role of all communities, including small		2.3 Encourage infill development and more compact growth near community-identified activity centers.		2.4 Strive for more walkable, bikeable, and livable communities with a strong sense of place and clear community		3.1 Encourage mixed-use neighborhoods, town centers, and other development types that include a variety of housing options to meet the transportation and housing needs of all socioeconomic		4.1 Promote land use patterns that provide Treasure Valley residents with safe, reliable, and cost-efficient		4.2 Promote maintenance and preservation of existing infrastructure.		5.1 Promote a transportation system and land use patterns that enhance public health, protect the environment, and improve the quality of life.		6.1 Develop a regional transportation system that connects communities, provides access to employment centers, and provides efficient truck, rail, and/or air freight movement throughout the		6.2 Maintain the vitality of regional centers, downtowns, and main streets through continued public and private investments in new and existing business, housing, and transportation		7.1 Promote development and transportation projects that protect and provide all of the region's population with access to open space, natural resources, and trails.		8.1 Protect and enhance transportation routes for the efficient movement of farm equipment and products.		8.2 Protect agricultural land for food, fiber, and fuel production and support of other agricultural and food-related	
3	Access (within walking distance) to parks				X					X				X		X																						
4	Acres of irrigated farmland																	X																				
5	Affordability of housing and																																					
6	Agencies adopting CIM 2040								X																													
7	Agricultural land used outside areas designated in CIM 2040 Vision				X													X																				
8	Annual ridership/share of alternative				X																																	
9	Areas conflicting with CIM 2040							X				X	X																									
10	Bridge conditions		X	X																																		
11	Composite population (population							X	X							X																						
12	Composite population (population and jobs) in major activity centers					X			X						X																							
13	Efficiency by mode: on-time performance (transit); reliability of	X																																				
14	Employment clusters (employment														X																							
15	Fatal/major injury crashes by mode		X																																			
16	Freight movement (travel time reliability in freight significant	X												X																								
17	production																	X																				

Transportation Land Use Housing Community Infrastructure Health Economic Development Open Space Farm Land Matrix

Ready 100%

10:48 AM 1/20/2014



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So different?

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Informed buying - Price



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- Working agricultural acres
- Agricultural loss



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- Water use
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\$ Cost?

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Informed buying – Price, Value

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\$ Cost?	\$ Value?
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\$ - Explicit Benefits & Costs

\$ - Access to TIGER and other funds

- Building the Interstate highway system was the largest public works project since the Egyptian pyramids. If past generations can think ahead for us, we should think ahead for others!

\$ - Discount Rates

\$ - Life Cycle Costs

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- The leading cause of death for teens is traffic accidents. Let's plan for better safety.

\$ - Crashes vs. other investments

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\$ - Hours of Congestion / Delay

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\$ - To show and prioritize full values

- Because the gas pump is not the fountain of youth!

\$ - To show energy savings

- There will be over a million people here. Need I say more?

\$ - To show quality of life

Communities in Motion: Why Do You Care? Part IX

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Communities in Motion: Why Do You Care? Part IX

- “Roads? Where we’re going, we don’t need roads.”
(From *Back to the Future*) Will you need roads
in your future?

\$ - Just in case...

\$ - Usually the smart bet

\$ - First make a plan

\$ - Follow the money...

Reducing transportation to dollars and applying common sense - 1/23/2014

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- *Applicability to transportation*

- How dollar valuations can help
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Performance measures for multimodal transportation investments and a common metric for assessing net benefits across the “Triple Bottom Line”

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- U.S. Dept of Housing and Urban Development

Transportation:

- COMPASS
- Federal Highway Administration
- Federal Transit Administration
- Highway districts
- Idaho Transportation Department
- Private transportation providers
- Safe Routes to School
- Valley Regional Transit

Economic Development:

- Boise Valley Economic Partnership
- Chambers of commerce
- Colleges and universities
- Idaho Department of Commerce
- Idaho Department of Labor
- Idaho Rural Partnership
- Redevelopment agencies
- Sage Community Resources

Infrastructure:

- Idaho Green Building Council
- Irrigation districts
- U.S. Army Corps of Engineers
- Utilities



Disclaimer: Graphic is an illustration of the variety of organizations needed to collaborate in a regional plan. Not all organizations are reflected.

Gary R. McVoy, Ph.D.
mcvoygr@pbworld.com

PARSONS
BRINCKERHOFF

How dollar equivalent valuations can help

- Set priorities
- Engage constituencies
- Forge consensus
- Document decisions
- Make good use of MAP-21 Metrics

Transportation Effects

<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

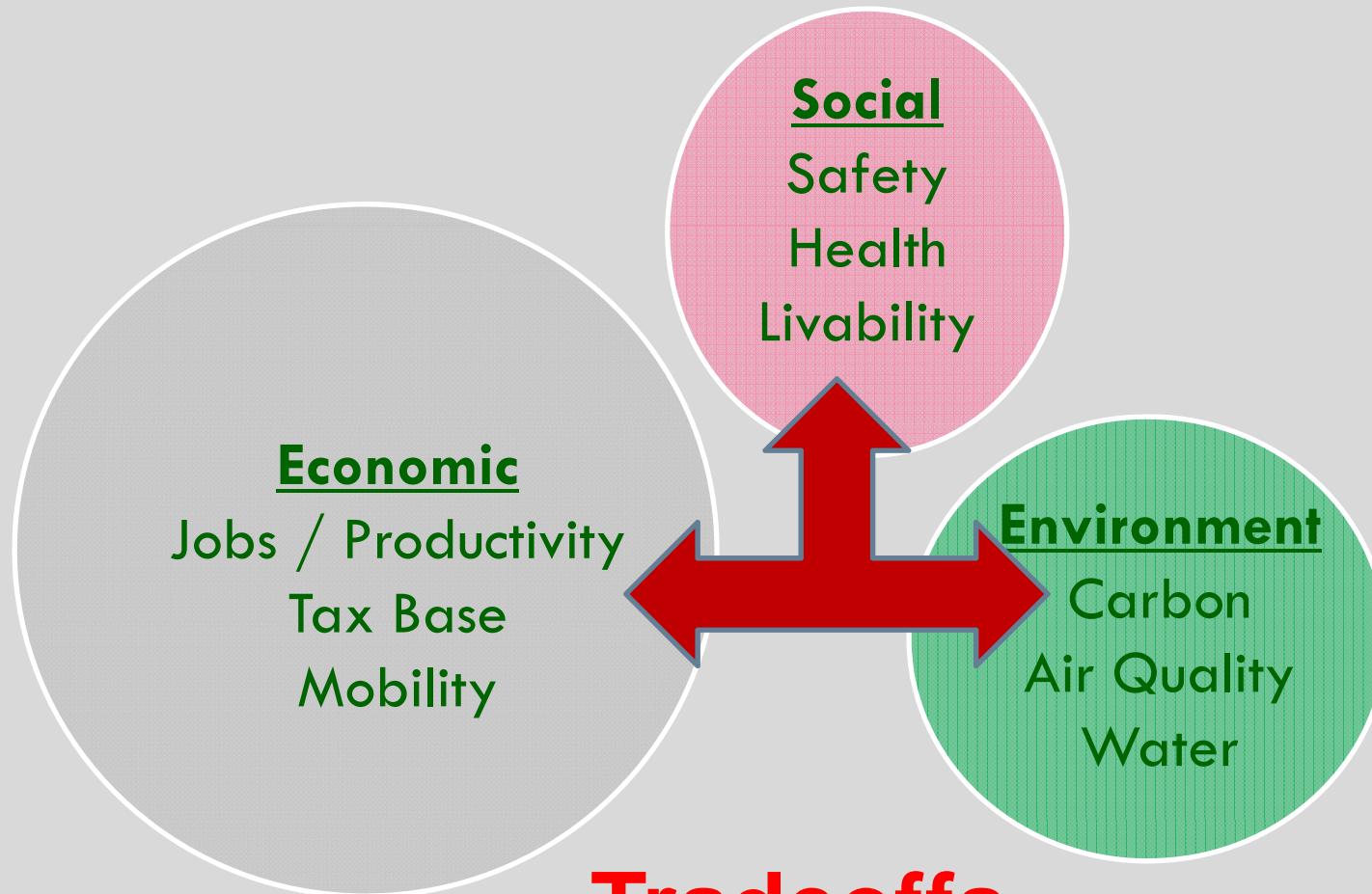
Source: Adapted from "Sustainable Transportation and TDM: Planning That Balances Economic, Social and Ecological Objectives;" Victoria Transport Policy Institute (An independent Canadian research organization)

5

**PARSONS
BRINCKERHOFF**

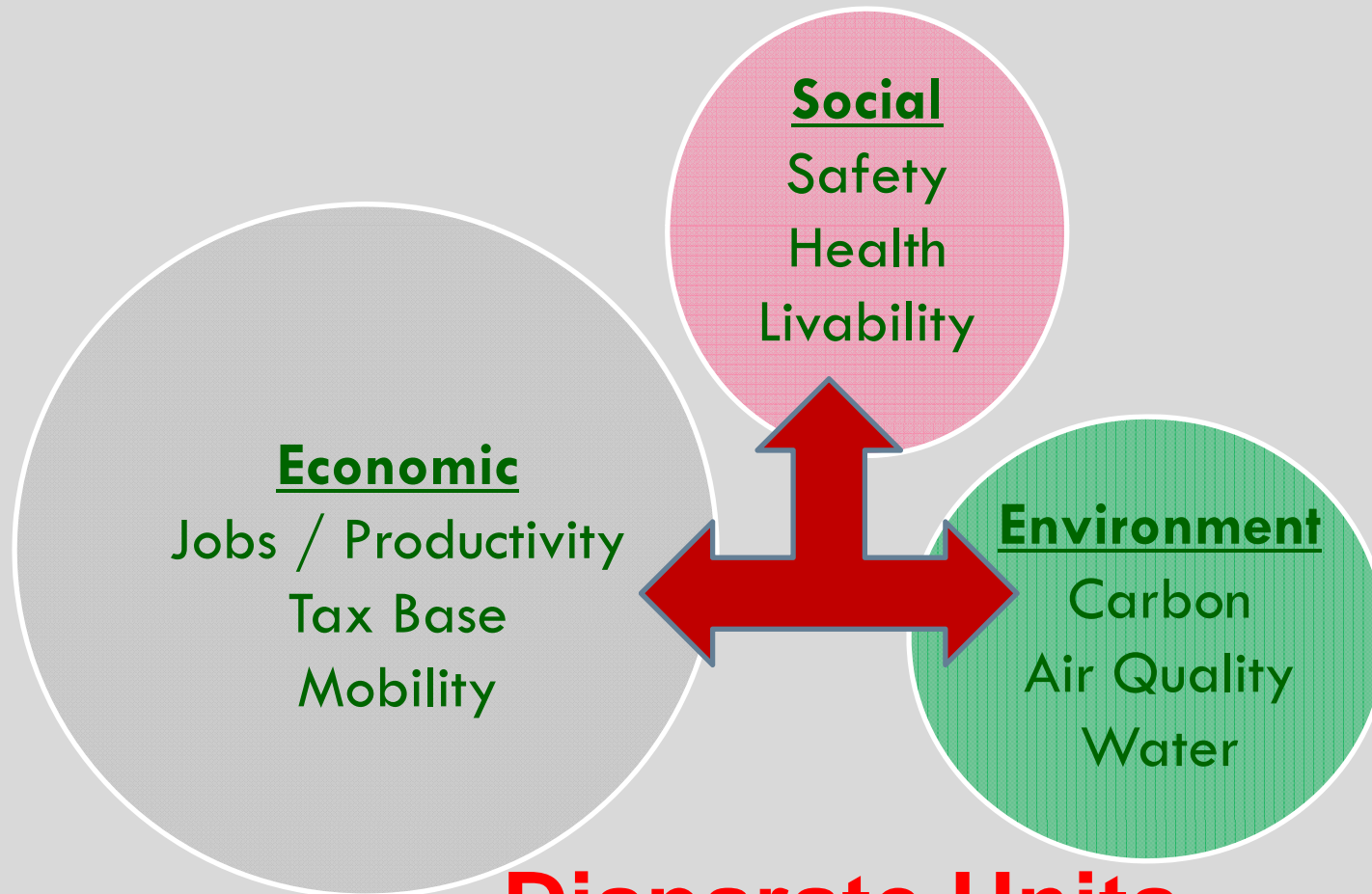
**PARSONS
BRINCKERHOFF**

Optimization / Prioritization?



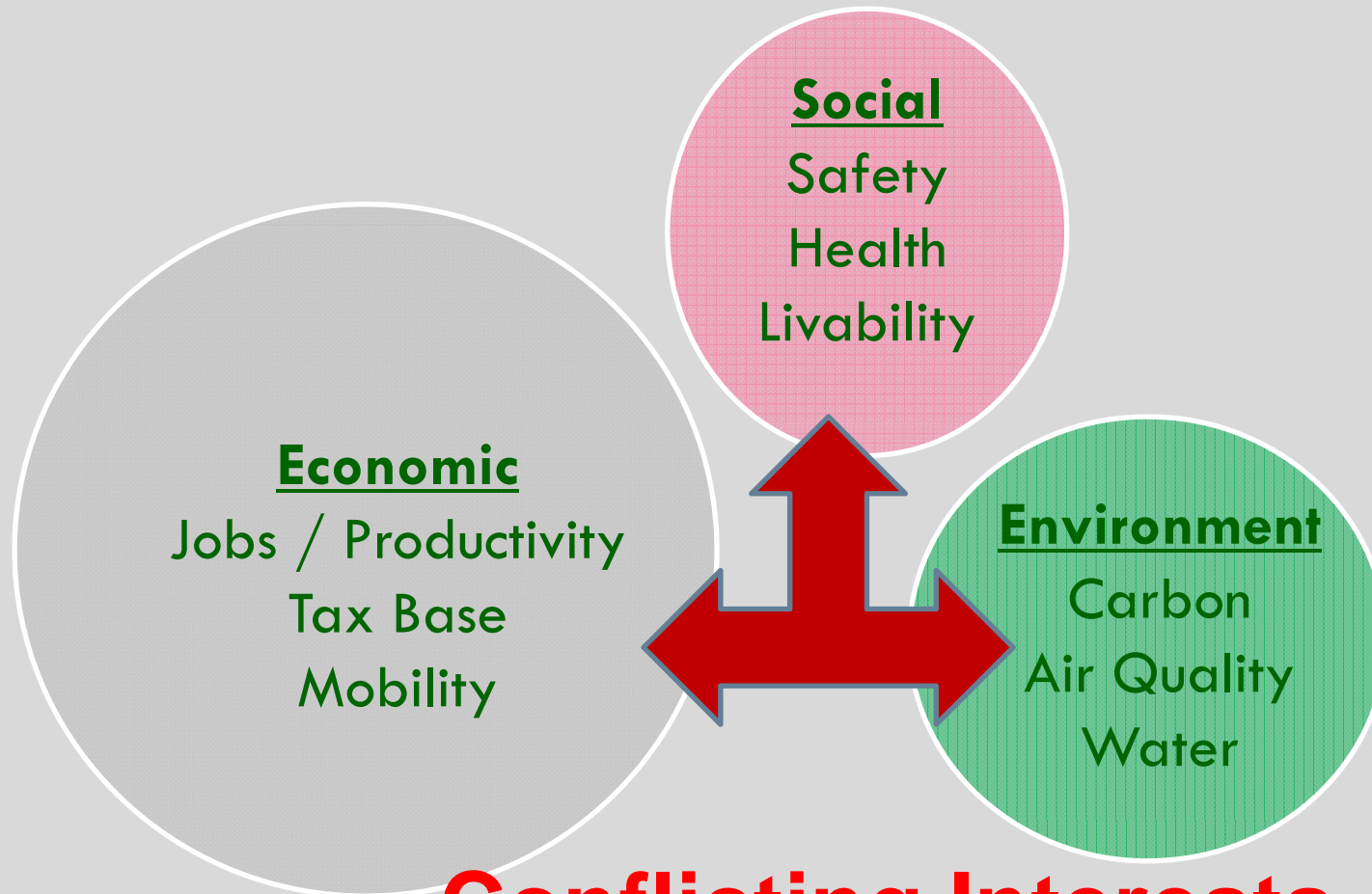
Tradeoffs

Assessment / Communication?



Disparate Units

Fairness / Transparency?

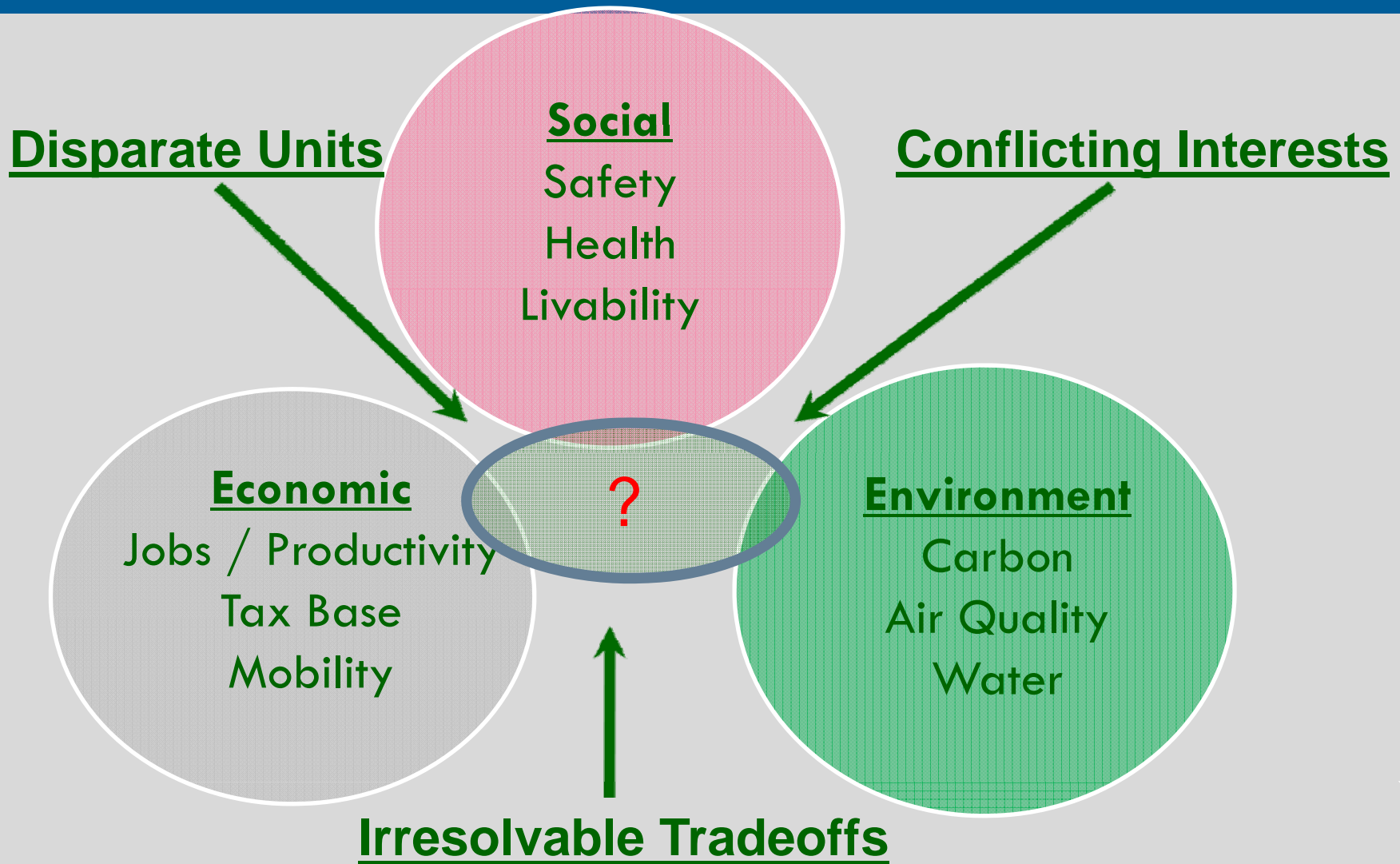


Conflicting Interests

How dollar equivalent valuations can help

- **Set priorities**
- Engage constituencies
- Forge consensus
- Document decisions
- Make good use of MAP-21 Metrics

Breaking Down Issues - Common Ground Values



Effects as \$ EQUIVELANTS

<i>Triple Bottom Line Metric (1-5)</i>	
Direct Agency Savings - Short Term	
	Maintenance Costs
	Energy Costs
	Other
Direct Agency Savings - Long Term	
	Life Cycle Cost Savings
	Pavement
	Bridge
	Facility
	Payroll
	Other
TBL Economic Benefits	
	Travel Time
	Reliability
	connectivity
	Other
TBL Environmental Benefits	
	GHG Emissions
	NAAQS / Air Toxics Emissions
	Wetlands
	Runoff Effects
	Habitat
	Noise
	Other
TBL Social Benefits	
	Safety
	Accessibility
	Livability
	Health
	Aesthetics
	Other

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 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 key areas: "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 sections for "Related Links" (including "Application Resources (FAQ)", "Lessons Learned Webinar", and "TIGER 2012 Notice of Funding Availability") and "Related Documents" with 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

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.

\$ benefits

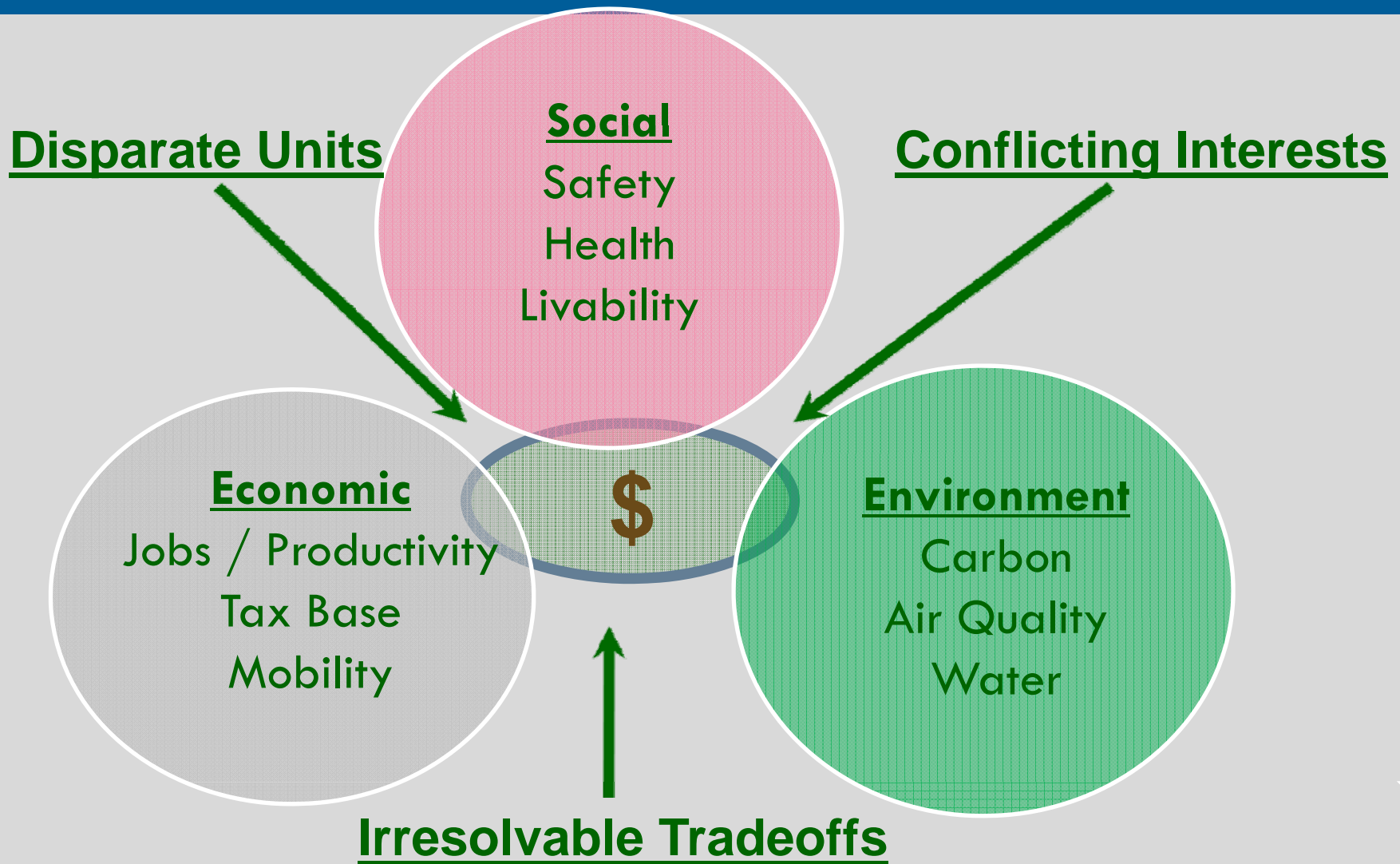
Cost/Benefit Category	Recommended Monetized Value(s)		
Value of Travel Time	Recommended Hourly Values of Travel Time Savings (2009 U.S. \$ per person-hour)		
	Category	Surface Modes* (except High-Speed Rail)	Air and High-Speed Rail Travel
	Local Travel		
	Personal	\$12.00	
	Business	\$22.90	
	All Purposes **	\$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	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

Breaking Down Issues / Common Ground Values



TIGER - \$ -- Triple Bottom Line

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

4877

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

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
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)

Zero value for a “sense of place”?

COLLABORATION

Regional planning requires a concerted effort from many agencies and organizations working collaboratively. Long-range planning involves natural resources, health and social services, land use, housing, transportation, economic development, infrastructure, and public and private partners. This illustration is an example of how several participants are needed to create a livable community.

Natural Resources/Agricultural Land

- City/county parks departments
- Idaho Conservation League
- Idaho Department of Environmental Quality
- Idaho Department of Fish and Game
- Idaho Department of Lands
- Idaho Department of Water Resources
- Idaho Green Building Council
- National Resources Conservation Service
- Land Trust of the Treasure Valley
- U.S. Bureau of Land Management
- U.S. Department of Agriculture
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service

Housing:

- Homeless shelters
- Idaho Housing and Finance Association
- Idaho Smart Growth
- Local housing authorities
- U.S. Dept. of Housing and Urban Development

Transportation:

- COMPASS
- Federal Highway Administration
- Federal Transit Administration
- Highway districts
- Idaho Transportation Department
- Private transportation providers
- Safe Routes to School
- Valley Regional Transit

Economic Development:

- Boise Valley Economic Partnership
- Chambers of commerce
- Colleges and universities
- Idaho Department of Commerce
- Idaho Department of Labor
- Idaho Rural Partnership
- Redevelopment agencies
- State Community Resources

Health and Social Services:

- AARP
- Faith-based charities
- Health districts
- Hospitals
- Refugee organizations
- School districts
- Women and children agencies

Public and Private Partners:

- Builders/Building Contractors Association of SW Idaho
- Media
- Neighborhood and home owner associations
- Realtors

Land Use:

- All cities and counties
- Idaho Smart Growth
- Urban Land Institute

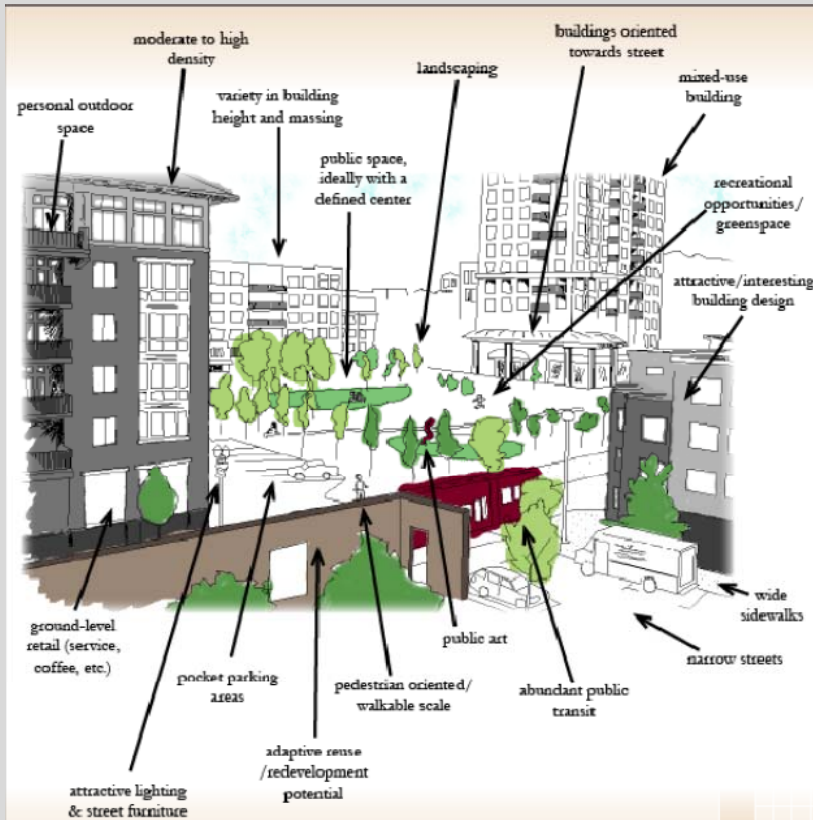
Infrastructure:

- Idaho Green Building Council
- Irrigation districts
- U.S. Army Corps of Engineers
- Utilities

Disclaimer: Graphic is an illustration of the variety of organizations needed to collaborate in a regional plan. Not all organizations are reflected.



Community Values / Aesthetics...



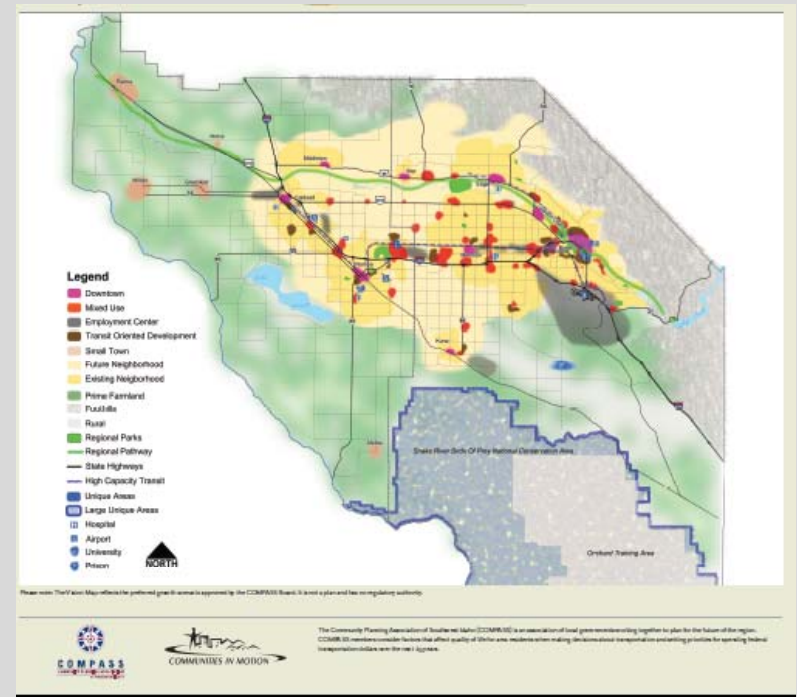
Communities in Motion - Page 2 - 22 September 2010

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

“Other Factors...”



Informed buying - Price, Value & Decision making

APPROVED 7 13 compass Goals with bc.xlsx - Microsoft Excel

Home Insert Page Layout Formulas Data Review View PDF-XChange 4

A16 Gross metropolitan farmland production

Goals/Performance Measures	Units (#)	\$ Costs (/ unit?)	Consensus Values (\$ eq. / unit)	B/C						
1										
2 Access (within walking distance) to parks	people									
3 Acres of irrigated farmland	acres									
4 Affordability of housing and transportation	cost / person									
5 Agencies adopting CIM 2040	% total									
6 Agricultural land used outside areas designated in CIM 2040 Vision	acres									
7 Annual ridership/share of alternative modes	person miles									
8 Areas conflicting with CIM 2040 Vision	acres									
9 Bridge conditions	life cycle cost reduction									
10 Composite population (population and jobs) in downtowns	% total									
11 Composite population (population and jobs) in major activity centers	% total									
12 Efficiency by mode: on-time performance (transit); reliability of travel time (auto); connectivity (bike and pedestrian)	% by mode									
13 Employment clusters (employment dissimilarity index)										
14 Fatal/major injury crashes by mode	crashes									
15 Freight movement (travel time reliability in freight-significant corridors)	% total freight value									
16 Gross metropolitan farmland production	total									
17 Household connectivity (access to parks, schools, and grocery stores)	% total									
18 Infill development (percent of new development within city limits and near schools, parks, and transit)	% total									
Infrastructure (water, sewer) maintained	Infrastructure									

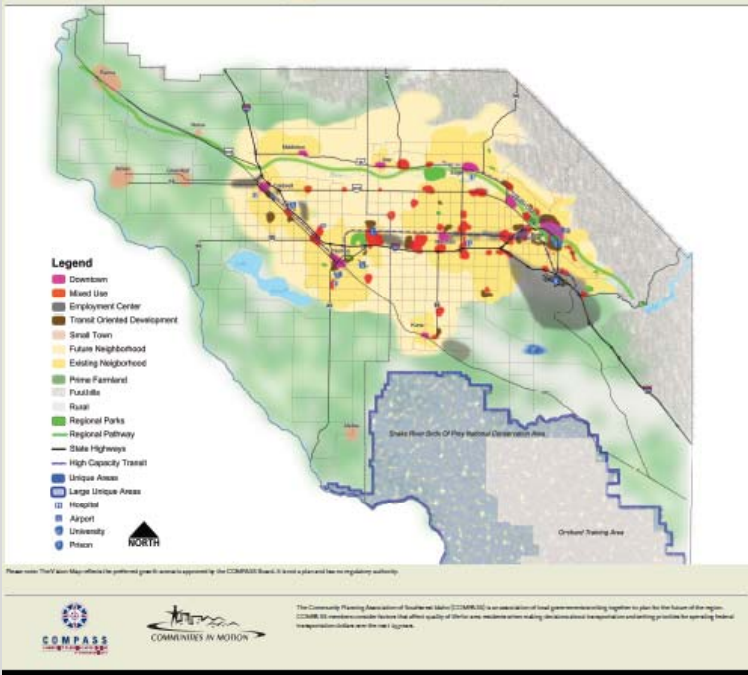
Ready

10:35 AM 1/20/2014

Better communications / decisions...



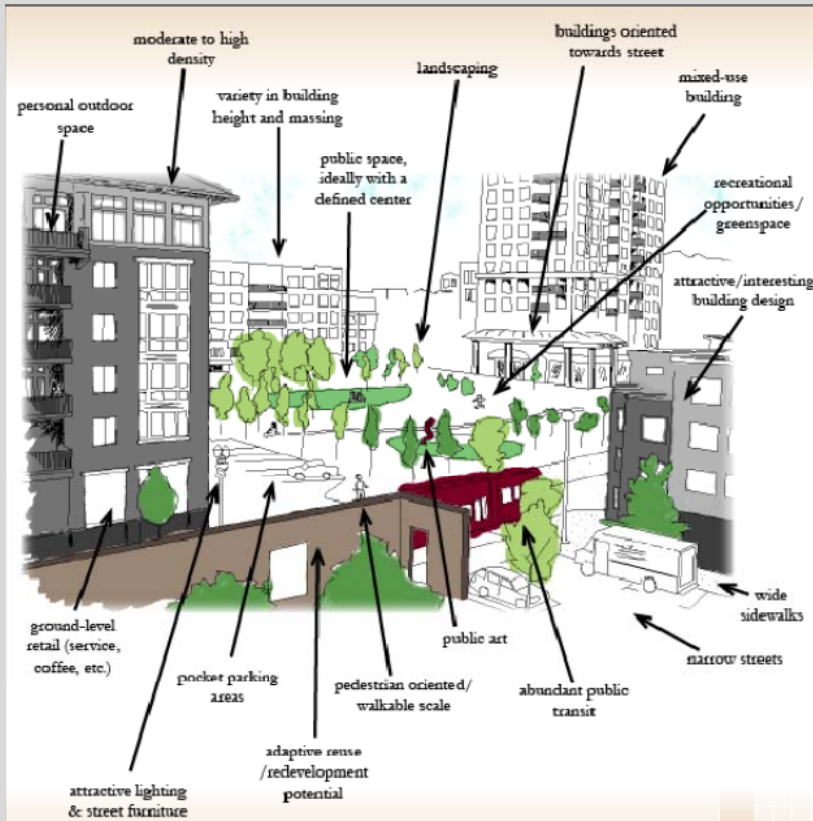
Informed
processes



How dollar equivalent valuations can help

- Set priorities
- **Engage constituencies**
- Forge consensus
- Document decisions
- Make good use of MAP-21 Metrics

Marginal Costs for Community Values / Aesthetics...



Communities in Motion - Page 2 - 22 September 2010

Price, Value - “Invisible Remainder Method”



- Hunting
- Fishing
- Licenses
- Wildlife
- Education
- Media
- Science
- Enforcement
- About Us

- Purchase A License, Tag, Permit: Resident Fees / Info Nonresident Fees / Info Controlled Hunt Information Applications / Forms
- Qualification / Selection for Special Wildlife Tags Disabled/Special Needs

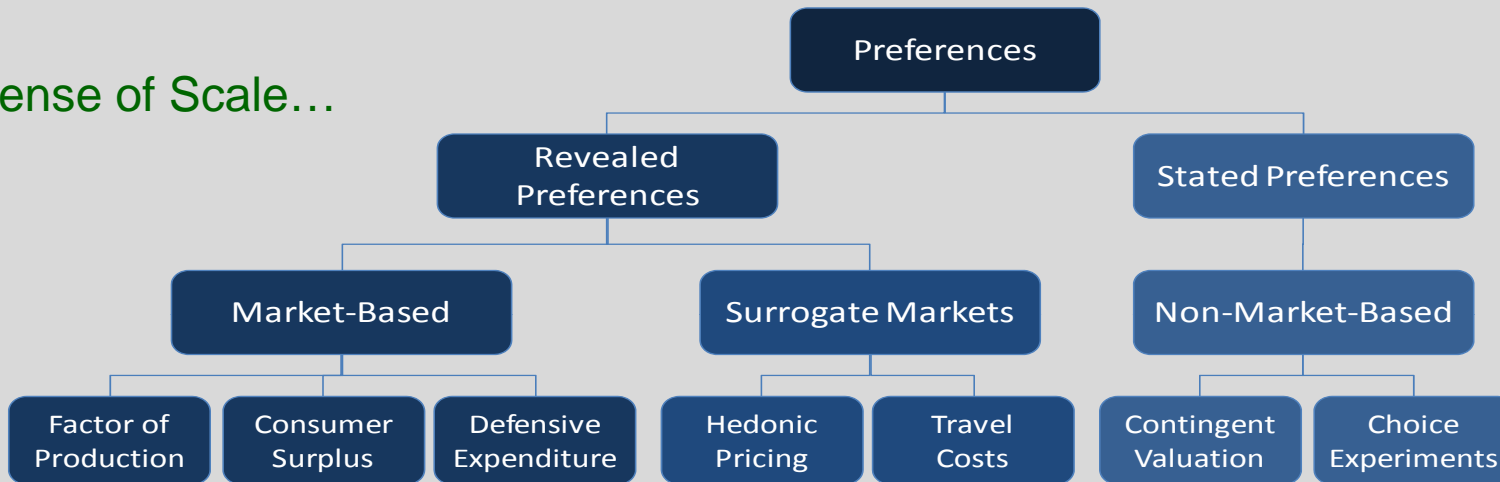
Nonresident License Fees

[Idaho Residency Requirements](#)

Combination Adult Hunting and Fishing	\$ 240.00
Combination - Adult Hunting and Fishing - 3 Year	\$ 716.50
Fishing - Adult	\$ 98.25 =
Fishing - Adult - 3 Year	
Fishing - Daily (first day)	\$141.75
<small>Each consecutive day at initial time of purchase add \$6.00.</small>	
Fishing - Junior (14-17 yrs)	\$ 21.75
Fishing - Junior (14-17 yrs) - 3 Years	\$ 61.75
Hunting - Adult	\$ 154.75

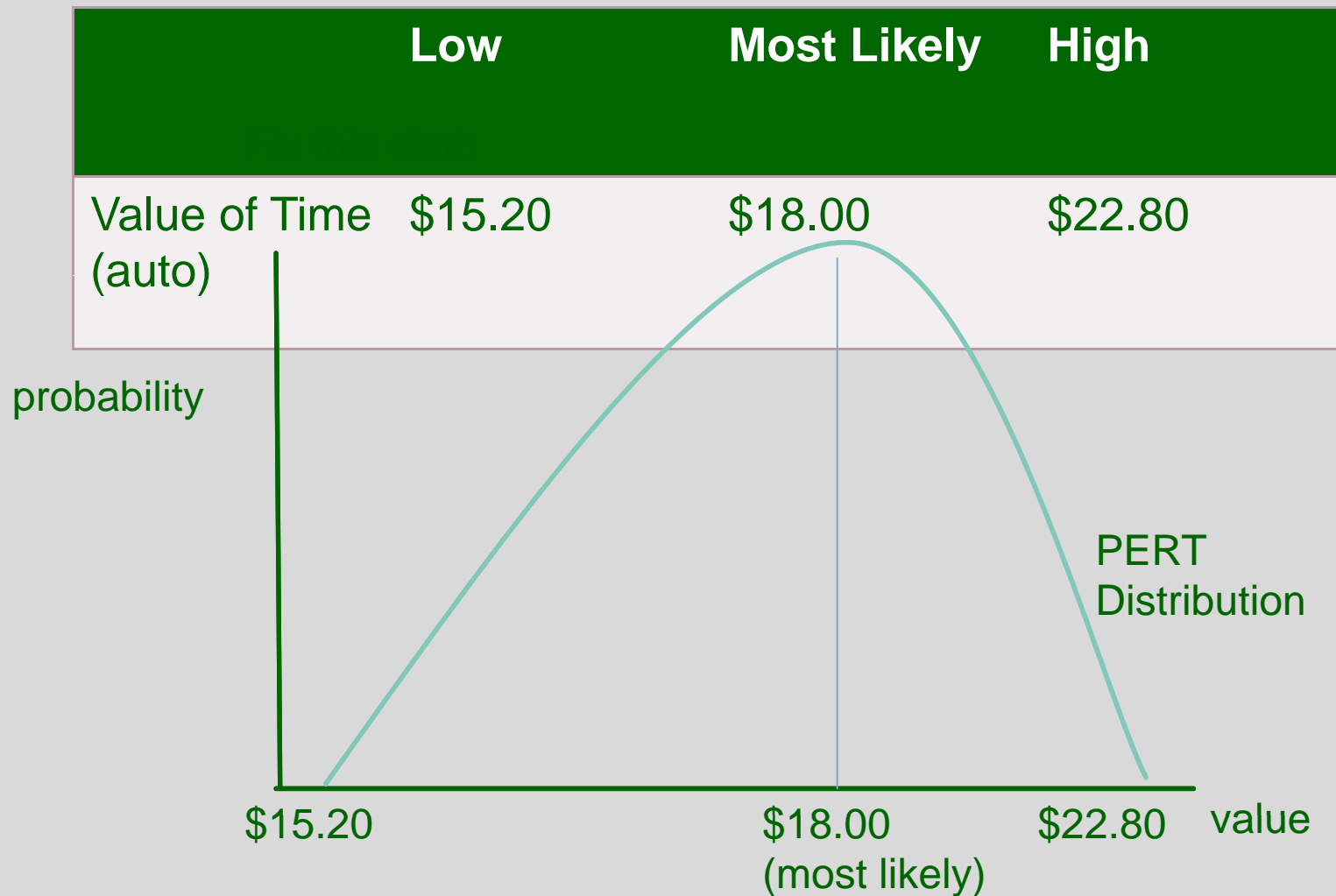
Valuation Methods

Sense of Scale...



- **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

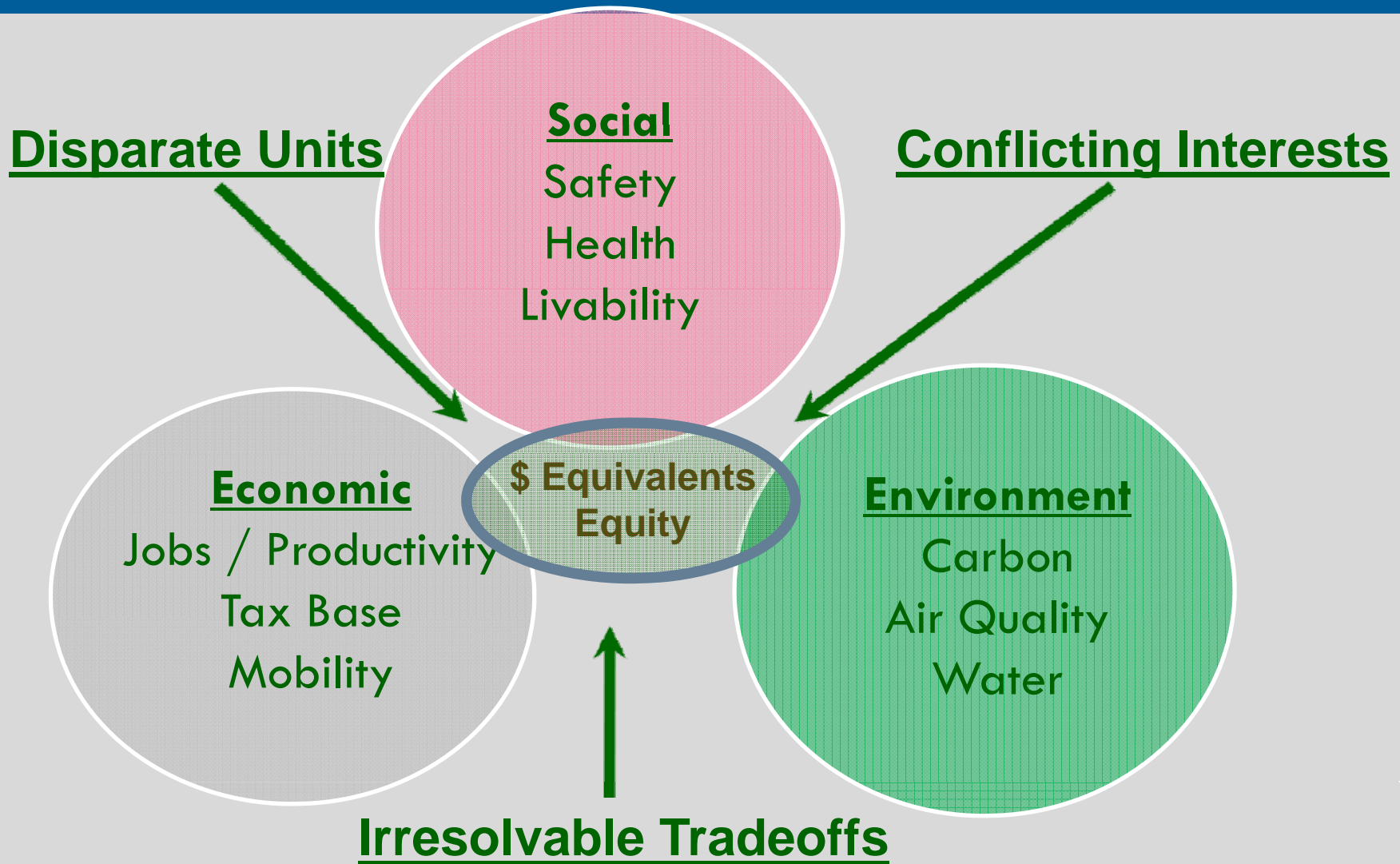
Community input to reflect their values...



How dollar equivalent valuations can help

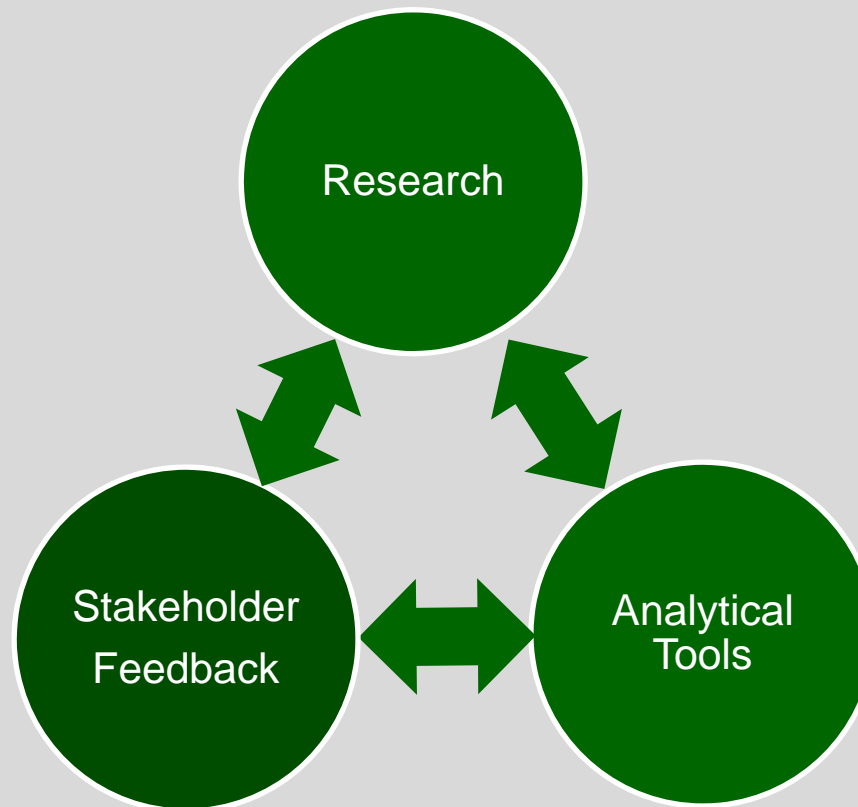
- Set priorities
- Engage constituencies
- **Forge consensus**
- Document decisions
- Make good use of MAP-21 Metrics

Breaking Down Issues - Common Ground Values



Enriching the conversation...

- Surrogate Market Methods
- Non-market methods



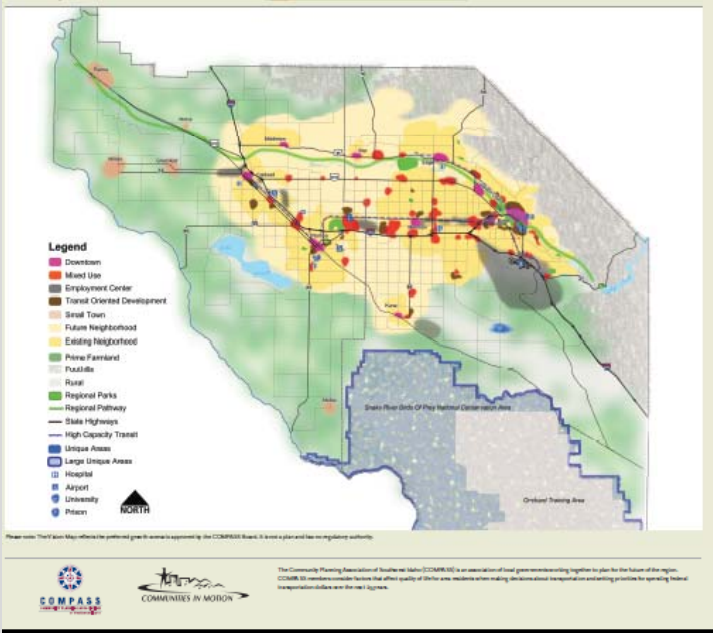
- Workshops and Interviews
- Web surveys

- Selection of category variables.
- Cost and project information
- Discount rates

Better communication among constituents...



Informed processes



How dollar equivalent valuations can help

- Set priorities
- Engage constituencies
- Forge consensus
- **Document decisions**
- Make good use of MAP-21 Metrics

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
		1	2	3					1	2	3	1	2	3	1	2	3									
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																										

Program VALUE...

TBL	Economic Cost to Agency	Economic Savings to Agency	Economic Benefits to region	Net Env. Benefits	Net Social Benefits	Benefit / Cost Ratio
Sample Metrics	\$	Life cycle	Mobility Jobs	Emissions	Safety Access	
Project / Program						
A						X
<u>B</u>						X
<u>C</u>						X
<u>D</u>						X

Project Rankings

compass breakdown 0.1.xlsx - Microsoft Excel

Home Insert Page Layout Formulas Data Review View PDF-XChange 4

Clipboard Font Alignment Number Styles Cells Editing

M15

TBL \$ METRICS

Direct Agency Savings - Short Term
Maintenance Costs
Energy Costs
Other
Direct Agency Savings - Long Term
Life Cycle Cost Savings
Pavement
Bridge
Facility
Payroll
Other
Economic Benefits
Travel Time
Reliability
connectivity
Other
Env. Benefits
GHG Emissions
MAAQs / Air Toxics
Emissions
Wetlands
Runoff Effects
Habitat
Noise
Other
Social Benefits
Safety
Accessibility
Livability
Health
Aesthetics
Other

PROJECTS

Project Name
Project Description
Location
Bridge Replacement
Bridge Replacement
Expansion
New Development
Project (State Transit - Park & Ride)
System Support
State Transit (Urban)
Trolley - Transline
Trolley - Harbor East
Trolley - North Star
System Planning
Urban Planning & Research
State Planning & Research
TAP - Urban & Rural
Tape Review for Transit
CH&C
High-Speed Rail
CIP - Local Urban
CIP - Transportation Mgt. Plan
CIP - Rural
TAP - Transportation Mgt. Plan
Bridge Loan
Bridge Loan
Bridge Loan
High Priority (SOPWA) L1
High Priority (SOPWA) L2
Transportation Benefits (Annual cost)
Emergency Relief
Other Transportation Issues
Other Federal/State Programs
Local/Private Partnership

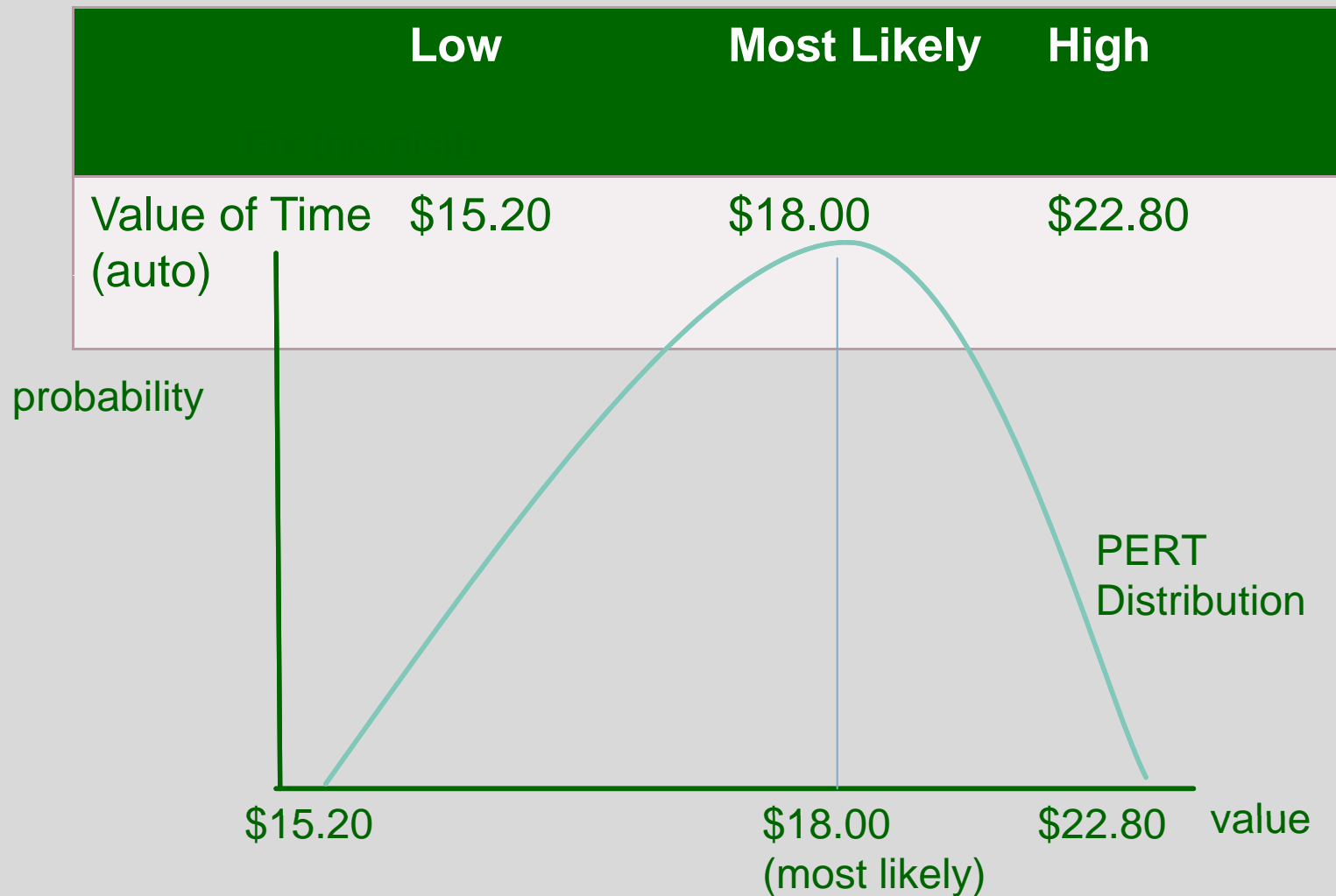
Sheet1 Sheet2 Sheet3

Ready

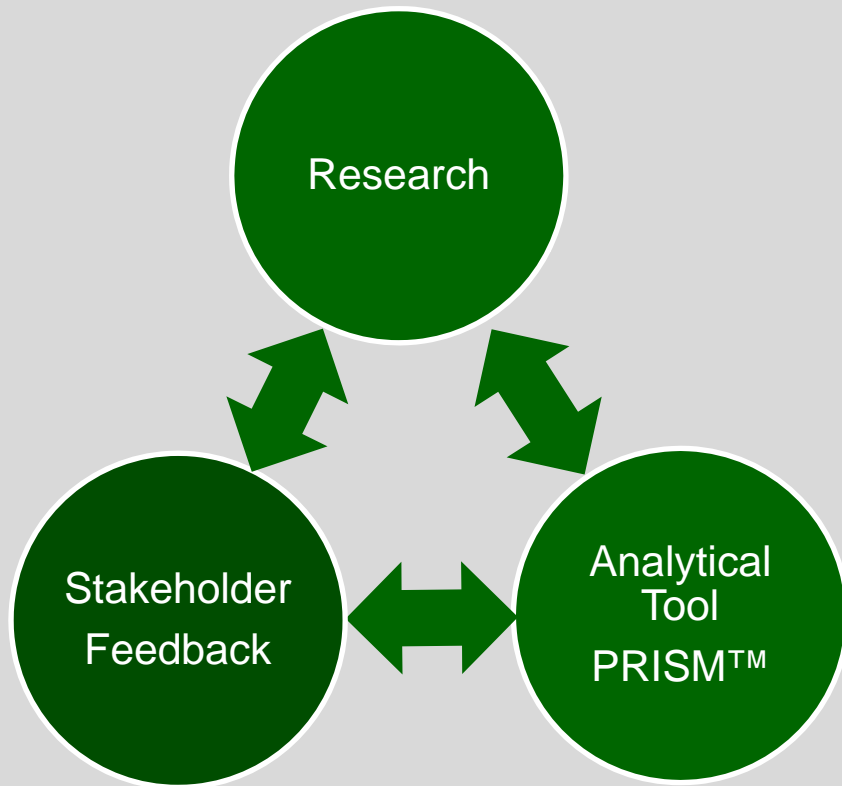
100%

3:27 PM
12/12/2013

Reflecting Community values...



Enriching the conversation...



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

How dollar equivalent valuations can help

- Set priorities
- Engage constituencies
- *Forge consensus*
- Document decisions
- Make good use of MAP-21 Metrics

PROJECT LIST with *Price & Value...*

YOUR METRICS ACCORDING TO YOUR VALUES...

		Direct Agency Savings - Short Term	Maintenance Costs	Energy Costs	Other	Direct Agency Savings - Long Term	Life Cycle Cost Savings	Pavement	Bridge	Facility	Payroll	Other	Economic Benefits	Travel Time	Reliability	connectivity	Other	Env.. Benefits	GHG Emissions	MAAQs / Air Toxics Emissions	Wetlands	Runoff Effects	Habitat	Noise	Other	Social Benefits	Safety	Accessibility	Livability	Health	Aesthetics	Other		
2																																		
3	PROJECTS																																	
4	Project Name																																	
5	Project Description																																	
6	Bridge Rehabilitation																																	
7	Recreation																																	
8	Early Development																																	
9	System Support																																	
10	Traffic - Transportation																																	
11	System Planning																																	
12	State Planning & Research																																	
13	TAP - Urban & Rural																																	
14	Statewide Planning																																	
15	Statewide Planning																																	
16	High Priority (SOP/TRA) (L)																																	
17	High Priority (TRA) (L)																																	
18	Emergency Repair																																	
19	Other National Programs																																	

How dollar equivalent valuations can help

- Set priorities
- Engage diverse constituencies
- Forge consensus
- Document decisions
- **Make good use of MAP-21 Metrics**

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	

How dollar equivalent valuations can help

- Set priorities
- Engage diverse constituencies
- Forge consensus
- Document decisions
- Make good use of MAP-21 Metrics

Tools & Data Sources



Transportation Benefit-Cost Analysis

Search this site

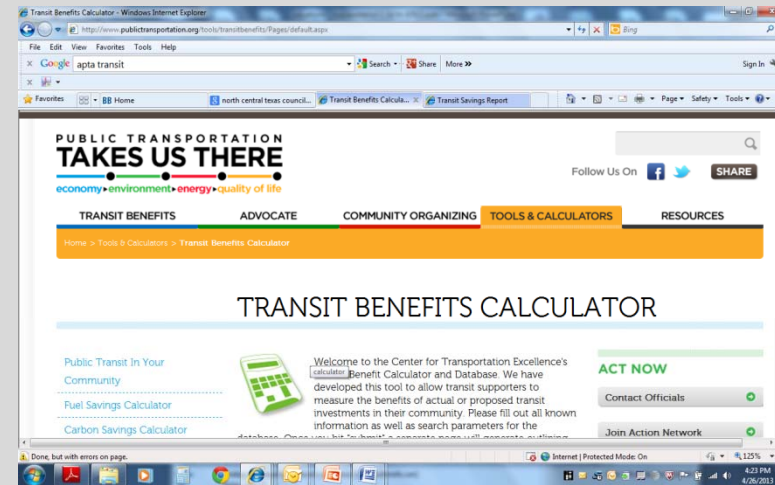
Benefits

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

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

TRANSIT BENEFITS CALCULATOR

Public Transit In Your Community

Fuel Savings Calculator

Carbon Savings 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

Join Action Network



Victoria Transport Policy Institute

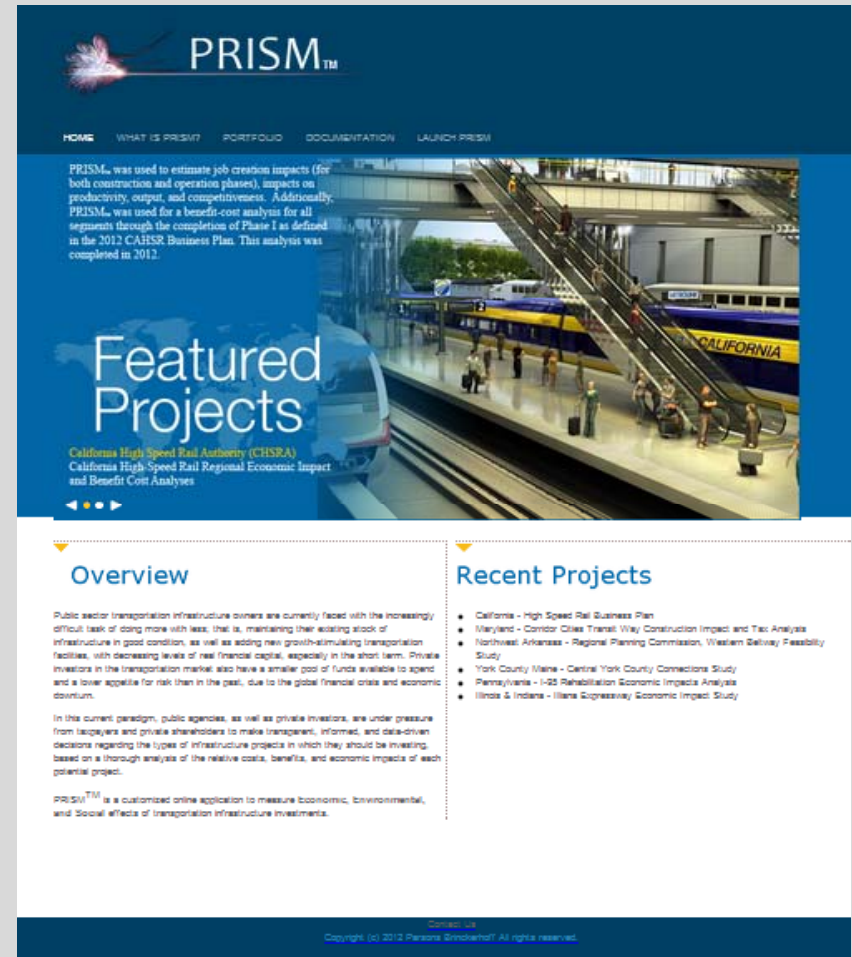
Home | Our Approach | TDM Encydopedia | Documents

Search: Go

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

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



PRISM™

HOME WHAT IS PRISM? PORTFOLIO DOCUMENTATION LAUNCH PRISM

PRISM™ was used to estimate job creation impacts (for both construction and operation phases), impacts on productivity, output, and competitiveness. Additionally, PRISM™ was used for a benefit-cost analysis for all segments through the completion of Phase II as defined in the 2012 CHSRA Business Plan. This analysis was completed in 2012.

Featured Projects

California High-Speed Rail Authority (CHSRA)
California High-Speed Rail Regional Economic Impact and Benefit Cost Analysis

Overview

Public sector transportation infrastructure owners are currently faced with the increasingly difficult task of doing more with less: that is, maintaining their existing stock of infrastructure in good condition, as well as adding new growth-stimulating transportation facilities, with decreasing levels of real financial capital, especially in the short term. Private investors in the transportation market also have a smaller pool of funds available to spend and a lower appetite for risk than in the past, due to the global financial crisis and economic downturn.

In this current paradigm, public agencies, as well as private investors, are under pressure from taxpayers and private shareholders to make transparent, informed, and data-driven decisions regarding the types of infrastructure projects in which they should be investing, based on a thorough analysis of the relative costs, benefits, and economic impacts of each potential project.

PRISM™ is a customized online application to measure economic, environmental, and social effects of transportation infrastructure investments.

Recent Projects

- California - High Speed Rail Business Plan
- Maryland - Corridor Cities Transit Way Construction Impact and Tax Analysis
- Northwest Arkansas - Regional Planning Commission, Western Railway Feasibility Study
- York County Maine - Central York County Connections Study
- Pennsylvania - I-25 Rehabilitation Economic Impacts Analysis
- Illinois & Indiana - Illinois Expressway Economic Impact Study

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PRISM™ – Online Tool

Accessibility Impacts module output

Scenario Name: **A352 No Toll 2018**, Last Updated: 2012-06-05 00:00:00 [Export Scenario Output Show](#)

A352 No Toll 2018

Total project cost: \$0 Project completion year: 2018 Mode:

1. General Inputs 2. Category Selection 3. Category Inputs 4. Results

SUMMARY PV COSTS BY YEAR PV BENEFITS BY YEAR PV BENEFITS DISTRIBUTION EFFECTS VS. REGION [Update Results](#) [Export](#)

B/C 2010\$

Parameter	Value	Percentile	Value
Minimum	N/A	1.00%	2.18
Maximum	N/A	2.50%	2.22
Most Likely	N/A	5.00%	2.28
Confidence Level	N/A	10.00%	2.31
		15.00%	2.34
		20.00%	2.37
Mean	2.48	25.00%	2.39
Median	2.48	30.00%	2.41
Standard Deviation	0.13	35.00%	2.42
Sample Variance	0.02	40.00%	2.44
Kurtosis	-0.25	45.00%	2.48
Skewness	-0.04	50.00%	2.48
Range	0.80	55.00%	2.49
Minimum	2.05	60.00%	2.51
Maximum	2.85	65.00%	2.53
Sum	2,477.34	70.00%	2.55
Count	1000	75.00%	2.58
		80.00%	2.59
		85.00%	2.62
		90.00%	2.65
		95.00%	2.69
		97.50%	2.73

Histogram & Cumulative Percentage Chart

■ Frequency — Cumulative Percentage

Confidence Interval	Value Range
90% Confidence Interval	[2.26, 2.69]
95% Confidence Interval	[2.22, 2.73]
98% Confidence Interval	[2.18, 2.77]

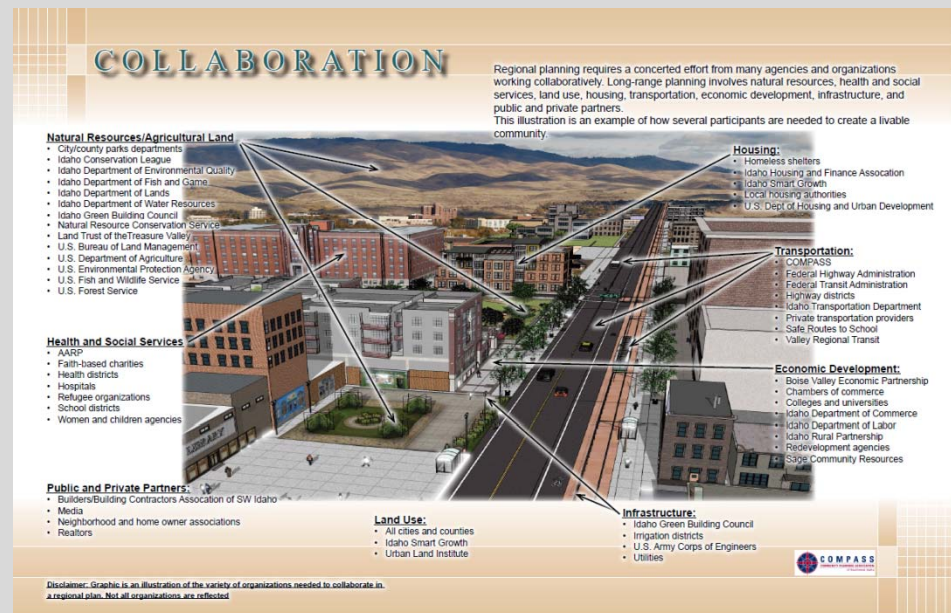
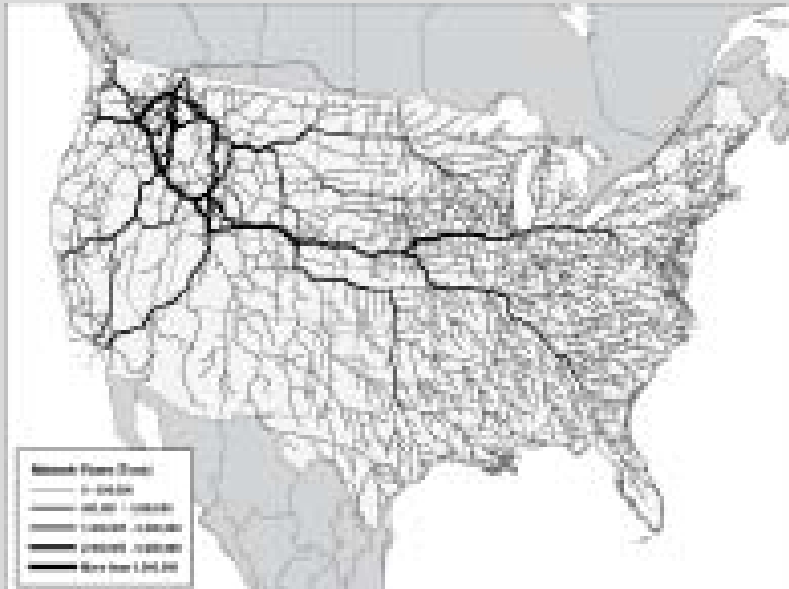
Value	Distribution	Summary by Year	Totals by Category
5,101,504			
471,489			
2,170,543			
7,743,536			
4,642,007			
-2,837			
-7,091			
-1,235,221			
3,307,848			
4,345,688			
2,28			

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Dollar equivalent valuations can help

- ✓ Set priorities
- ✓ Engage diverse constituencies
- ✓ Forge consensus
- ✓ Document decisions
- ✓ Make good use of MAP-21 Metrics

Reducing transportation to dollars and applying common sense



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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 Bridge 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

	Valuation (Most)	Valuation (High)	Valuation (Low)	Growth Factor	Confidence Level	Time Series	PERT Distribution	Reference
Environment								
On-road mobile source emissions (mass) (2014 \$ / tons)	100	10,000	10	0.00%	Standard			
Economic								
Acre of irrigated farmland (2014 \$ / acres)	10,000	100,000	100	0.00%	Standard			
Bridge conditions (2014 \$ / life cycle cost avoided)	100,000	1,000,000	0	0.00%	Standard			
Agricultural land used outside areas designated in CIM 2040 Vision (2014 \$ / acres)	10	10	0	0.00%	Standard			
Peak hour travel time (2014 \$ / person hours)	10	10	0	0.00%	Standard			
Vehicle miles traveled (2014 \$ / % change)	10,000	10,000	0	0.00%	Standard			
Transportation system maintained by mode (2014 \$ / life cycle cost avoided)	100,000	100,000	0	0.00%	Standard			
Pavement conditions, including sidewalk and bike lane conditions where available (2014 \$ / life cycle cost avoided)	10,000	10,000	0	0.00%	Standard			
Miles of sidewalks and bikeways (2014 \$ / person miles traveled)	1,000	1,000	0	0.00%	Standard			
Gross metropolitan farmland production (2014 \$ / Total)	10,000	10,000	0	0.00%	Standard			
Efficiency by mode: on-time performance (transit); reliability of travel time (auto); connectivity (bike and pedestrian) (2014 \$ / % by mode)	10	10	0	0.00%	Standard			
Freight movement (travel time reliability in freight-significant corridors) (2014 \$ / % change)	100	100	0	0.00%	Standard			
Infrastructure (water, sewer) maintained. (Infrastructure capital expenditures by jurisdiction.) (2014 \$ / life cycle cost avoided)		10,000	0	0.00%	Standard			
Social								
Composite population (population and jobs) in major activity centers (2014 \$ / % total)	10,000	10,000	0	0.00%	Standard			

Freight movement (travel time reliability in freight-significant corridors) (2014 \$ / % change)	100	100	0	0.00%	Standard			
Infrastructure (water, sewer) maintained. (Infrastructure capital expenditures by Jurisdiction.) (2014 \$ / life cycle cost avoided)		10,000	0	0.00%	Standard			
Social								
Composite population (population and jobs) In major activity centers (2014 \$ / % total)	10,000	10,000	0	0.00%	Standard			
Composite population (population and jobs) In downtowns (2014 \$ / % total)	10,000	10,000	0	0.00%	Standard			
Areas conflicting with CIM 2040 Vision (2014 \$ / acres)	100,000	100,000	0	0.00%	Standard			
Affordability of housing and transportation (2014 \$ / unit cost)	100,000	100,000	0	0.00%	Standard			
Agencies adopting CIM 2040 (2014 \$ / % total)	10,000	10,000	1	0.00%	Standard			
Employment clusters (employment dissimilarity Index) (2014 \$ / % total)	10,000	1,000,000	0	0.00%	Standard			
Annual ridership/share of alternative modes (2014 \$ / % total)	10,000	1,000,000	0	0.00%	Standard			
Ratio of regional preserved open space to population (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Ratio of regional preserved open space to population (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Ratio of parks (acreage) to population in cities (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Miles of trails and pathways (2014 \$ / miles)	10,000	1,000,000	0	0.00%	Standard			
Household connectivity (access to parks, schools, and grocery stores) (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Infill development (percent of new development within city limits and near schools, parks, and transit) (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Gross metropolitan farmland production (2014 \$ / % change)	10,000	1,000,000	0	0.00%	Standard			
Fatal/major injury crashes by mode (2014 \$ / crashes)	10,000	1,000,000	0	0.00%	Standard			
Access (within walking distance) to parks (2014 \$ / people within 1 mile)	10,000	1,000,000	0	0.00%	Standard			