THE CRITICAL INTERSECTION OF PUBLIC HEALTH, SOCIAL EQUITY, AND PERFORMANCE-BASED PLANNING

A CASE STUDY FROM THE SAN FRANCISCO BAY AREA

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METROPOLITAN TRANSPORTATION COMMISSION
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1 **Smarter Target-Setting:**
Integrating Public Health and Social Equity

2 **Why Project Evaluation Matters:**
Limitations of Scenario-Level Analysis

3 **Quantifying Benefits:**
Framework for Evaluating Hundreds of Projects

4 **Linking Performance and Policy Decisions:**
High-Performers and Low-Performers

5 **What's Next:**
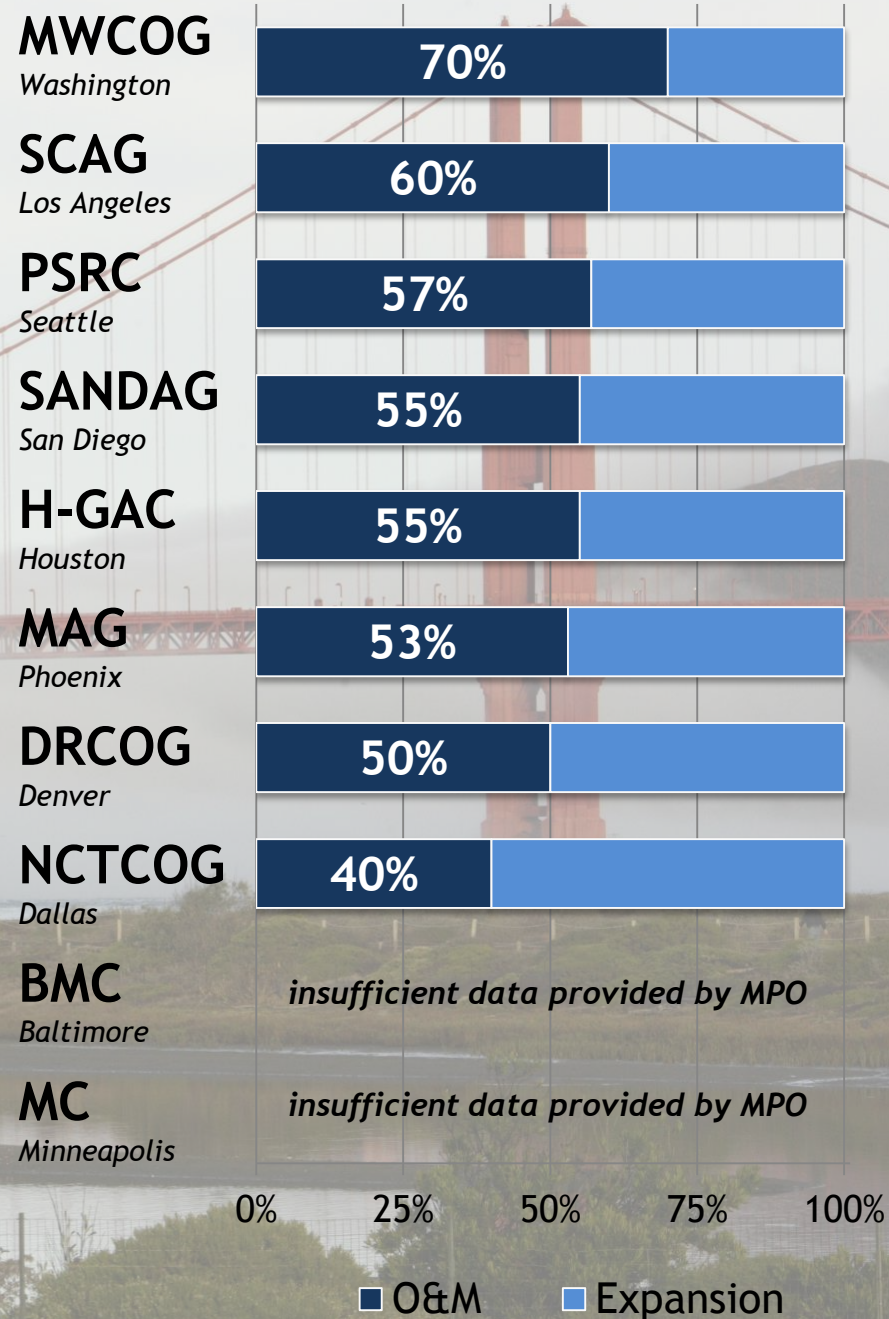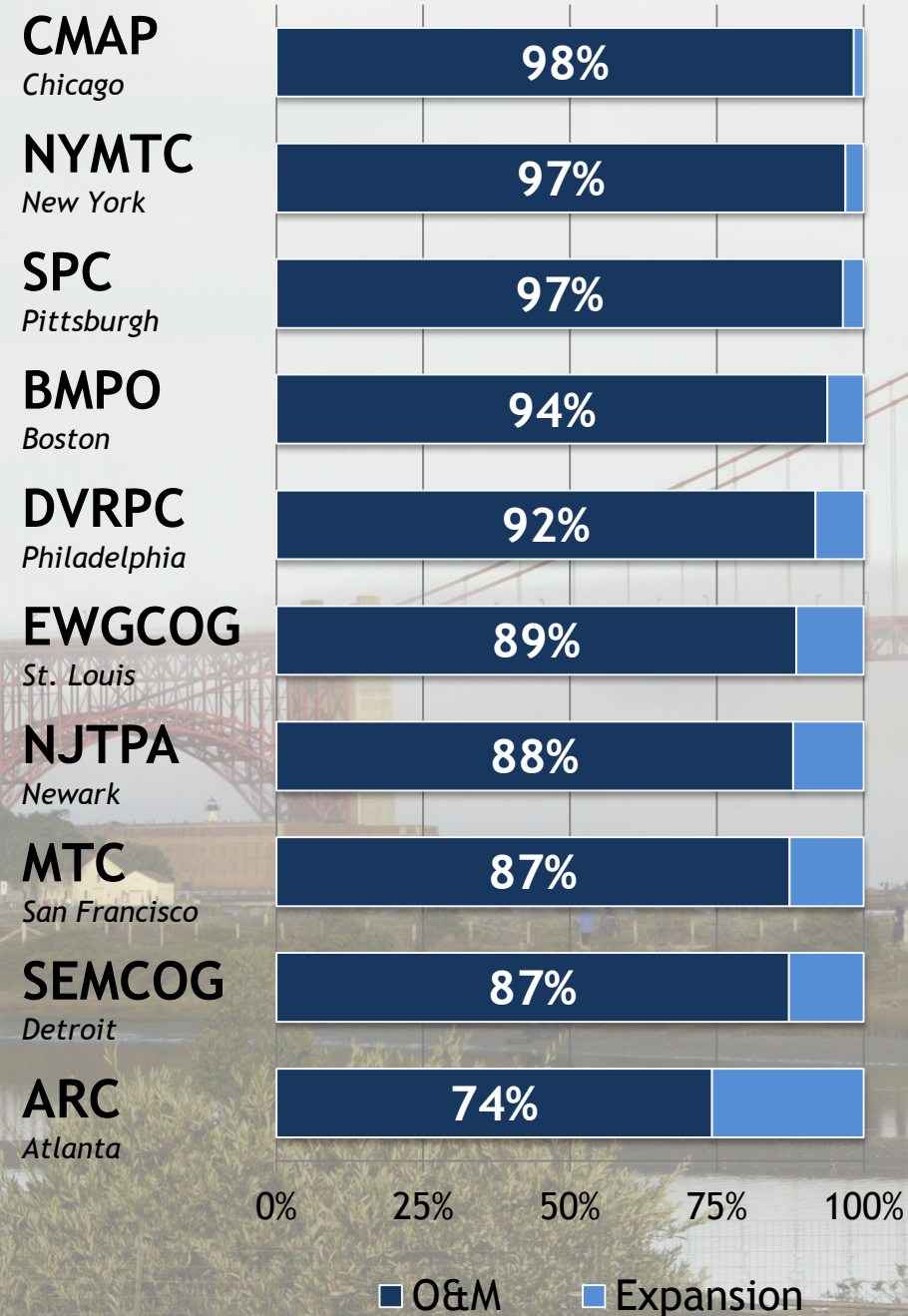Leveraging New Tools in Health/Equity Planning

1 Smarter Target-Setting:
Integrating Public Health and Social Equity

Top 20 MPOs: O&M versus Expansion Funding

MPO	O&M		MPO	O&M
CMAP *Chicago*	98%		**MWCOG** *Washington*	70%
NYMTC *New York*	97%		**SCAG** *Los Angeles*	60%
SPC *Pittsburgh*	97%		**PSRC** *Seattle*	57%
BMPO *Boston*	94%		**SANDAG** *San Diego*	55%
DVRPC *Philadelphia*	92%		**H-GAC** *Houston*	55%
EWGCOG *St. Louis*	89%		**MAG** *Phoenix*	53%
NJTPA *Newark*	88%		**DRCOG** *Denver*	50%
MTC *San Francisco*	87%		**NCTCOG** *Dallas*	40%
SEMCOG *Detroit*	87%		**BMC** *Baltimore*	*insufficient data provided by MPO*
ARC *Atlanta*	74%		**MC** *Minneapolis*	*insufficient data provided by MPO*

■ O&M ■ Expansion

LONG-RANGE PLANNING PROCESS

A — Establish Performance Targets

B — Assess Project Performance

C — Assess Scenario Performance

D — Assess Plan/EIR Performance

E — Monitor Performance of Adopted Plan

BRIEF HISTORY OF PERFORMANCE ASSESSMENT AT MTC

Year	2001	2005	2009	2013
	2001 REGIONAL TRANSPORTATION PLAN	TRANSPORTATION 2030	TRANSPORTATION 2035 CHANGE IN MOTION	BayArea Plan
SCENARIO PLANNING	Transportation investment packages	Transportation investment packages	Transportation investment packages	**Integrated transportation & land use scenarios**
PERFORMANCE TARGETS	Transportation targets	Transportation targets	Transportation targets	**Integrated targets**
QUALITATIVE PROJECT ASSESSMENT	None	Goals-based	Goals-based	**Targets-based**
QUANTITATIVE PROJECT ASSESSMENT	None	None	Limited benefit-cost analysis	**Rigorous benefit-cost analysis**
NUMBER OF PROJECTS ANALYZED	0	400	700	900

BayArea Plan

- First regional plan to integrate **transportation, land use, and housing**

- Sustainable Communities Strategy initiated by **California Senate Bill 375**

A Collaborative Target-Setting Process

- Engaged stakeholders from the region's **9 counties**, **101 cities**, **26 transit operators**, and **numerous advocacy organizations**

- **6-month process** to define performance measures & targets

- **8-month process** to establish project evaluation framework

- **Result:** broad support for rigorous performance assessment from key stakeholders, executive leadership, and policymakers

CHOOSING A PUBLIC HEALTH TARGET

Infrastructure-Oriented

PUBLIC HEALTH

Increase sidewalk-miles and bicycle lane-miles by X%

- OR-

Customer-Oriented

PUBLIC HEALTH

Increase average daily time spent walking or biking by X%

- OR-

Objective-Oriented

PUBLIC HEALTH

Decrease life-year impact of mortality or morbidity due to insufficient physical activity by X%

CHOOSING AN EQUITY TARGET

Infrastructure-Oriented

EQUITY

Invest X% of regional transportation dollars into disadvantaged communities

- OR-

Customer-Oriented

EQUITY

Increase middle-class jobs within X minutes by transit by Y%

- OR-

Objective-Oriented

EQUITY

Decrease housing and transportation costs as a share of low-income household budgets by X%

Choosing an Air Quality Target

Infrastructure-Oriented

Clean Air — Increase the market share of zero-emission cars & trucks to X%

- OR-

Customer-Oriented

Clean Air — Reduce particulate emissions by X%

- OR-

Objective-Oriented

Clean Air — Reduce premature deaths from exposure to particulate emissions by X%

ECONOMY

Economic Vitality — Increase gross regional product

Transportation System Effectiveness — Increase non-auto mode share and reduce VMT per capita / Maintain the transportation system

ENVIRONMENT

Climate Protection — Reduce per-capita greenhouse gas emissions from cars and light-duty trucks

Open Space and Agricultural Preservation — Direct all non-agricultural development within the urban footprint

Healthy and Safe Communities — Reduce premature deaths from exposure to particulate emissions / Reduce injuries and fatalities from collisions / Increase average daily time spent walking or biking

EQUITY

Adequate Housing — House all of the region's projected housing growth

Equitable Access — Decrease housing and transportation costs as a share of low-income household budgets

Equity Analysis Technical Measures
Comparing "Communities of Concern" with Remainder of Bay Area

1 Housing + Transportation Affordability

2 Displacement Risk

3 Vehicle Miles Traveled Density

4 Average Commute Travel Time

5 Average Non-Commute Travel Time

② Impetus for Project-Level Assessment: Limitations of Scenario-Level Analysis
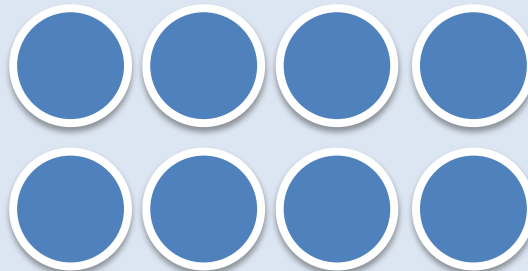
SCENARIO PERFORMANCE ASSESSMENT
Comparing Forecasted Outcomes to Regional Targets

achieves or exceeds performance target
falls short of performance target
moving in the wrong direction

Target	Goal	No Project	Preferred	Transit Priority Focus	Network of Communities	Equity, Environment & Jobs
1 Reduce per–capita CO_2 emissions from cars and light–duty trucks	–15%	–8%	–18%	–16%	–16%	–17%
2 House the region's projected growth	100%	100%	100%	100%	118%	100%
3a Reduce premature deaths from exposure to fine particulates ($PM_{2.5}$)	–10%	–71%	–71%	–72%	–69%	–72%
3b Reduce coarse particulate emissions (PM_{10})	–30%	–16%	–17%	–17%	–14%	–18%
3c Achieve greater particulate emission reductions in highly impacted areas	Yes	Yes	Yes	Yes	No	Yes
4 Reduce the number of injuries and fatalities from all collisions	–50%	+18%	+18%	+17%	+23%	+16%
5 Increase the average daily time walking or biking per person for transportation	+70%	+12%	+17%	+18%	+13%	+20%

SCENARIO PERFORMANCE ASSESSMENT
Comparing Forecasted Outcomes to Regional Targets

		Target					
6	Direct all non–agricultural development within the year 2010 urban footprint	100%	53%	100%	100%	100%	100%
7	Decrease the share of low–income and lower–middle income residents' household income consumed by transportation and housing	−10%	+8%	+3%	+5%	+3%	+2%
8	Increase gross regional product (GRP)	+110%	+118%	+119%	+118%	+123%	+118%
9a	Increase non–auto mode share	26%	19%	20%	20%	19%	21%
9b	Decrease automobile vehicle miles traveled (VMT) per capita	−10%	−5%	−9%	−8%	−9%	−9%
10a	Increase local road pavement condition index (PCI)	75	50	68	68	68	71
10b	Decrease share of distressed lane–miles of state highways	10%	44%	44%	44%	30%	41%
10c	Reduce share of transit assets exceeding useful life	0%	36%	24%	24%	24%	24%

SCENARIO EQUITY ANALYSIS
Understanding Impacts to "Communities of Concern"

Measure	Community	2010	2040 No Project	2040 Preferred
Housing + Transportation Affordability	**Low-Income**	**72%**	**80%**	**74%**
	Rest of Region	41%	44%	43%
Displacement Risk	**COC**	**n/a**	**21%**	**36%**
	Rest of Region	n/a	5%	8%
VMT Density	**COC**	**9,737**	**11,447**	**11,693**
	Rest of Region	9,861	11,717	11,895
Commute Travel Time	**COC**	**25**	**26**	**26**
	Rest of Region	27	29	27
Non-Commute Travel Time	**COC**	**12**	**13**	**13**
	Rest of Region	13	13	13

3 Quantifying Benefits:
Framework for Evaluating Hundreds of Projects

DETERMINING HOW TO EVALUATE PROJECTS –
AND WHICH PROJECTS SHOULD BE EVALUATED

Number of Projects

Qualitative only (by project type)
700

Committed
200

Quantitative & qualitative
100

Qualitative only
100
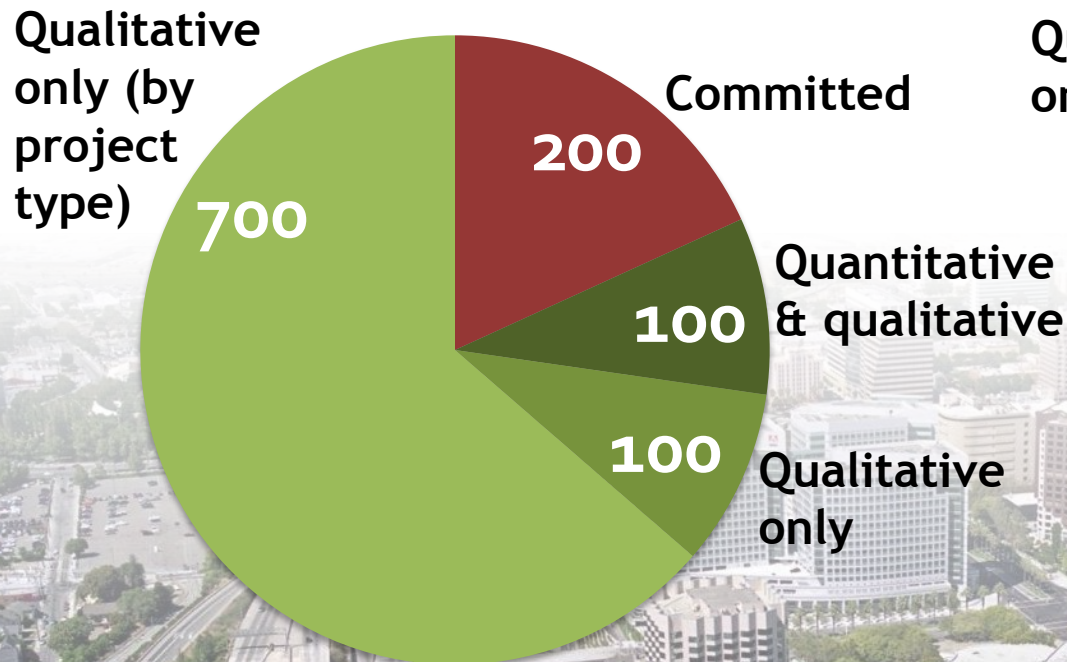
Cost of Projects (in billions of $)

Qualitative only (by project type)
10

Qualitative only
20

Committed
30

Quantitative & qualitative
150
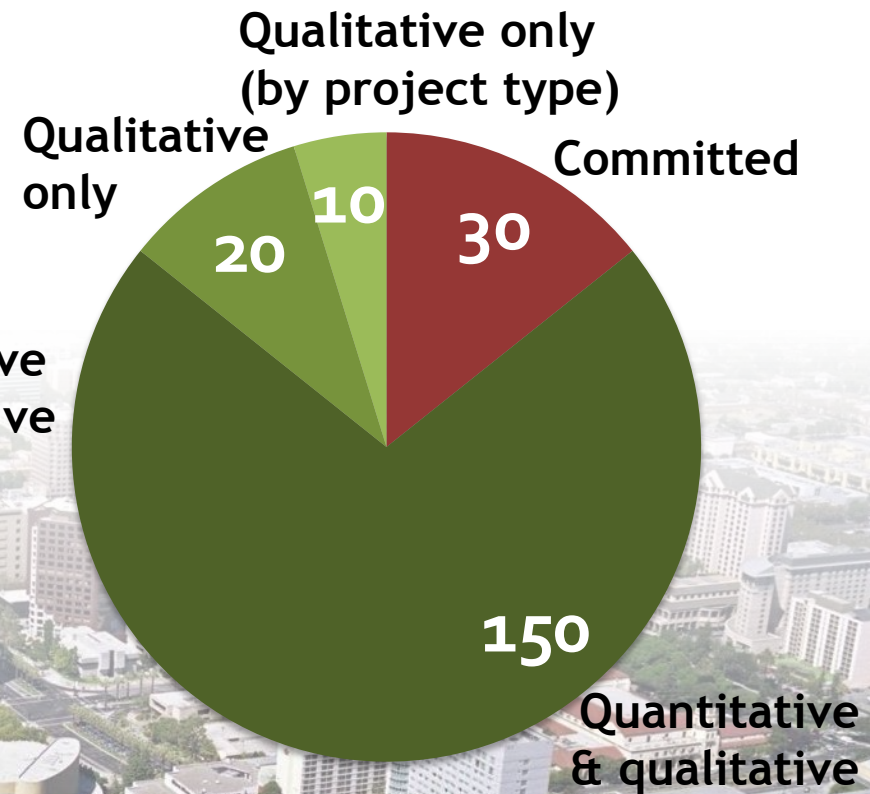
PRIMARY ELEMENTS OF PROJECT PERFORMANCE ASSESSMENT

TARGETS ASSESSMENT

Determine impact on targets adopted by MTC and ABAG

Analyzed all **900** uncommitted projects

BENEFIT-COST ASSESSMENT

Compare benefits & costs

Analyzed most significant projects (approximately **100** in total)

Targets Assessment

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

1. Climate Protection
2. Adequate Housing
3. Particulate Matter
4. Collisions
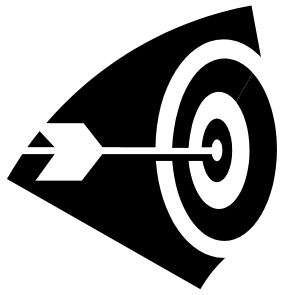5. Active Transportation

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_2, $PM_{2.5}$, ROG, NO_x)
- Collisions (fatalities, injuries, property damage)
- Health impacts due to active transport
- Noise

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

Project Performance Assessment: All Road Projects

Bubble size represents the project benefits.

● Road Project

- Treasure Island Congestion Pricing
- Congestion Pricing Pilot
- Freeway Performance Initiative
- ITS Improvements in Santa Clara and San Mateo Counties
- Silicon Valley Express Lanes Network
- Fremont/ Union City East-West Connector
- MTC Express Lanes Network
- SR-85 Auxiliary Lanes
- US-101 HOV Lanes (Whipple to Cesar Chavez)
- SR-239 Expressway (Brentwood to Tracy)
- SR-84/I-680 Interchange Improvements and Widening
- I-80 Auxiliary Lanes (Airbase Parkway to I-680)
- New SR-152 Alignment
- I-680/SR-4 Interchange Improvements and Widening
- SR-29 HOV Lanes and BRT
- Bay Bridge Contraflow Lane
- SR-4 Bypass Completion
- Marin-Sonoma Narrows (Phase 2)

Benefit/Cost

59
45
15
10
1
0
-5

-10
10

Adverse Impact on Targets

Supports Targets

Project Performance Assessment: Selected Transit Projects

Bubbles labeled for projects with greater than $15 million in annual benefits. Bubble size represents the project benefits.

⬤ Transit Project

Benefit/Cost

>60 — BART Metro ⬤

AC Transit Grand-MacArthur BRT ⬤

15

SFMTA Transit Effectiveness Project

Irvington BART Station •

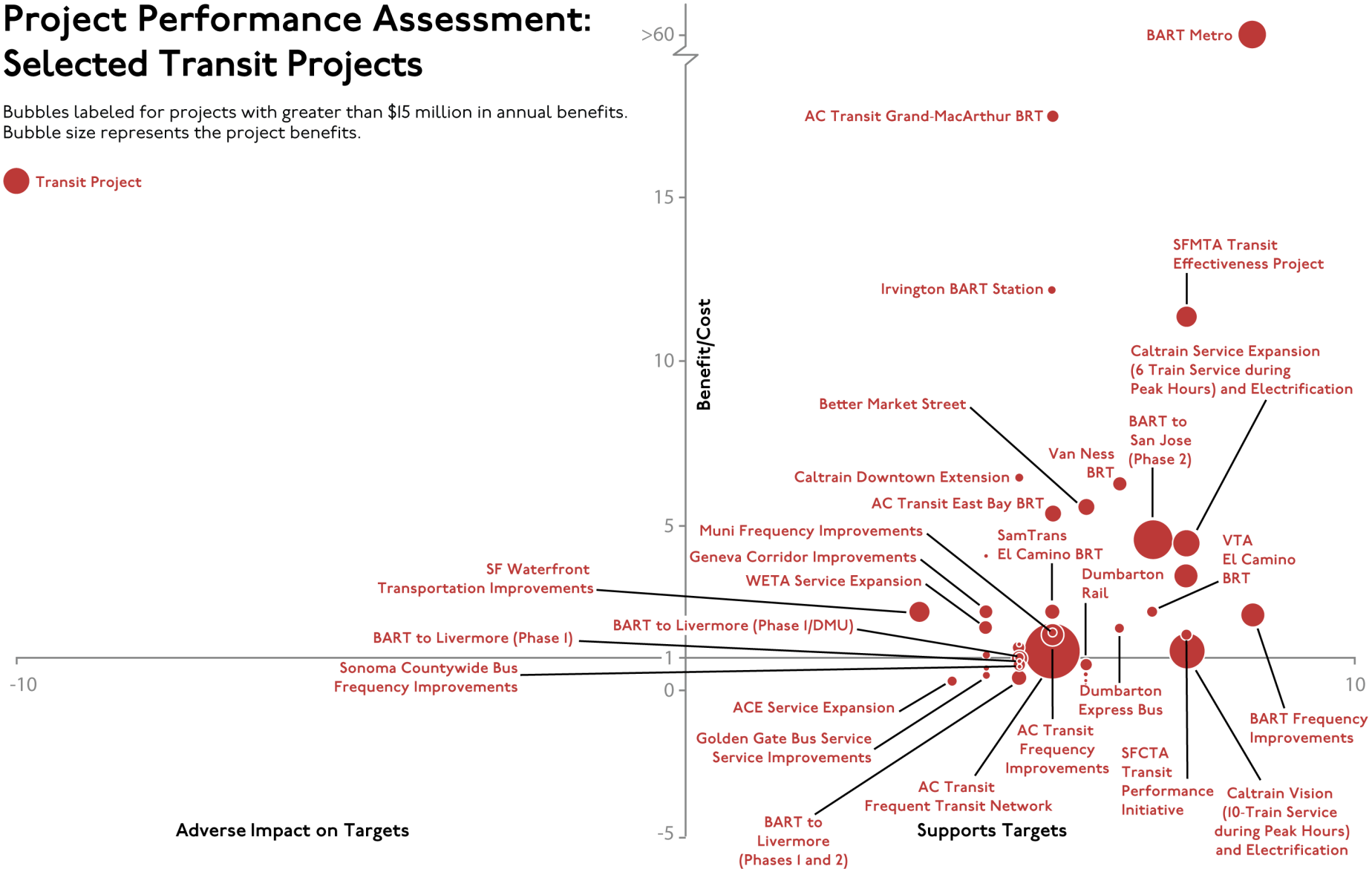Caltrain Service Expansion (6 Train Service during Peak Hours) and Electrification

10

Better Market Street

BART to San Jose (Phase 2)

Van Ness BRT

Caltrain Downtown Extension •

AC Transit East Bay BRT

5

Muni Frequency Improvements

SamTrans El Camino BRT

VTA El Camino BRT

Geneva Corridor Improvements

WETA Service Expansion

Dumbarton Rail

SF Waterfront Transportation Improvements

BART to Livermore (Phase I/DMU)

BART to Livermore (Phase I)

1

Sonoma Countywide Bus Frequency Improvements

0

ACE Service Expansion

Dumbarton Express Bus

Golden Gate Bus Service Service Improvements

AC Transit Frequency Improvements

BART Frequency Improvements

AC Transit Frequent Transit Network

SFCTA Transit Performance Initiative

Caltrain Vision (10-Train Service during Peak Hours) and Electrification

BART to Livermore (Phases I and 2)

-5

Adverse Impact on Targets
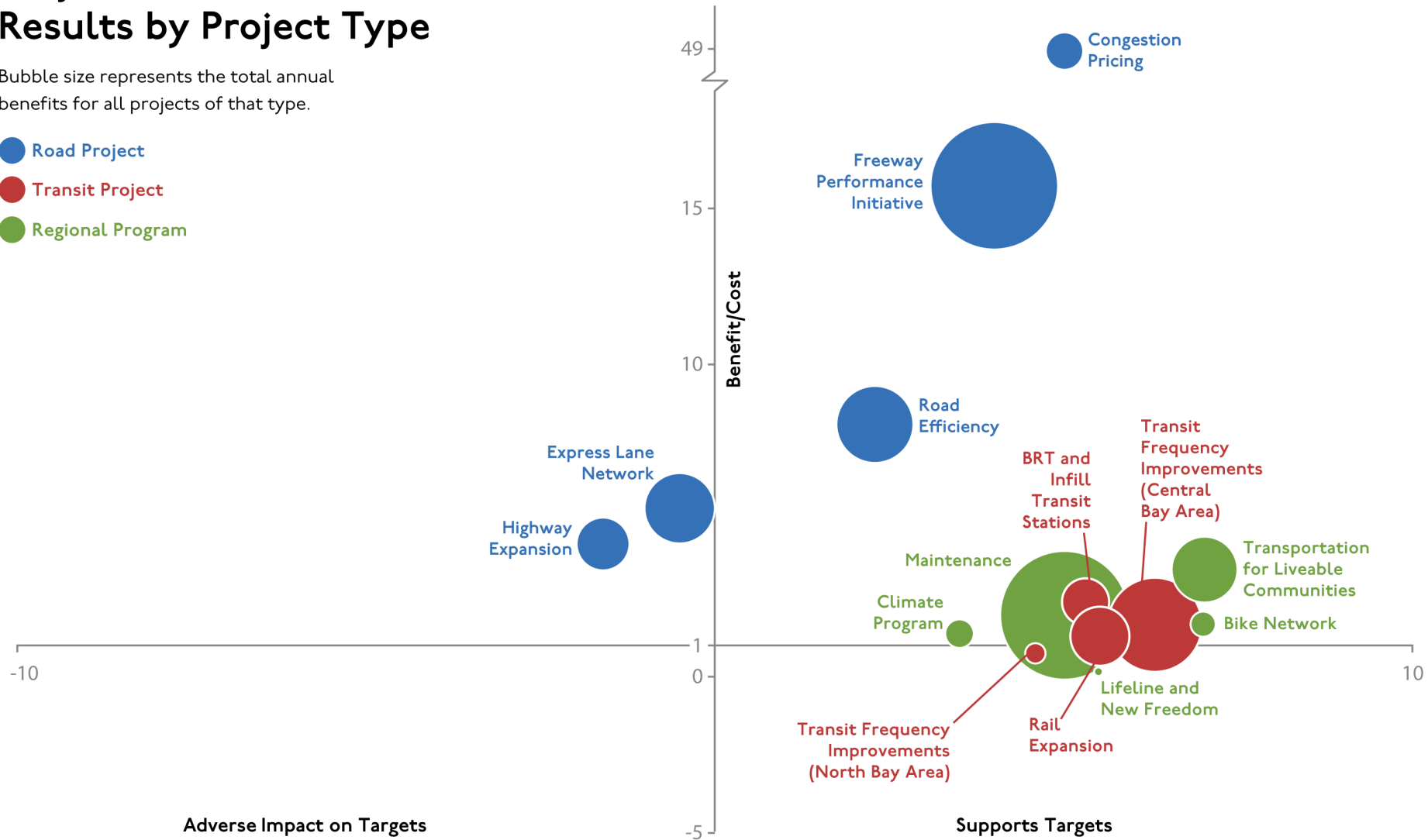
Supports Targets

-10

10

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

Benefit/Cost (y-axis: 49, 15, 10, 1, 0, -5)

Adverse Impact on Targets ← → **Supports Targets** (x-axis: -10, 0, 10)

Bubbles and labels:
- Congestion Pricing (Road Project)
- Freeway Performance Initiative (Road Project)
- Road Efficiency (Road Project)
- Express Lane Network (Road Project)
- Highway Expansion (Road Project)
- BRT and Infill Transit Stations (Transit Project)
- Transit Frequency Improvements (Central Bay Area) (Transit Project)
- Transportation for Liveable Communities (Regional Program)
- Maintenance (Regional Program)
- Climate Program (Regional Program)
- Bike Network (Regional Program)
- Transit Frequency Improvements (North Bay Area) (Transit Project)
- Rail Expansion (Transit Project)
- Lifeline and New Freedom (Regional Program)

# BENEFITS SPECIFIC TO PUBLIC HEALTH – AND COST-EFFECTIVENESS

Top 3 Most Cost-Effective Projects for Active Transportation

Project Name	Annual Project Cost	Δ Active Individuals	Cost-Effectiveness (Δ/$)
BART Metro Program	-$18.5 million	2,735 people	*infinite*
Cordon Pricing	$5.1 million	11,899 people	2,338
Treasure Island Pricing	$1.2 million	2,483 people	2,108

Top 3 Least Cost-Effective Projects for Active Transportation

Project Name	Annual Project Cost	Δ Active Individuals	Cost-Effectiveness (Δ/$)
Muni TEP	$7.8 million	-3,811 people	-486
I-80 Auxiliary Lanes	$3.5 million	-399 people	-112
Alameda-Oakland BRT	$2.1 million	-200 people	-96

Example Project Equity Map:
San Francisco County
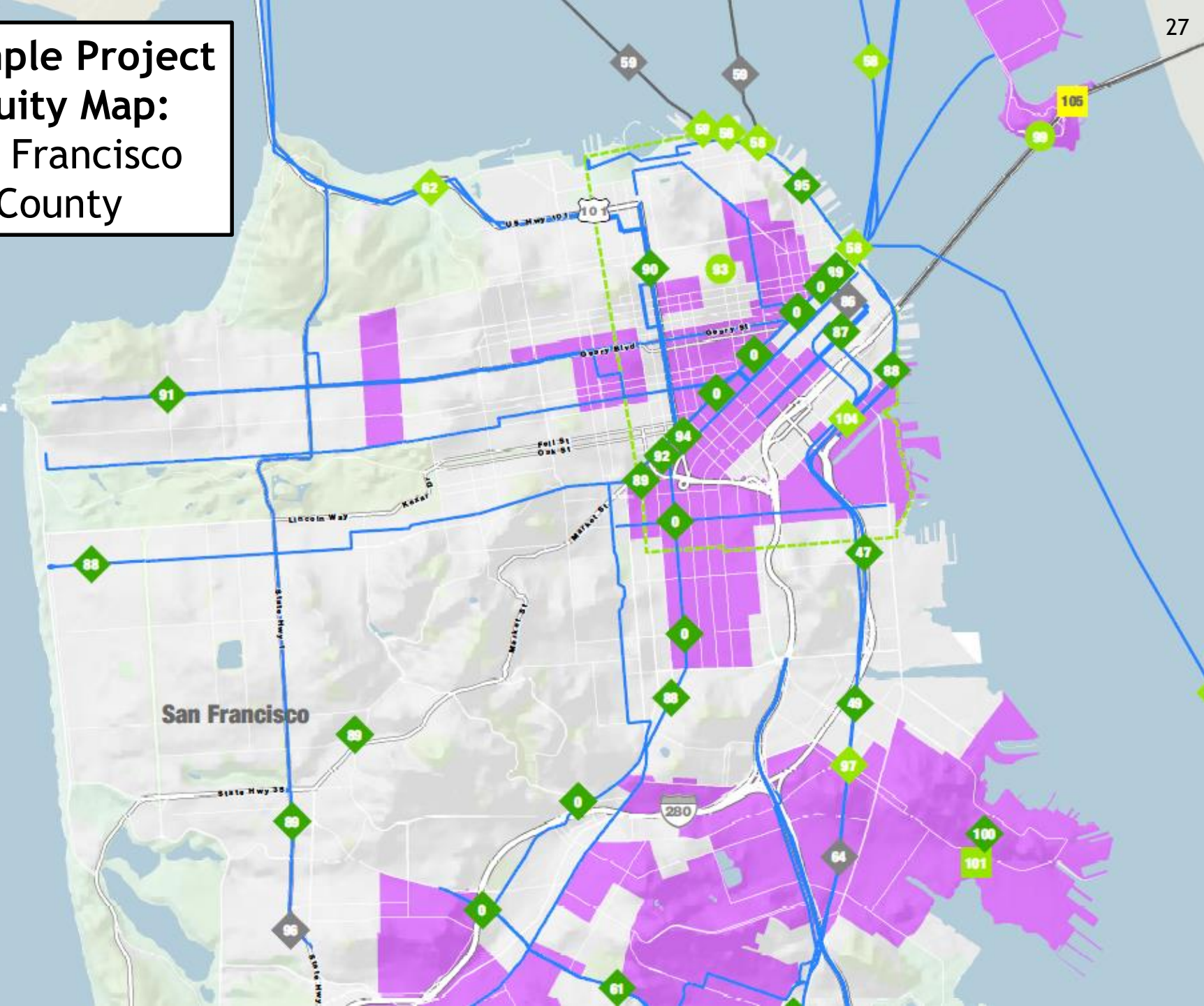
④ Linking Performance and Policy Decisions:
High-Performers and Low-Performers

SAMPLE HIGH-PERFORMING PROJECTS

PRIORITIZED FOR REGIONAL FUNDING

BART METRO

URBAN BRT SYSTEMS

FREEWAY PERFORMANCE INITIATIVE

SAMPLE MODERATE-PERFORMING PROJECTS

"NOTHING TO SEE HERE, MOVE ALONG"

CALTRAIN DOWNTOWN EXTENSION
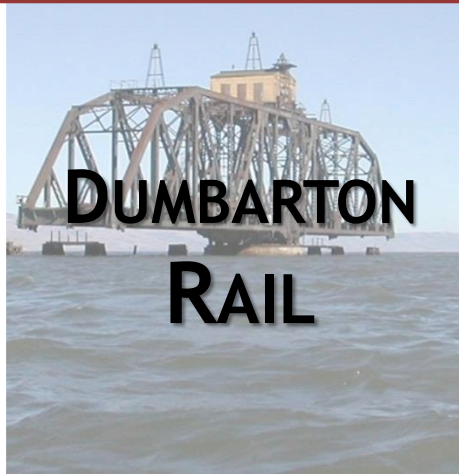
URBAN BUS FREQUENCY IMPROVEMENTS
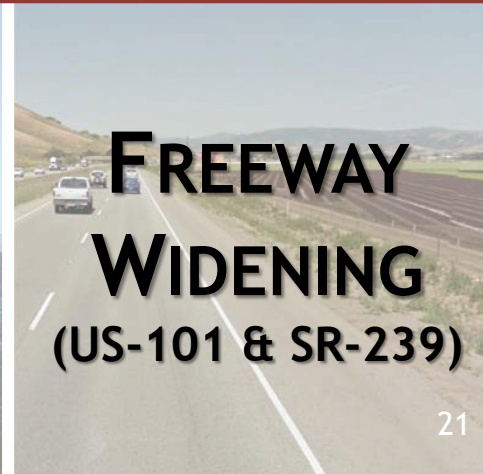
EXPRESS LANE NETWORK

SAMPLE LOW-PERFORMING PROJECTS

REQUIRED COMPELLING CASE FOR INCLUSION IN PLAN

SMART EXPANSION

DUMBARTON RAIL

FREEWAY WIDENING (US-101 & SR-239)

21

COMPELLING CASE CRITERIA

Category 1: Modeling Limitations
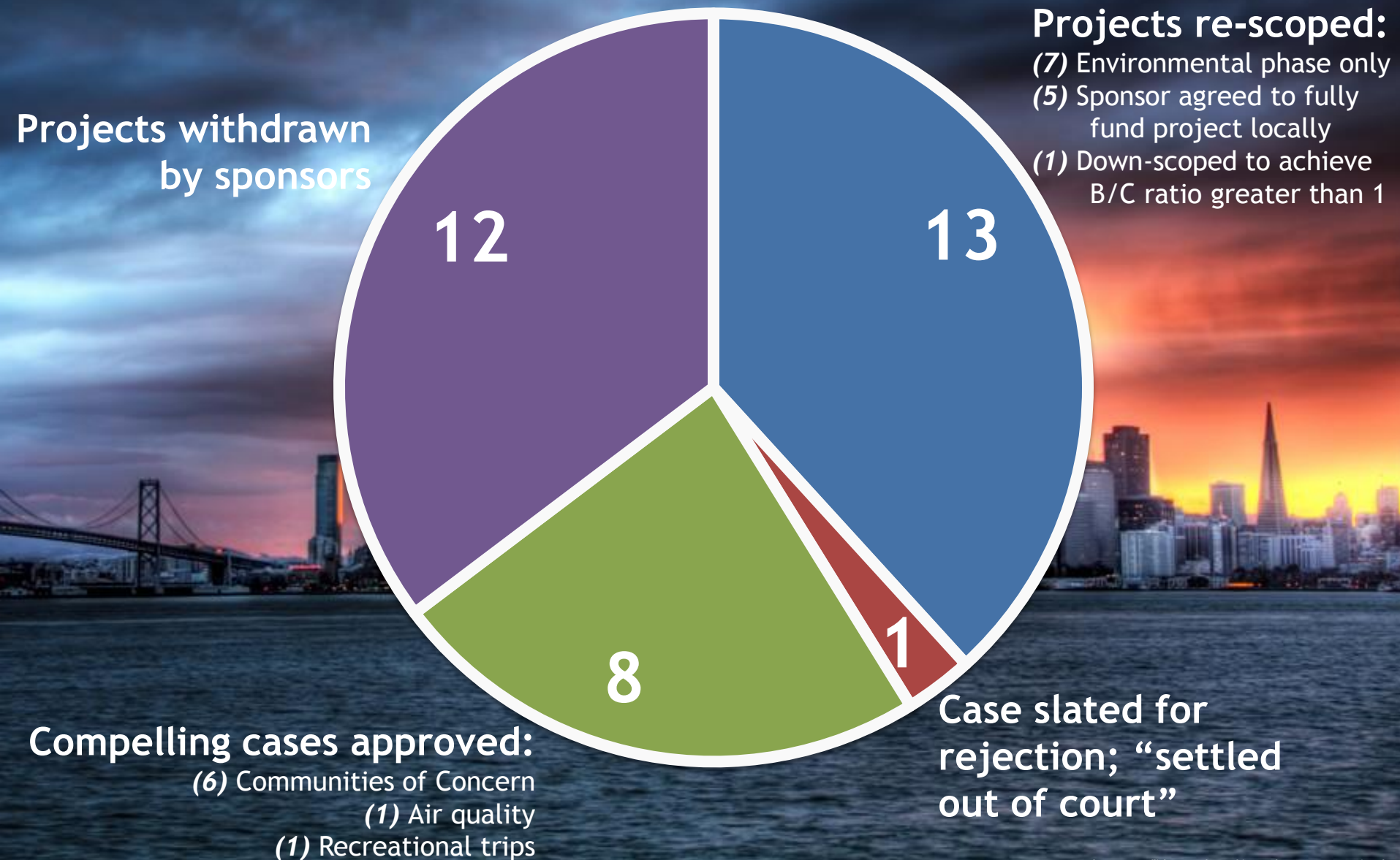*must prove limitations directly resulted in a B/C ratio less than 1*

1. Interregional or recreational corridor
2. Access to international airports
3. Benefit accrual from non-modelable effects such as weaving reduction, transit crowding reduction, etc.
4. Synergies with other fully funded investments

Category 2: Federal Requirements

1. Cost-effective in reducing CO_2, PM, or ozone precursors
2. Improves mobility or air quality in communities of concern

Implications of Compelling Case Requirement for Low-Performing Projects

Projects re-scoped:
(7) Environmental phase only
(5) Sponsor agreed to fully
fund project locally
(1) Down-scoped to achieve
B/C ratio greater than 1

Projects withdrawn by sponsors

12

13

8

1

Compelling cases approved:
(6) Communities of Concern
(1) Air quality
(1) Recreational trips

Case slated for rejection; "settled out of court"

Image Source: http://www.flickr.com/photos/fritography/5162434063/sizes/l/

5 What's Next:
Leveraging New Tools in Health/Equity Planning

Expectations for performance assessment have grown significantly in the past decade.

Yet there remains no national mandate to incorporate health & equity measures. It is up to MPOs and state DOTs to lead the way.

# INTEGRATED TRANSPORT AND HEALTH IMPACTS MODEL (ITHIM)

- Developed in 2011; **now being leveraged by MPOs across California**

- Calculates health impacts (**mortality and morbidity**) related to air quality, physical activity, and collisions

- Integrates with travel demand model & GIS databases (Excel-based tool)

Policy Strategy Analysis Example
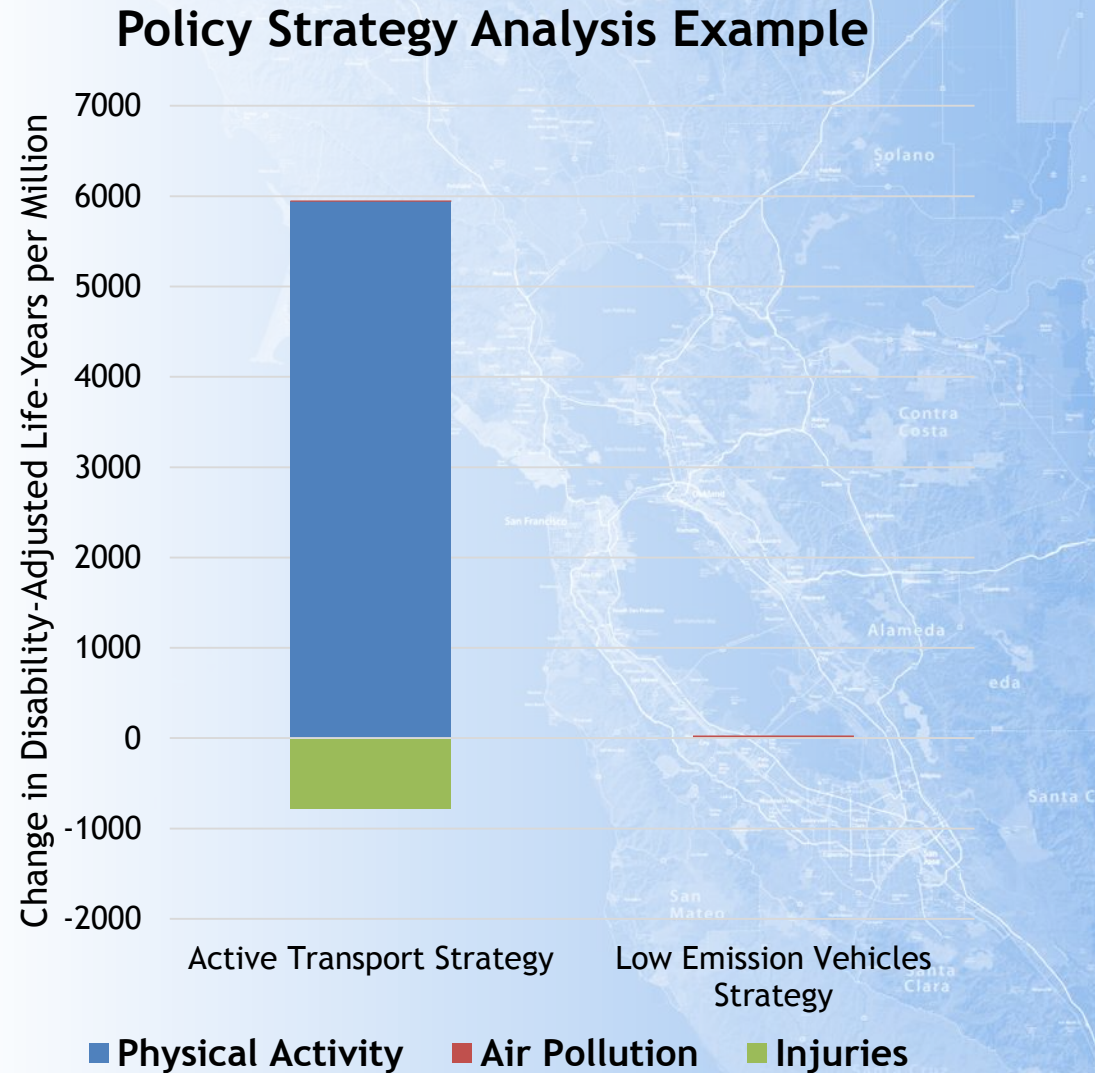
CONCLUDING THOUGHTS

- Integrating health and equity measures into regional and state performance frameworks is a critical step to support livability and sustainability objectives.

- Focusing on outcomes – rather than proxies – leads to more meaningful results that support smarter policy decisions.

- It is essential to move beyond scenarios to quantify a suite of project-level benefits in the long-range planning process.

- New tools and methodologies make incorporating health benefits easier than in years past.
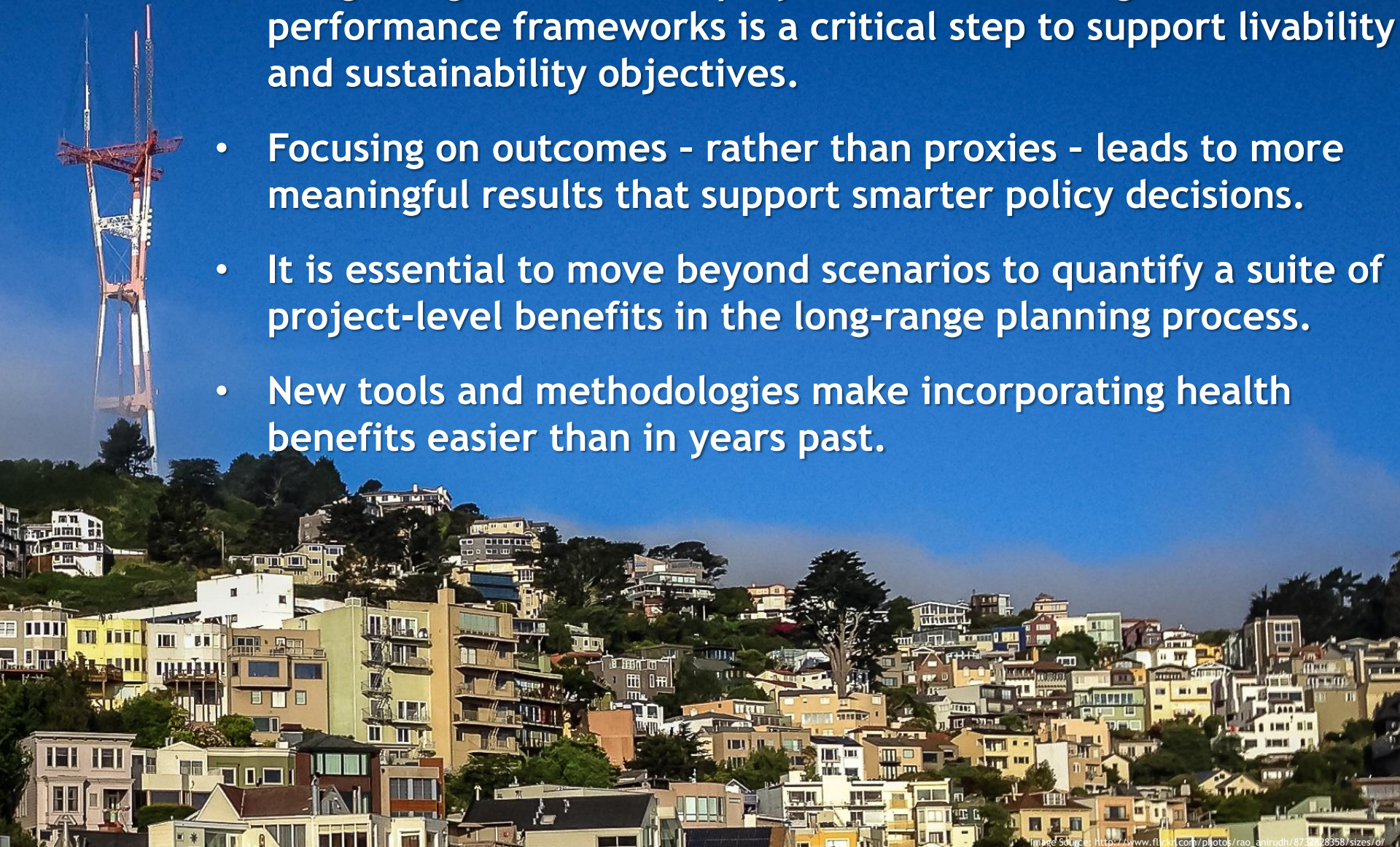
Questions?

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