



**METROPOLITAN  
TRANSPORTATION  
COMMISSION**

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***Memorandum***

TO: Joint Policy Committee

DATE: May 9, 2008

FR: Lisa Klein, MTC

W. I.

RE: Transportation 2035: Project Performance Assessment - Preliminary Findings

Last year, the Commission agreed to pursue a performance-based approach to the Transportation 2035 Plan. Earlier this year, the Planning Committee approved a project-level performance assessment of investments under consideration for inclusion in the Plan.

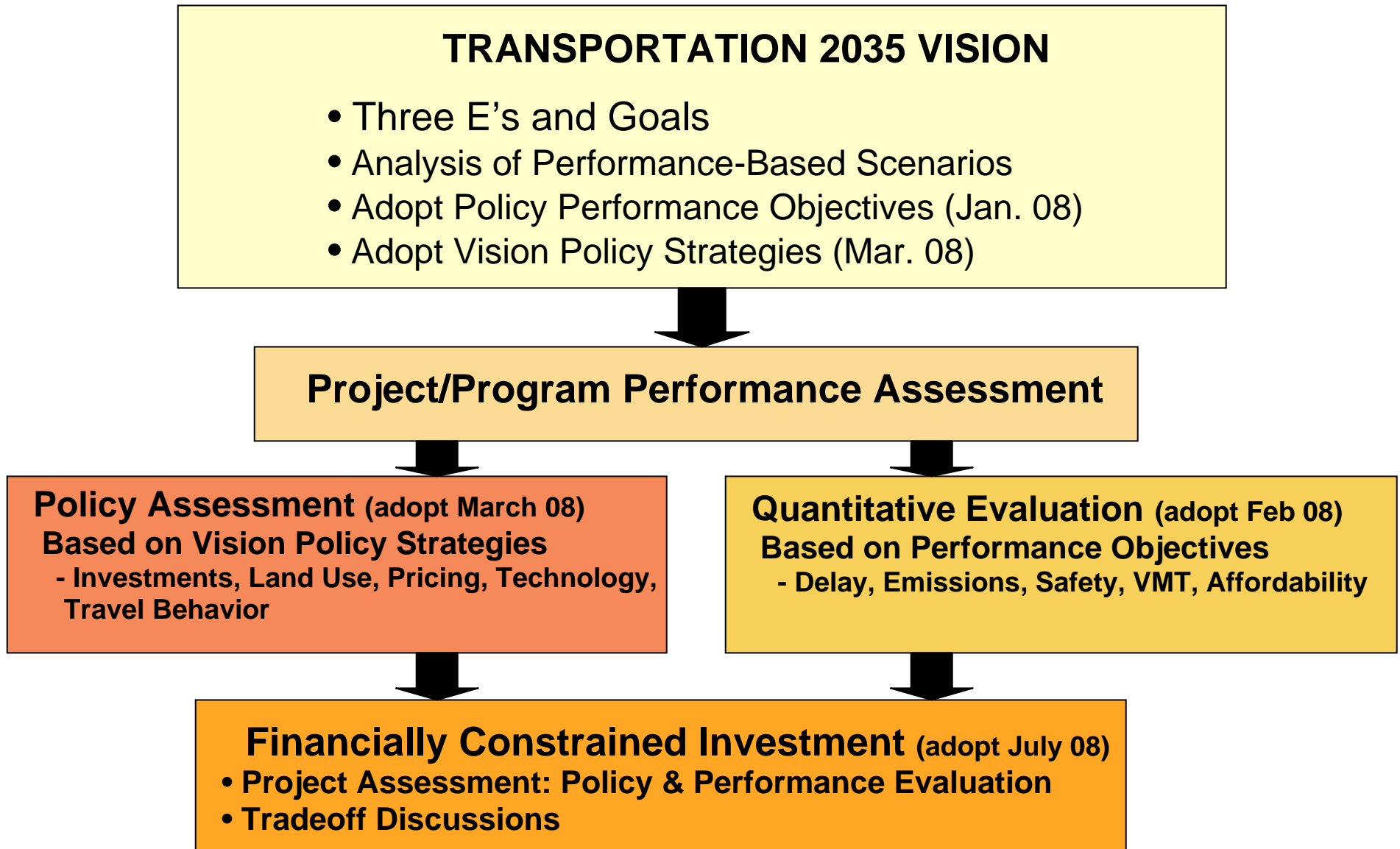
The assessment consists of both a qualitative policy assessment and a quantitative performance evaluation and builds on the policy foundation for the Plan. (See [Attachments A and B](#).) The assessment applied to potential investments, except those considered “committed” by Commission policy. (See Attachment C.)

At your May 16 meeting, MTC staff will present findings from this analysis and will discuss how this information might inform the investment trade-off discussions over the next few months.

LK

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## Attachment A: Project Assessment Process



### Attachment B: Quantitative Project Evaluation Measures

<b>Transportation 2035 Performance Objectives</b>	<b>Project Performance Measures</b>
Reduce <ul style="list-style-type: none"> <li>• Delay</li> <li>• Emissions</li> <li>• Fatalities and Injuries</li> </ul>	<b>Combined benefit-cost</b> Benefit equals value in dollars of reductions in: <ul style="list-style-type: none"> <li>• Delay</li> <li>• Particulate matter emissions</li> <li>• Carbon dioxide emissions</li> <li>• Fatalities and injuries</li> </ul>
Reduce VMT	<b>Cost per vehicle mile traveled (VMT) reduced</b>
Improve Affordability	<b>Cost per low-income household served (trial measure)</b>
Improve Maintenance	<b>Alternative benefit-cost for maintenance</b> Benefit equals direct public and private cost savings from performing maintenance on-time

## Attachment C: Quantitative Evaluation Approach

The approach is to compare project costs and benefits in order to identify the most cost-effective projects with respect to the Transportation 2035 Performance Objectives. Key aspects of the proposed approach include:

- Quantitative comparison of project costs and benefits: As possible, benefits are valued monetarily based on established economic research. This approach is similar to that used for the Corridor Mobility Improvement Account program in the State Infrastructure Bond.
- Benefits related directly to the Transportation 2035 Performance Objectives: See below.
- Projects compared directly and quantitatively: The evaluation captures a range of project types. Data was generated through the regional travel demand model for most projects. For the regional funding programs (e.g., Transportation for Livable Communities, Lifeline, Transit and Roadway Maintenance Shortfall programs), MTC developed methodologies based on recent research.
- Most cost-effective projects identified: The strength of this analysis lies in identifying the outliers (i.e. the highest and lowest project performers). It is not precise enough to distinguish among investments with very similar benefit-to-cost ratios.
- Focus performance evaluation on major investment decisions: While practical limitations preclude evaluation of each of the 400 to 600 discretionary investments expected in the Plan, major investment decisions can be informed through evaluation of a subset of projects as described below. Some smaller projects were not quantitatively evaluated, but were reviewed in the policy assessment.

### Projects Subject to Analysis

1. Committed projects, as defined by the Planning Committee in January 2008, were not evaluated quantitatively or qualitatively.
2. Regional funding programs (beyond committed baseline programs) (e.g., TLC, Regional Bike and Pedestrian Program, Lifeline, Climate Change) were evaluated quantitatively.
3. MTC staff selected approximately 60 transit and roadway projects with total cost of \$50 million (2007\$) or greater and/or with area-wide impacts. Examples include:
  - New/enhanced transit service, including transit priority measures (if reasonable expectation of operating funding)
  - Freeway-to-freeway interchanges
  - Freeway widenings, including HOV lanes & slow-vehicle lanes
  - HOT lanes corridors (bundled by county/region and with express bus)
  - State highway widenings and major arterial connectors/reliever route improvements
4. Due to limitations of resources and analysis tools, some transit and roadway improvements costing more than \$50 million were not evaluated quantitatively. Examples include:
  - Arterial or intersection improvements, except as noted above
  - Local interchanges
  - Individual, new transit stations/stops for existing services, transit center improvements & parking expansion
  - Grade separations
  - Programmatic categories (e.g., countywide bike and pedestrian projects, non-capacity enhancing arterial improvements)

Table 1: Transportation 2035 Quantitative Evaluation - Summary of Benefits - Draft Results

RTP ID#	Project Title	County	Investment Type [1]	Project Capital Cost (2007\$M)	Total Annual Benefit (2007\$M)	Annual VMT Reduced (millions) [2]	Annual CO <sub>2</sub> Reduced (tons) [2]	Cost Per VMT Reduced (2007\$M) [2]	Cost Per Ton CO <sub>2</sub> reduced [2]	Benefit/Cost [3]	Notes
<b>B/C Ratio of 10 or higher</b>											
21992, 230111	AC Transit Transit Priority Measures (TPM) and Corridor Improvements* *AC Transit submitted additional TPM components consisting of Grand/Maritime HOT on-ramp and Bay Bridge contraflow lane, which are not included in this assessment. Preliminary off-model analysis suggests these components have significant benefits for transit riders and merit further examination.	Alameda	NC/V	\$38.3	\$56.5	12.1	720	\$0.2	\$2,700	30	
230419	Freeway Performance Initiative	Bay Area Region/ Multi-County	NC	\$600.0	\$1,593.5	-66.2	202,000	-\$0.8	\$300	28	
Various	Santa Clara HOT Corridors: US 101, SR 87, SR 85, SR 237, I-880, I-280, I-680 (RTP ID#230248, 230404, 230254, 230259, 230258, 230278, 230280, 230264, 230263, 230256, 230257, 230270, 230272, 230281, 230275, 230260, 230276)	Santa Clara	NC	\$777.9	\$1,030.9	310.7	246,000	\$0.1	\$200	25	
230369, 230610	Regional HOT Network and express bus enhancement	Multi-County	NC	\$3,281.6	\$3,795.9	781.5	610,000	\$0.3	\$300	18	
22420	Bus Rapid Transit (BRT)/Transit Preferential Streets (TPS) (sales tax project)	San Francisco	NC	\$418.2	\$350.5	50.2	4,500	\$0.4	\$4,650	17	
22776	Route 84 Expressway Widening	Alameda	NC	\$124.0	\$90.8	5.9	13,000	\$1.2	\$500	13	
230161	Van Ness Avenue BRT	San Francisco	NC	\$76.1	\$39.6	7.2	200	\$0.5	\$19,000	10	
<b>B/C Ratio of 5 to 9</b>											
22657	I-580 (Altamont Pass) Westbound Truck Climbing Lane	Alameda	V	\$75.6	\$31.8	-0.5	-4,900	-\$7.6	-\$800	8	
21902, 230413, 98154, 98147*	US 101 SB HOV lane extension (Railroad/ Pepper to Petaluma River Bridge) and Marin-Sonoma Narrows (SB: Petaluma River Bridge to Rowland; NB: north of Atherton Avenue to north of East Washington Ave)	Multi-County/ Bay Area Region	NC	\$926.8	\$378.7	-36.6	-2,090	-\$1.3	-\$24,000	8	
Various	Alameda HOT Corridors: I-680, I-580, I-880, I-238 (RTP ID#230088, 230089, 230609, 22042, 22668, 22664, 230241)	Alameda	NC	\$1,550.9	\$663.4	188.6	130,000	\$0.5	\$700	7	Under review
230164	Geary Boulevard BRT	San Francisco	NC	\$190.5	\$64.2	6.9	200	\$1.4	\$47,600	7	
22700	Parallel corridor north of I-80 from Red Top Road to Abernathy Road (the western section extends from the railroad crossing on Red Top Road	Solano	NC	\$68.0	\$25.3	7.7	5,000	\$0.5	\$800	6	
22351*	I-680 NB HOV lane extensions (North Main to SR-242 and north of Benicia Bridge to I-80) and HOV lane connector NB I-680 to EB I-80	Multi-County	V	\$193.0	\$74.3	-18.3	2,800	-\$0.7	\$4,400	6	
21902, 230413*	US 101 SB HOV lane extension (Railroad/ Pepper to Petaluma River Bridge)	Sonoma	NC	\$124.0	\$36.6	-4.2	-7,140	-\$1.7	-\$980	5	
22145, 22958	SR 237/US 101 improvements: a) Widen westbound Route 237 on-ramp to northbound US 101 to 2 lanes and add auxiliary lane on northbound US 101 from Route 237 on-ramp to... b) US 101 southbound to eastbound Route 237 connector improvements	Santa Clara	NC/V	\$73.0	\$20.3	-0.1	3,900	-\$47.6	\$1,000	5	
22013	Eastbound I-580 Truck Climbing Lane	Alameda	NC	\$64.2	\$17.6	-0.5	-3,300	-\$7.4	-\$1,000	5	
230569*	I-80 EB & WB HOV lanes between Airbase Parkway and I-505	Solano	NC	\$132.0	\$45.8	-22.9	-1,000	-\$0.4	-\$10,000	5	
Various	Local Streets and Roadway Maintenance Shortfall	Regional	NC	\$8,208.0	\$1,573.0	N/A	N/A	N/A	N/A	5	B/C based on dollars saved by performing maintenance on time. Average annual benefit for high funding scenario
94151	Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road	Solano	NC	\$182.0	\$46.6	-2.0	15,000	-\$5.1	\$700	5	
<b>B/C Ratio of 1 to 4</b>											
22667	BART to Livermore: Tri-Valley rail extension from Dublin/Pleasanton BART Station to Greenville Road in the I-580 median	Alameda	NC	\$1,042.0	\$187.7	6.6	1,000	\$6.8	\$44,600	4	
230477	SR 12 Improvements: Phase 1	Solano	NC	\$100.0	\$21.4	-13.8	-4,700	-\$0.4	-\$1,300	4	
230060	Marin County Local Transit Enhancement on 6 Key Corridors	Marin	NC	\$27.3	\$6.9	1.9	200	\$1.0	\$9,750	4	
230326, 230327	I-80/I-680/SR12 Interchange: Phase 1 plus Balance of Project	Solano	V	\$1,183.0	\$209.9	-7.2	-2,200	-\$8.7	-\$28,000	3	
22346	Express bus service expansion along I-580 corridor	Contra Costa	V	\$50.0	\$9.0	0.4	30	\$7.4	\$108,000	3	
230326	I-80/I-680/SR12 Interchange - Phase 1	Solano	NC	\$513.0	\$67.2	1.3	-2,100	\$21.4	-\$13,000	2	
230570*	I-80 EB & WB HOV lanes between Carquinez Bridge and SR-37	Solano	NC	\$105.0	\$14.3	-3.7	-620	-\$1.7	-\$10,000	2	
n/a	I-80 add 5th mixed-flow lane (EB: SR-12 East to Airbase Parkway and WB: West Texas to SR-12 East)	Solano	N/A	\$69.8	\$8.7	-0.8	-2,582	-\$4.7	-\$1,500	2	
21714	SR 25/Santa Teresa Boulevard/US 101 Interchange (includes US 101 widening between Monterey Road and SR 25 and connection to Santa Teresa Blvd)	Santa Clara	NC	\$233.0	\$26.0	7.2	7,500	\$1.7	\$1,600	2	Under review.

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<b>B/C Ratio of 1 to 4, cont.</b>											
Various	Transit Capital Shortfall	Regional	NC	\$11,199.0	\$783.9	N/A	N/A	N/A	N/A	2	B/C based on dollars saved by performing maintenance on time. Average annual benefit for high funding scenario
21011	Transportation for Livable Communities + (TOD emphasis)	Regional	NC	\$1,500.0	\$129.4	164.7	94,000	\$0.5	\$800	2	B/C based pivots off estimated VMT reduction
94644	Route 92 westbound slow vehicle lane between Route 35 and I-280	San Mateo	NC	\$82.0	\$8.4	-0.3	3,800	-\$12.8	\$1,100	2	
21612	Improvement of Dumbarton Bridge access to US 101	San Mateo	NC	\$317.0	\$27.0	1.3	10,000	\$11.9	\$1,590	2	
230403	US 101 Widening to 6-lane Freeway: SR 25 to SR 129	Santa Clara	V	\$170.0	\$15.4	0.5	200	\$17.9	\$45,800	2	
230496	SR 12 Improvements: Phase 2	Solano	NC	\$150.0	\$15.0	-0.8	-4,000	-\$11.0	-\$2,300	2	
230271	I-80 Express Bus Service	Alameda	NC	\$70.0	\$12.6	2.0	100	\$4.2	\$81,800	2	
21030	I-580/US 101 interchange improvements and new freeway-to-freeway connector from northbound US 101 to eastbound I-580	Marin	V	\$98.0	\$7.4	0.4	2,000	\$11.6	\$2,500	2	
22516	Enhance Capitol Corridor regional rail service (West Contra Costa and Solano cou	Contra Costa	V	\$70.0	\$11.4	7.2	1,000	\$1.0	\$7,600	2	
21205, 22350	I-680/Route 4 interchange (Phase 1, 2 and 3) and (Phases 4 and 5) and HOV flyover ramps	Contra Costa	NC/V	\$320.2	\$21.9	-7.9	-1,100	-\$2.1	-\$15,000	1	
22162	Route 237 westbound to Route 85 southbound connector ramp improvements	Santa Clara	NC	\$37.0	\$2.6	-1.3	-590	-\$1.5	-\$3,300	1	
94506	East-West Connector Project in North Fremont and Union City	Alameda	NC	\$150.0	\$8.7	-10.8	-300	-\$0.8	-\$27,000	1	
230287	Goods Movement Emissions Reduction Project	Regional	NC	\$106.5	\$8.1	N/A	2,200	N/A	\$6,100	1	Benefit based on CO <sub>2</sub> and particulate emissions.
22400	Construct Route 239 from Brentwood to Tracy Expressway	Contra Costa	V	\$200.0	\$11.2	-7.8	6,100	-\$1.5	\$1,900	1	
230099	I-580/I-680 Improvements (NB I-680 to WB I-580)	Alameda	NC	\$392.5	\$19.0	0.4	200	\$52.3	\$98,300	1	
230294	New SR 152 Alignment: SR 156 to US 101	Santa Clara	V	\$350.0	\$15.8	-2.0	18,000	-\$9.5	\$1,000	1	
22605, 98222, 230208	SR4 Bypass: a) Segments 1 & 2: widen from 4 to 6 lanes from Sand Creek to Balfour, and widen segment 3 to 4 lane; b) Segment 1: Route 160 freeway-to-freeway connectors to and from the north; and c) Widen from 4 to 6 lanes from Laurel Road to Sand Creek Road	Contra Costa	V/NC/V	\$219.0	\$10.4	-10.6	-2,500	-\$1.2	-\$5,100	1	
22343	Express bus service expansion along I-680 corridor, Phase 2	Contra Costa	V	\$57.0	\$5.5	1.2	80	\$5.7	\$85,100	1	
21613	Route 92 improvements from San Mateo Bridge to I-280, includes uphill passing lane from US 101 to I-280	San Mateo	NC	\$186.2	\$7.2	-9.1	-5,600	-\$1.1	-\$1,700	1	
230207	Geneva/Harney Bus Rapid Transit	San Francisco	NC	\$202.0	\$9.0	1.2	30	\$10.6	\$422,000	1	
230252	Marin County Local Transit Expansion	Marin	NC	\$56.0	\$12.2	2.7	100	\$6.7	\$181,000	1	
22981	Widen Route 4 as continuous 4-lane arterial from Marsh Creek Road to San Joaquin County line	Contra Costa	V	\$100.0	\$3.3	0.1	1,700	\$105.5	\$3,400	1	
<b>B/C Ratio of less than 1</b>											
22247	Regional Bicycle Network	Regional	NC	\$1,300.0	\$34.8	59.2	33,800	\$1.1	\$1,900	0.5	
230550	Transportation Climate Action Plan	Regional	NC	\$184.0	\$13.0	N/A	271,200	N/A	\$200	0.4	Benefit based only on CO <sub>2</sub> reduction
230571	I-80 EB & WB HOV Lanes (SR 37 to Red Top Rd.)	Solano	NC	\$107.0	\$2.4	-3.7	-620	-\$1.7	-\$10,000	0	
22415	Expand historic streetcar service	San Francisco	NC	\$72.7	\$0.7	0.0	1	\$103.5	\$3,550,000	0	Project likely serves recreational, weekend and tourist trips not captured in analysis
22671	Construct direct HOV connection between southbound I-880 to westbound Route 84 (Dumbarton Bridge approach)	Alameda	NC	\$125.0	\$0.6	0.3	510	\$19.6	\$12,300	0	Project too small to capture meaningfully.
22423	Lifeline	Regional	NC	\$1,600.0	\$1.8	N/A	N/A	N/A	N/A	0.03	Benefit based only on reduced auto ownership costs
22352	I-680/Norris Canyon Road HOV direct ramps in San Ramon	Contra Costa	NC	\$80.0	-\$0.2	-0.2	200	-\$21.4	\$20,400	0	Project too small to capture meaningfully.
94050	Upgrade Route 4 to full freeway from I-80 to Cummings Skyway (Phase 2)	Contra Costa	V	\$75.0	-\$3.2	-25.2	-14,800	-\$0.2	-\$300	-1	Under review

## Notes

[1] V = Proposed as Vision Investment; NC = Proposed as New Commitment Investment

[2] negative number indicates an increase in VMT or CO<sub>2</sub> emissions

[3] B/C is based on total benefit divided by annualized cost. Refer to the detailed worksheet for annualized cost.

Delay reduction/travel time saving is the single biggest component of benefit, as measured here. B/C can be understood as a cost effectiveness measure for delay reduction and time savings

\* Project analyzed may differ slightly from project submitted, as per discussions with the CMAS under the Freeway Performance Initiative corridor studies

**Table 2: Benefit-Cost Analysis of Regional Programs, May 8, 2008**  
**Summary of Draft Results**

Program	Approximate B/C	Alternative Performance Metric	Notes
<b>FREEWAY PERFORMANCE</b>			
<b>Most direct impact on delay and only program run through regional model</b>			
Freeway Performance Initiative	28		
<b>MAINTENANCE</b>			
<b>While B/Cs are low to average, the actual dollar value of the public savings by performing maintenance on time is huge</b>			
Local Streets and Roads Capital Shortfall	5	Total savings = \$9.5 B to \$39 B (Depending on level of regional investment)	B/C ratio reflects avoided increases in deferred maintenance and rehabilitation costs as well as savings in private extra vehicle operating costs incurred by driving on poorly maintained roadways, divided by the 25-year regional investment in maintenance shortfalls. Other benefits that are not accounted for here include impact that varying states of repair have on air quality, congestion, goods movement, emergency services, transit efficiency, etc...
Transit Capital Shortfall	2	Total savings = \$1.5 B to \$16 B (Depending on level of regional investment)	Reflects 1) the public benefit of avoided increases in rehabilitation and maintenance costs, and 2) the private benefit for passengers of avoided delays due to increased reliability, if transit capital assets are replaced and rehabilitated in a timely manner. Reflects only a small portion of the benefits of transit capital maintenance; does not include other benefits of maintaining an operable transit system, such as increased ridership, reduced congestion, reduced emissions, and increased mobility.
<b>FOCUSED GROWTH</b>			
<b>Programs support focused growth, which reduces delay and emissions. but do not have huge, direct delay reduction benefits proportional to cost</b>			
Regional Bike Network	0.5		Bridge links account for approx 50% of total cost and 14% of mileage.
TLC + (recommended shift to facilitate TOD)	2		Higher VMT reduction from realignment of program to facilitate TOD. But program at this scale is still marginal compared to Focused Growth scenario tested in the Vision.
TLC (current emphasis)	0.4		Modest VMT reduction associated with amenities that are currently funded through TLC
<b>AFFORDABILITY</b>			
<b>Programs mainly affect amount of funding spent by low-income households on transportation</b>			
Lifeline	0.03		Benefits include reduction in auto-ownership costs only.
Means Based Fare Subsidy	1	Reduces transportation expenditures as share of total expenditures from 36% to 33% for households with annual income < \$15,000	Benefits include reduction in transit fare expenditures only. This is essentially a direct transfer
<b>EMISSIONS REDUCTION</b>			
<b>B/Cs are low - because delay not affected, programs are most cost-effective strategies for emission reduction. The cost per emissions reduced is an order of magnitude lower than for other programs.</b>			
Climate Change	0.4	\$200 per ton CO2 reduced	Benefits reflect CO2 reductions only. Under other projects and programs, the cost per ton reduced is in the thousands or tens of thousands
Port Emissions/Truck Retrofit	1	\$560 K per ton PM2.5 reduced	Benefits reflect CO2 and particulate emissions only. Under other projects and programs, the cost per ton reduced is in the millions or tens of millions

Table 2: Draft Benefits and Costs of Regional Funding Programs  
May 8, 2008

	FOCUSED GROWTH			AFFORDABILITY		EMISSIONS REDUCTION	
	Bike Network	TLC (current emphasis)	TLC + (TOD emphasis)	Lifeline	Means Based Transit Discount	Climate Protection	Truck Emissions Reduction
<b>COST (2007\$)</b>							
<b>Total 25-Year Cost</b>	<b>\$1,300,000,000</b>	<b>\$1,500,000,000</b>	<b>\$1,500,000,000</b>	<b>\$1,600,000,000</b>	<b>\$1,125,000,000</b>	<b>\$ 184,000,000</b>	<b>\$ 106,500,000</b>
Lifecycle of investment - for capital projects	20	20	20	n/a	n/a	n/a	n/a
Years of funding - for operating programs	n/a	n/a	n/a	25	25	5	8
<b>Annual cost in 2035</b>	<b>\$ 65,000,000</b>	<b>\$ 75,000,000</b>	<b>\$ 75,000,000</b>	<b>\$ 64,000,000</b>	<b>\$ 45,000,000</b>	<b>\$ 36,800,000</b>	<b>\$ 13,312,500</b>
<b>BENEFITS - Year 2035 (unless noted)</b>							
Reduction in annual vehicle trips	14,808,400	n/a	n/a	n/a	n/a	n/a	n/a
Reduction in annual VMT (millions)	59.2	49.3	164.7	n/a	n/a	n/a	n/a
Reduction in annual total delay (VHD)	546,500	454,600	1,519,500	n/a	n/a	n/a	n/a
Reduction in annual CO2 emissions (tons)	33,800	28,100	94,000	n/a	n/a	271,200	2,200
Reduction in annual PM10 emissions (tons)	31.9	26.5	88.6	n/a	n/a	n/a	2.0
Reduction in annual PM2.5 emissions (tons)	8.7	7.3	24.3	n/a	n/a	n/a	22.8
Reduction in annual motor vehicle fatalities and injuries	33	27	92	n/a	n/a	n/a	n/a
<b>VALUE of BENEFITS - Year 2035 (unless noted) in 2007\$</b>							
Reduction in annual auto ownership costs (dollars)	n/a	n/a	\$ 51,057,200	\$ 1,798,600	n/a	n/a	n/a
Reduction in annual auto operating costs (dollars)	\$ 13,612,000	\$ 11,323,000	\$ 19,325,000	n/a	n/a	n/a	n/a
Reduction in annual transit fare costs (dollars)	n/a	n/a	n/a	n/a	\$ 45,000,000	n/a	n/a
Reduction in annual delay (VHD)	\$ 10,706,000	\$ 8,906,000	\$ 29,767,000	n/a	n/a	n/a	n/a
Reduction in annual CO2 emissions	\$ 2,366,000	\$ 1,969,000	\$ 6,580,000	n/a	n/a	\$ 13,035,000	\$ 157,000
Reduction in annual PM10 emissions	\$ 676,000	\$ 562,000	\$ 1,879,000	n/a	n/a	n/a	\$ 42,000
Reduction in annual PM2.5 emissions	\$ 3,057,000	\$ 2,543,000	\$ 8,500,000	n/a	n/a	n/a	\$ 7,981,000
Reduction in annual motor vehicle fatalities and injuries	\$ 4,412,000	\$ 3,670,000	\$ 12,267,000	n/a	n/a	n/a	n/a
<b>Total Benefit</b>	<b>\$ 34,829,000</b>	<b>\$ 28,973,000</b>	<b>\$ 129,375,200</b>	<b>\$ 1,798,600</b>	<b>\$ 45,000,000</b>	<b>\$ 13,035,000</b>	<b>\$ 8,180,000</b>
<b>B/C Ratio (rounded, if rounds to 1 or higher)</b>	<b>0.5</b>	<b>0.4</b>	<b>2</b>	<b>0.03</b>	<b>1</b>	<b>0.4</b>	<b>1</b>
<b>Cost per million VMT Reduced</b>	<b>\$ 1,097,000</b>	<b>\$ 1,522,000</b>	<b>\$ 455,000</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>
<b>Cost per Ton CO2 Reduced</b>	<b>\$ 1,900</b>	<b>\$ 2,700</b>	<b>\$ 800</b>	<b>n/a</b>	<b>n/a</b>	<b>\$ 200</b>	<b>\$ 6,100</b>
<b>Cost per Ton PM10 Reduced</b>	<b>\$ 2,040,100</b>	<b>\$ 2,829,700</b>	<b>\$ 846,700</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>\$ 6,713,800</b>
<b>Cost per Ton PM2.5 Reduced</b>	<b>\$ 7,441,500</b>	<b>\$ 10,321,700</b>	<b>\$ 3,088,300</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>\$ 583,800</b>



# Project Performance Assessment Draft Results General Findings

Joint Policy Committee

May 16, 2008

# Process

## TRANSPORTATION 2035 VISION

- Develop Performance-Based Scenarios
  - Define performance measures
  - Achieve with defined strategies
- Adopt Policy Performance Objectives (Jan. 08)

## Project/Program Performance Assessment

**Policy Assessment (adopt March 08)**  
**Based on Vision Policy Strategies**  
- Investments, Land Use, Pricing, Technology,  
Travel Behavior

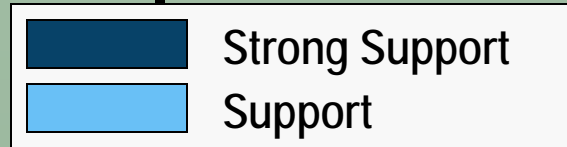
**Quantitative Evaluation (adopt Feb 08)**  
**Based on Performance Objectives**  
- Delay, Emissions, Safety, VMT, Affordability

**Financially Constrained Investment (adopt July 08)**  
• Project Assessment: Policy & Performance Evaluation  
• Tradeoff Discussions

# Qualitative Policy Assessment

- **All potential discretionary investments (beyond committed)**
- **21 project types representing 700+ projects**
- **Assess support for Vision Policy Strategies**
  - Investments
  - Land Use
  - Pricing/Affordability
  - Technology
  - Travel Behavior

# Qualitative Assessment Draft Results



Project Type	Goals Met	Maint. & Safety	Congest. Relief	Emissions Reduction	Focused Growth	Access
Transit efficiency/expansion	4		Strong Support	Strong Support	Strong Support	Strong Support
Bike and pedestrian	3.5	Support		Strong Support	Strong Support	Strong Support
Fwy & arterial technology	2.5	Support	Strong Support	Strong Support		
TOD	2.5			Strong Support	Strong Support	Support
Maintenance	2	Strong Support			Strong Support	Support
Fwy-to-fwy interchanges	2	Strong Support	Strong Support			
HOT	2		Strong Support	Support		Support
Lifeline transportation	1.5			Support		Strong Support
Local interchanges	1.5	Support	Strong Support			
HOV	1.5		Support	Support		Support
Climate/emissions reduction	1			Strong Support		
Freeway expansion	1		Strong Support			
Arterial expansion	0.5		Support			

# Quantitative Evaluation

- **Compare costs and benefits relative to Performance Objectives**
  - Reduce delay, emissions, collisions, VMT
  - Improve affordability and system maintenance
- **Similar to Corridor Mobility Improvement Account I-Bond analysis**
- **Identify outliers**
- **Focus on key investment decisions**
  - 75 higher-cost projects/programs evaluated (beyond committed)
    - Transit & roadway expansion and efficiency – regional travel model
    - Regional programs – alternative methods

# Performance Measures

- **Benefit-cost measure (monetized)**
  - Delay/travel time
  - Particulate and CO<sub>2</sub> emissions
  - Collisions
  - Direct user costs (vehicle operating or ownership)
- **Additional metrics**
  - Cost per VMT reduced
  - *Cost per low-income household served (transit only)-incomplete*
- **Annualized benefits & costs in year 2035**

# Benefit-Cost for Regional Programs

- **Focused Growth: TLC, Bike Network**
  - Reductions in VMT, emissions and congestion based on research
- **Affordability: Lifeline, Means-Based Transit Discount**
  - Direct private savings in auto ownership and transit fares only
- **Emissions Reduction: Climate Protection, Truck Retrofit**
  - Emissions reductions only
- **Transit and Roadway Maintenance Shortfalls**
  - Avoided public costs and private costs to users
  - Savings to local agencies are potentially huge: \$2 to \$40 billion

# Draft Findings: Benefit-Cost

## High: B/C 10 or Higher

### Transit efficiency

- SFMTA & AC Transit transit priority meas.
- Van Ness BRT

Roadway expansion - SR 84 widening

### Freeway efficiency

- Freeway Performance Initiative (FPI)
- HOT lanes + express bus (Santa Clara, Regional)

## Medium-High: B/C between 5 and 9

### Roadway maintenance

### Roadway operations/expansion

- I-580 Truck climbing lanes
- Sol-80 reliever route
- Jepson parkway connection (Solano)

Freeway efficiency – HOT lanes + express bus (Alameda)

Fwy-to-fwy interchange – SR237/US101

Transit efficiency – Geary BRT

# Benefit-Cost, cont.

## Mid-Range: B/C Between 1 and 4

### Transit expansion/efficiency

- BART to Livermore
- Marin County Transit
- I-80, I-580, I-680 express bus
- Geneva/Harney BRT
- Capital corridor

### Fwy-to-fwy interchanges

- I-80/I-680/SR12
- I-580/US 101
- I-680/SR4
- 237/SR 85
- SR 25/US 101/Santa Teresa Blvd

### Roadway expansion

- SR 12 widening
- SR 92 uphill passing lane
- SR 239 Brentwood/Tracy expressway
- SR 152 new alignment
- US 101 widening south Santa Clara County
- Jepson parkway phases 1 and 2
- Widen SR 4 to San Joaquin County Line
- Dumbarton Bridge access (San Mateo)

### Regional programs

- TLC
- Port Emissions/Truck Retrofit

### Transit maintenance

## Low: B/C Under 1

### Transit expansion - MTA historic streetcar

### Regional Programs

- Lifeline
- Regional Bike Network
- Climate Protection

### Roadway

- Single, direct HOV connectors/ramps
- Upgrade SR4 West to freeway
- I-680 NB/I-580 WB interchange

# Draft Findings: CO<sub>2</sub> Specific

	Tons CO <sub>2</sub> Reduced in 2035 (000s)	Cost per Ton CO <sub>2</sub> Reduced
<b>Most Effective/Cost-Effective</b>		
HOT networks + express bus	100 to 600	\$200 - \$800
Climate Protection Program	300*	\$200
Freeway Performance Initiative	200	\$300
TLC	100	\$800
<b>Limited Impact/Less Cost-Effective</b>		
"Reliever" routes	10 to 20	\$500 to \$2,000
Transit exp./efficiency	2 to 5	\$1,000 to
Selected roadway exp./ interchanges		\$45,000
<b>Increase CO<sub>2</sub> Emissions</b>		
Selected roadway expansion	-3 to -15	NA

\* For year 2015

# Equivalent CO<sub>2</sub> Emissions Reductions

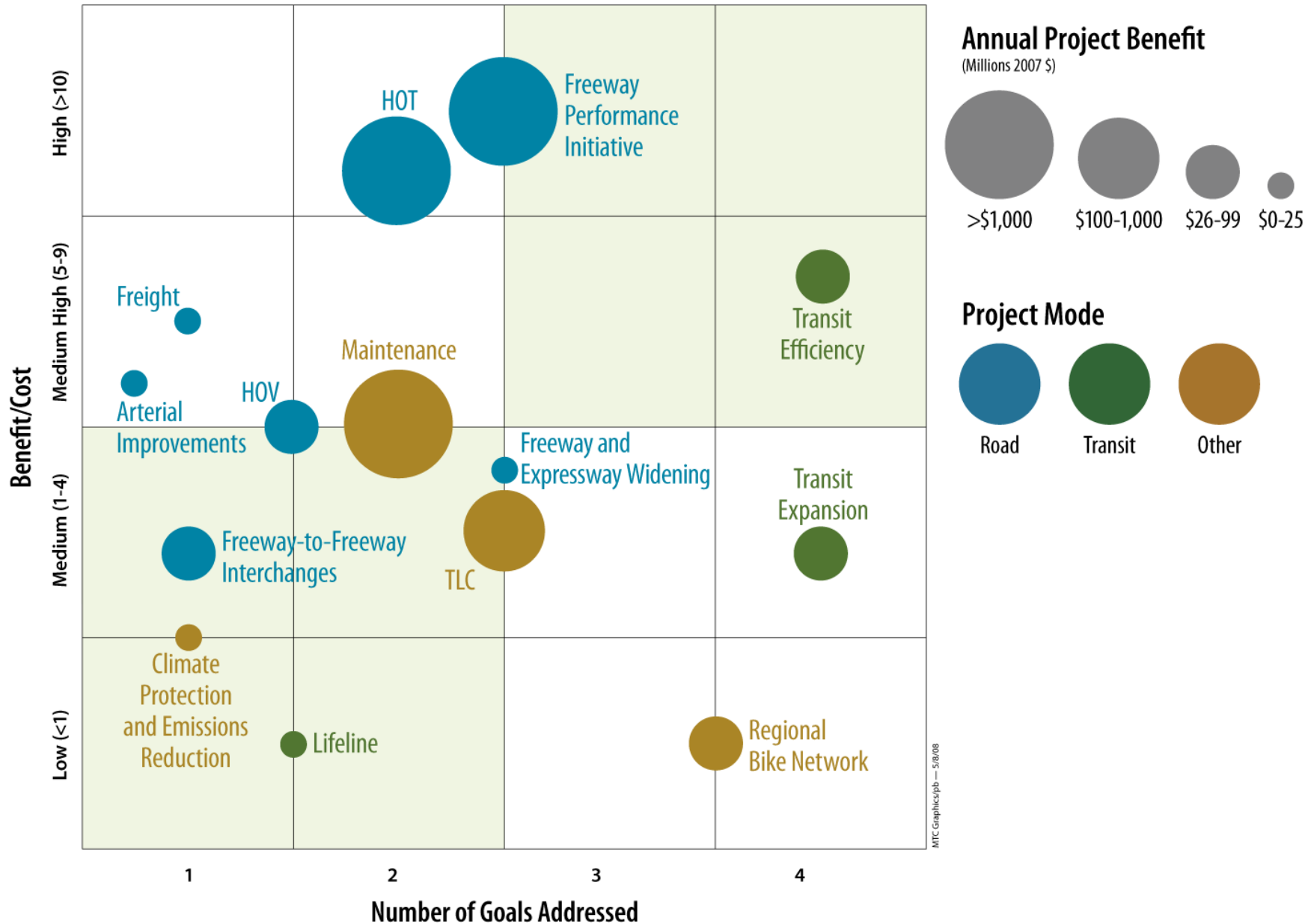
- **Reduction of 100,000 tons/year is equivalent to\***
  - One year of electricity use by 18,000 California households
  - Replacing 1.2 million standard light bulbs with compact fluorescent lamps
- **100,000 tons is 1.7% of total transportation emissions in 2035 (15,000 tons is 0.04%)**

\* Adapted from ARB Fact Sheet,  
Conversion of 1MMT CO<sub>2</sub> to Familiar Equivalents (10/07)

# Draft Findings: VMT Specific

	Millions VMT Reduced in 2035	Cost per Thousand VMT Reduced
<b>Most Effective</b>		
HOT networks + express bus	200 to 800	\$100 to \$500
TLC	200	\$500 to \$800
<b>Less Effective</b>		
Regional Bike Network	60	\$1,000
High volume transit (e.g., transit priority, SFMTA BRT, BART to Livermore)	7 to 50	\$200 to \$7,000
Roadway projects that provide direct routing (e.g., I-80 reliever, SR84)	6 to 8	\$500 to \$1,000
<b>Increase VMT</b>		
Most roadway expansion projects	-1 to -40	NA
Freeway Performance Initiative	- 66	NA

# Project Performance Assessment



# Informing Trade-Off Discussions

- 1. Ensure high-end performers are in the plan**
  - Multiple goals and high benefit-cost ratio
- 2. Include low-end performers only if compelling case is made**
  - Few goals and/or low benefit-cost ratio
  - Other considerations may be compelling (e.g., cost-effective for CO<sub>2</sub> reduction)
- 3. Some goals could be weighted higher than others**

# Transportation 2035 Schedule

<b>May</b>	<b>Review Performance Evaluation Results</b> <ul style="list-style-type: none"><li>• Partnership</li><li>• Planning Committee</li><li>• Joint Policy Committee</li><li>• Commission Workshop</li></ul> <b>Discuss Investment Tradeoff Options</b>
<b>June</b>	<b>Preliminary Investment Plan</b>
<b>July</b>	<b>Approve Investment Plan</b>



**METROPOLITAN  
TRANSPORTATION  
COMMISSION**

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***Memorandum***

TO: Joint Policy Committee

DATE: May 9, 2008

FR: Doug Kimsey, MTC

W. I.

RE: Transportation 2035 Plan: Financial Estimates/ Project Tradeoff Framework

Over the past few months staff has sought input and approval on several aspects of the Transportation 2035 Plan that include: goals and objectives; project performance objectives; vision policy strategies; defining committed projects/funding; and road and transit shortfalls.

We are now at a point in the RTP process when we need to begin thinking about how we might frame tradeoff discussions for the plan's financially constrained element using the evaluation structure that has been previously approved by the Commission. The attached slides provide some background on past decisions and financial estimates that can be used to define a framework for how we might approach tradeoff decisions. These decisions will need to occur over the next 4 months and will ultimately lead the Commission to select a preferred financially constrained investment plan in July 2008.

Staff will be available at your meeting to present the attached information and answer questions.

DK

C:\Temp\tradeoffs v2.doc



# Developing a Project Tradeoff Framework

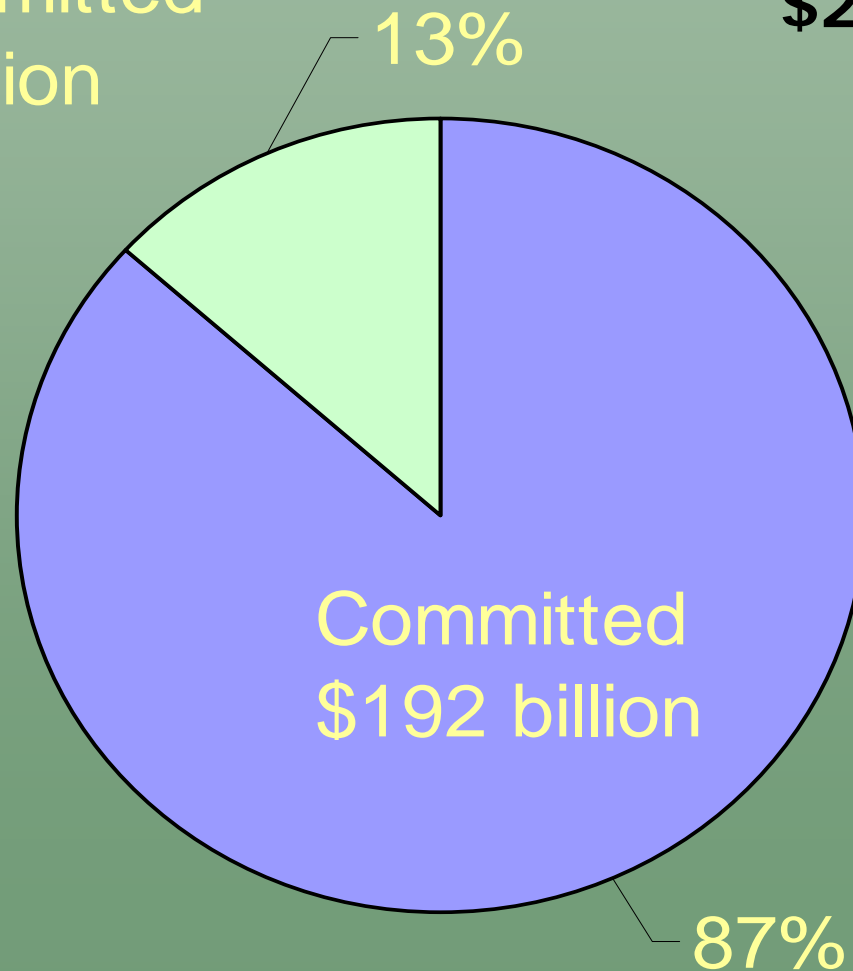
Joint Policy Committee

May 16, 2008

# T-2035 Committed vs. Uncommitted Funds

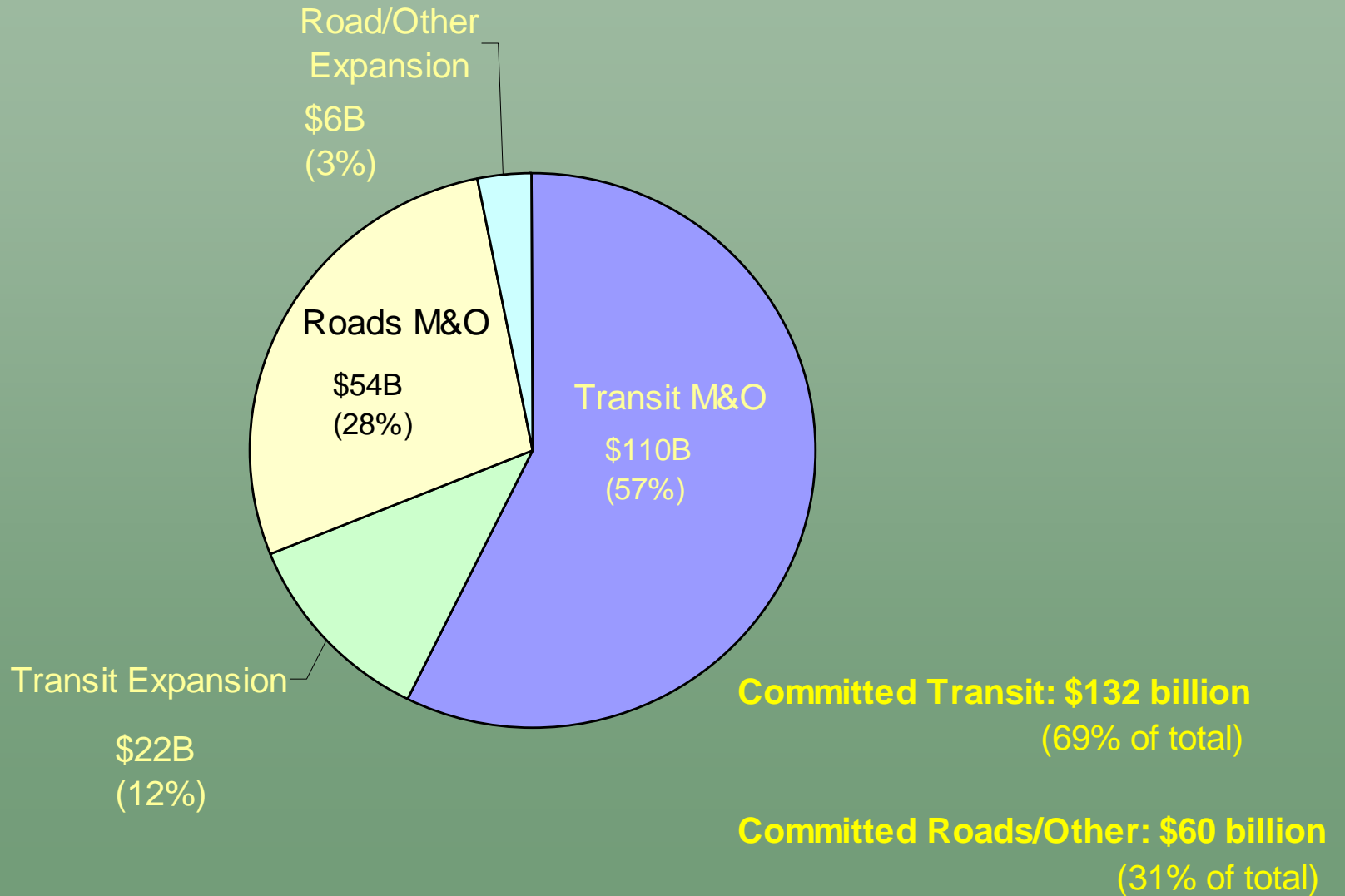
Uncommitted  
\$30 billion

\$222 billion total



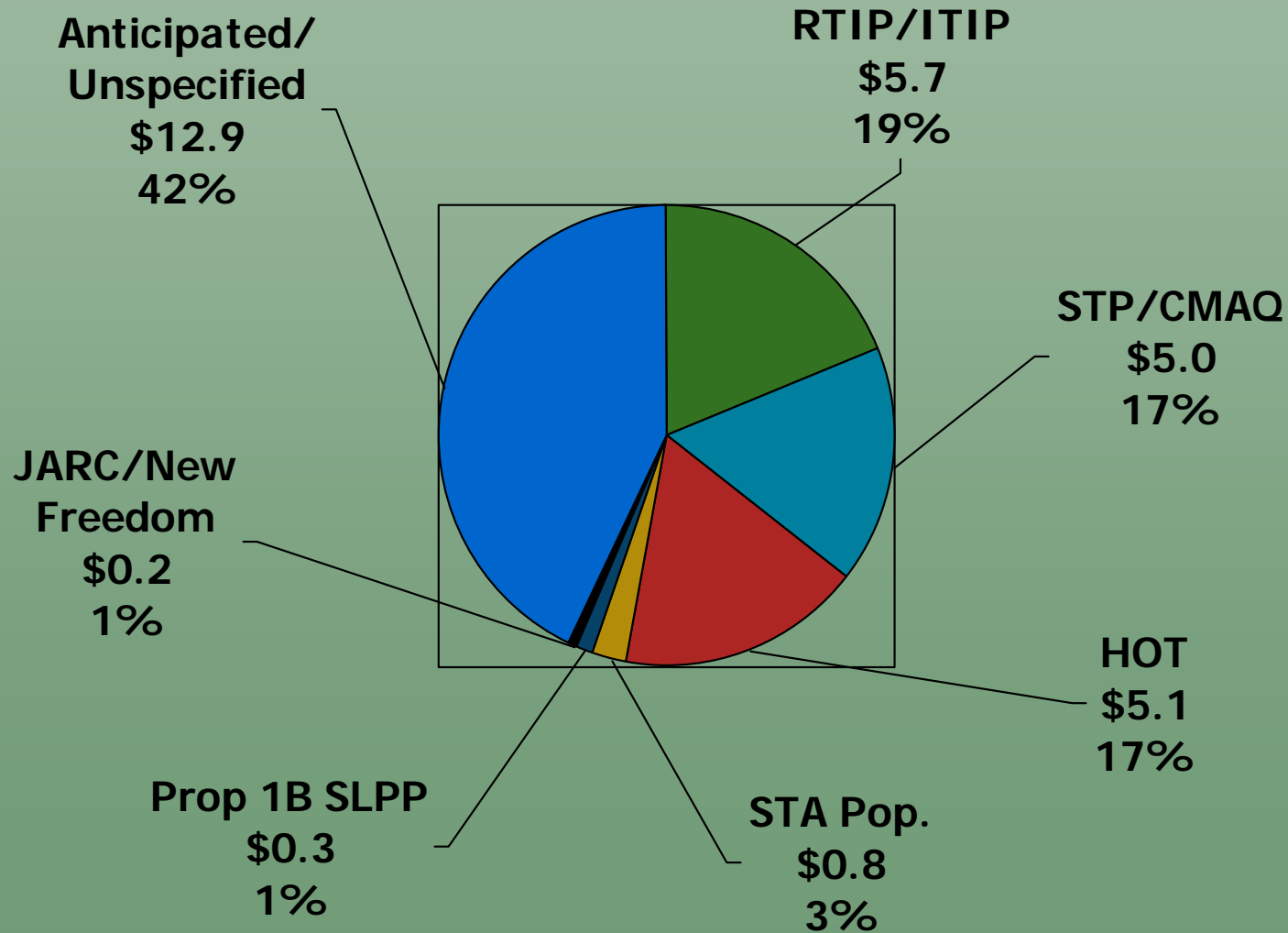
# T-2035 Committed Funds

(\$192 billion total)



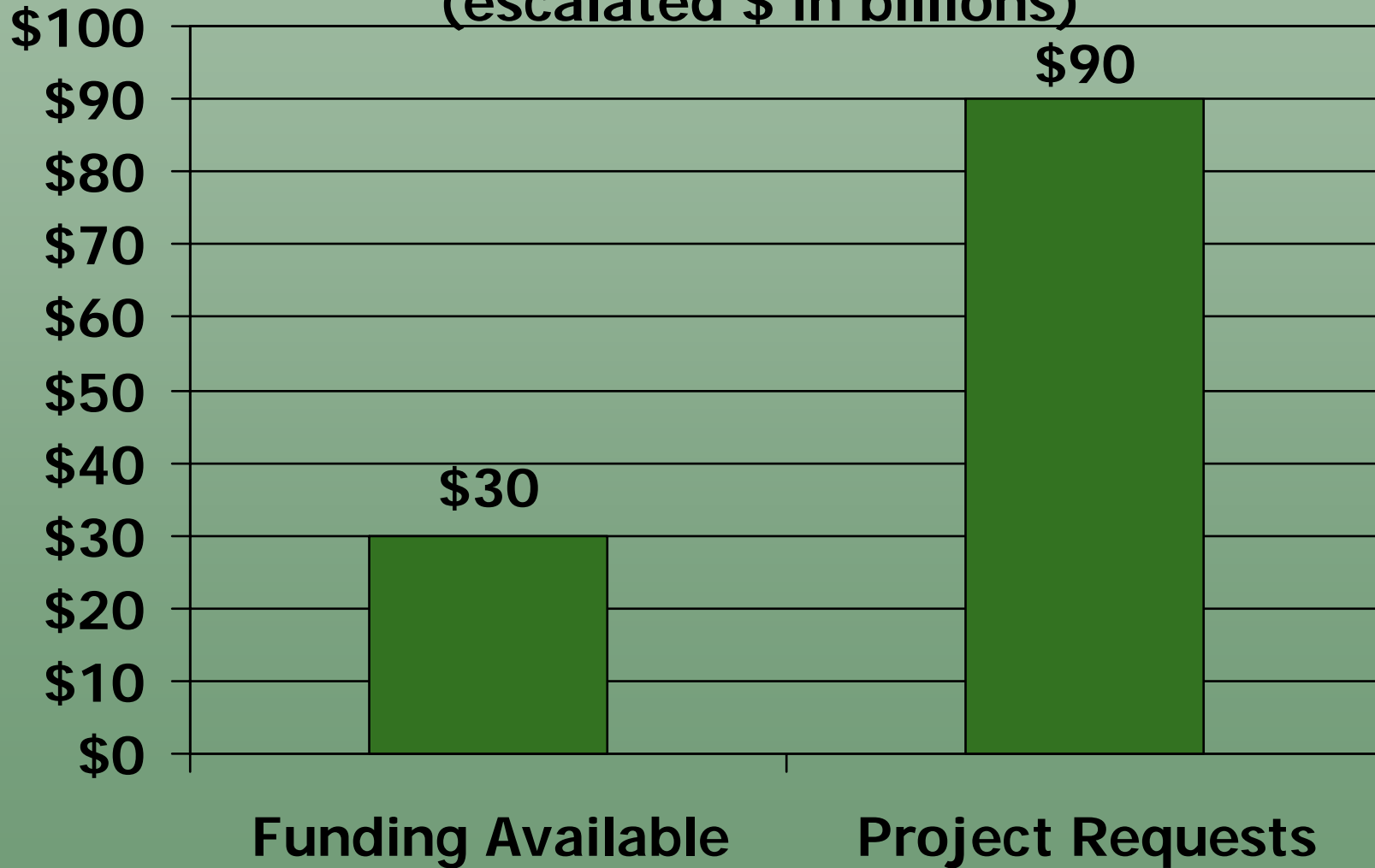
# Uncommitted Regional Discretionary Funds (escalated \$ in billions)

\$30 billion total



# Available Revenues vs. Project Requests

(escalated \$ in billions)



# Potential Investment Theme Approaches

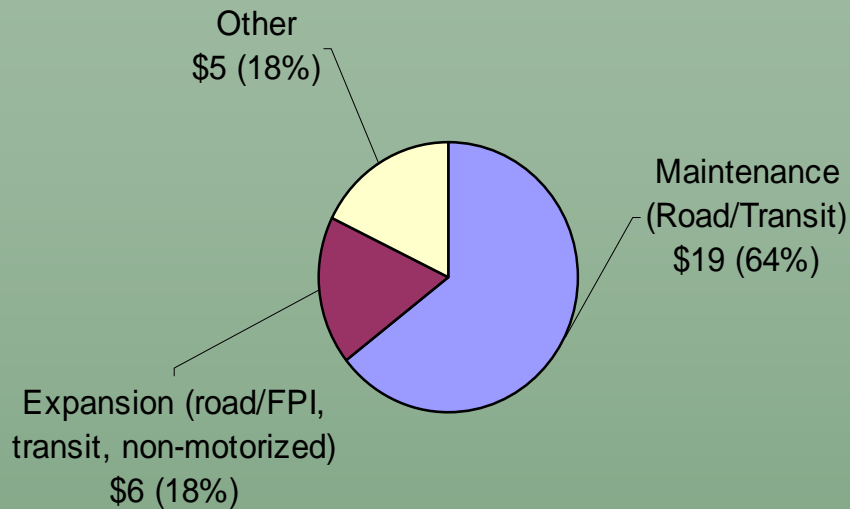
3 E's

Goals

Economy		Equity		
Environment		Equity		
Economy		Equity		
Maintenance/ Safety/ Security	Reliability/ Efficient Freight (Congestion Reduction)	Clean Air/ Climate Protection	Focused Growth	Access

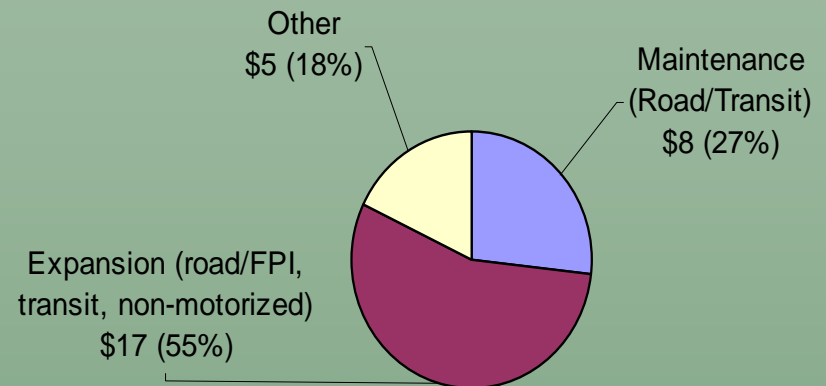
## High Maintenance

(escalated \$ in billions)



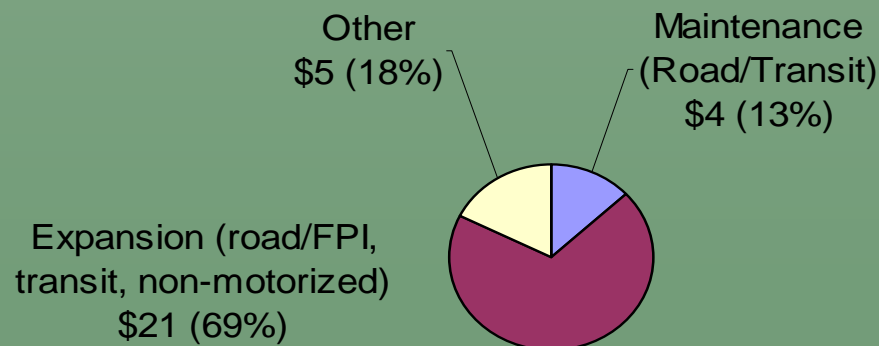
## Medium Maintenance

(escalated \$ in billions)



## Low Maintenance

(escalated \$ in billions)



### Maintenance Investment Assumptions:

High: Roads- MTS Pavement/non-Pave.  
Transit- Score 16+  
Signif. RTIP funds used for maint.

Medium: Roads- MTS Pavement only  
Transit- Vehicle Focus  
Some RTIP may be needed for maint.

Low: Roads- Arterial Pavement Only  
Transit- Vehicle focus (extended life)  
No RTIP needed for maint.

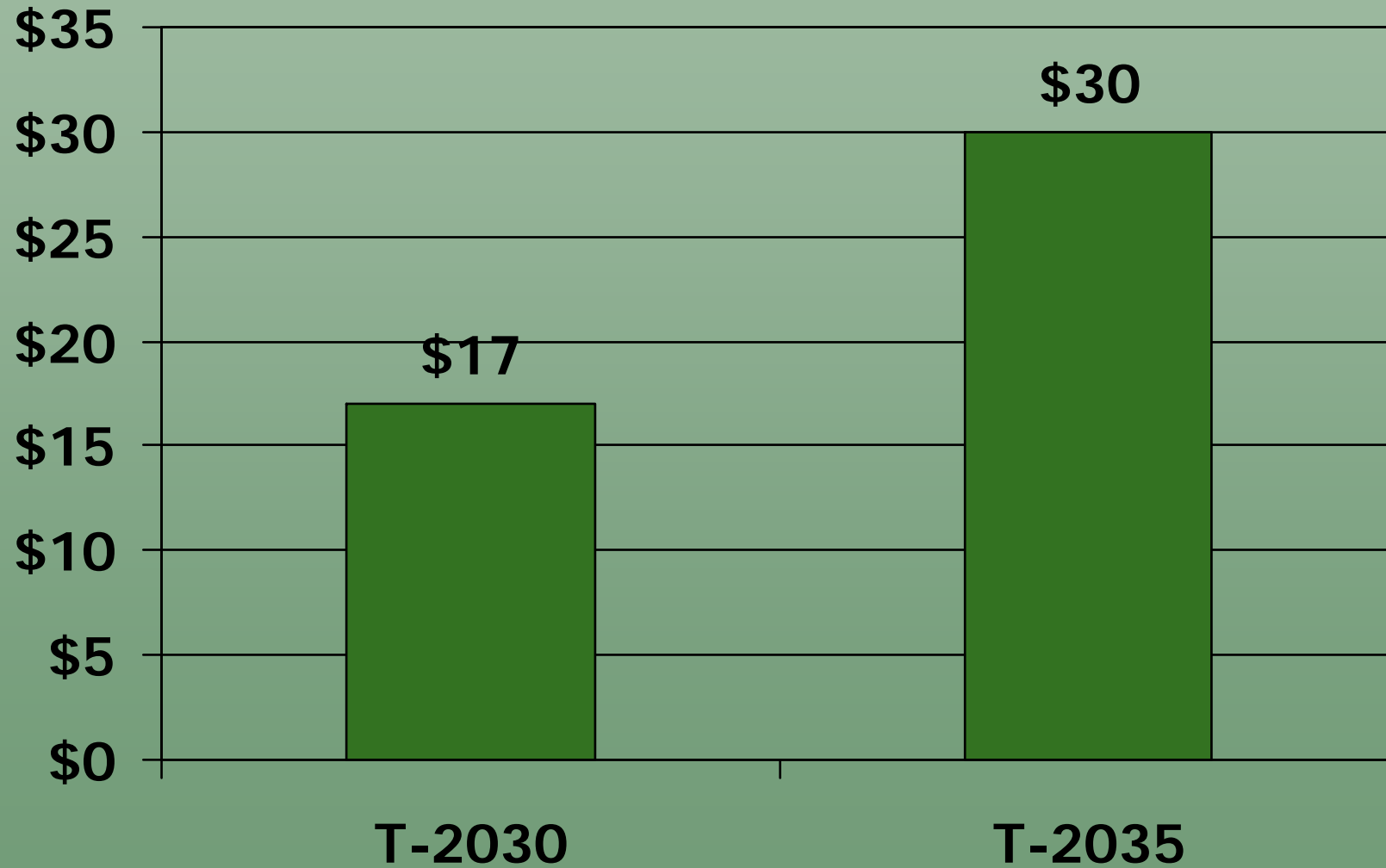
## Maximum Transit/Roads Maintenance Funding: Yrs. 1-5

Maintenance Investment Level	Years 1-5 Shortfall	Available Funds		Years 1-5 Deficit
		STP	STA Pop. Spillover	
High	\$ 4.00	\$ 0.30	\$ 0.05	\$ 3.65
Medium	\$ 1.60	\$ 0.30	\$ 0.05	\$ 1.25
Low	\$ 0.80	\$ 0.30	\$ 0.05	\$ 0.45

## Maximum Transit/Roads Maintenance Funding: Yrs. 6-25

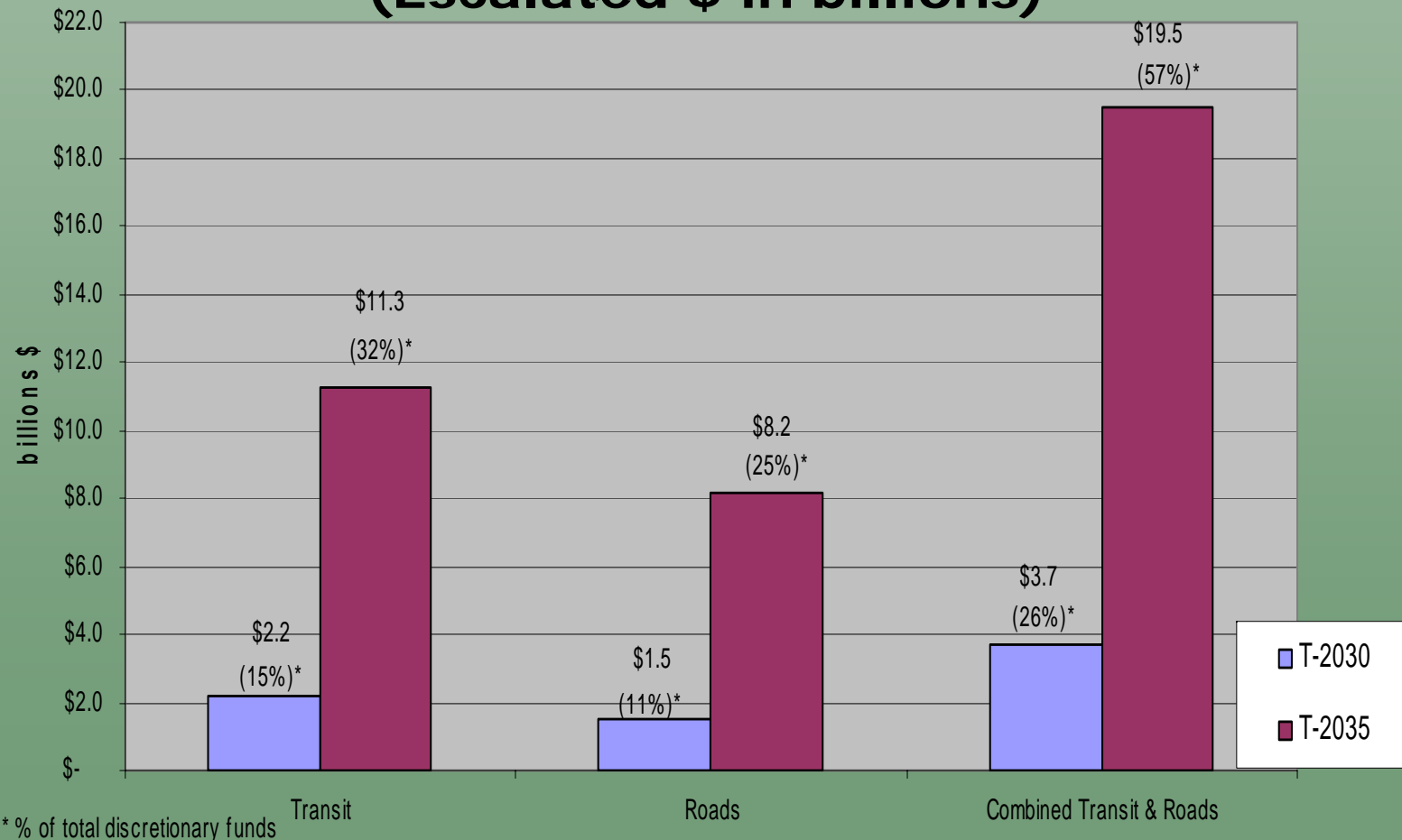
Maintenance Investment Level	Year 6-25 Shortfall	Available Funds		Year 1-5 Deficit	Anticipated/Unspecified	RTIP
		STP	STA Pop. Spillover			
High	\$ 15.00	\$ 2.10	\$ 0.75	\$ 3.65	\$ 13.00	\$ 2.80
Medium	\$ 6.00	\$ 2.10	\$ 0.75	\$ 1.25	\$ 4.40	\$ -
Low	\$ 3.00	\$ 2.10	\$ 0.75	\$ 0.45	\$ 0.60	\$ -

# Discretionary Revenues: T-2030 vs. T-2035 (escalated \$ in billions)



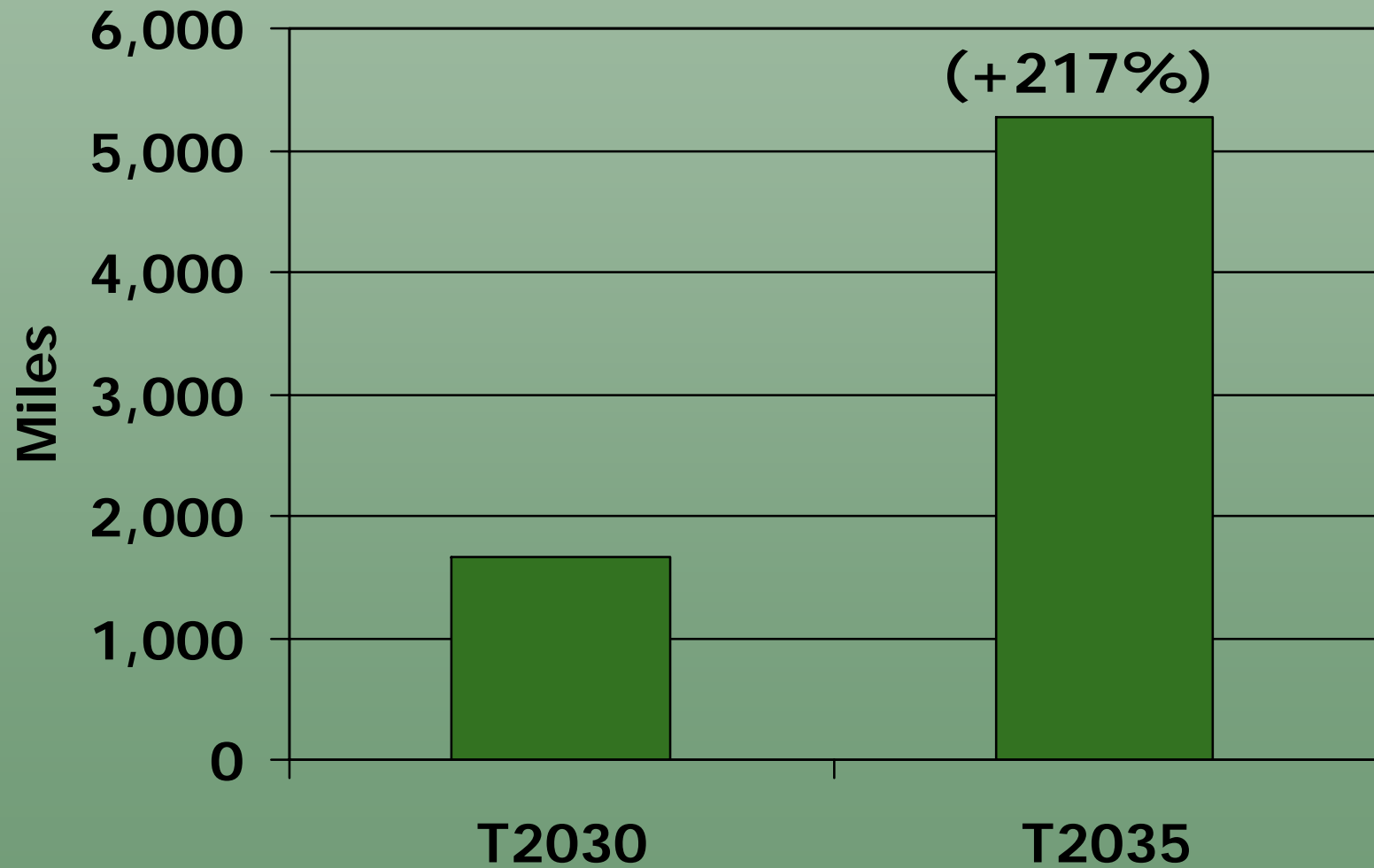
# T-2030 vs. T-2035 Shortfalls

## Transit Score 16+ and MTS Road Pavement/Non-Pavement (Escalated \$ in billions)



\* % of total discretionary funds

# MTS Mileage: Definition Change



# Transportation 2035 Schedule

<b>May</b>	<b>Review Performance Evaluation Results</b>  <b>Discuss Investment Tradeoff Options</b>
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