The True Cost of Transit…

And what to do about it…

… wherein your fearless speaker gets in trouble for thinking about transit in ways never done before…

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October 13, 2025

Why are we talking about this?

SHIFT: Bay Area

- Longstanding bad, terrible, atrocious financial discipline…
- Combined with higher inflation/tariffs…
- … and likely Federal and State funding cutbacks…
- Have led to a looming Transit Fiscal Crisis..
- And the 2026 Regional Measure 5 (RM5) proposes to raise sales taxes to continue paying for a failing transit system…

Discussion Outline

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- What matters in transit?
  - Cost per passenger mile?
  - Pollution?
  - Affordability – for whom?
- How is Bay Area transit performing?
- What is wrong with our transit
  - Bad Network Design
  - Cost Inefficiency
  - Abysmal Asset Utilization
  - Bad Management
  - Lack Of Oversight (Standards And Accountability)
- What needs to happen
  - Stop RM5
  - Support alternative transit modes
  - Reduce the peak transit bottleneck

What's Wrong With This Picture?

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Everyone,

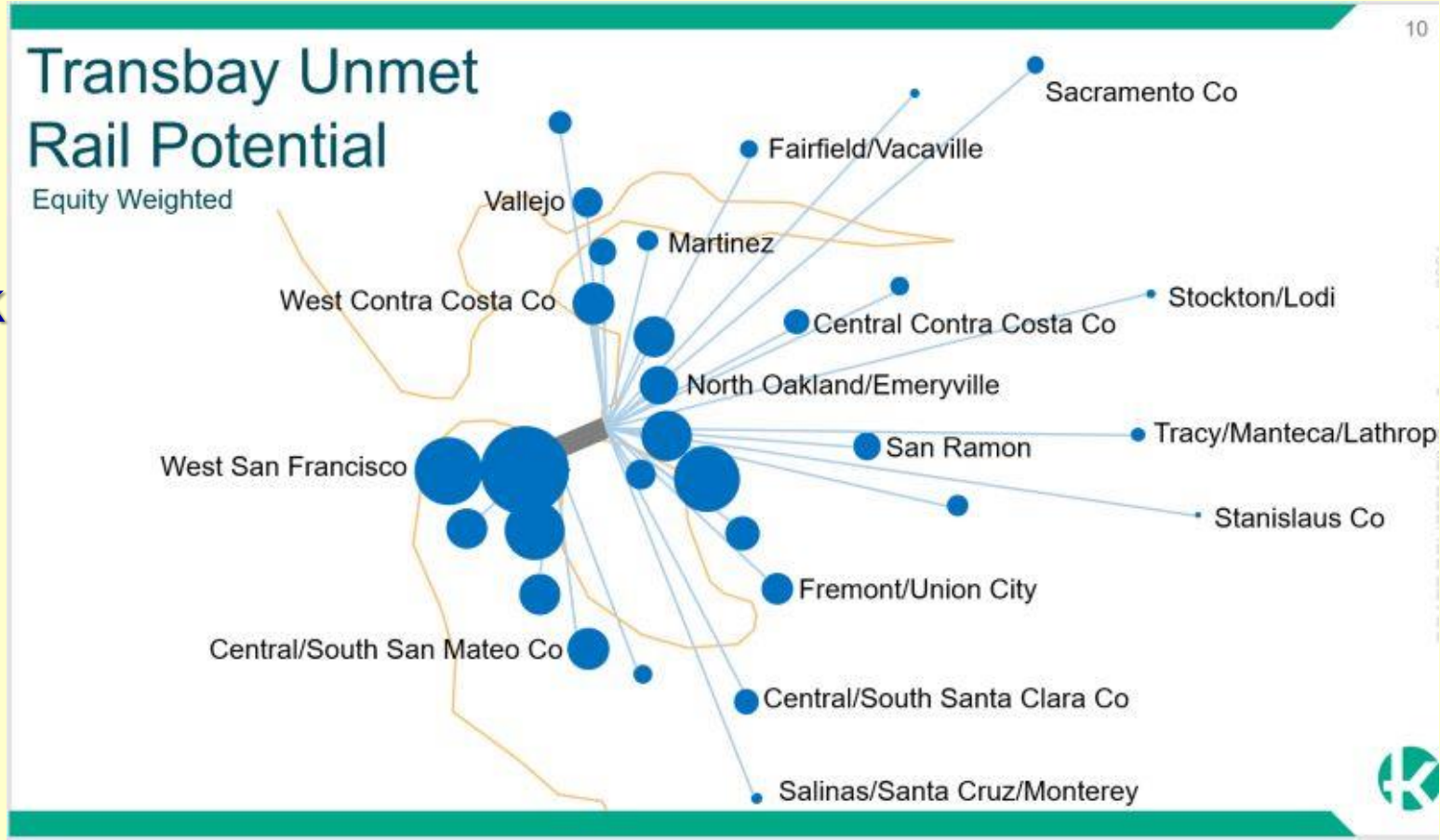
Everywhere,

All At Once…

… is costly network design…

Put the jobs where the people want to, and can afford to, live…

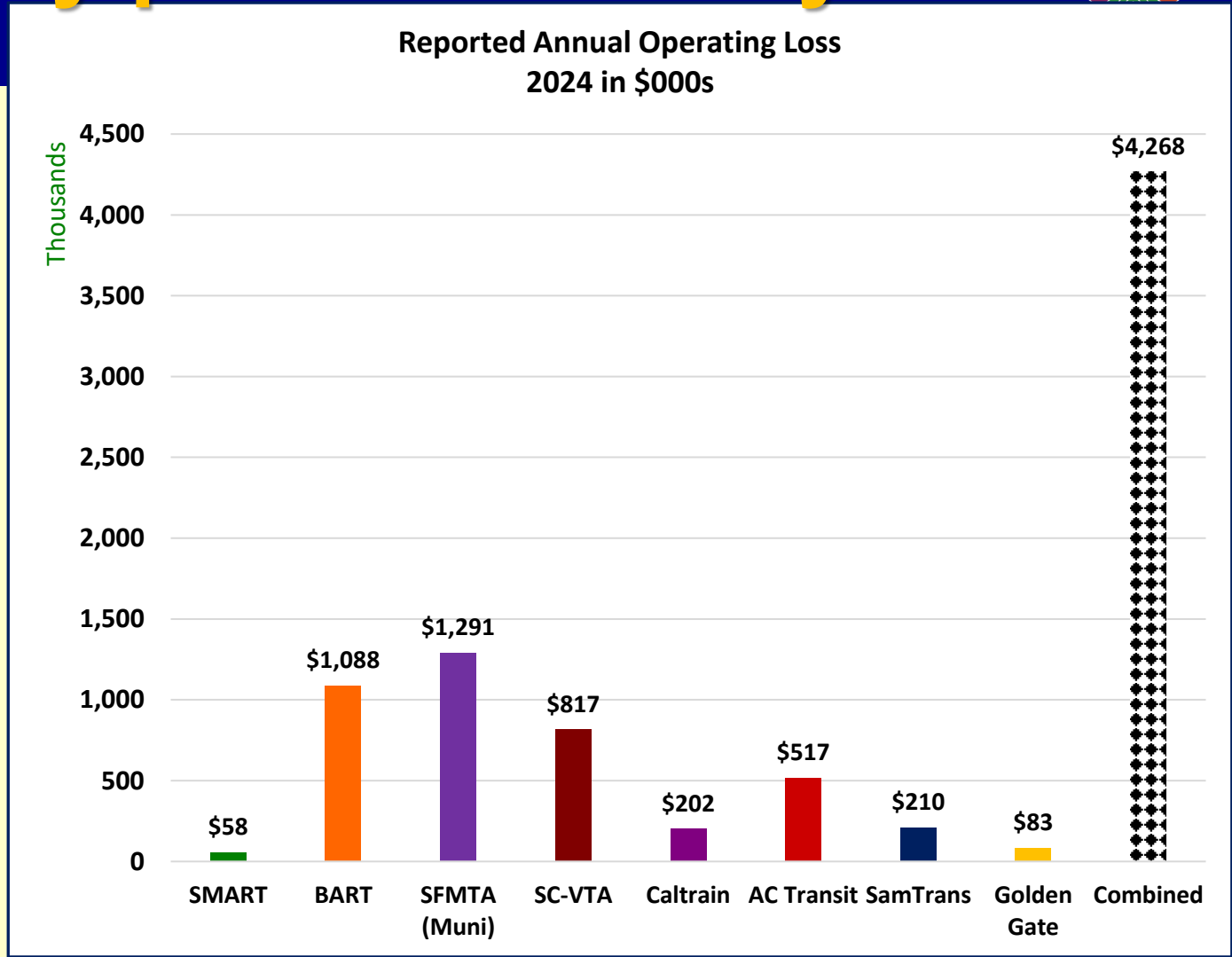
or have the cities pay for the transit..



Losses are only part of the story

These losses are <u>understated</u>, because the depreciation expense is based on decades-old costs, which have increased a lot.

(not to mention capitalizing interest paid on debt, hiding costs in Non-operating revenue, etc.)



Most Annual Transit Funding is Subsidy

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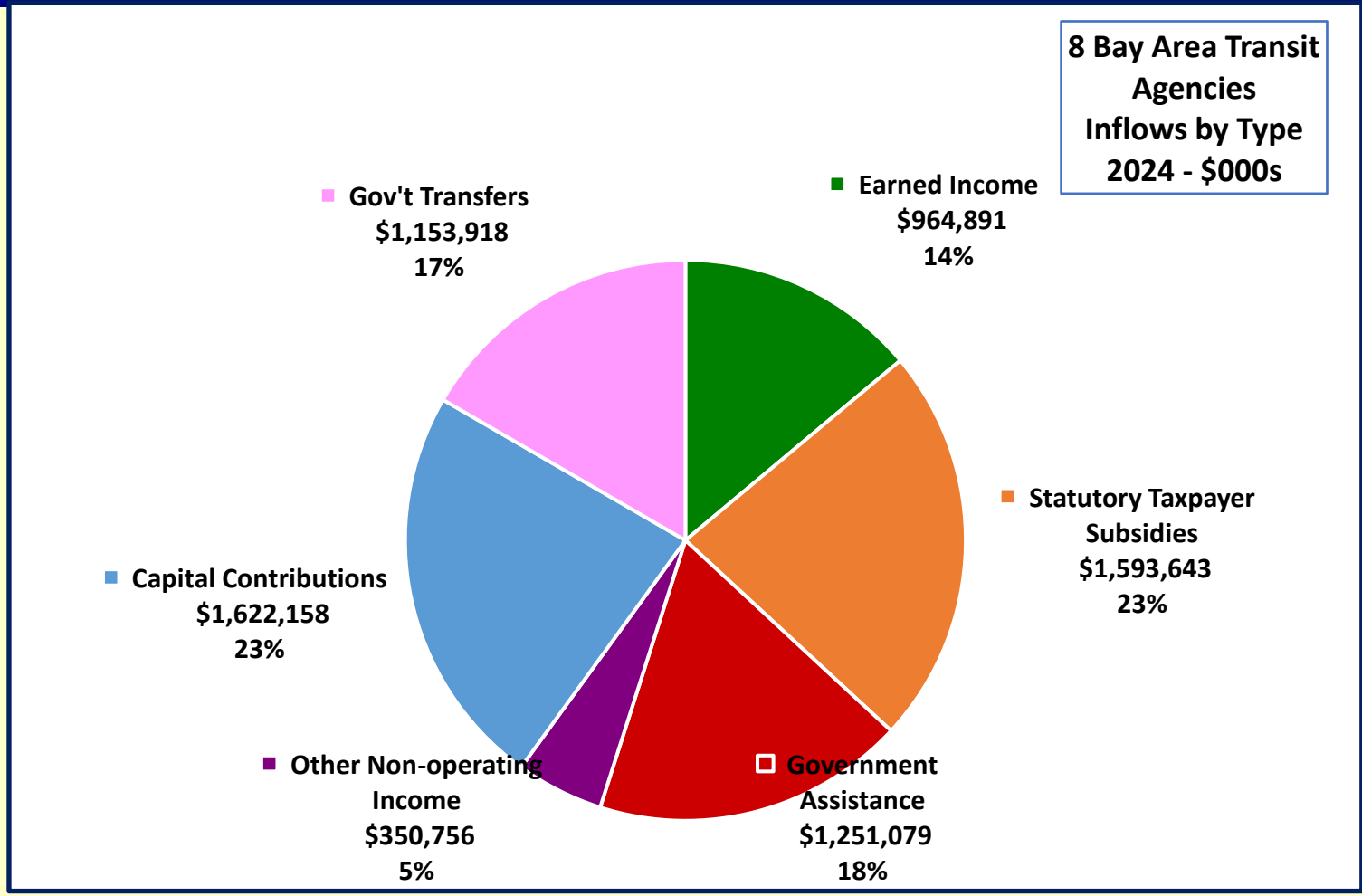
8 Bay Area Transit Agencies combined…

Only **14%** of inflows are earned income: fares, parking, ads, leases, etc.

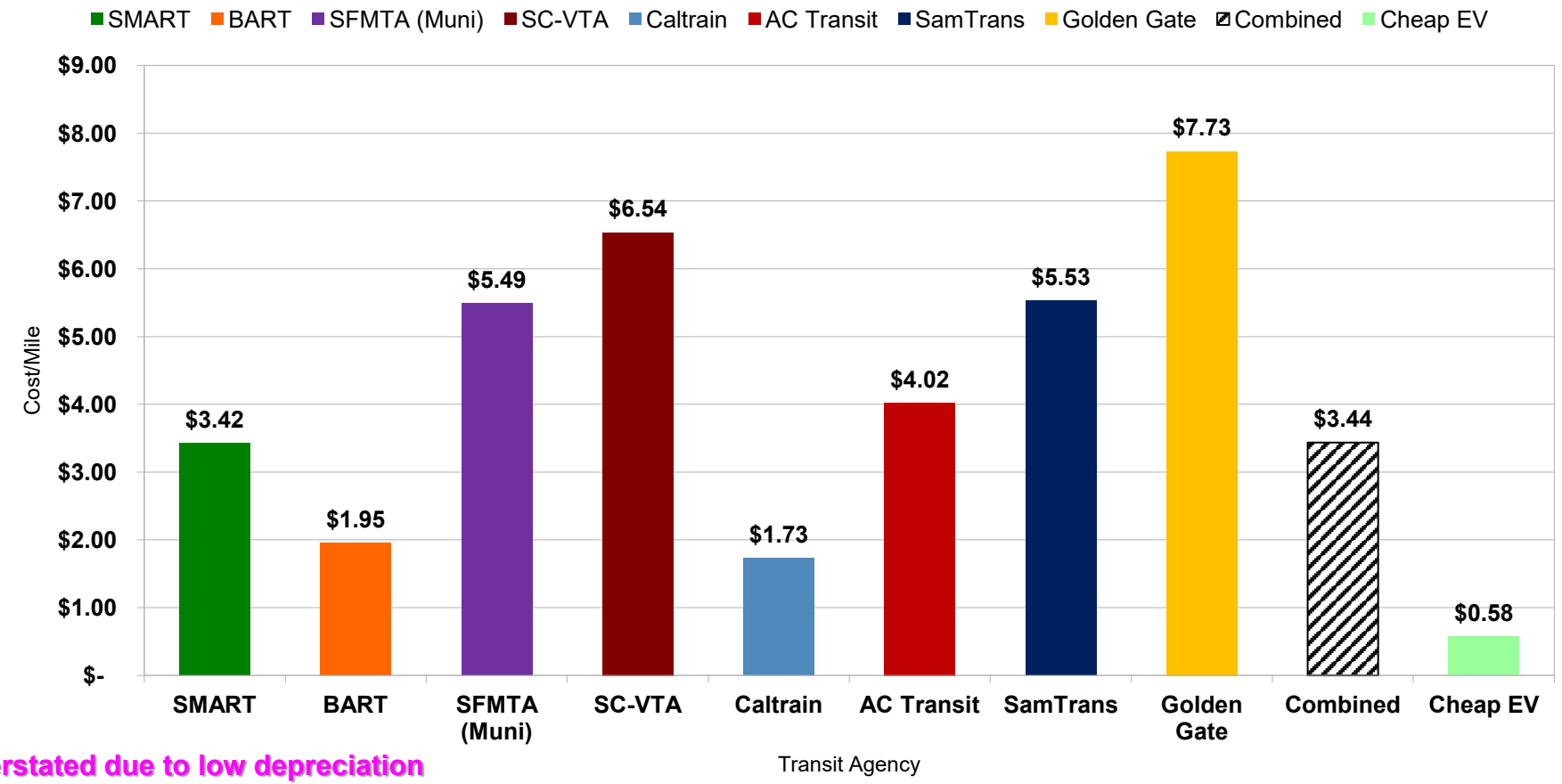


Transit is cost-inefficient vs. EV

Figure 1

Reported Cost per Passenger Mile (2024)

Bay Area Transit vs. Cheap EV



Note: Costs Understated due to low depreciation

Operating Losses are The Least of the Inefficiencies

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- Over $4 Billion in losses annually sounds bad, but…
- Without subsidies, annual losses were $9.9B in 2024.
- Also traditional accounting hides the burden of Asset Replenishment…
- Which will be another $60 to $100 Billion over the next decade, and…
- There are at LEAST another $25 Billion in unfunded Retirement Benefits and Interest costs…
- And those hidden costs would increase by 80-100% if funded by bonds…

Public Works Assets Are Perpetual

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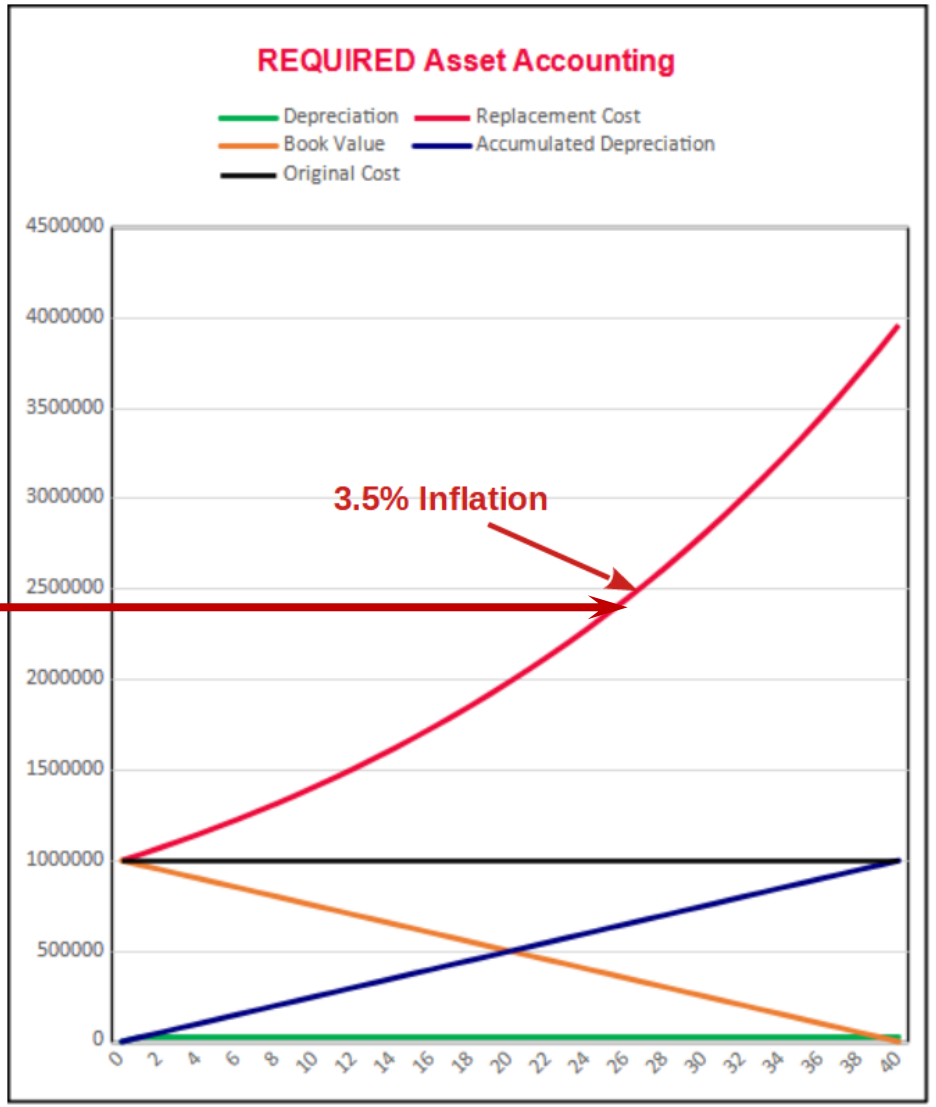
- Because as long as our civilization survives, we will have to continue to provide the services those assets support:
  - Roads
  - Water
  - Sewer
  - Power
  - … and more, maybe – Schools, Transit
- Thus, we have to fund them…. Sustainably

Reality: Accounting Is Deficient

- Over the past 25 years, Public Works construction cost inflation has been ~3.6%/yr.
- The Replacement Cost of exhausted assets reaches 4X original cost after 40 years at 3.5%
- The ‘expense’ recorded by ‘Depreciation’ is far lower than required for Asset Replenishment…



Transit's Hidden Future Fiscal Burdens…

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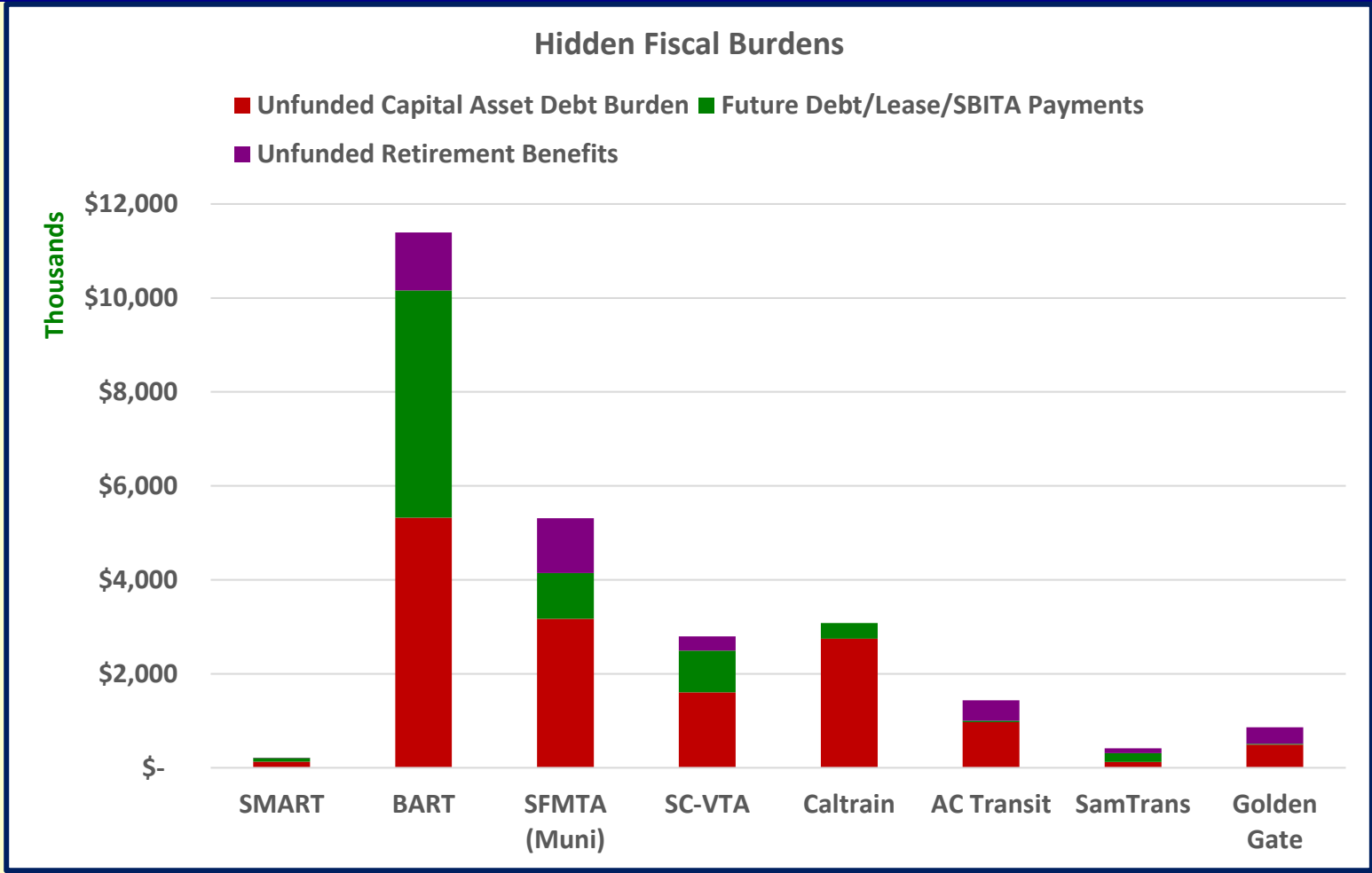
- Capital funding deficits,
- Unfunded retirement benefits,
- Long term debt costs
- *Not Shown: bond interest on any of the above would add 80-100% cost over 30 years*



Return on funds is even worse…

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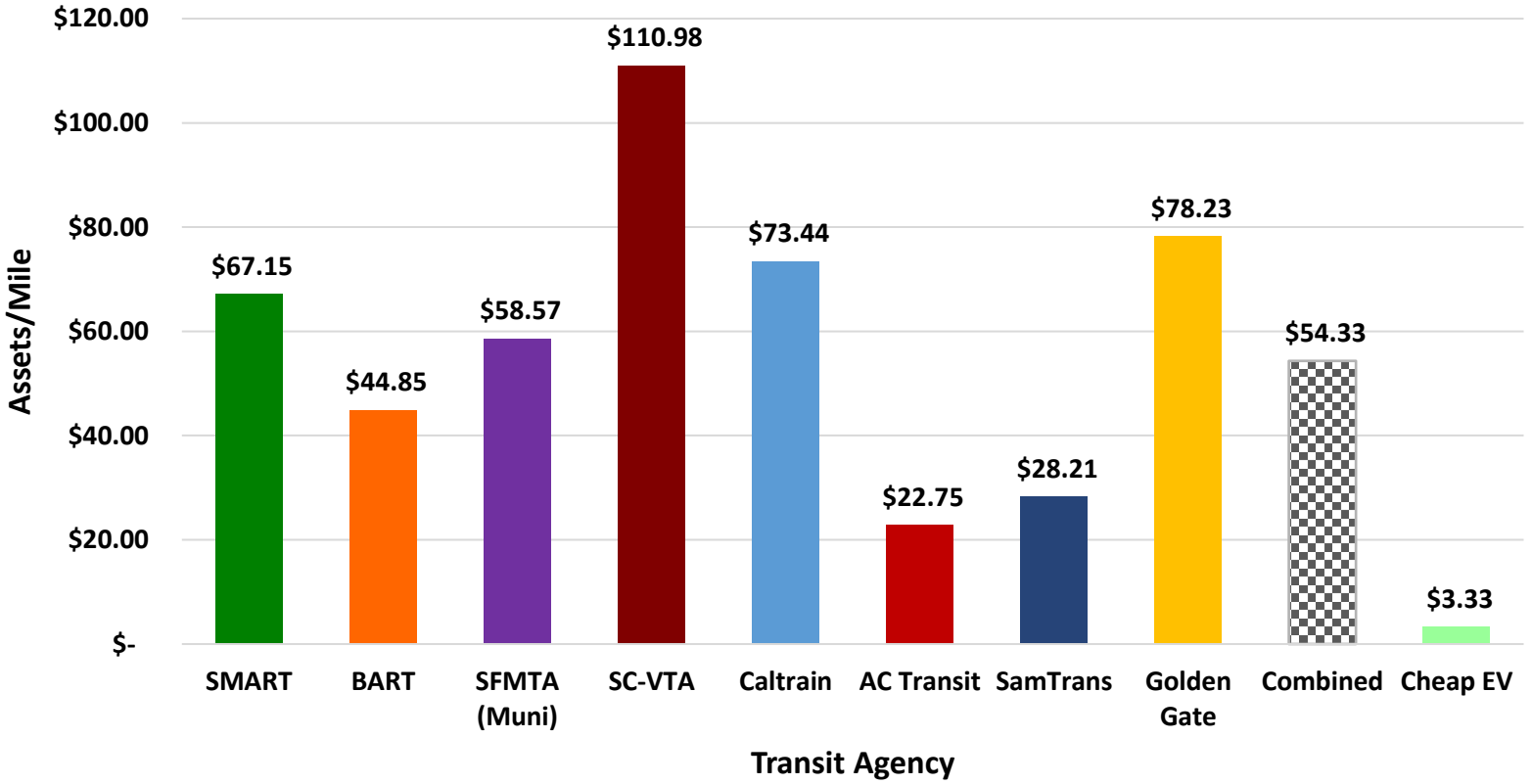
- **Per Passenger Mile:** Replacement costs of capital assets, debt service, & unfunded retirement obligations
- Compared to a cheap EV, the fiscal burdens of Traditional Transit are **16 to 19.5 times greater**

Figure 2

Cumulative Fiscal Burden per Passenger Mile (2024)

Bay Area Transit vs. Cheap EV

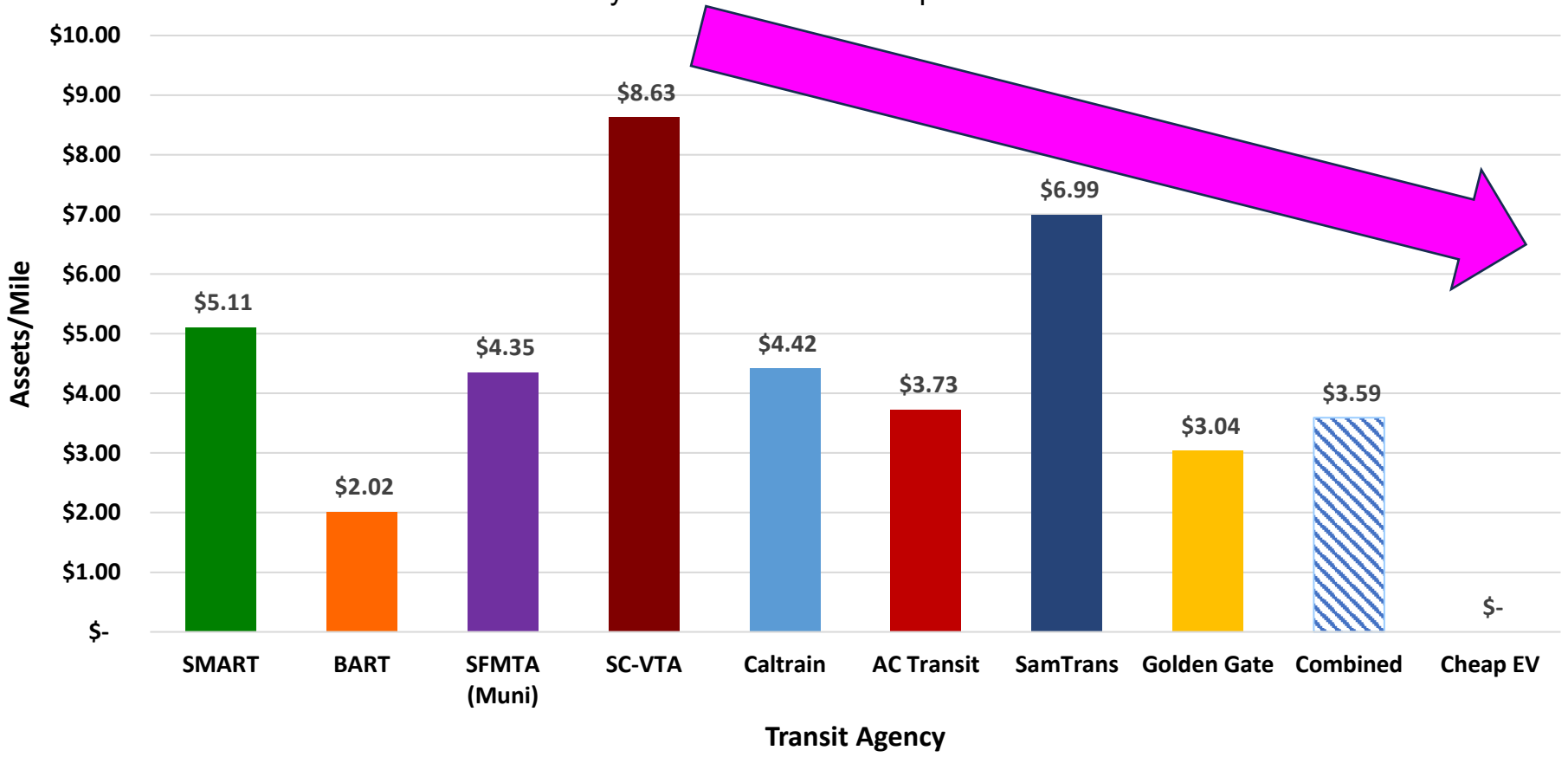


Current subsidies are inefficient…

Figure 3

Subsidy per Passenger Mile (2024)

Bay Area Transit vs. Cheap EV



Roads: Should Cars Pay?

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- Common objection: You have to charge the AV/EV's for the roads and parking!
- Rebuttal #1: Cars ARE paying for much of the roads and bridges, and for some of mass transit
  - But a tax change for EV's is merited
- Rebuttal #2: **We won't get rid of roads**…used by…
  - First/emergency responders
  - Last mile deliveries
  - National security
  - Bicycles, scooters, motorcycles
  - Getting to and from Transit… and…
  - Buses *(you know, Transit)*

What About Pollution?

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- Vehicle Miles Travelled (VMT) introduced as prime metric for road planning *(minimizing the Delay Index)*
- Concept was that cars pollute and less miles is less pollution
- However, EV's are cleaner than transit, unless transit is fully loaded.
- The general ranking from cleanest to highest emissions is often:
  - High-Capacity Mass Transit *(especially electric rail)* or Fully Occupied EV on a Clean Grid *(or home solar)*
  - Electric Vehicles (EVs) on an average grid
  - Moderately Occupied Mass Transit *(like a standard bus)*
  - Internal Combustion Engine (ICE) Cars

Transit Is Out Of Control

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- Lack of Accountability
  - No objective measures trigger firings or project cancellations
- Incompetence without consequence
  - See also: outages, project overages, $2B/mi transit extensions with no financial justification
- Electeds conscripted with campaign contributions
- Even the proposed (SB63-RM5) ‘new oversight’ is meaningless and the re-planning is to be done by the same people who got us into this mess

Let's move down & to the right…

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- To jobs nearer to housing
- To jobs with flexible hours and locations
- To lower or zero Transit subsidies
  - *Exception:* handicapped and lower income folks
- To more agile and flexible assets, routing, and scheduling
- To less labor-intensive Transit services
- To funding Transit by those who benefit *(e.g. Businesses)*
- To choice by those who don't benefit, but currently pay

So What?

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- SB 63 will place a 5-county regional measure on the Nov. 2026 ballot
- To raise sales tax for transit by ½ % *(in SMC, YMMV)*
  - On top of other sales tax proposals *(e.g. Santa Clara health care)*
- They will fake a "citizens' initiative" so that only 50% +1 of voters are required to pass the tax
- Transit agencies continue to spend without constraint:
  - Electrification of Caltrain – *7x more expensive…*
  - New Police Station for BART *($83.4 million ?!?)*
  - **1129** new cars for BART
  - MTC loss of ?$120M?! in 2010 derivatives investments… more?
- In spite of obvious and longstanding trends requiring less transit, and with future funding uncertain…
- *… is this any way to run a railroad?*

What is needed

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- Public awareness of the problem, and the solution
  - A vision of a more agile and affordable transit future
- Your insights on how to analyze and present the issues:
  - What are we missing?
  - What venues should we use to communicate?
  - Who can we contact at AV firms?
- Opportunities for SHIFT to speak in public
- Social media support
- Donations to fund our efforts
- Voters to turn out in opposition!

Why Should We Care?

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"The Ultimate Test of a moral society
is the kind of world
that it leaves to its children."

- Dietrich Bonhoeffer

Fiscal Sustainability

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Your comments and suggestions?

The Approach: Understandable? Believable?
Desired Next Steps and Priorities?

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Supplemental Slides

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… Used in prior presentations to Cities and Public Works Districts..

Scope of Today's Transit Data

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- Audited Financial Data, and metrics therefrom:
  - Operation and Maintenance Costs
  - Capital Assets and Bothersome Liabilities (CABL)

- Unaudited, unaccountable, additional metrics & benefits
  - Pollution
  - Convenience
  - Economic impact
- Redesign of our civilization, and who pays for what?

How aged are Bay Area transit assets?

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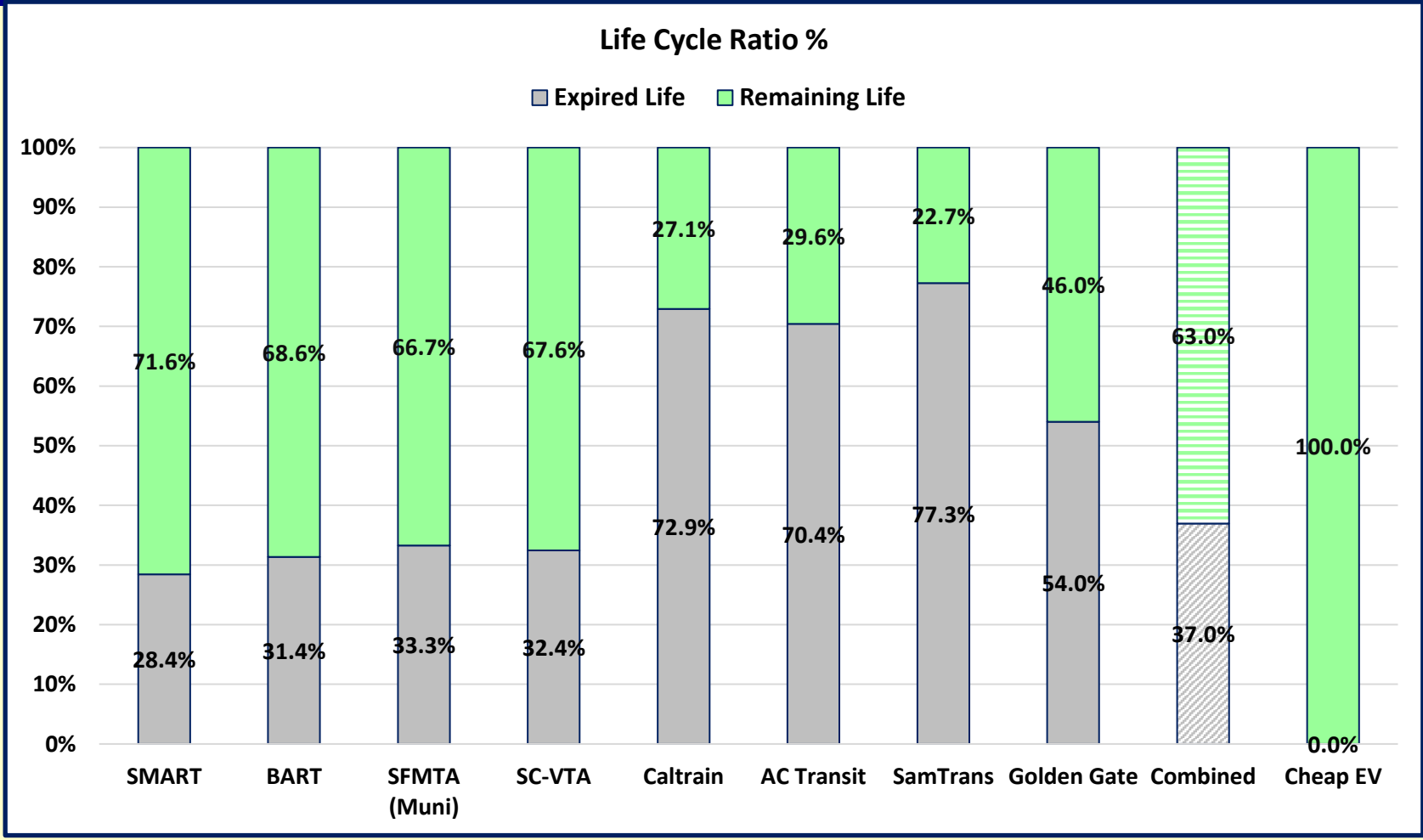
Most of the 8 Bay Area Transit Agencies are ~one-third into their asset lifecycles. Several are about 3/4ths expired.



Asset Replenishment Funding

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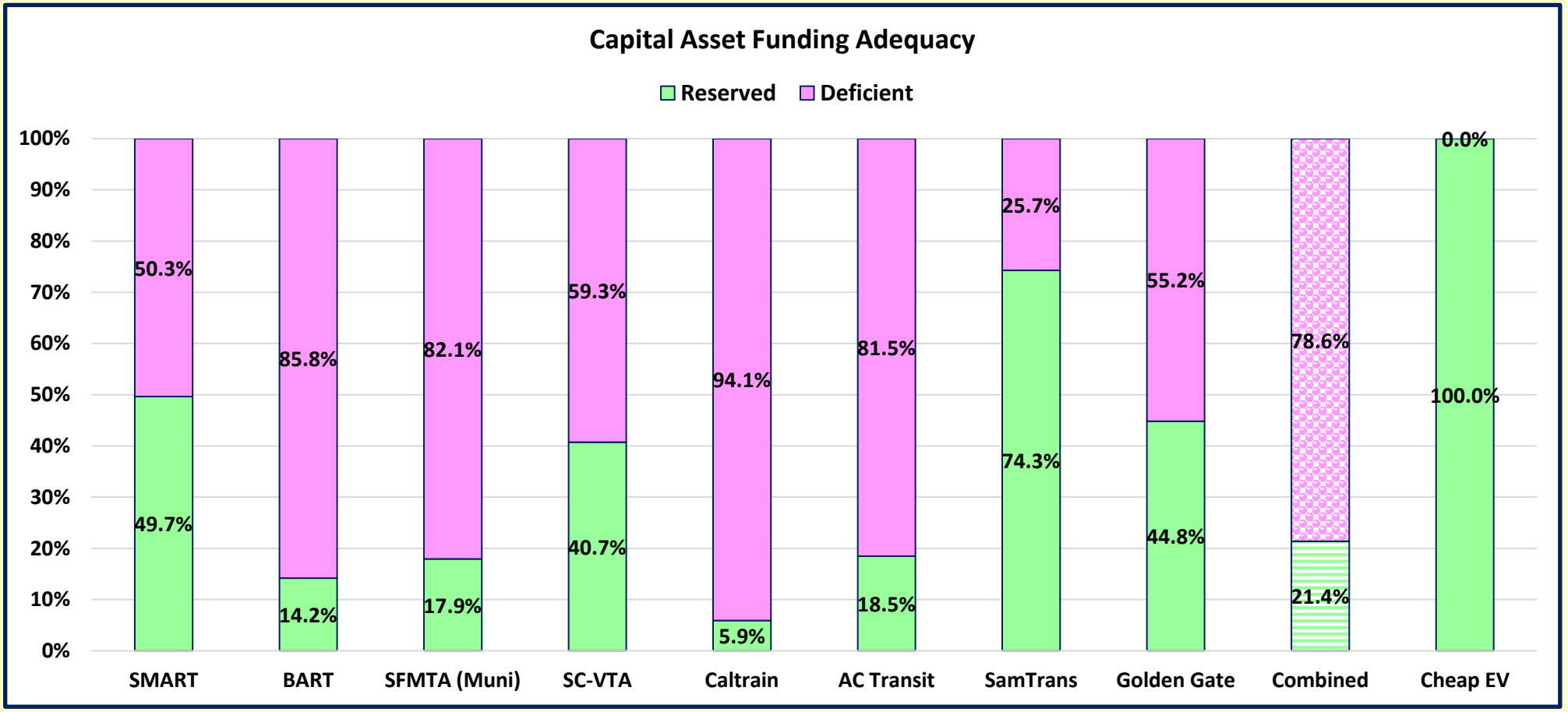

Huge, Perpetual Fiscal Burdens…

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FY 2024 - $000's	SMART	BART	SFMTA (Muni)	SC-VTA	Caltrain	AC Transit	SamTrans	Golden Gate	Combined	Cheap EV
Known Transit Assets (Replacement Cost)	1,019,987	22,296,322	12,407,246	11,984,381	7,352,914	1,773,238	722,857	1,953,149	59,510,094	40
Hidden Future Burdens	215,993	11,393,112	5,312,634	2,794,563	3,083,543	1,437,398	416,439	860,930	25,514,612	-
Cumulative Fiscal Burden of Transit	1,235,980	33,689,434	17,719,881	14,778,944	10,436,457	3,210,635	1,139,296	2,814,080	85,024,706	40
Cumul. Fiscal Burden per Pass. Mile	67.15	44.85	58.57	110.98	73.44	22.75	28.21	78.23	54.33	3.33
Transit to EV Cost Burden Ratio	20.1	13.5	17.6	33.3	22.0	6.8	8.5	23.5	16.3	1.0
Fiscal Burden with Borrowing / Pass. Mile	73.94	52.97	71.92	124.32	91.44	32.07	33.50	100.08	65.14	3.33
Transit to EV Complete Burden Ratio	22.2	15.9	21.6	37.3	27.4	9.6	10.0	30.0	19.5	1.0

- Expensive, long-term assets…
- Cost **4x** to replenish every 40 years…
- **Hidden burdens** in retirement liabilities, debt, and unfunded capital assets
- And if those deficits are funded with bonds, even HIGHER burdens

- Compared to a cheap EV, the fiscal burdens are **16 to 19.5 times** greater
- Do we get $85 Billion in benefit from Traditional Transit?
- What is fair to all stakeholders?

Is the EV a fair benchmark?

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What if we used a ride-share Autonomous Vehicle EV instead?

Metric	EV	AV/EV - 1	AV/EV - 2
Price	$40k	$200k	$200k
Lifetime	10 years	5 years	5 years
Annual Depreciation	$4k	$40K	$40K
Annual Miles	10,000	100,000	50,000
Avg. Riders	1.2	2	1.5
Passenger Miles	12,000	200,000	75,000
Assets/Pass. Mile	$3.33	$1.00	$2.67

The Financial Leverage is with the Ride Share Vehicle…

What To Expect - A Hint…

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- Looking only at Capital Asset Funding, BART** has:
  - Liquid assets of 14.2% of $6.2B in required funding, meaning…
  - A $5.3 Billion capital asset funding deficit/burden…
  - In addition to operating cost deficits…
  - Resulting in costs and GHG emissions higher than EV's
- BART is cash flow negative, thus cannot accumulate reserves
- Borrowing to fund that deficit will add ~$5.3 Billion in costs
- Thus: BART has future capital costs of over $11 Billion not reported in financial statements
- A more thorough SHIFT evaluation is coming…

**Based on 6/30 24 financial statements

Oops! Worse than I imagined…

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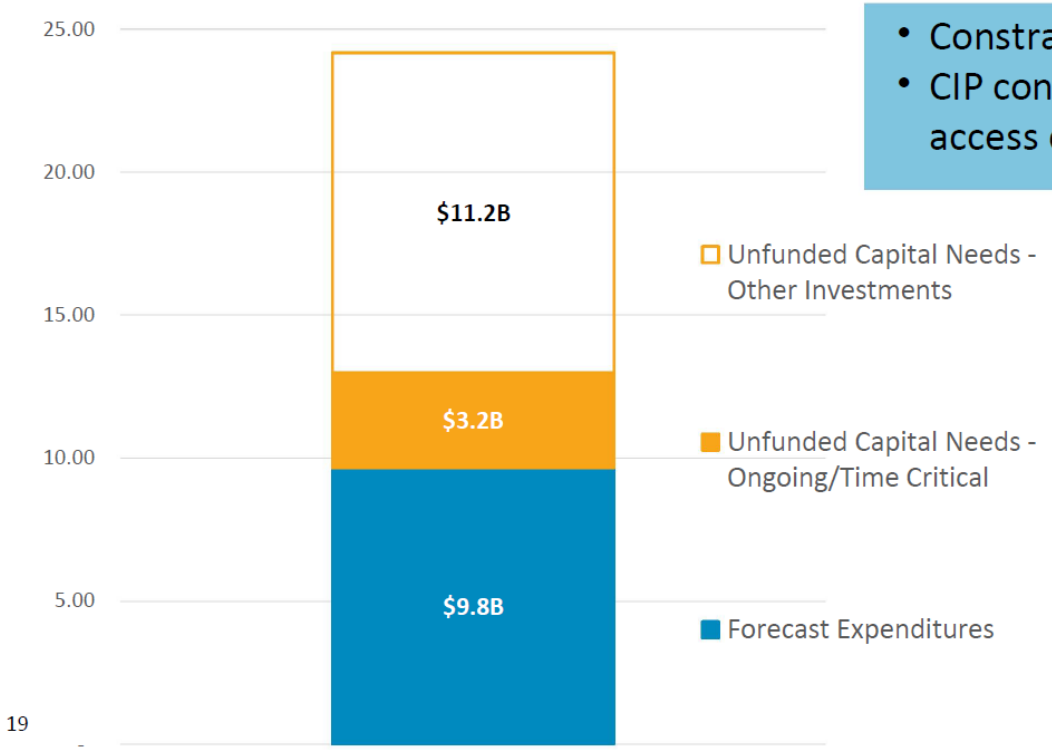
BART wants $24.2B over next 10 years. I estimated $6.2B on 6/30/24.

We could buy every daily BART commuter an EV and home charging station and have $20B left over…

Capital Program Funding Challenges



- Constrained CIP = **$9.8B over 10 years**
- CIP constrained by funding and system access capacity

CalTrain Anomaly: electrification went live early in FY 2025

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2025 life cycle ratio will be much lower once these assets become Depreciable

CalTrain 6/30/24

Noncurrent assets:		
Capital assets:		
Depreciable (Note 6)		
Right-of-way improvements	1,202,363	1,202,236
Rail vehicles	339,502	338,413
Facilities and equipment	148,840	145,879
Office equipment	13,817	13,765
Less accumulated depreciation	(1,242,918)	(1,186,380)
Depreciable assets, net	461,604	513,913
Nondepreciable		
Construction in progress (Note 2L)	3,102,854	2,775,062
Right-of-way (Note 6)	237,254	237,254
Intangible assets - trackage rights (Note 6)	8,000	8,000
Nondepreciable assets	3,348,108	3,020,316
Right-to-use lease assets, net (Note 6)	4,532	1,857
Total noncurrent assets	3,814,244	3,536,086

Caltrain Electrification: What Price “Success”?

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“The only electrification project this century has been Caltrain. And Caltrain was so extremely poorly run, we're talking factor of seven cost premium over comparable electrification projects. And it's scaring everyone else.”

- Alon Levy of NYU's Transit Costs Project, July 30, 2025 on Voltz podcast

Aging and Underfunded Capital Assets

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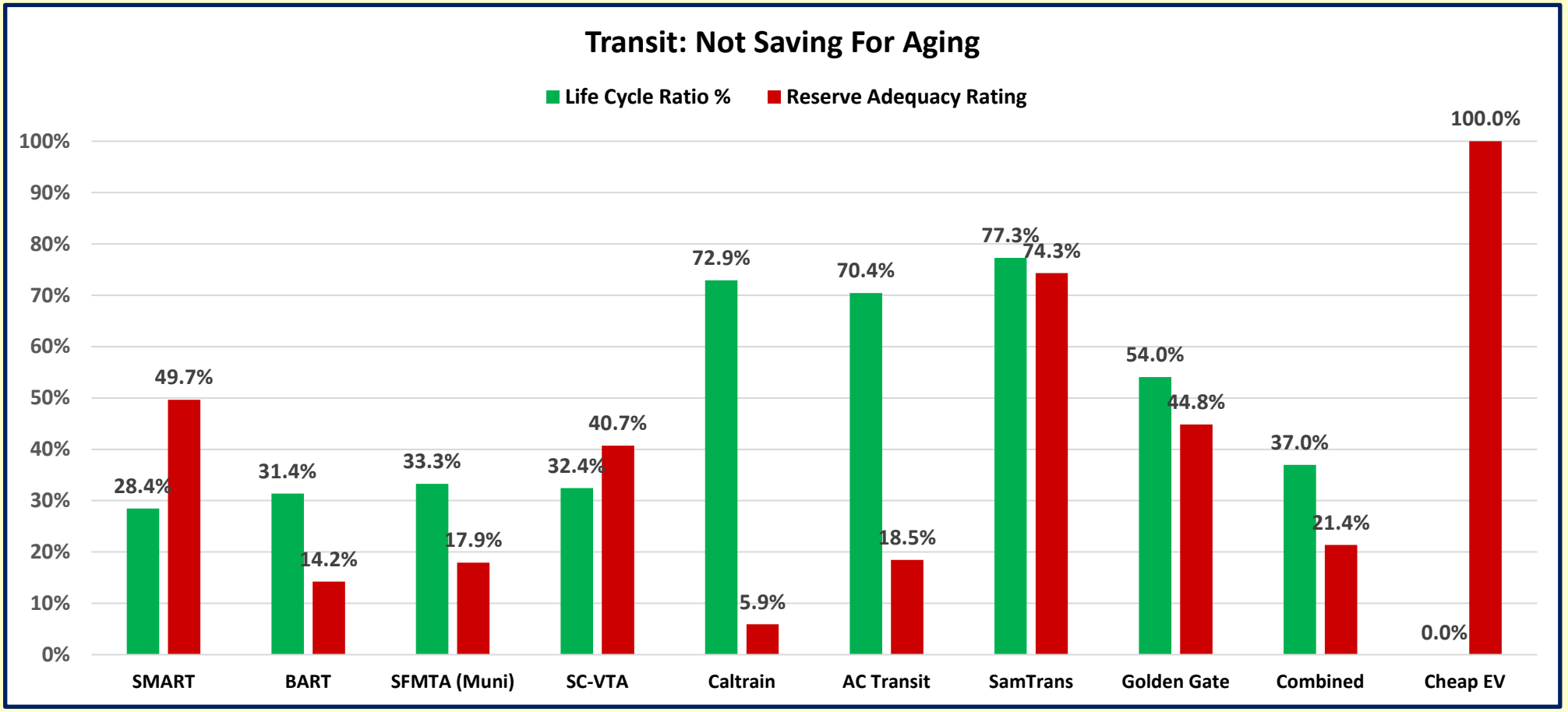

Now What?

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- Every(?) transit agency is behind on capital asset funding
- And probably losing most federal and state annual aid
- Future generations will suffer from our lack of fiscal responsibility
- SHIFT will analyze whether Alternative Agile and Affordable Transit makes more sense
  - Express bus lanes (Seoul, SK)
  - Mini-vans (EV's)
  - Autonomous ride-share (AV/EV's)
- SHIFT will analyze how existing transit should transition

Required Capital Asset Reserves…

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- Should be proportional to the…
  - Cost of the assets to be replenished, and…
  - To the age of those assets, expressed as a % of their life cycle
- Use Fitch Rating Agency method to compute the “Life Cycle Ratio”

Capital Planning and Management

Metrics to Support Assessment

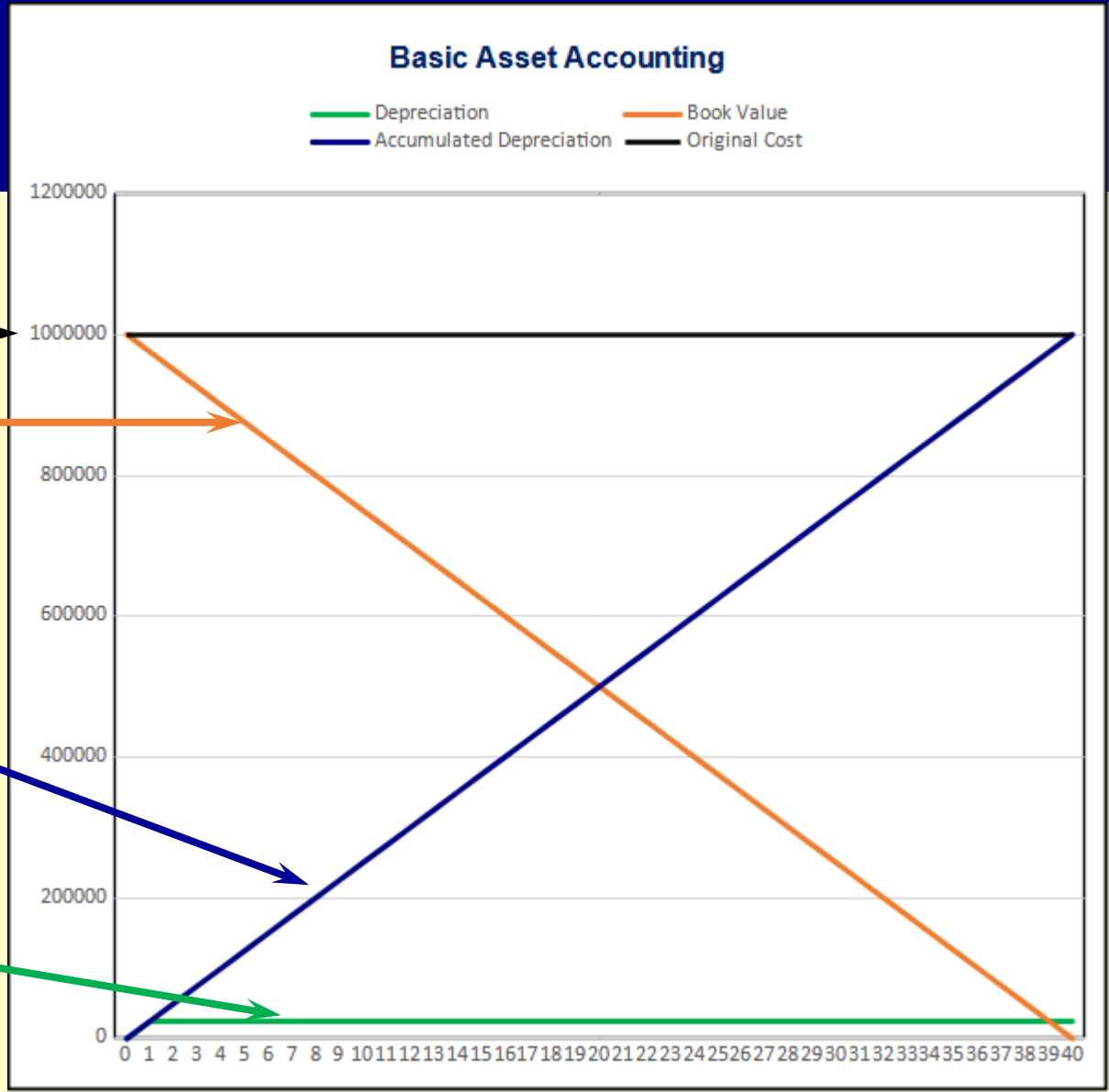
• Fitch calculates a ratio to measure the status of a utility's life cycle based on information from a utility's financial statements and typically over the most recent five-year period. The life cycle ratio is calculated as age of plant as the numerator divided by the sum of age of plant plus remaining useful life. Age of plant is calculated as accumulated depreciation divided by annual depreciation expense, while remaining useful life is calculated as net capital assets divided by annual depreciation expense. In cases where accumulated depreciation is not available, Fitch will calculate age of plant as follows: 45 – (remaining useful life).

- Use that ratio and the asset portfolio age, and adjust the original cost of assets by inflation *(example follows for SFPUC)*

Current Accounting

1. Assets start at Original Cost…
2. Each year Depreciation reduces the Book Value
3. Accumulated Depreciation eventually reaches Original Cost at end of Asset Useful Life

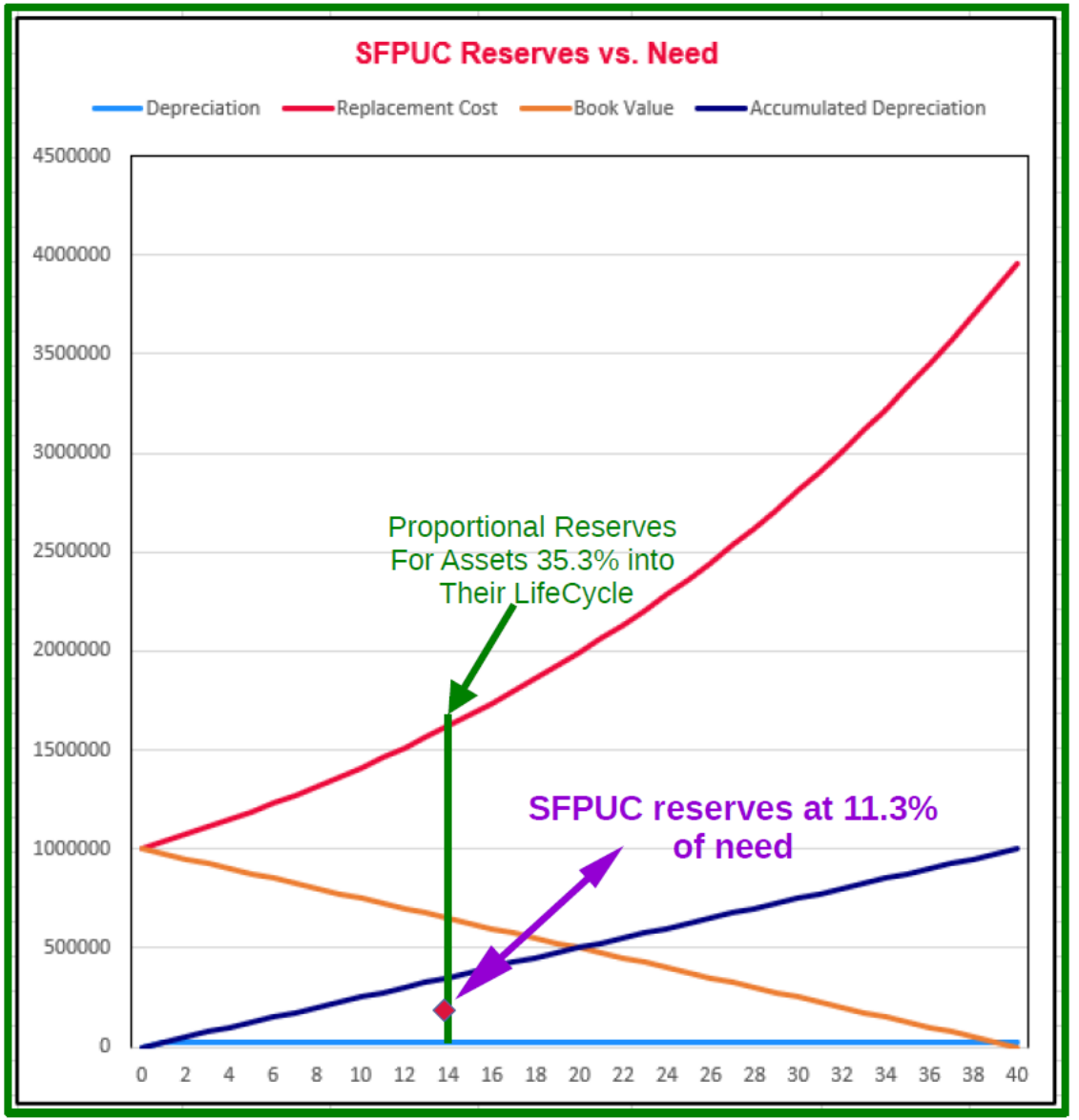
Depreciation at 1/40th per year



Example: SFPUC

- SFPUC assets are 35.3% into their Life Cycle
- SFPUC reserves are only 11.3% of pro rata replacement cost for that age
- SFPUC has a Reserve Deficit of $6.7 Billion, and is cash flow negative
- Thus, Borrowing at ~75% extra cost will be required as the assets are exhausted
  - *Recent bond rates may make this~100%...*

Note: axis labels are conceptual



Sample Life Cycle Calculation

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Financial Data	Calculation	Example
Original Cost	*From Financial Report*	$10,000
Annual Depreciation	*From Financial Report*	$1,000
Implied Asset Lifetime	Original Cost ÷ Annual Depreciation	10 years
Current Book Value	*From Financial Report*	$4,000
Implied Remaining Lifetime	Book value ÷ Annual Depreciation	4 years
Implied Asset Age	Asset Life – Remaining Lifetime	6 years
Life Cycle Ratio:	Asset Age ÷ Implied Asset Lifetime	60%
Inflation Factor:	Look up inflation index for today & for age of asset at reported date *(6 yrs. before)*	203.1 ÷ 139 = 1.46
Replacement Cost:	Original Cost * Inflation Factor	10,000*1.46 = $14,600
Hidden Debt Burden	Replacement Cost * Life Cycle Ratio	14,600 * 60% = $8,760

Who Says This Approach Is Correct?

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- The AWWA, several papers by professors, and some U.S. regulations.
- The clearest definition is from the reserve study industry which developed the National Reserve Study Standards in conjunction with Community Associations Institute (CAI).
- The authors of the standards defined the term “fully funded” as being “100 percent funded when the actual (or projected) reserve balance is equal to the fully funded balance. The ***fully funded balance*** is the balance that is in direct proportion to the fraction of life “used up” for a given component.”**

* https://www.reserveadvisors.com/resources/blog/are-your-reserves-fully-funded/

How Does This Happen?

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"In 1974, we got 7/8ths of the money from the Clean Water Act, then we forgot we'd have to replace the plant."

- Quote from a founder of our local water and sewer agency, who does not want to be identified...

- Most governmental bodies hold reserves FAR LOWER than required to replenish assets without borrowing.
- Political forces and lack of financial expertise allow this.