Sea Level Rise Adaptation Funding and Investment Framework

BARC Governing Board

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PLAN BAY AREA 2050
STRATEGY EN1
SEA LEVEL RISE
ADAPTATION

BAY ADAPT
REGIONAL STRATEGY FOR A RISING BAY

Photo credit: Rebuild by Design, 2017

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Sea Level Rise and the Bay Area

The Bay Area is defined by its relationship to water, with our communities and regional culture centered around the Bay, the Delta, and the Outer Coast. **So how do we define what's at stake with sea level rise (SLR)?**

While the Framework explores key financial estimates to tackle this challenge, **it's important to remember why we want to prioritize the needs of people & places we deeply care about.**

Photo credit: Karl Neilsen, 2020

What's at Risk if We Don't Adapt?

Assets at risk of SLR flooding[1]:

75,000 **total households,** including **12,000** in the most socially vulnerable communities[3].

200,000 **total jobs,** and **15,000** total businesses.

20,000 **vulnerable acres at risk,** including wetlands, lagoons, and tidal marshes.[3]

Photo credit: Ben Botkin, 2020

Estimates of a Subset of Assets at Risk:
(in 2022 dollars)

$85 billion
Estimated *assessed value* of parcels at risk[1]

$151 billion
Estimated value of major roadways at risk[2]

[1] *Assuming 4.9 feet of inundation by 2050.*

[2] *Calculated based on 230 miles of vulnerable major class roadways, using a median transportation adaptation cost of $125,000 per foot. Adaptation assumes only elevation or realignment and not protection in place or multi-benefit solutions.*

[3]. *Social vulnerability defined by the high and highest levels of BCDC's Community Vulnerability Data.*

[4] *From Adapting to Rising Tides Bay Area, 2020*

Building on Past Efforts with the Framework: Quantifying Needs and Revenues for Adaptation

Focus Areas

1

Update and improve regional accounting of anticipated sea level rise adaptation projects.

2

Update and characterize existing revenue sources for sea level rise adaptation.

3

Study how new revenues for sea level rise adaptation needs can be raised most equitably.

Outcomes

- Update prior regional analyses with local projects from recent planning efforts.

- Estimate the regional sea level rise adaptation need through 2050.

- Inventory and forecast revenues for new state and federal funding programs.

- Characterize how existing adaptation funds are dispersed and for what purpose.

- Analyze a range of possible revenue measures at different scales, to understand equitable approaches to close the sea level rise funding gap.

Inventory of Adaptation Needs

Local Adaptation Projects and Study Areas[1]

■ Local Adaptation Projects

■ Local Study Areas

192 projects in original inventory

132 projects updated with stakeholder input
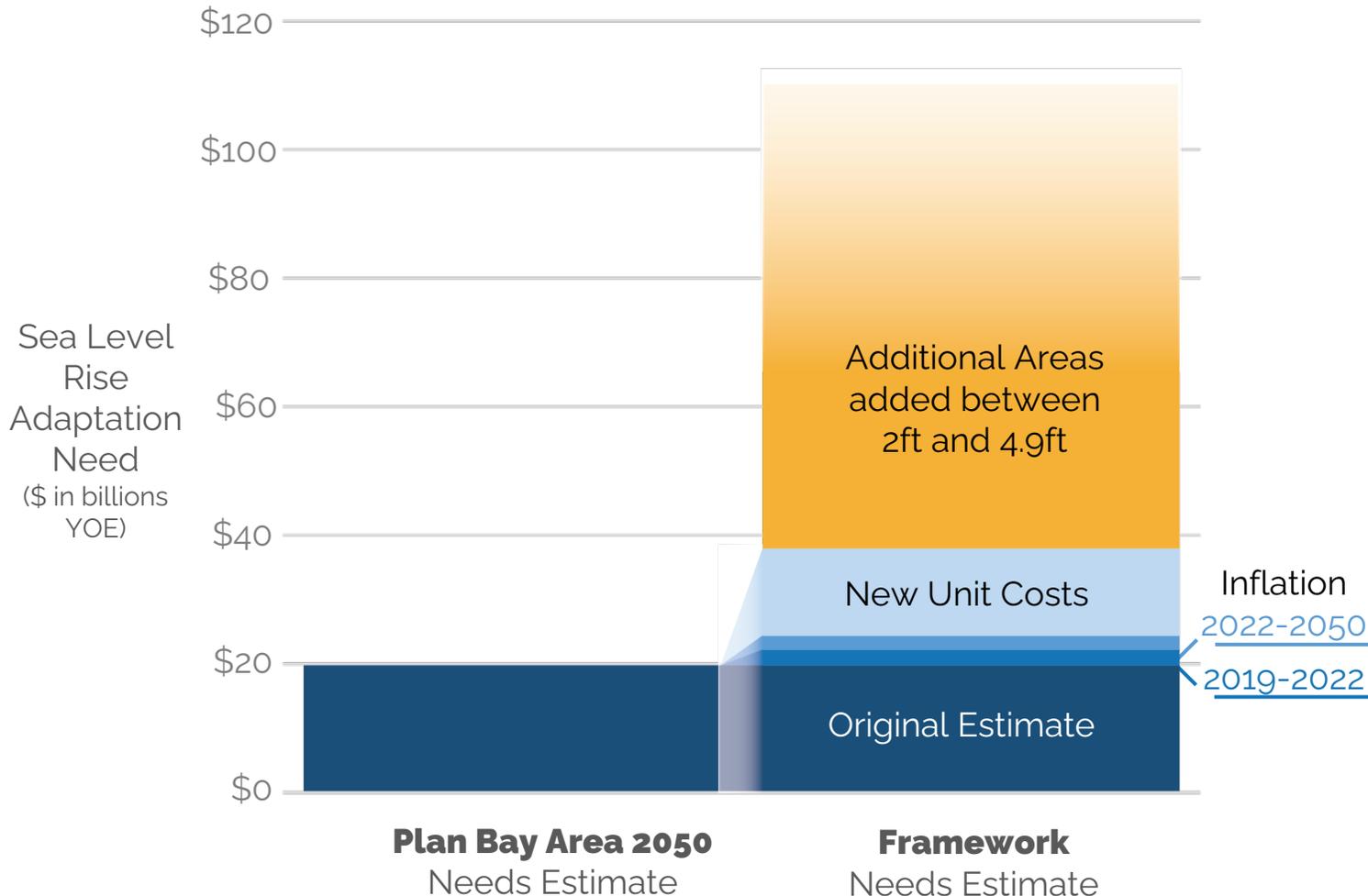
Includes 47 new projects added

Potential Protective Infrastructure Needs[2]

■ Placeholder Adaptation Needs

[1] *Includes projects identified in BCDC's Shoreline Adaptation Project Map, a regional project inventory hosted through EcoAtlas: https://www.ecoatlas.org/groups/303*

[2] *Placeholder needs determined by assuming the protection of the shoreline in place.*

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Estimate of Adaptation Funding Needs

Sea Level Rise Adaptation Need ($ in billions YOE)

- $120
- $100
- $80
- $60
- $40
- $20
- $0

Additional Areas added between 2ft and 4.9ft

New Unit Costs

Inflation
2022-2050
2019-2022

Original Estimate

Plan Bay Area 2050
Needs Estimate

Framework
Needs Estimate

Key Assumptions

- Increased **sea level rise height** from 2-feet to 4.9-feet[1].

- Assumed **"protect in place" adaptation action for all vulnerable shoreline**, including areas without planning and those in need of augmented plans.

- **Per-unit cost estimates** increased.

- **Inflation** over the past three years has been higher than the 2.2% assumed in Plan Bay Area 2050. In addition, the Framework assumes a higher rate of 3.0% going forward.[1]

[1] *Increased planning height to exceed state recommendation of 3.5' and coincide with similar planning trajectories by many local efforts.*

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Adaptation Needs

What is the regional estimate to fund adaptation?

$110 billion

Estimated cost of sea level rise adaptation through 2050 (in Year of Expenditure dollars)

- **$52 billion:** Estimated cost for known or planned projects

- **$54 billion:** Estimated placeholder cost for areas with adaptation needs

- **$3 billion:** Estimated additional sediment management needs[1]

The estimate includes:

- Assumed "protect in place" adaptation action for all vulnerable shoreline, including low density areas and agricultural land

- Assumed areas vulnerable to up to 4.9 feet of inundation are protected

The estimate does not include:

- Alternative approaches that do *not* protect in place, which could change the cost estimate for adaptation in some shoreline segments

- Building code or other local policy adjustments

- Riverine and groundwater adaptations

- Adaptation plans made by utilities

[1] *Estimate developed by BCDC and SFEI analysis.*

Adaptation Needs
Additional Findings

- Most planned projects are hybrid, representing a focus on multiple benefits.

- Alameda and Marin are estimated to have the highest adaptation costs.

- Significant implementation gaps are present across the region; the largest gaps are in Alameda, Contra Costa, and Marin[2].
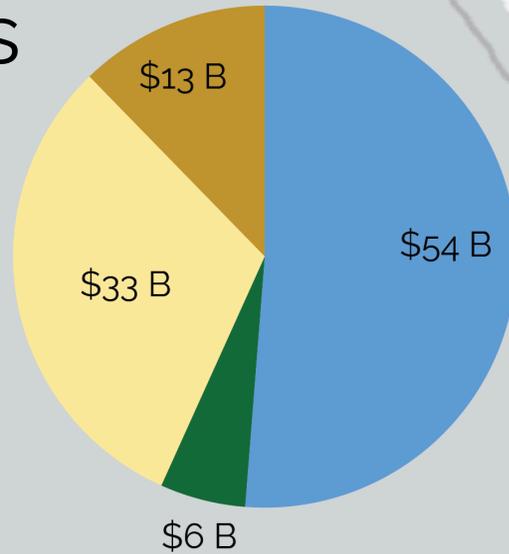
Escalated Regional Cost by Project Type[1]
$110 billion (B)

$54 B

$13 B

$33 B

$6 B

Project Type
- Grey
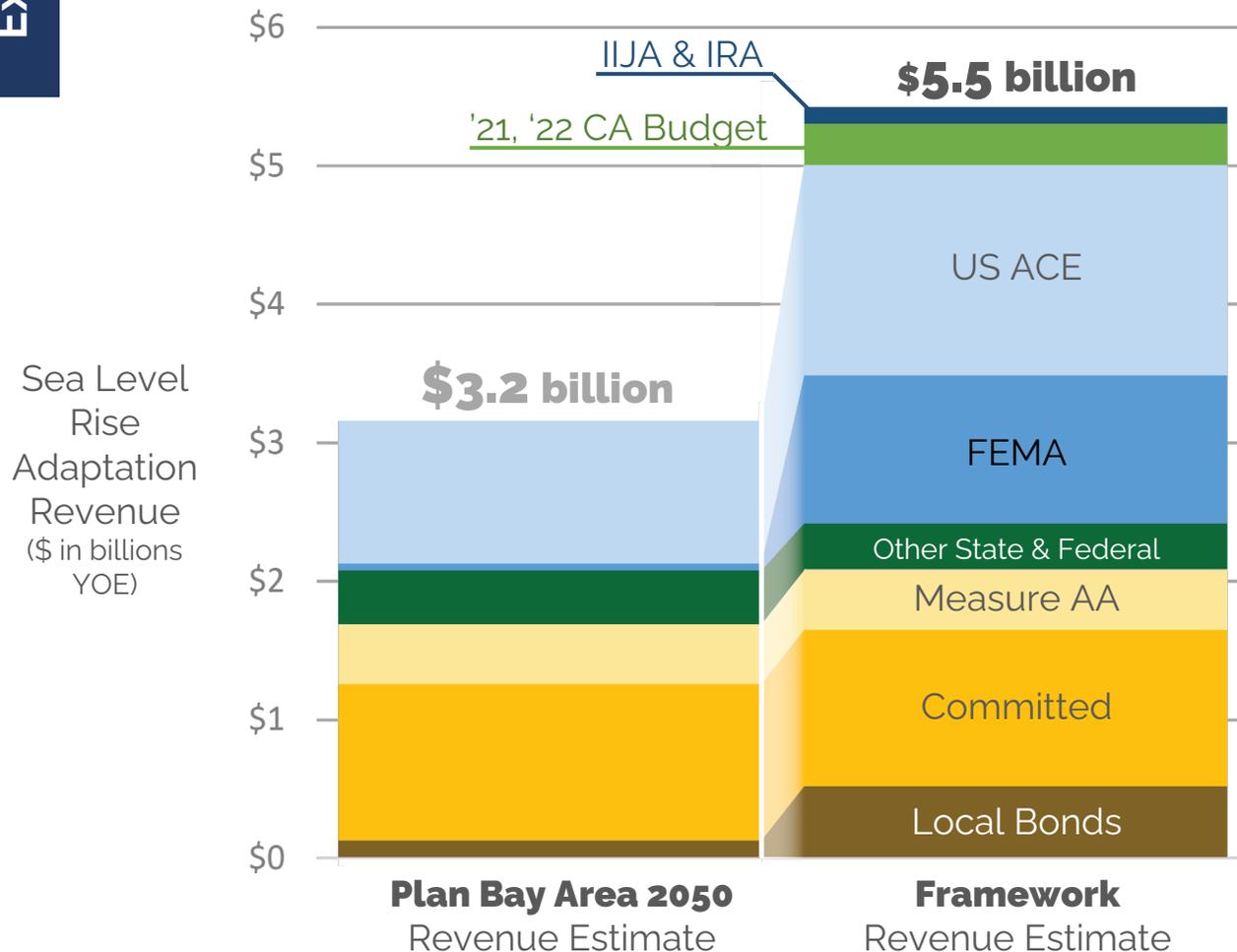- Hybrid
- Green
- Placeholders
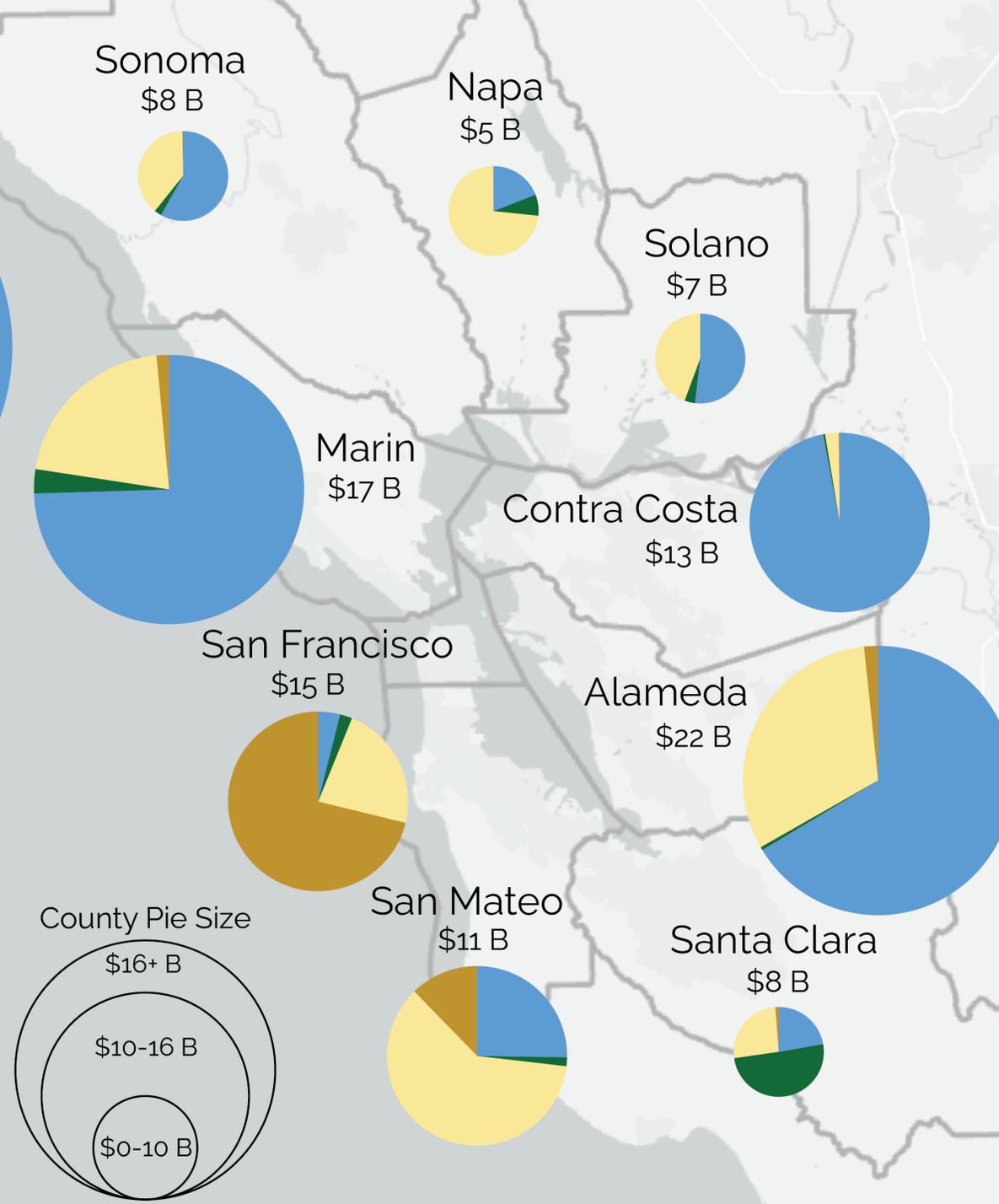
[1]*Values represented in Year of Expenditure dollars; Regional cost includes $3B in additional sediment need.*
[2]*Locally identified projects do not account for studies or plans without defined interventions.*

County Pie Size

$16+ B

$10-16 B

$0-10 B

Sonoma $8 B

Napa $5 B

Solano $7 B

Marin $17 B

Contra Costa $13 B

San Francisco $15 B

Alameda $22 B

San Mateo $11 B

Santa Clara $8 B

Forecasting Existing Public Revenues
Updated Revenue Forecast (2022-2050)

Sea Level Rise Adaptation Revenue ($ in billions YOE)

Chart:
- IIJA & IRA
- '21, '22 CA Budget
- $5.5 billion
- $3.2 billion

Framework Revenue Estimate categories (bottom to top):
- Local Bonds
- Committed
- Measure AA
- Other State & Federal
- FEMA
- US ACE

Y-axis: $0, $1, $2, $3, $4, $5, $6

X-axis:
- **Plan Bay Area 2050** Revenue Estimate
- **Framework** Revenue Estimate

Key Updates

- Federal action by IIJA & IRA account for ~$120 million in new revenues.[1]

- 2021 and 2022 State budget line items account for ~$800 million in new revenues.[2]

- Emergence of FEMA's BRIC program greatly increases anticipated FEMA revenue.

- Inclusion of $425 million SF Prop A (2018)[3] increases locally generated sources.

[1] US ACE's IIJA allocation increase is not yet accounted for. It may add between $0.02-0.15 billion. Waiting for US ACE feedback.

[2] The Governor's proposed 2023 budget is estimated to reduce the regional estimate by $200 million.

[3] Prop A was not included in Plan Bay Area 2050 because the analysis focused on areas that flooded with only 2' of permanent rise.

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Exploratory Funding Sources: Context

To fill this funding gap, the region may need multiple additional funding sources at multiple scales.

The Framework explored three possible new revenue measures at the local, county, and regional scales to understand:

- **Revenue generation potential:** how much funding can be raised annually?

- **Bond issuance potential:** how funding can different measures raise for near-term project implementation?

- **Initial equity implications**: who pays?

Note: This Framework research is high level and exploratory only, and it is intended to provide insight for further research and discussion in the years ahead.

Three measures were reviewed based on their overall feasibility and regional precedence.

Sales Tax · Business Tax · New Toll Revenues · Stormwater Tax · Utility Tax · Other Districts[1] · Development Fees · Parcel Tax · Ad Valorem Property Tax · Assessment District

[1] Including value capture mechanisms such as Community Facilities Districts and Tax Increment Financing.

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Case Studies for Three Funding Measure Types

Key Finding: Regional and/or local measures will not be capable of closing the funding gap. Additional funding from federal and/or state sources will also be necessary.

Scale: County & Regional
Regional and county taxes distribute tax burden across wider base

Scale: District-based (sub-local)
Only parcels that directly benefit pay

Parcel Tax

- Typically a flat rate property tax: each parcel charged the same amount
- Does not account for value or size of the property

$25 per parcel annual tax could support a ~$750 million bond.

Ad Valorem Property Tax/GO Bond

- Property-related tax that *can* be progressive: higher assessed properties pay more
- Subject to Prop 13 limitations

$55 annual tax could support a $13 billion bond.
Based on regional median single-family home value.

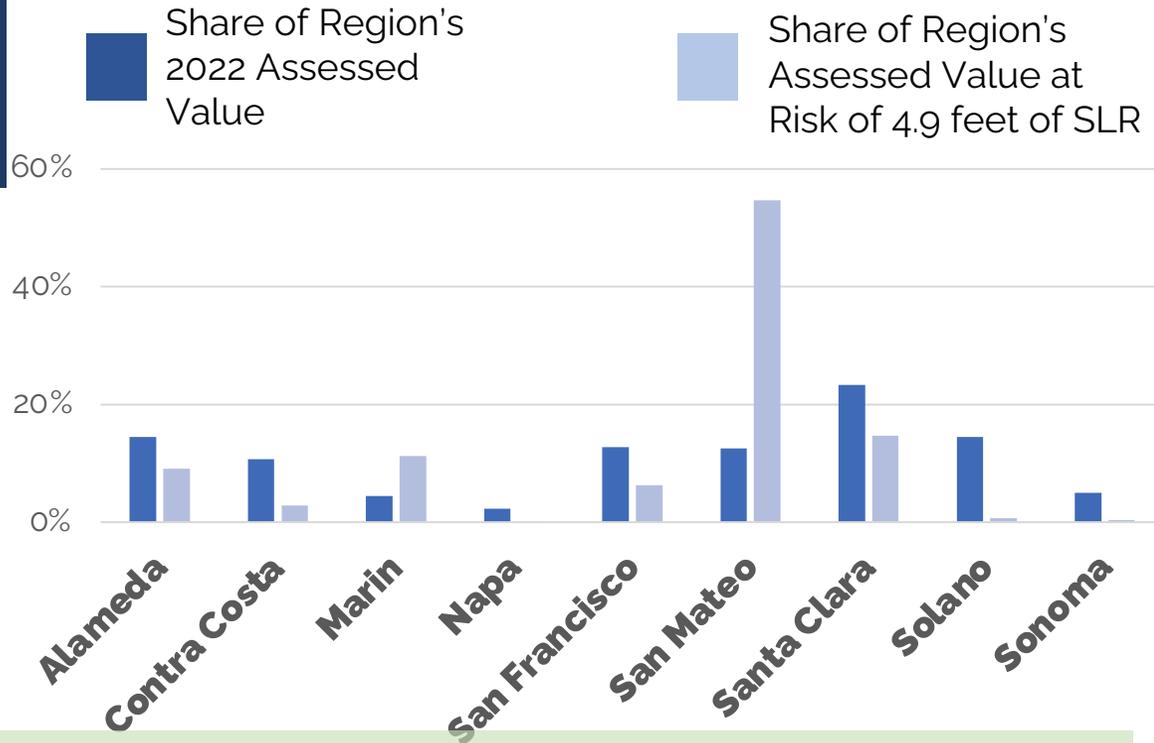## Assessment District

- Directly tied to specific benefits
- Most feasible in areas with greater resources and/or more direct impacts of SLR

$90 annual tax could support a $10 million *local project*.
*Based on average regional single family home size in an 8000 parcel district.*

Exploring Potential Revenue Sources

Geographic Equity Lens

■ Share of Region's 2022 Assessed Value
■ Share of Region's Assessed Value at Risk of 4.9 feet of SLR

Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma

Social Equity Lens

■ Share of Tax Revenues from Socially Vulnerable Areas
■ Share of Population Living in Socially Vulnerable Areas

GO Bond/Ad Valorem Tax — 28%, 44%
Parcel Tax — 32%, 44%

**Key Findings:** For geographic equity, using multiple types of funding measures would help to balance tax burden.
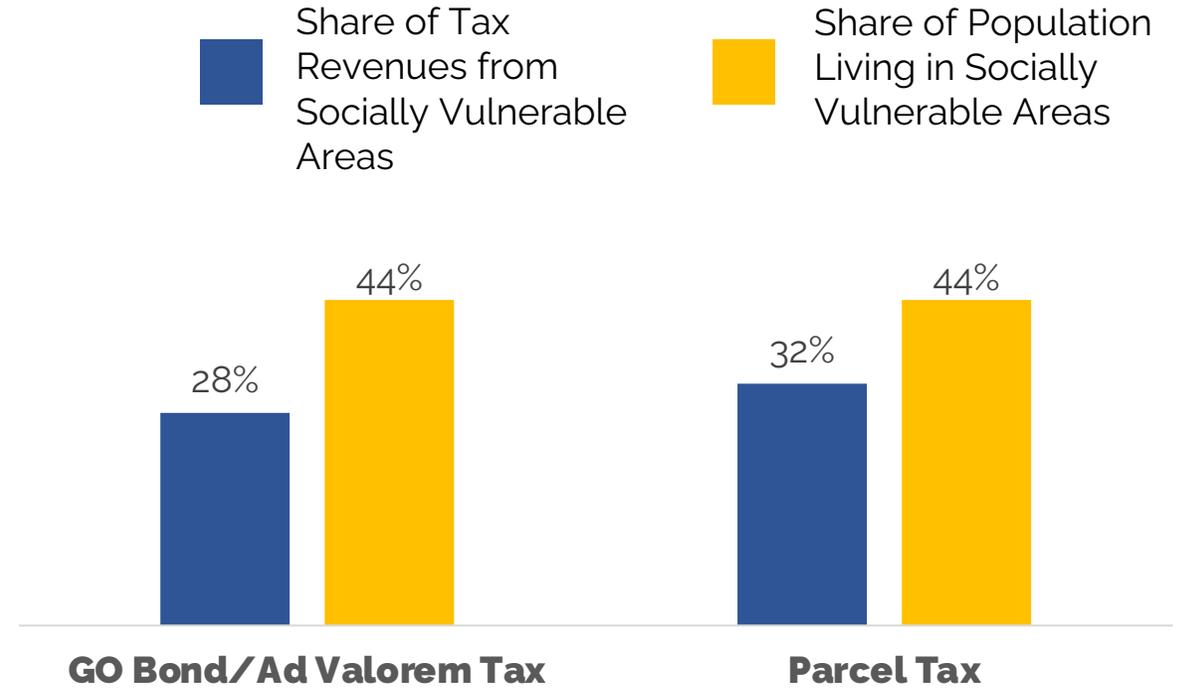
Key Findings: Parcel taxes are less socially equitable than an ad-valorem tax, as they place a higher burden on socially vulnerable areas[1].

[1] Social vulnerability defined by medium, high and highest levels of BCDC's Community Vulnerability Data.

Recap of Key Learnings

Estimated Existing Revenue

Estimated Adaptation Needs

● *Represents $5.5 billion*
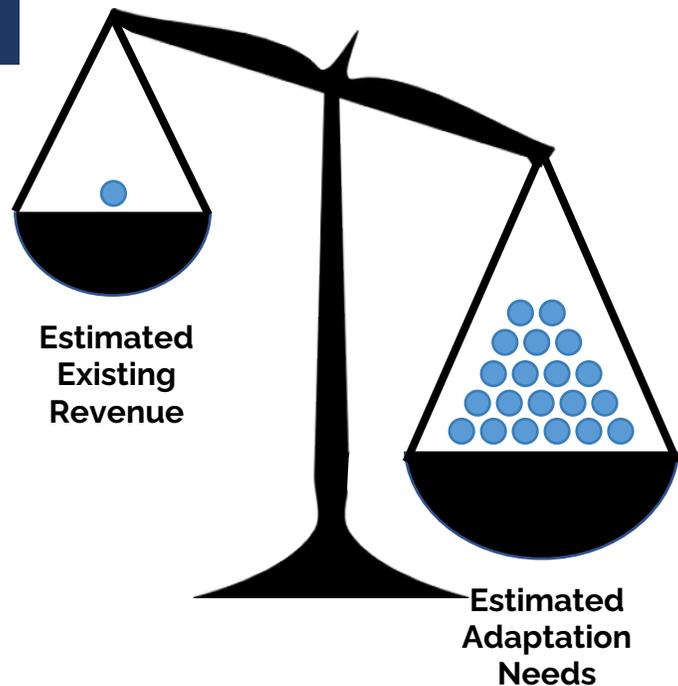
1. **Mix of "Green" and "Gray".** Roughly half of the known project costs are for green or hybrid projects, reflecting the region's shift towards multi-benefit adaptation.

2. **Significant Funding Gap.** Current revenues are inadequate to meet the need, leaving a funding gap of over $100 billion. Increasing revenues, prioritizing or phasing shoreline protection, and discouraging new development in highly-vulnerable areas should all be considered.

3. **Key Differences between Counties.** The costs are inequitably distributed across the region – more than 50% of the costs are in only three counties – and the level of local planning for sea level rise varies widely as well due to resource constraints.

4. **Multiple Fund Sources Required.** Even with prioritizing and phasing adaptation projects, there is no single funding measure that will be able to fill the gap.

5. **Prioritizing Equity.** GO bonds/ad valorem property taxes place a lower burden on socially vulnerable areas, while providing a greater benefit to socially vulnerable areas than their regional share.

Adaptation in Progress

While there's much to be done ahead, major projects across the region are already underway.

SR-37 Corridor Adaptation

Transportation Project

Estimated Cost: $8 billion
Status: Planning

North Richmond Shoreline Living Levee

Ecotone Levee

Estimated Cost: $16 million
Status: Design

Foster City Levee Improvement

Levees and Restoration

Estimated Cost: $90 million
Status: Construction

SR-37 Adaptation

North Richmond Shoreline Living Levee

Foster City Levee Improvement

What's Next After the Framework?

1. **Prioritize SLR investments through upcoming plans to reduce the funding gap.** Plan Bay Area 2050+ and the Regional Shoreline Adaptation Plan are opportunities to explore which resilience projects require early action and which low-density areas might be more appropriate for lower-cost interventions. **[MTC/ABAG & BCDC]**

2. **Explore how envisioned regional measures can make communities and transportation more resilient.** With no regional sea level rise measure on the horizon, it is critical to explore how planned measures for affordable housing and transportation could integrate policies or programs to advance more resilient outcomes. **[MTC/ABAG]**

3. **Complete and maintain the development of the Shoreline Adaptation Project Mapping Program** to ensure that the region has access to the best possible inventory data. **[BCDC, others]**

4. **Accelerate advocacy at the federal and state levels to secure more monies for the Bay Area.** Messaging the magnitude of the need here in the San Francisco Bay Area and competing for available funds will be key. **[MTC/ABAG, BCDC, BARC, others]**

5. **Seek input from elected officials to identify lead agency roles for sea level rise efforts in the Bay Area.** While tackling sea level rise requires robust partnerships, the lack of a lead agency in this space to secure monies and distribute them equitably hinders the Bay Area's ability to mitigate climate impacts.