The background of the slide is a photograph of a rusty, brown metal structure, possibly a pier or a piece of machinery, partially submerged in greenish, rippling water. The water's surface is textured with small waves and reflections. The metal structure has a rough, weathered appearance with visible rust and some smaller debris on its surface.

Dealing with the Potential Costs of Climate Change Adaptation for the Bay Area: The Need for Regional Government

April 19, 2019

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**Regional Government Needs to Start Addressing
Potential Costs Now**

The Combined Costs are Potentially Staggering

- ▶ The combined costs of climate change adaptation - *if solely paid from inequitable exactions on Bay Area residents and businesses*- could be staggering
- ▶ Typical sources of revenue that may be tapped to pay for more adaptive infrastructure - taxes, utility rates or fees from multiple public or private entities
- ▶ How do we monitor and manage the combined cost impact on Bay Area households, and ensure it is equitable?

Climate Change Adaptation Challenges for the Bay Area

Challenges

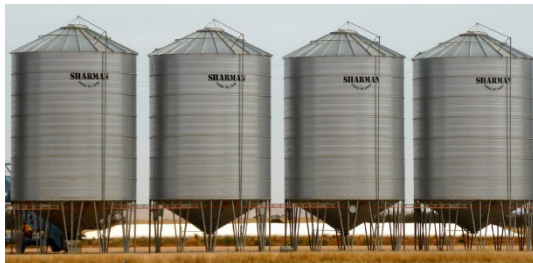
- Rising bay levels
- Algae bloom due to a warming bay (nutrient levels)
- WUI fire risk mitigation
- Sierra snowpack water storage “lost” as rainfall
- Bay Delta flow concerns will be exacerbated by climate change
- Losing the Delta through sea level rise will have a major adverse impact on the Bay Area: the Delta is part of the Bay
- Heat waves may necessitate air-conditioned “heat wave refugee centers”

Insurance Markets May Force Our Hand on Action Now

- ▶ Since the 2017 and 2018 wildfires, thousands of homeowner's insurance policies are not being renewed
- ▶ Home buyers may not be able to obtain insurance required for mortgage lending, other than the State mandated "FAIR" program
- ▶ 2017 insurance premium collected for homeowner's insurance totaled \$7.8 billion against \$15.4 losses (so far) in incurred losses
- ▶ 2018 incurred losses are estimated at \$18+ billion against a similar amount of premium
- ▶ **This math does not work: our Bay Area homeowners facing major premium increases in addition to non-renewal risk?**

Forging Consensus and Cooperation

- ▶ Climate change adaptation will result in a need for taxes and fees from businesses and the public in multiple forms
- ▶ Currently, various public entities that formulate responses to climate change tend to operate in silos
- ▶ But.....the public and businesses paying these fees will feel the combined impact of all potential responses, some more than others
- ▶ Ignoring the combined costs can lead to voter unrest
 - ▶Like Prop 13 in 1978
 - ▶Like the yellow-vest movement in France now

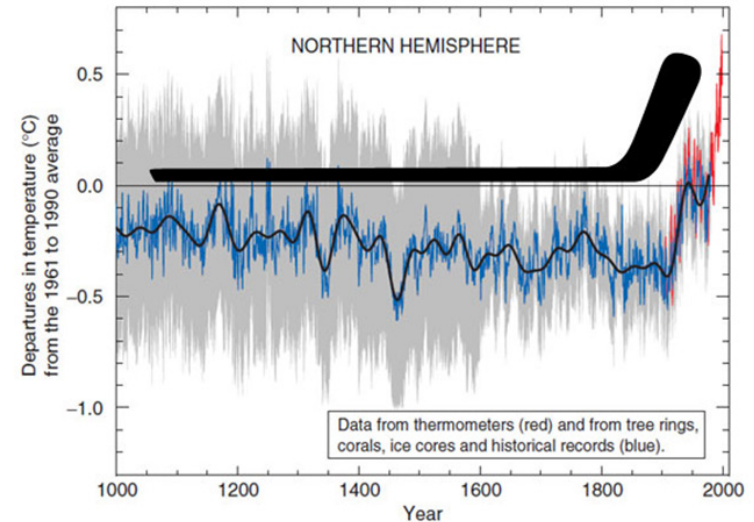


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Our biggest challenge to forging consensus: the “hockey stick”

- ▶ Climate change scientists frequently use the shape of a hockey stick as an analogy
 - ▶ The rate of change in climate starts gradually and then accelerates abruptly
- ▶ We want to design and fund projects while we are on the shallow part of the hockey stick
- ▶ We do not really know where we are on the hockey stick—change may be in shallow part for years or we may be nearing the steep part
- ▶ **Will voters approve tax/fee/utility rate increases now if we cannot tell them when the projects are actually needed?**





How “Wrong” Numbers Can Help Us






“Wrong” Numbers Can Be the Right Numbers

- ▶ The precise costs for each category of climate change adaptation for the Bay Area cannot presently be determined
 - ▶ Estimates can be provided to help frame the conversation
- ▶ Forming rough estimates can deliver benefits for staff and elected officials of Bay Area public entities:
 - ▶ Shock at how high the potential costs could be can drive public agencies out of their “silo’s” into cooperative work on climate change adaptation
 - ▶ Ensure payment burden is equitable and fair
 - ▶ Sharpen focus on making climate change adaptation a higher priority
 - ▶ Drive a search for alternate funding sources in addition to new taxes and fees, reorienting existing funding to better address new challenges

Likely Category of Fees/taxes for Climate Change Adaptation Challenges

Climate Change Adaptation Infrastructure/Service Needed	Stakeholder Groups Affected		
	Wastewater Ratepayers	Water Ratepayers	Property Tax Payers
Horizontal levees	Yes - if utility provides funding as an alternative to treating nutrient levels through conventional means	No cost impact likely	Maybe - if voter approved special assessments or <i>ad valorem</i> taxes are used
Sea walls	No cost impact likely	No cost impact likely	Yes - San Francisco and Foster City are funding initial levy/sea wall improvements through <i>ad valorem</i> taxes or special assessments
New Water Supplies for Loss of Snowpack for Water Storage and/or Bay Delta Flows	No cost impact likely	Yes - Major impact on nearly all water ratepayers Statewide	No cost impact likely
Bay nutrient levels	Yes - costs will have major impact on WW ratepayers if mitigated through wastewater treatment plant improvements	No cost impact likely	Maybe - Some WW utilities in the Bay bill their ratepayers through their property tax bills
Twin Tunnels	No cost impact likely	Yes - Water users in San Joaquin Valley, southern California, and Silicon Valley will pay majority of costs for Twin Tunnels	Maybe - Burns Porter Act allows some of Twin Tunnels costs to be levied as special assessments
Save the Delta	Maybe - cost of horizontal levees in the Bay may become part of the saving the Delta	Maybe - costs of saving the Delta may be passed on to SWP and CVP water users in order to get Twin Tunnels approved	No cost impact likely
WUI fire risk mitigation	No cost impact likely	Yes - water utilities with watersheds in the WUI are likely to have to pay for fire risk mitigation	Yes - <i>ad valorem</i> tax overrides were approved by multiple jurisdictions in November 2018 in the North Bay
Heat wave refugee centers	No cost impact likely	No cost impact likely	Yes - a parcel or <i>ad valorem</i> tax is the most likely funding source for this cost

Potential Cross Connections – Opportunities for Collaboration

	Nutrient Removal	Save the Delta	Twin Tunnels	Loss of Snowpack Water Storage	WUI ¹ Fire Risk Mitigation	Bay Delta Flows
Horizontal Levees	Yes - horizontal levees help with nutrient removal	Yes - horizontal levees can reduce magnitude of sea level rise	Yes - by reducing magnitude of sea level rise in the Delta, need for Twin Tunnels may be deferred	No apparent connection	Yes - long term costs of WUI fire risk mitigation escalate total costs of climate change adaptation	Yes - to extent that DPR ² used as new water supply reduces nutrient flows, it reduces the need for horizontal levees for that purpose
	Nutrient Removal	Yes - horizontal levees used for nutrient removal can help save the Delta	No apparent connection	No apparent connection	Yes - long term costs of WUI fire risk mitigation escalate total costs of climate change adaptation	Yes - DPR used for new water supply reduces treated effluent flows into the Bay
		Save the Delta	Yes - Twin Tunnels could eliminate need to save the Delta in order to save State Water Project and Central Valley Project	Yes - snowpack turning into rainfall will significantly alter flows through the Delta	No apparent connection	Yes - improves water quality, but does not save Delta levees. Question: What happens to Delta water quality if levees fail?
			Twin Tunnels	Yes - reduced water deliveries through Twin Tunnels drive up cost per acre foot	Yes - water utilities that will pay for Twin Tunnels also likely have to pay for "watershed" maintenance in their boundaries	No apparent connection
				Loss of Snowpack Water Storage	Yes - longer dry season is already having a major impact on WUI	Yes - DPR is a potential solution for Bay Delta Flows
					WUI Fire Risk Mitigation	Yes - long term costs of WUI fire risk mitigation escalate total costs of climate change adaptation

1) WUI in this table refers to Wildland-urban interface
 2) DPR in this table refers to Direct Potable Reuse



Potential Combined Costs of Bay Area Climate Change

The potential cost of doing nothing

- ▶ Two detailed studies on cost of Bay Area sea level rise so far: Marin County and San Mateo County
 - ▶ Marin County: \$15.6 billion in current assessed valuation would be flooded with a 60" rise
 - ▶ San Mateo County: \$38.2 billion in current assessed valuation flooded with an 80" rise.
- ▶ While both studies identified all major public infrastructure that would be impacted or lost under different scenarios, neither quantifies the cost of lost infrastructure
- ▶ What is the combined cost for lost private property and public infrastructure for the entire Bay Area?



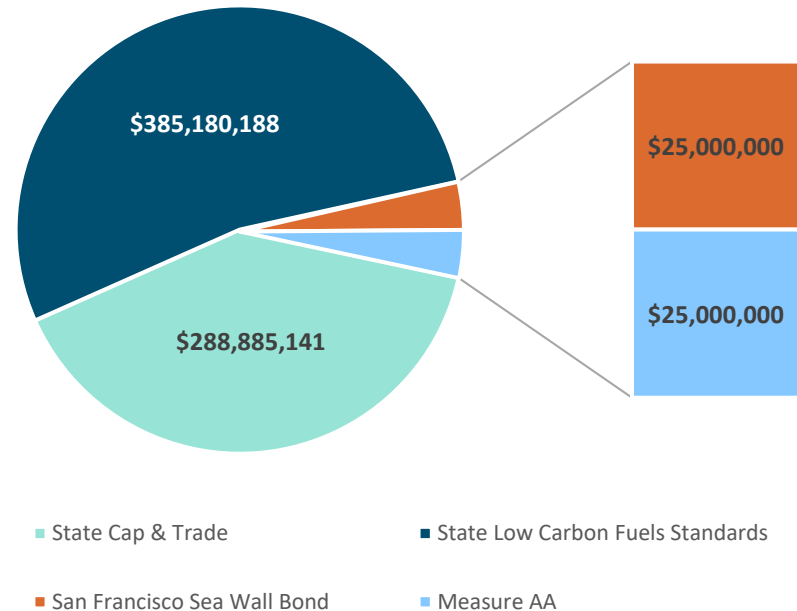
Numbers We Hope are Wrong: Potential Climate Change Adaptation Costs for the Bay Area

Project	High Cost Estimate (Billions)	Estimated Bay Area Share (%)	Estimated Cost to Bay Area (Billions)	Background Hypotheses of "Wrong" Numbers
Horizontal levees	\$40	100%	\$40	200 linear miles of levees at \$200M/mile
Sea walls	\$10	100%	\$10	Sea walls in Seattle and NYC start at \$1B/mile. Certain parts of the Bay will require a sea wall.
New Water Storage for Loss of Snowpack for Water Storage	\$20	25%	\$5	Based on the cost/AF for the Sites Reservoir proposal, assuming that approach is used to make up for lost storage capacity from snowpack loss
New Water Supplies for Loss of Snowpack or Bay Delta Flows (DPR or Desalination)	\$10	100%	\$10	Based on cost/AF of the Carlsbad Desalination Project, if applied for 1/3 of the Bay Area's water supply
Bay Nutrient Levels	\$10	100%	\$10	Numbers sourced from the BACWA report
Twin Tunnels	\$20	5%	\$1	DWR's "as-built" cost at time of completion multiplied by Table A % for Bay Area SWP contractors.
Save the Delta	\$20	50%	\$10	Based on MWD's apparent assumption that saving the Delta costs at least as much as Twin Tunnels
WUI Fire Risk Mitigation	\$2	100%	\$2	Present value of \$200/parcel over 40 years for 20% of Bay Area parcels; parcel taxes recently approved in California for fire risk mitigation have been around \$200 per parcel. Assumes that 20% of Bay Area parcels are considered WUI, or are otherwise liable for non-renewal by insurance carriers
Heat Wave Refugee Centers	No Estimate	100%	No Estimate	There is no current estimate of what it will cost to provide air conditioned refugee centers for elderly and families with infants.
Total	\$131.72 billion		\$87.72 billion	

What does the Bay Area Pay for Climate Change Now?

- ▶ Indirect tax: Cap and trade, \$1.5 billion per year statewide, estimated \$289 million per year in Bay Area
- ▶ State Low Carbon Fuels Standards - \$2 billion per year statewide, estimated \$385 million per year in Bay Area
- ▶ San Francisco sea wall bond: \$25 million per year
- ▶ Measure AA: \$25 million per year
- ▶ Combined estimated climate revenue in Bay Area - \$725 million per year

Other Climate Change Payments by the Bay Area



Another Potential Climate Change Cost: What if Homeowner's Insurance Premiums Dramatically Increase?

Estimated Bay Area Homeowner's Insurance Premiums

\$1.58 billion per year



Annual Cost of 50% Increase in Premiums

\$790 million per year



\$300 annually per Bay Area household

Making Sure Funding Mechanisms are Fair: West Oakland Compared with Facebook on Measure AA

- ▶ In June 2016, Measure AA adopted a \$12 per year parcel tax earmarked for the restoration of wetlands surrounding the San Francisco Bay
- ▶ As the tax is levied on a per-parcel basis, various sub-regions of the Bay Area can pay **differing amounts of taxes per acre** based on the size of respective parcels

Facebook

- ▶ Estimated 0.3 parcels/acre
 - ▶ Approximately 135 acres
 - ▶ Approximately 40 parcels
- ▶ **Roughly \$4 in taxes per acre**
- ▶ Roughly **\$540** in annual Measure AA taxes

West Oakland

- ▶ Estimated 9.6 parcels/acre
 - ▶ Approximately 4,160 acres
 - ▶ Approximately 39,940 parcels
- ▶ **Roughly \$108 in taxes per acre**
- ▶ Roughly **\$479,200** in annual Measure AA taxes



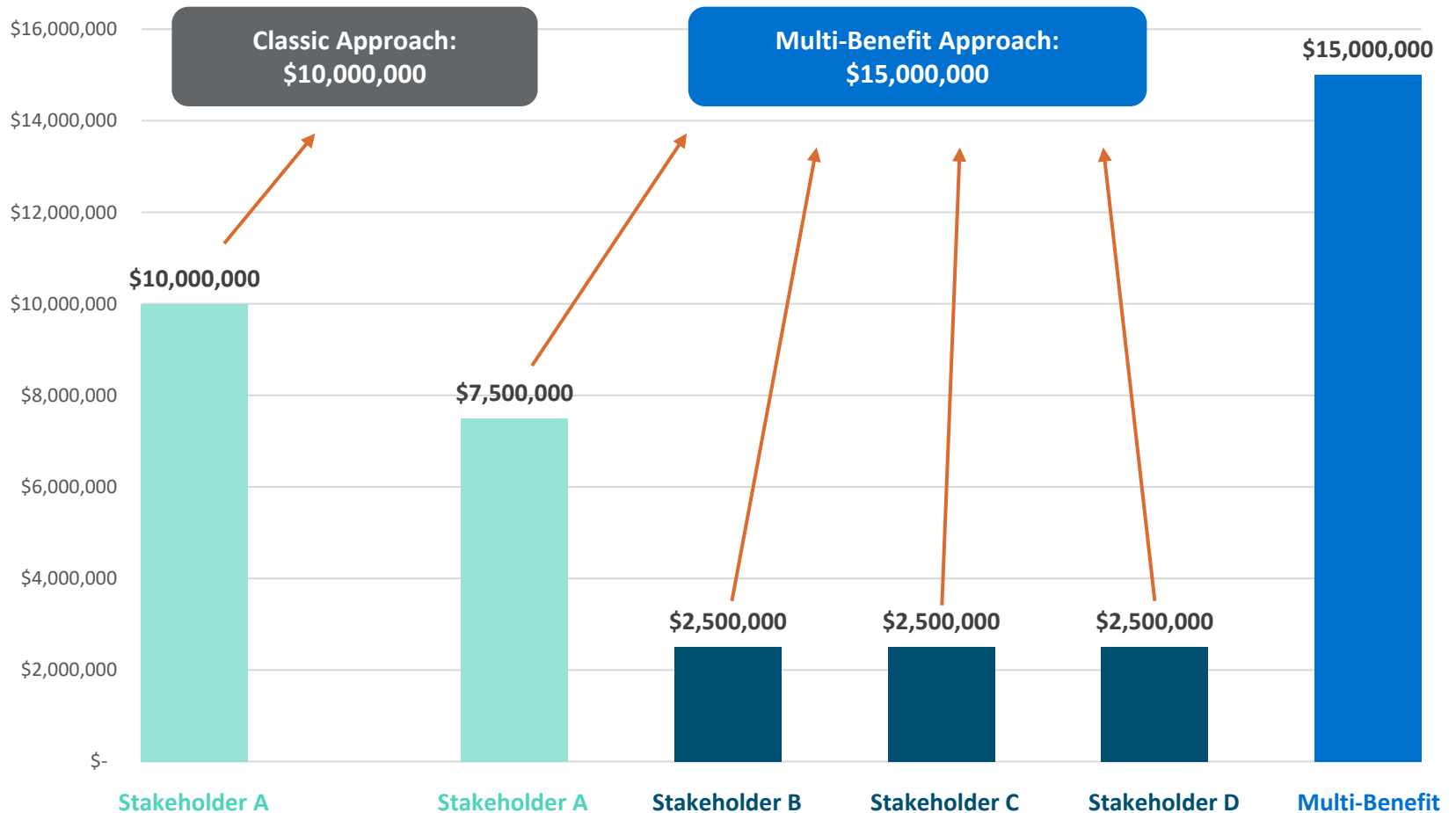
**A Paradoxical Approach to Climate Change:
Making Projects Bigger to Make Them Cost Less**

An Example of How the Numbers Can Work

Stakeholders can benefit from a lower allocable cost in a multi-benefit approach

Project Cost by Stakeholder			
	Funding Source	Classic Approach	Multi-Benefit Approach
Stakeholder A	Local Share	10,000,000	7,500,000
Stakeholder B	Grants	-	2,500,000
Stakeholder C	Grants	-	2,500,000
Stakeholder D	Grants	-	2,500,000
Total Cost		10,000,000	15,000,000

Multi-Benefit Cost Approach Comparison



“Holistic Funding”: Integrating Funding for Multiple Benefits

- ▶ Federal Emergency Management Agency (FEMA)
- ▶ Army Corps of Engineers (ACOE)
- ▶ Prop 64
- ▶ SB 1
- ▶ Cap and Trade
- ▶ Metropolitan Transportation Commission (MTC)
- ▶ Regional Measure 3 (RM3)
- ▶ Measure AA
- ▶ Opportunity Zones



Next Steps: Regional Government is Key

Advance Integrated Projects to Reduce Costs

- ▶ Can a silo'd public agency be expected to deliver a complex project with both regional and local benefits?
- ▶ Who should be in charge of complex, multi-source, multi-benefit projects?
 - ▶ Who has that skill set?
 - ▶ Localities lost some of that expertise with the end of redevelopment
- ▶ As with Highway 37, can regional government help support complex multi-jurisdictional projects?

A Regional Government role: Examine Potential Project Cross-Connections

Cross Connections

- May uncover other stakeholders who may contribute to funding
- May reveal ways to reduce the overall combined cost on the Bay Area
- Are drivers for regional consensus and collaboration

Examples

- Horizontal levees may reduce the chances of algae bloom
- DPR or desalinization may reduce both algae bloom and the need for replacement water storage
- Potential for “Twin Tunnels” project to be cheaper than saving the Delta

Climate Change Adaptation for Bay Area Regional Government: Some Ground Rules

- ▶ Can't just fall back on old funding systems. Multi-benefit approach requires creative funding programs
 - ▶ Design projects that have multi-benefits and multi-funding sources
 - ▶ Important regional role in finding the cross-connections
 - ▶ **The goal: the project may cost more, but constituents bear the burden more fairly**
- ▶ Work collaboratively: no silos
 - ▶ Our constituents also pay property taxes, sales taxes, gas taxes, etc. How are we integrating these resources to accomplish multiple goals in an accountable way?
 - ▶ Give regional government a leading role in project development and funding
- ▶ Social equity is crucial
 - ▶ A perception of social inequity in funding climate change adaptation will result in failure in attempts to raise new revenue streams to fund climate change adaptation
- ▶ Confront the “hockey stick”: Start early
 - ▶ Rising seas may be in the future, but project development and collaborative funding can also take years to realize

