

Welcome to the *Climate-Safe Infrastructure* Webinar Series

Supporting AB2800 and the Work of California's Climate-Safe
Infrastructure Working Group

June 28, 2018 | 12-1pm



Hosts



Juliette Finzi Hart | USGS

Co-Facilitator of CSIWG's work

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Co-Facilitator of CSIWG's work

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AB 2800 (Quirk): Purpose

Examine how to integrate scientific data concerning projected climate change impacts into state infrastructure engineering, including oversight, investment, design, and construction.



AB2800 Working Group and Support Team

The Climate-Safe Infrastructure Working Group

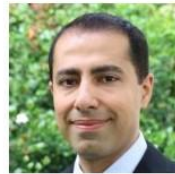
Co-Facilitators



Juliette Finzi Hart
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Amir Aghakouchak
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Cis Liban
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Dan Cayan
UC-San Diego, SIO



David Groves
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Nancy Ander
DGS, Off. of Sustain.



Deb Niemeier
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James Deane
High-Speed Rail Auth.



John Andrew
DWR



Kristin Heinemeier
Realized Energy



Kyle Meng
UC-Santa Barbara



Martha Brook
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Stanford



Gurdeep Bhattal
Cal-Trans



Robert Lempert
RAND

Project Team



Keali'i Bright
Natural Resources
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Elea Becker Lowe
Natural Resources
Agency



Joey Wall
Natural Resources
Agency



Guido Franco
California Energy
Commission

AB 2800 (Quirk): Scope of Assessment and Recommendations

The working group shall consider and investigate, at a minimum, the following issues:

- (1) **informational and institutional barriers** to integrating climate change into infrastructure design.
- (2) **critical information needs** of engineers.
- (3) **selection of appropriate engineering designs** for different climate scenarios.



The *Climate-Safe Infrastructure* Webinar Series

Purpose

- Hear from others elsewhere with relevant experience and expertise.
- Hear from CSIWG members.
- Educate and engage with interested stakeholders on climate change and infrastructure issues.

Sample of Webinar Topics

- What climate science can offer
- Various sectoral perspectives
- Processes of changing engineering standards and guidelines
- Holistic infrastructure planning and management
- Financing climate-safe infrastructure
- And others...

A Couple of Housekeeping Items



- Please type your questions for presenters into the chat box
- We will try to answer as many as possible after the presentations
- Answers to remaining questions will be posted on the website
- Thank you to USC Sea Grant!

Financing Infrastructure – Part III



Caitlin MacLean

Senior Director of Innovative Finance
Milken Institute



Brad Benson

Director of Special Projects
Port of San Francisco



Joyce Coffee

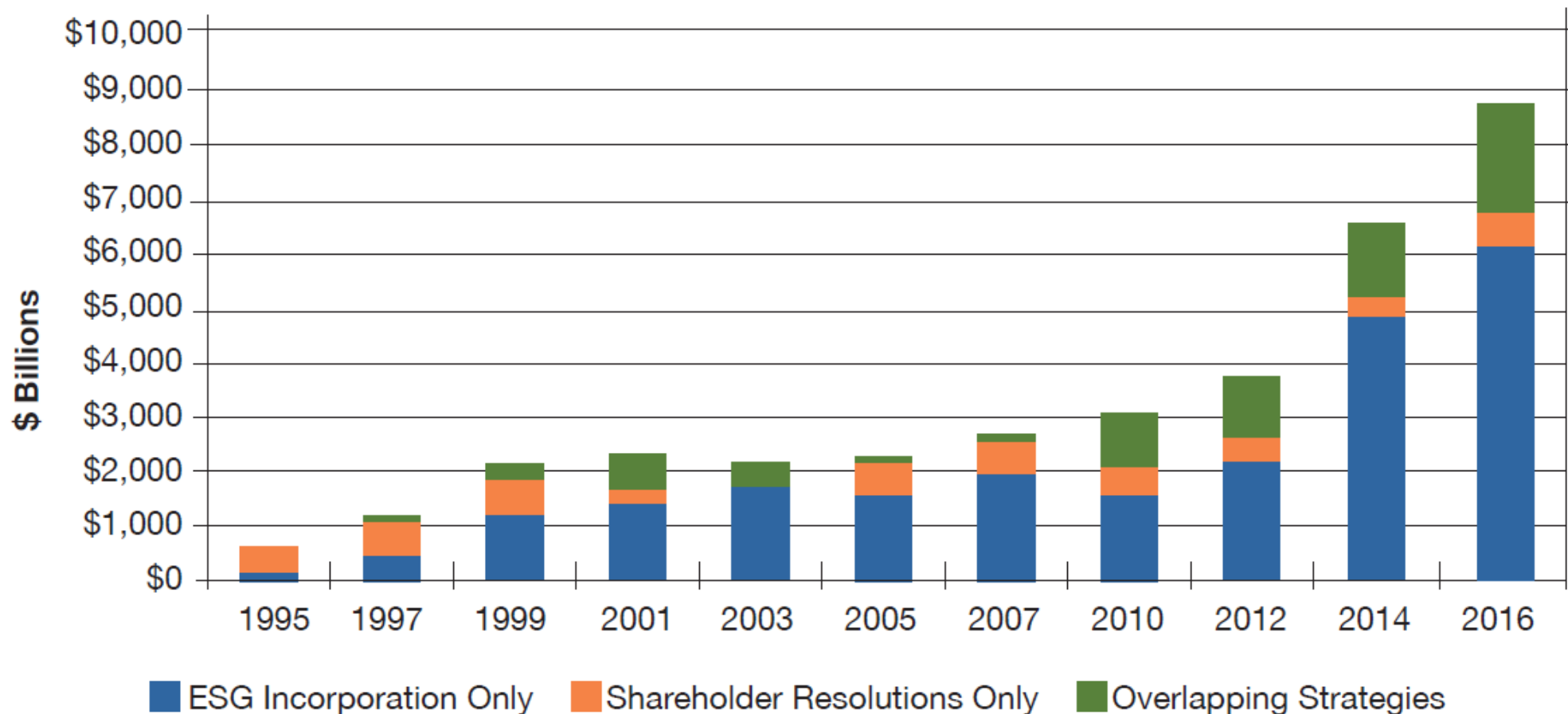
Founder and President
Climate Resilience Consulting

Market demand for sustainable investing

Green Bonds and Beyond



Sustainable, responsible and impact investing in the U.S.



SOURCE: US SIF Foundation.



Why Sustainable Investing?

The World Is Changing

- Global sustainability challenges such as flood risk and sea level rise, privacy and data security, demographic shifts, and regulatory pressures, are introducing new risk factors for investors
- Increasingly systemic national action

Investors are changing

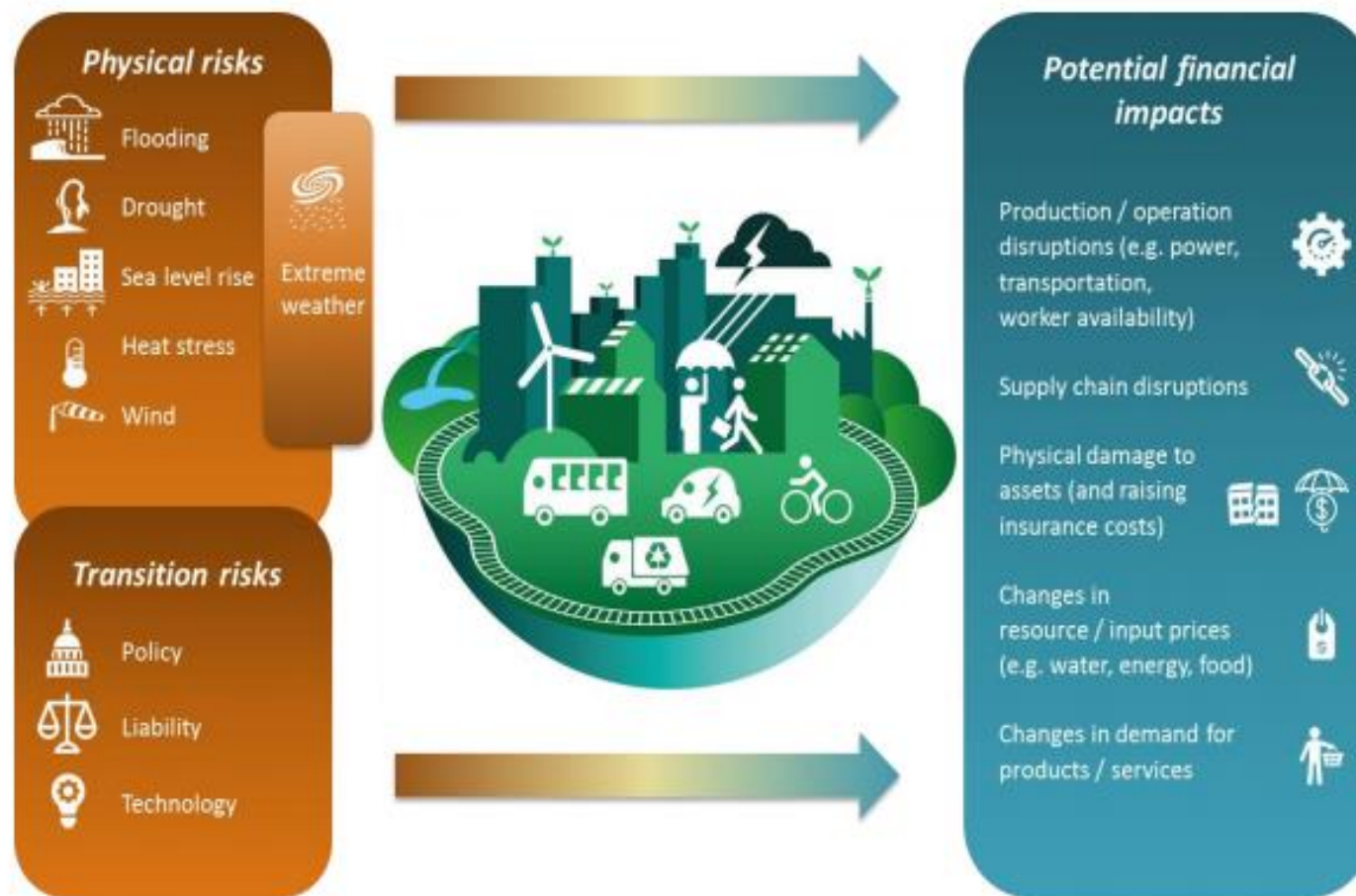
- \$30 trillion intergenerational wealth transfer from baby boomers to their children.
- People from 25 to 40 years old simply think about their investment decisions differently
- UN PRI = \$70 tril AUM committed to use responsible investment to enhance returns and manage risks
- Indicators of growing shareholder support for environmental issues, including recent historic passing votes on 2 degree stress testing for oil giants Exxon Mobil and Occidental

Data/Analytics are evolving

- With better data from companies combined with better ESG research and analytics capabilities, we are seeing more systematic, quantitative, objective and financially relevant approaches to ESG key issues



Assessing Climate Risk in Portfolios





ESG factors

ENVIRONMENT	SOCIAL	GOVERNANCE
Carbon emissions	Labour management	Corporate governance
Energy efficiency	Diversity and discrimination	Business ethics
Natural resource use	Working conditions	Anti-competitive practices
Hazardous waste management	Employee safety	Corruption and instability
Recycled material use	Product safety	Anti-bribery policy
Clean technology	Fair trade products	Anti-money laundering policy
Green buildings	Advertising ethics	Compensation disclosure
Biodiversity programmes	Human rights policy	Gender diversity of board



Credit Ratings Statements on ESG and Creditworthiness

“[Moody’s] credit ratings incorporate a forward-looking view of all issues that can materially impact the credit quality of a given sector or debt issuer, including those related to ESG“

“Environmental, social, and governance (ESG) risks and opportunities can affect the capacity and willingness of an entity to meet its financial commitments in many ways...[S&P Ratings] monitor[s] the impact of ESG factors, as we do all relevant factors, on an entity's credit profile. Our view will evolve as new information becomes available, or as the issuer's fundamentals change”

- “For example, between July 16, 2015, and Aug. 29, 2017 environmental and climate (E&C) concerns affected corporate ratings in 717 cases, or approximately 10% of corporate ratings assessments and resulted in a rating impact (an upgrade, downgrade, outlook revision, or CreditWatch placement) in 106 cases”

“Fitch's criteria and analysis incorporate ESG risk factors, but only where they are relevant to the assessment of credit risk. We assess these factors as part of the overall credit analysis when we consider them to have a financial impact on the rating within the rating horizon. It is rare for ESG risk to be the main driver of credit risk or a rating action.”



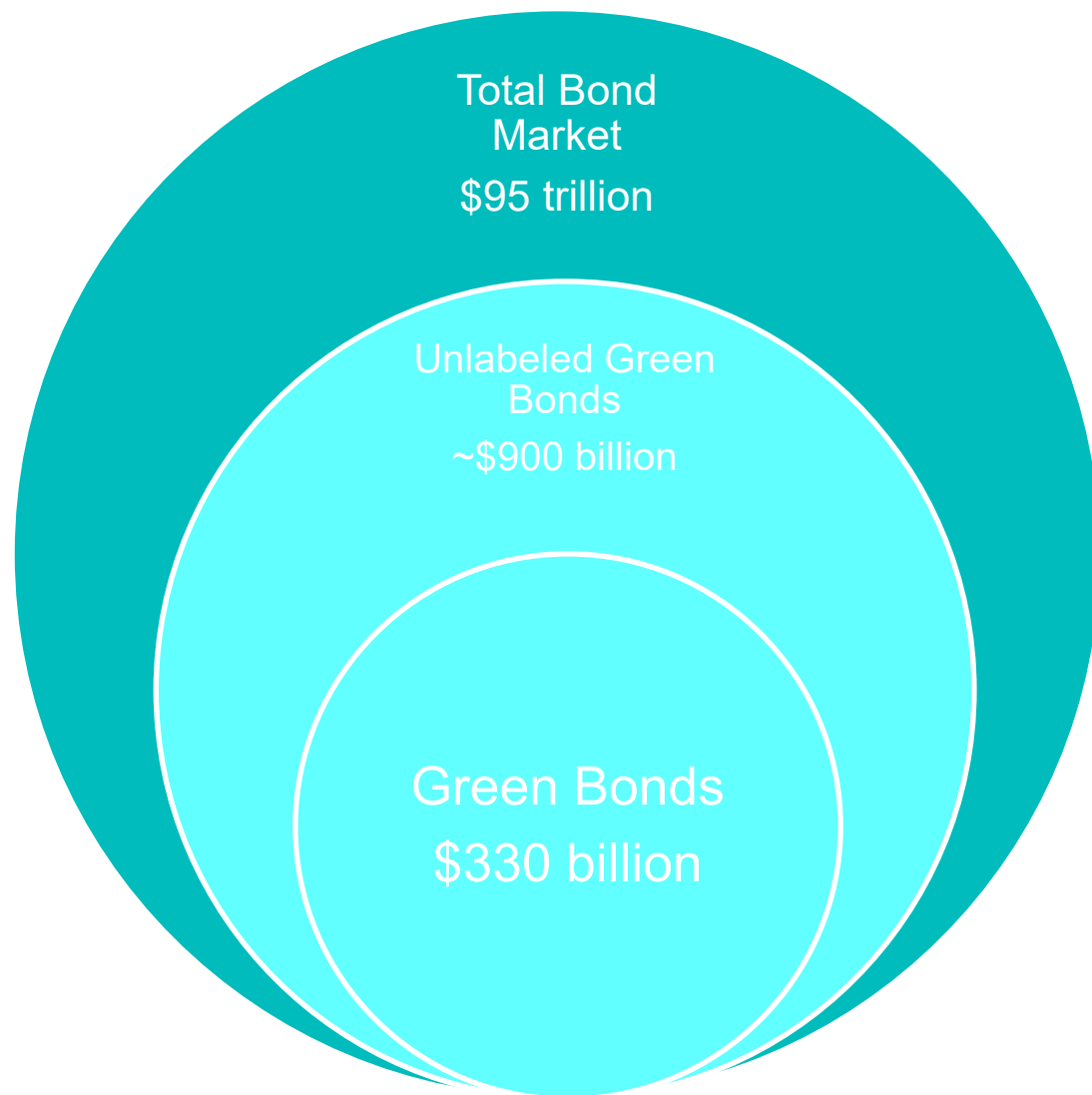
ESG and Bonds

	Bonds with low ESG scores	Bonds with high ESG scores
Average ESG score (from 0-10)	2.6	7.7
Average spread (bp)	172	134
Average credit quality	A3	A2

Source: MSCI ESG Research, Barclay's Research.



Going Green



Green bonds are public sector, private sector, or multilateral institution debt issuances used to finance climate-friendly or other environmental projects.

Less than one-tenth of 1% of bonds outstanding in the United States are green.



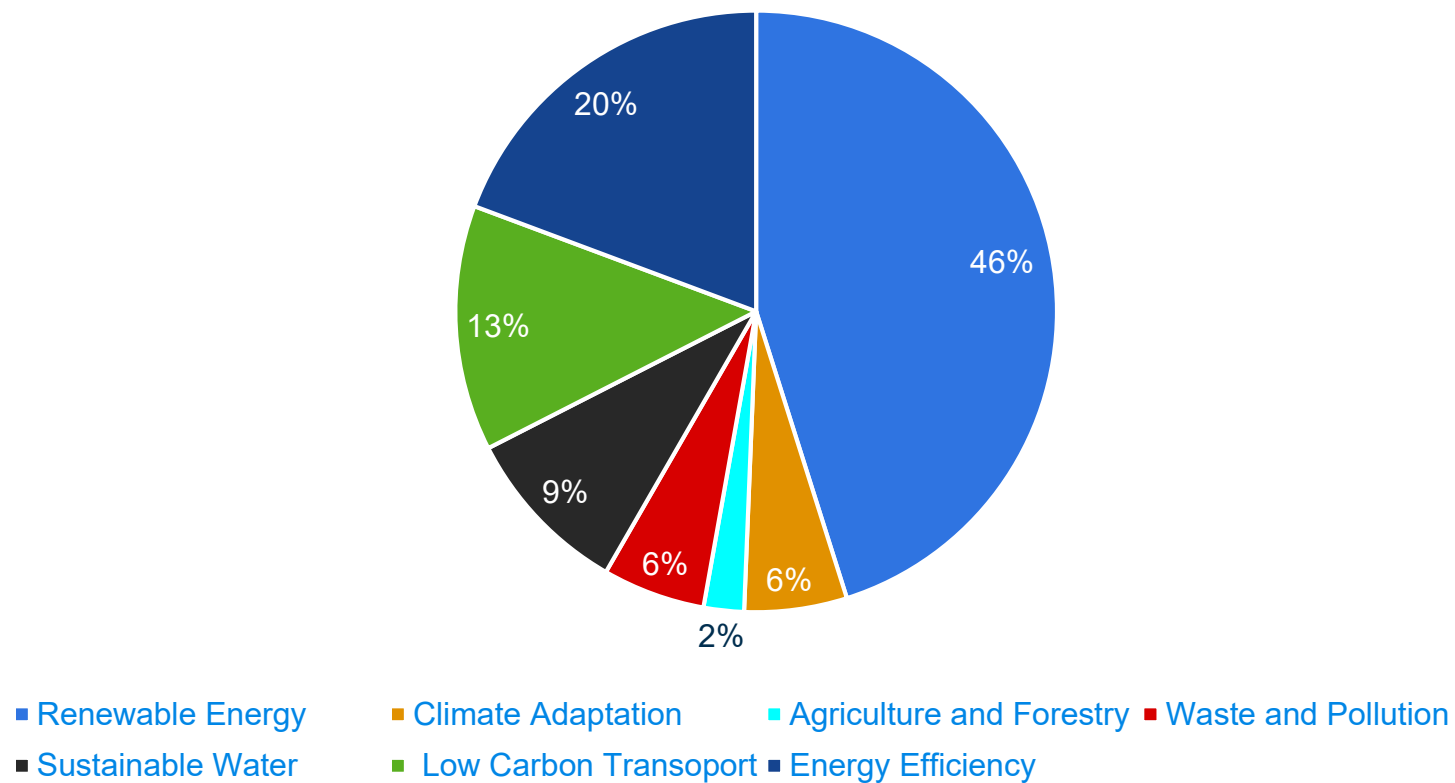
Types of Green Muni Bonds

Type	Proceeds raised by bond sale	Debt re-course	Example
Green “Use of Proceeds” Bond	Reserved for green projects	Standard re-course to the issuer; therefore same credit rating applies as to issuers other bonds	CA issued \$300 million in AAA bonds backed by the State’s General Fund
Green “Use of Proceeds” Revenue Bond	Reserved for green projects	Revenues from the issuers through fees, taxes, etc. are the collateral for the debt	Iowa Finance Authority issued \$321.5 million of State Revolving Fund revenue bonds in February 2015, The green bonds were backed by water-related fees and taxes. Proceeds were earmarked for water and wastewater projects.
Green Project Bonds	Targeted for the specific underlying green project	Re-course is only to the project’s assets and balance sheet	No Muni issuance to date
Green Securitized Bond	Either earmarked for green project or go directly into underlying green projects	Re-course is to a group of projects that have been grouped together	Hawaii State Government issued \$150 million, AAA-rated of green asset backed securities in November 2014. The bonds were backed by a Green Infrastructure Fee applied to the bills of the State Utility’s electricity customers.



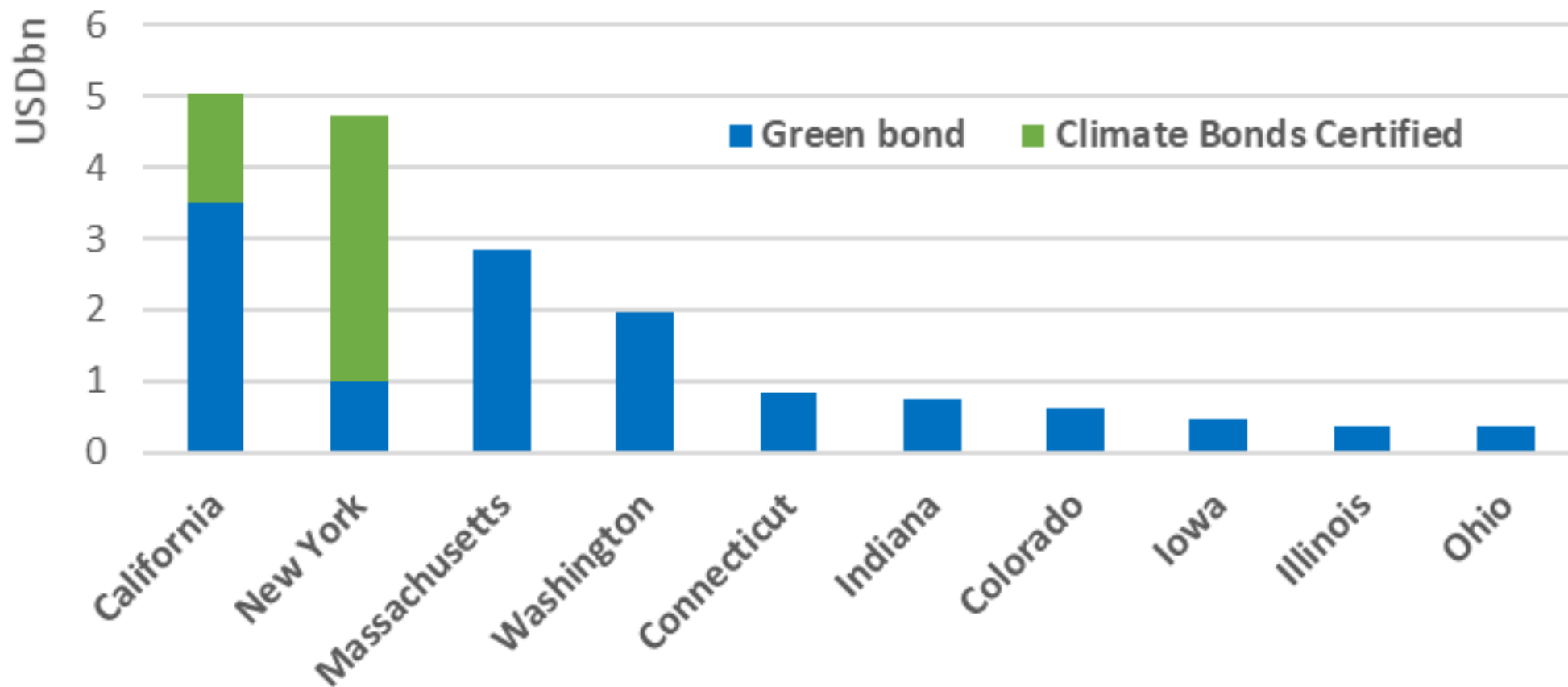
US Municipal Green Bond Issuance Allocation

Breakdown of allocated funds





Top 10 US Municipal Green Bond Issuers Nov 2017



Climate Bonds INITIATIVE



MILKEN INSTITUTE



CA Green Municipal Market

CA Muni GB issuance top \$5 bil in total issuances (since 2014), making the it first state and leader, ahead of NY (4.73 bil) and Mass (2.83bn)

Wide range of issuers

- Transbay Transit Center bond for the City and County of SF
- CA Investment bank
- Trinity Public Utilities District
- Midpeninsula Open Space District
- BART
- LACMTA
- SFPUC
- City of LA
- San Diego Unified School District



Bottlenecks for Issuing Entities

No “greenium”
(higher issuance
cost & no
premium)

Lack of
standards to
identify eligible
green projects

Lack of green
project pipeline

Lack of
aggregation
mechanisms for
green projects

Lack of
information &
market
knowledge





Bottlenecks for Investors

Lack of
information on
impacts of green
bond projects

(Perceived)
Higher risk of
green investments

Lack of standards
to characterize
green bonds

Disclosure usually
not mandatory for
green bond
issuers

Fiduciary duty
challenges with
returns

Source: Adelphi/COWI, 2016



Carrots and Sticks

Policy Incentives for Issuers

Responsible Municipal Issuer Program

- Guidelines for measuring, disclosing and reporting on environmental, social and governance impact of bond issuance
- Key Performance Indicators would be suggested based on industry or sector
- The California Debt and Investment Advisory Commission (CDIAC) would oversee the new guidelines and provide education around implementation
- Issuers would use a technology platform, similar to a green EMMA or EDGAR, to facilitate easier and more uniform disclosures
- Issuers could compete for a Responsible Gold Medal, awarded from an industry association, to foster a healthy sense of competition around best-in-class responsible issuances
- Issuers could be rewarded with cost recovery or pricing incentives for the most responsible issuances or tracking to a Resilient City Plan



Carrots and Sticks

Pricing Incentives for Issuers

Utilizing existing California State programs to lower capital costs for smaller, less credit worthy issuers

- Cal Mortgage
- Regional water authorities

Lowering Issuance Costs

- Streamlining disclosures
- Sharing human capital costs to meet Responsible Issuer Guidelines, including with environmental experts from the UC system



Carrots and Sticks

Incentives for Investors

- Creating a Green Taxable Muni Program similar to Build America Bonds
- Warehousing smaller green bond issuances into a fund, similar to a State Revolving Fund
- Creating a new entity: A Bear Flag Bond Bank (BFBB) to aggregate issuances

Financing the Seawall Earthquake Safety Program



Climate Safe Infrastructure Working Group

June 28, 2018

City Grid Mapped into Bay, 1860's Filling

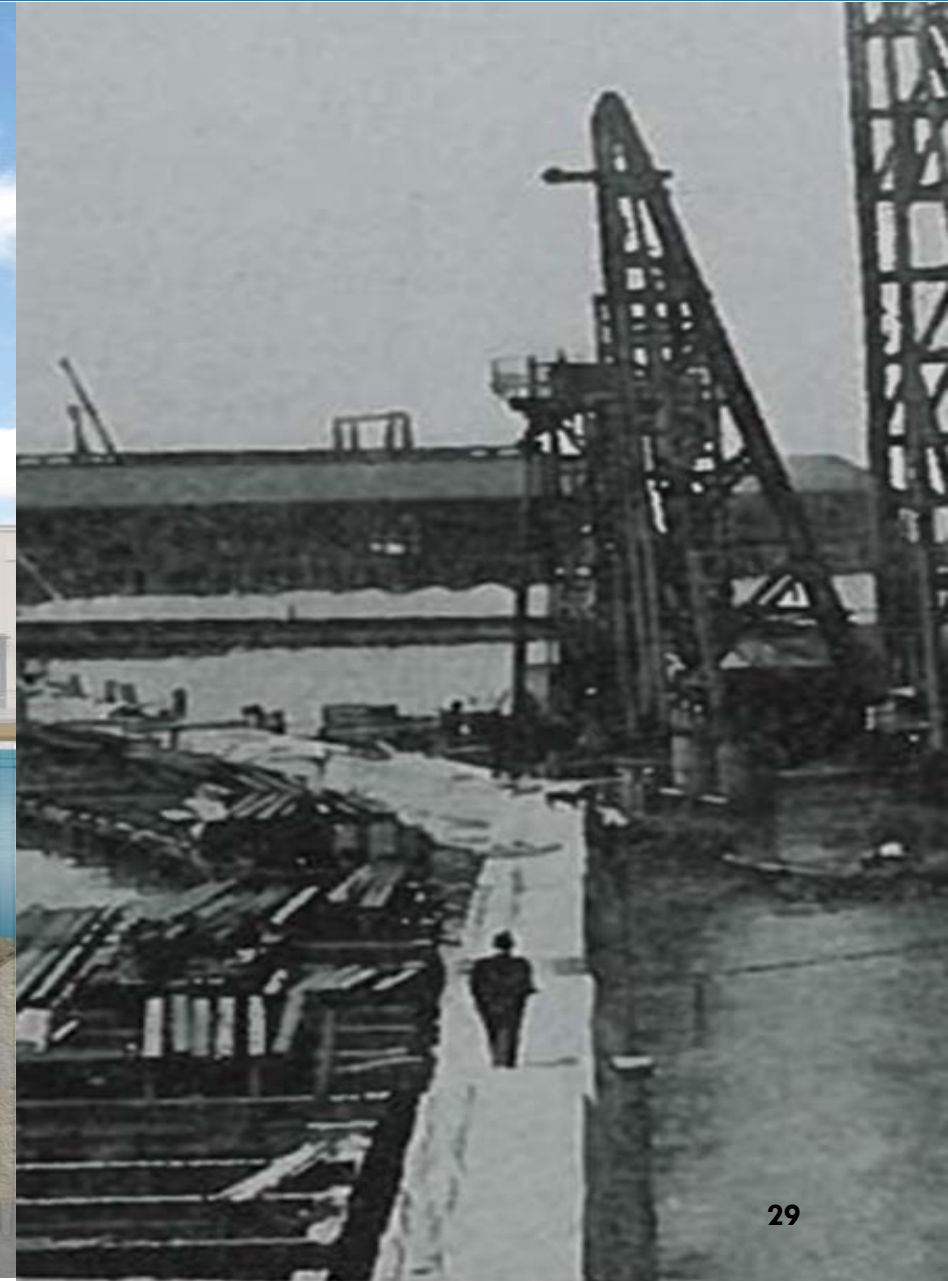


State of California Constructed the Seawall



Original Embarcadero Seawall Construction

- Built to deep water
- Holds filled land in place
- Protects against flooding

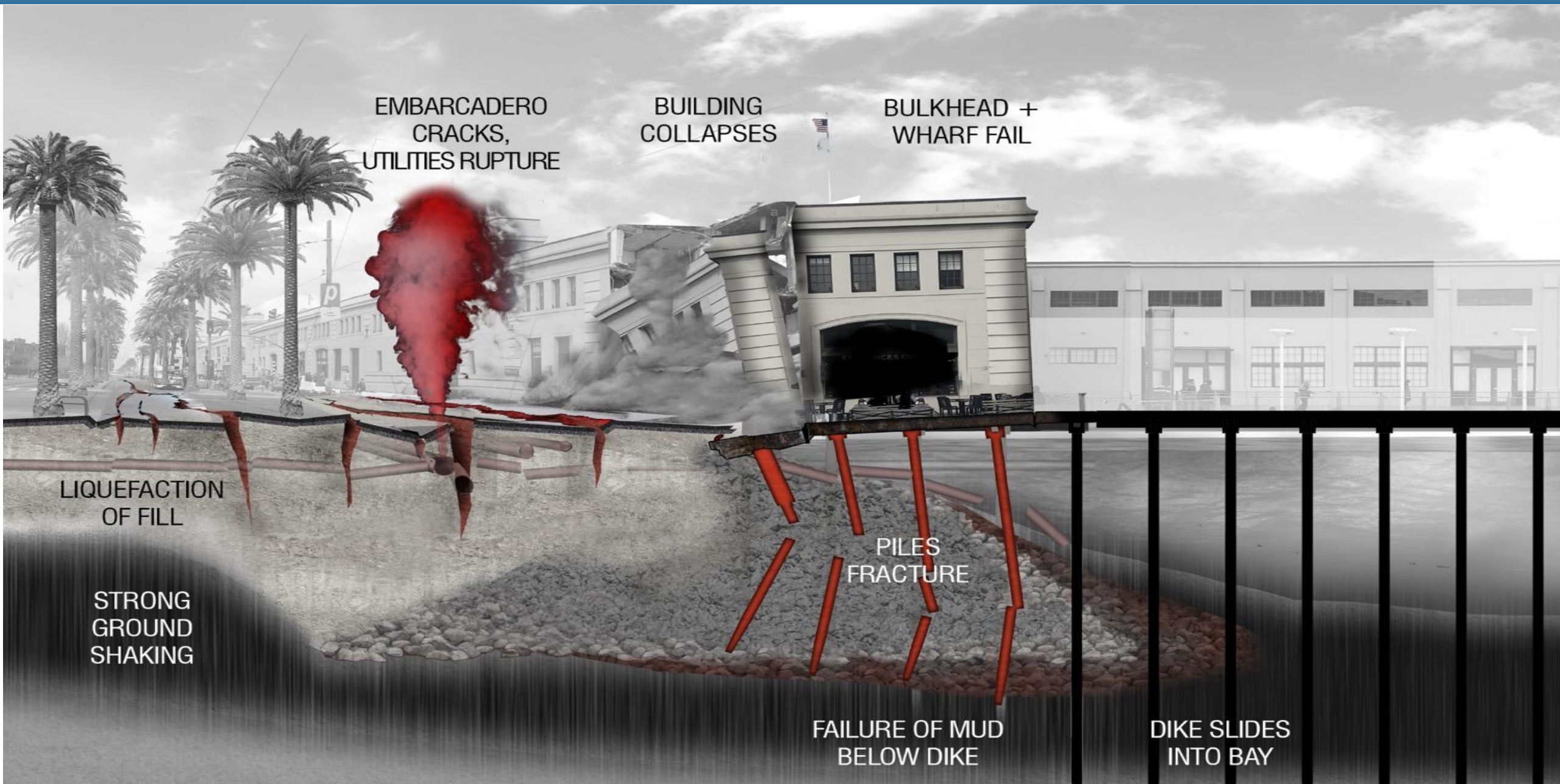


What Are the Problems?

- Deterioration
- Earthquake vulnerability
- Current flood risk and sea level rise
- Co-dependent infrastructure



San Francisco Faces Earthquake Risks



San Francisco Faces Flood Risks



- Sea levels have risen 8 inches in the last 100 years
- King tides send water of the Seawall today
- Sea level rise predictions:
 - 1-2 feet by 2050
 - 3-5½ feet by 2100

Earthquake Retrofit Concepts

OPTION 1 GROUND IMPROVEMENT



OPTION 2 GROUND IMPROVEMENT UNDER SEAWALL



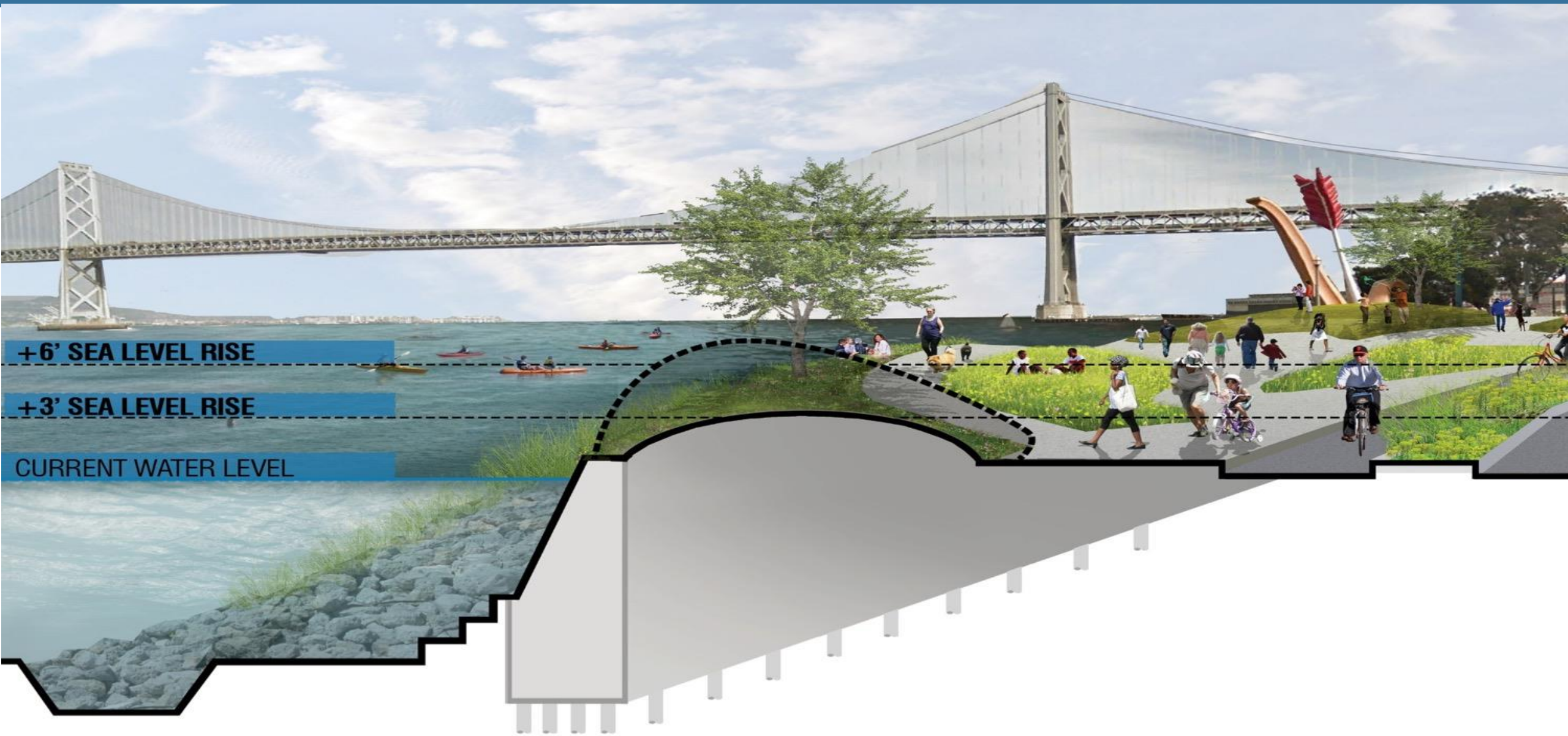
OPTION 3 BULKHEAD REPLACEMENT



OPTION 4 NEW BAYWARD SEAWALL

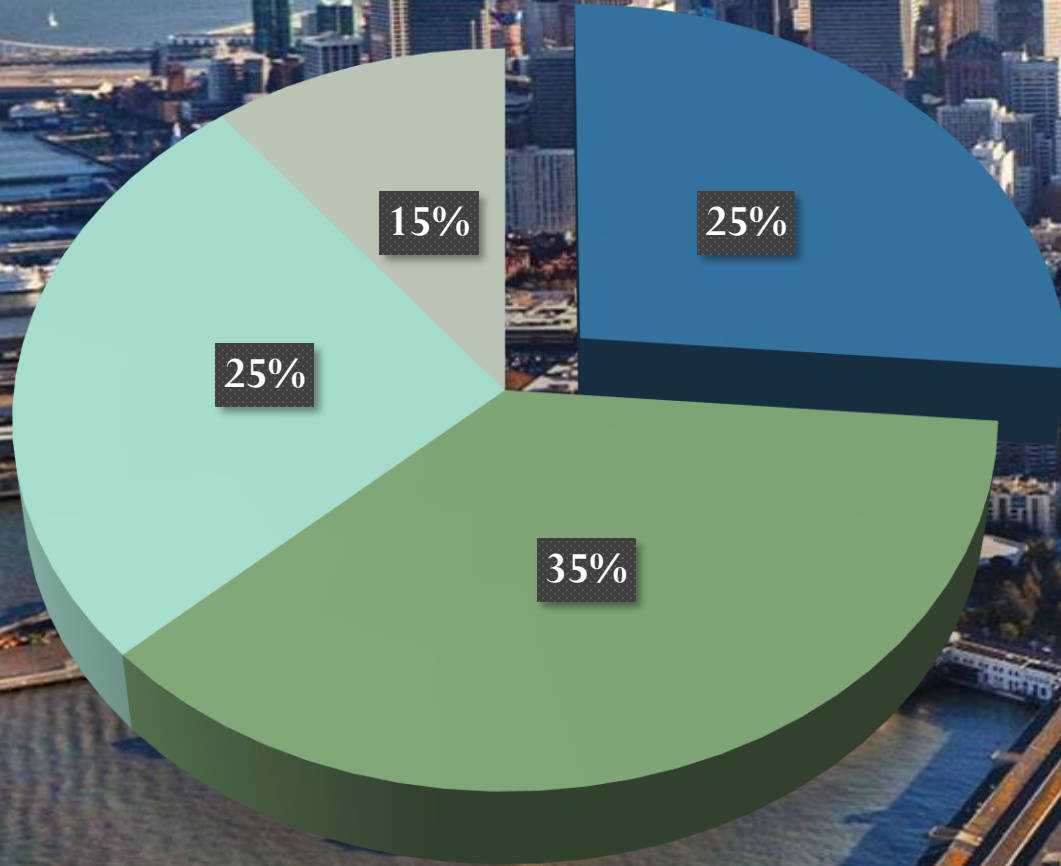


Potential Sea Level Rise Solutions



Desired Program Funding by Source

- City GO Bond Program (residential and commercial taxpayers)
- Federal (Water Resources, Transportation)
- State (Cap and Trade, State Share of Tax Increment)
- Private (waterfront development projects and businesses)



Infrastructure Financing Districts & Community Facility Districts

IFD Law (Property Tax Increment)

- Formed by cities/counties, sometimes by a vote of the people
- Property taxes in CA divided among cities, counties and state
- IFD tax increment:
 - Can capture city and county share of tax increment
 - pays debt service on bonds issued or annual pay-go to finance public facilities of “communitywide significance”

CFD Law (Additive Special Taxes)

- Land-Secured Financing
 - Formed by cities or counties; landowner vote or vote of the people
 - Finance capital costs of public facilities
 - Bonds secured only by Special Taxes
- Special Tax Formula
 - Special taxes set according to formula (“Rate and Method of Apportionment”)

\$425 Million General Obligation Bond – Nov. 2018 Ballot



SEAWALL EARTHQUAKE SAFETY BOND REPORT

April 20 18



sfseawall.com



[@portofsanfrancisco](https://www.facebook.com/portofsanfrancisco)



[@sf_port](https://www.instagram.com/sf_port)



[@sfport](https://twitter.com/sfport)

AB 2578 – Seawall Improvements (Assemblymember Chiu)

AB 2578 will finance improvements to the San Francisco Seawall to address urgent seismic risk and flood risk. Will generate \$330 million over 45 years.

- Authorizes San Francisco to direct the State's share of tax increment (ERAF) to Seawall Improvements;
- Authorizes San Francisco to direct motor vehicle in-lieu fees from a Port IFD district to permitted uses;
- Authorizes the use of IFD revenues for Seawall Improvements.



U.S. Army Corps of Engineers – New Start FY 2018-19

- San Francisco was awarded a New Start in the U.S. Army Corps of Engineers FY 2018-19 Work Plan
- \$3 million, 3 year study of flood risk along the San Francisco waterfront
- One of six New Starts nationally
- If USACE finds a federal interest, Congress could appropriate substantial federal funding to the project, subject to a local match



What's New in Finance Innovation {I} for Resilience

Where Money Comes From

Public Finance

Taxes, fees & charges
(Municipal, Agency,
State, Federal)

Private Finance

Capital market bonds
Investment & comm.
bank loans
Foundation funding
Innovative funding

Government Companies Residents

Subsidies
Grants
Guarantees
Loans

Where Money Goes To

2018 Climate Resilience Consulting

Joyce Coffee
President

Climate Resilience Consulting



@joycecoffee

Where Money Comes From

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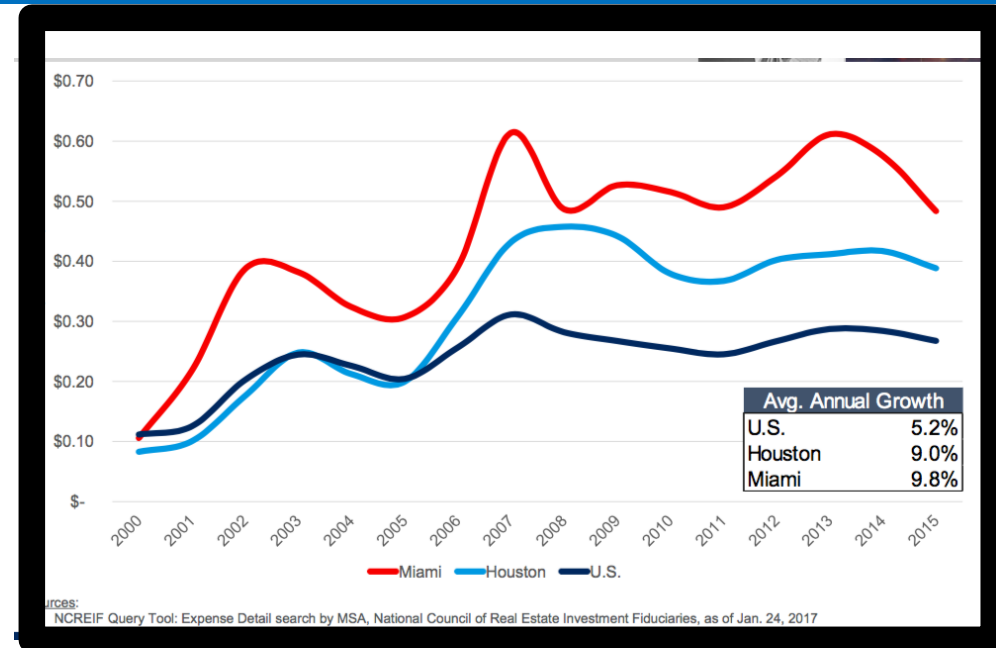
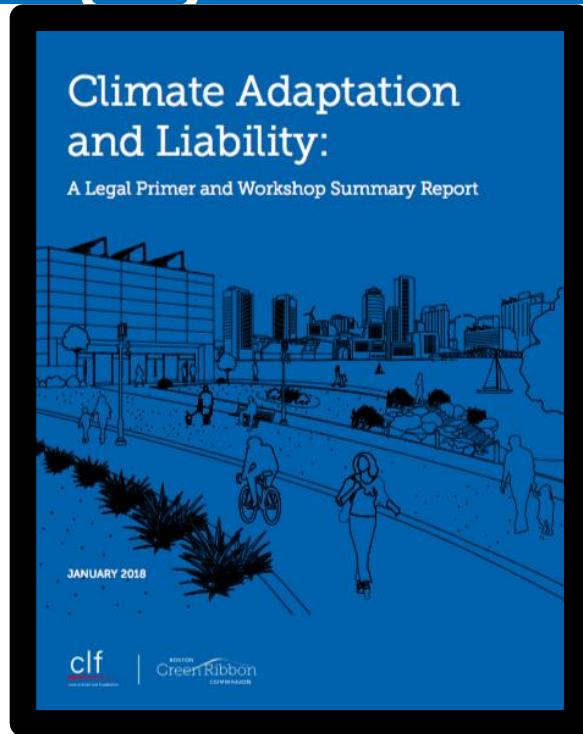
Capital market bonds
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Government Companies Residents

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Where Money Goes To

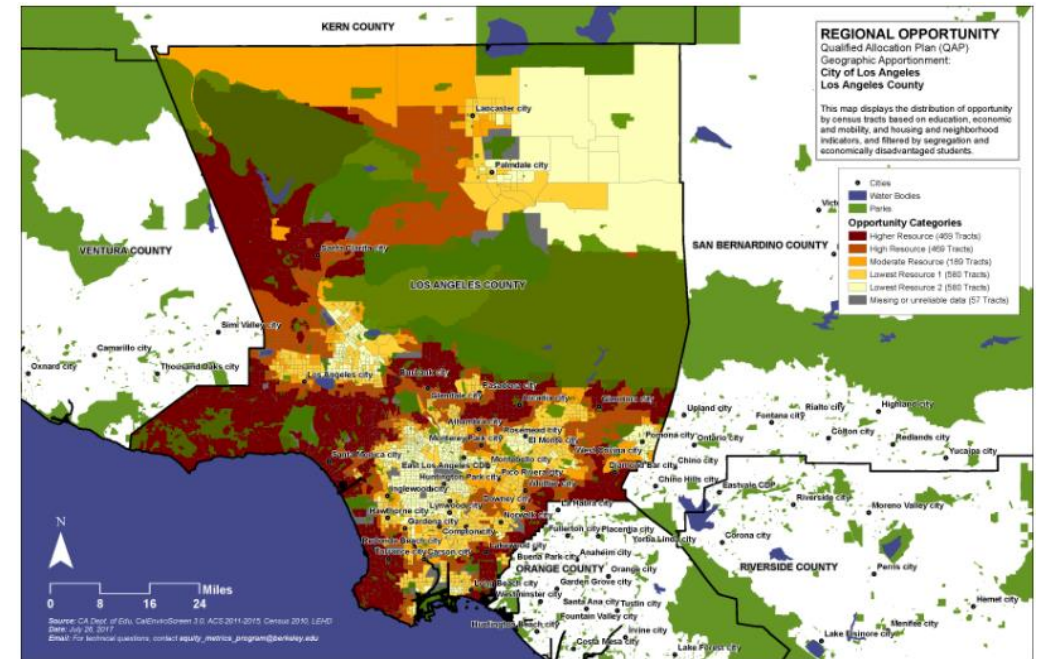
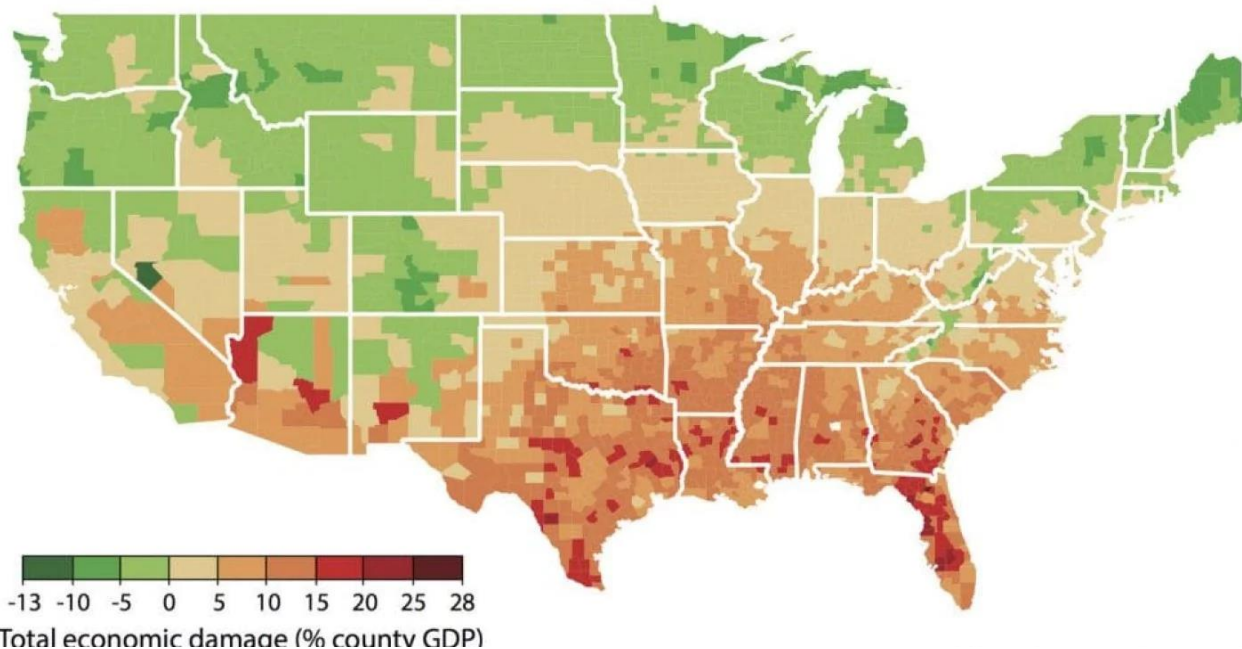
{I} Market Inspirations for Resilience



Moody's	Standard & Poor's	Fitch	AM Best	Credit worthiness	Investment grade
Aaa	AAA	AAA	aaa	An obligor has EXTREMELY STRONG capacity to meet its financial commitments.	
Aa1	AA+	AA+	aa+	An obligor has VERY STRONG capacity to meet its financial commitments. It differs from the highest rated obligors only in small degree.	
Aa2	AA	AA	aa		
Aa3	AA-	AA-	aa-		
A1	A+	A+	a+	An obligor has STRONG capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligors in higher-rated categories.	
A2	A	A	a		
A3	A-	A-	a-		
Baa1	BBB+	BBB+	bbb+	An obligor has ADEQUATE capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments.	
Baa2	BBB	BBB	bbb		
Baa3	BBB-	BBB-	bbb-		
Ba1	BB+	BB+	bb+	An obligor is LESS VULNERABLE in the near term than other lower-rated obligors. However, it faces major ongoing uncertainties and exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitments.	
Ba2	BB	BB	bb		
Ba3	BB-	BB-	bb-		
B1	B+	B+	b+	An obligor is MORE VULNERABLE than the obligors rated 'BB', but the obligor currently has the capacity to meet its financial commitments. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitments.	
B2	B	B	b		
B3	B-	B-	b-		
Caa	CCC	CCC	ccc	An obligor is CURRENTLY VULNERABLE, and is dependent upon favourable business, financial, and economic conditions to meet its financial commitments.	
Ca	CC	CC	cc		
C	C	C	c	An obligor is CURRENTLY HIGHLY-VULNERABLE.	
				The obligor is CURRENTLY HIGHLY-VULNERABLE to nonpayment. May be used where a bankruptcy petition has been filed.	
C	D	D	d	An obligor has failed to pay one or more of its financial obligations (rated or unrated) when it	Junk or sub-investment grade

Finance Cautions: Tales of Two Futures

- Poorest 1/3 of U.S. counties sustain greater economic hardship from hurricanes, rising sea levels & high temperatures



{I}: General/Green/Environmental/Resilience Bonds

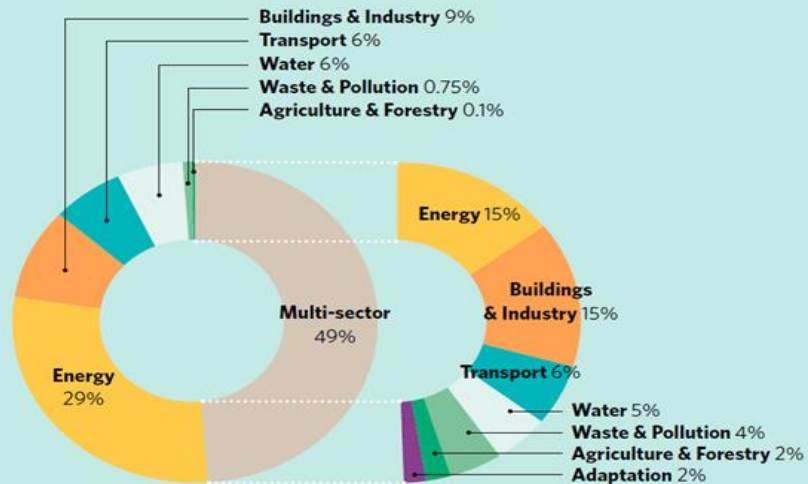
The Water Criteria of the Climate Bonds Standard Phase 1: Engineered Water Infrastructure



ABSTRACT
What can be certified and under what eligibility conditions?



The sectors covered by the green bond market

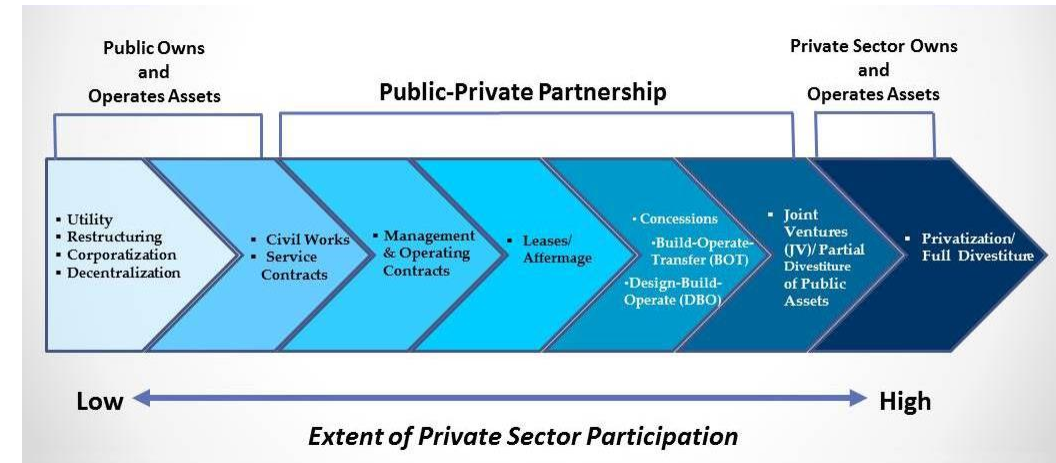


Source: Moody's/Climate Bonds Initiative, The Economist; ASU Smart City Investment Guide; District of Columbia

{I}: PPP, Special Purpose Vehicles, Green Banks

Regional Resilience Trust Funds

An Exploratory Analysis for the New York Metropolitan Region



Source: World Bank, NRDC & Climate Finance Advisors, Hindu Times, Regional Plan Association

{I} How to Invite Finance

- ✓ Design and Inspire Future Utopias
- ✓ Strategic objectives, priorities and programs
- ✓ Priorities and program with stakeholders
- ✓ Governance, vehicles and focal point
- ✓ Mechanisms for contracting by project stage
- ✓ Overview of legislative, regulatory and licensing
- ✓ Clear, comparative and analyzed data
- ✓ Budget strategy

Recommended Reading - Finance {I}

1. [6 Steps for Building the "Sweet Spot" Between Social Equity and Financial Equity](#)
2. [Paying for Resilience: Market Drivers and Financial Means](#)
3. [Who Owns The Physical Risks From Climate Change? \(And What One Move Can Make It Less Risky?\)](#)
4. [Climate Disasters Hurt The Poor The Most. Here's What We Can Do About It.](#)
5. [10 Tips For A National Infrastructure Bank That Furthers Resilience Investments](#)
6. [The Next Era Of Market Finance For Resilience](#)
7. [Credit Rating Agencies Assess The Physical Risks Of Climate Change](#)

Recommended Reading - Finance {I} Cont

Resilient by Design Finance Guide

- <http://www.resilientbayarea.org/finance-guide/>

Smart Cities Council Financing Guide

- https://urbaninnovation.asu.edu/sites/default/files/smartcitiescouncil_-_financing_guide-3_31_14.pdf

PWC Investor Ready Cities

- <https://www.pwc.com/gx/en/psrc/publications/assets/pwc-investor-ready-cities-v1.pdf>

UMB Financing Climate Resilience

- http://www.umb.edu/editor_uploads/images/centers_institutes/sustainable_solutions_lab/Financing_Climate_Resilience_April_2018.pdf

EEA Financing Urban Adaptation

- <http://www.derris.eu/wp-content/uploads/2017/08/eea-financing-urban-adaptation-thal17002enn.pdf>

Climate Resilience Consulting Partners



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Thank you!

- The ***Climate-Safe Infrastructure*** Webinar Series continues at least through July 2018
- Upcoming webinars:
 - Talking Climate Change with Engineers – July 12, 12pm – 1pm PST
 - AB2800 Report Release! – August 23, 12pm – 1pm PST
 - Track webinars and progress of CSIWG at: <http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/>
- Questions: Joey Wall - Joseph.Wall@resources.ca.gov