



MARKET EXPECTATIONS FOR CLIMATE CHANGE DISCLOSURE

CDIAC BOND BUYER PRE-CONFERENCE
SESSION 1 | OCTOBER 26, 2020

SPEAKER INTRODUCTIONS



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CLIMATE-RELATED RISKS





**CLIMATE RISK
= PHYSICAL
RISK =
MATERIAL
RISK**

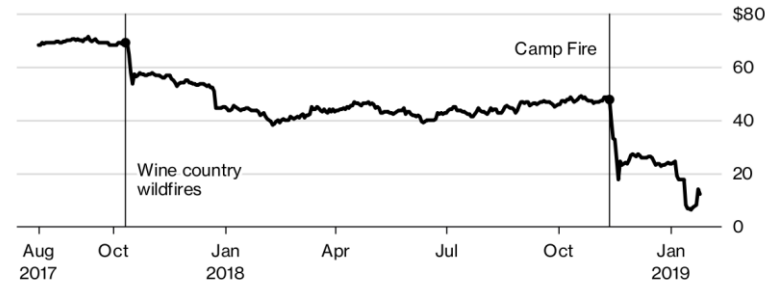
Recognizing that climate change poses an immediate risk to physical infrastructure but also a financial risk to long-term investment stability

PG&E BANKRUPTCY

Fires Burn PG&E

Two years of deadly fires pushed company to bankruptcy

Share price



Source: Bloomberg

Bloomberg



**CLIMATE-RELATED
INFRASTRUCTURE IMPACTS**



State-Owned Property At Risk

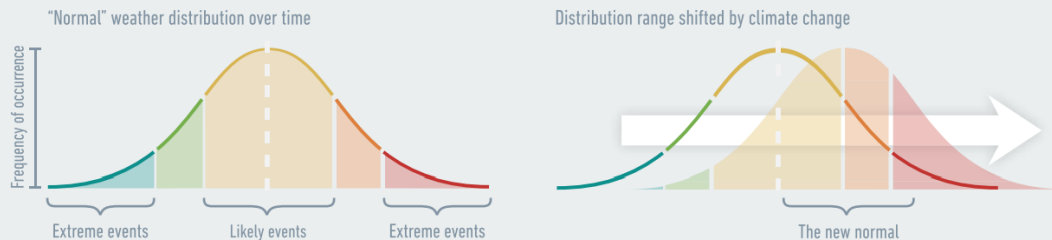
- Schools
- Freeways, highways, roads
- Prisons
- Government buildings
- Caltrans fleet



Defining Risk

- Accelerated sea level rise
- Changes in water availability
- Declines in agriculture productivity
- Increases in electricity demand & cost
- Heat-related mortality
- Decreases in labor productivity

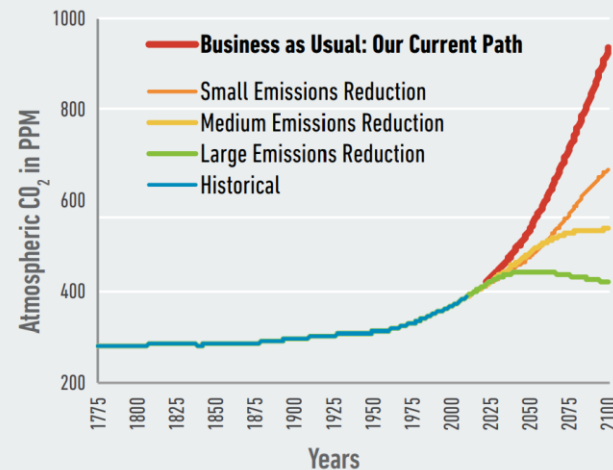
Figure 1: How Extreme Weather Events Become the New Normal



Human society is structured around "normal" weather, with some days hotter than average and some colder. At the distant "tails" are extreme events such as catastrophic weather. Climate change shifts the entire distribution curve to the right: old extremes become the new normal, new extremes emerge, and the process continues until we take action.

Source: Risky Business Project

Figure 8: Global Emissions Scenarios



Our research examines the risks of the U.S. continuing on its current path, or "business as usual." Alternate pathways that include investments in policy and other efforts to mitigate climate change through lowering carbon emissions could significantly reduce these risks.

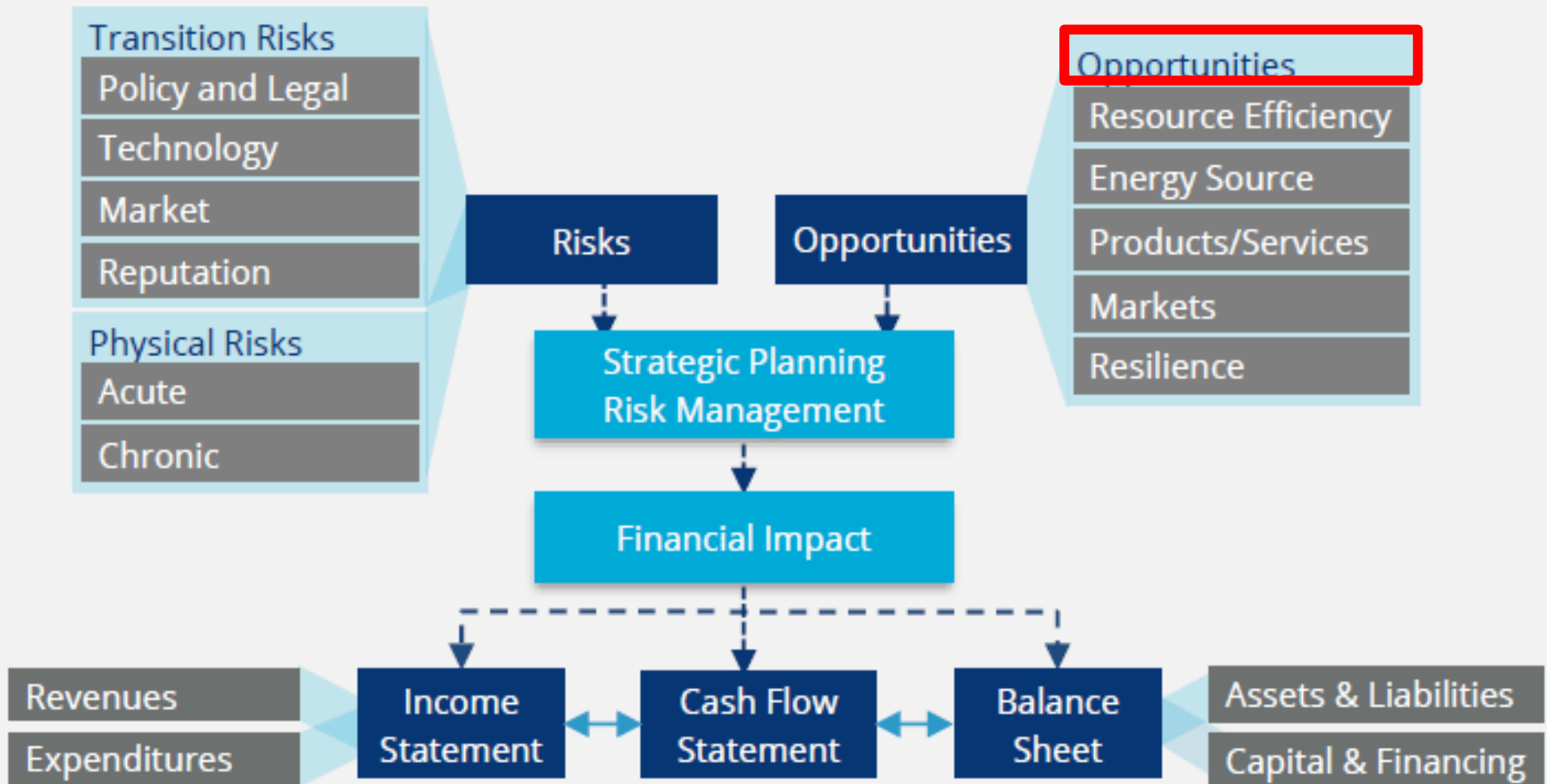
Original data source, adapted: Meinshausen and others 2011¹⁴²

**“Climate
Risk is
Investment
Risk...”**



Every
government,
company,
and
shareholder
must confront
climate
change.”

-Larry Fink,
*Chairman and CEO
of BlackRock*, in his
2020 letter to CEOs



Core Elements of Recommended Climate-Related Financial Disclosures



Governance

The organization's governance around climate-related risks and opportunities

Strategy

The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management

The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets

The metrics and targets used to assess and manage relevant climate-related risks and opportunities

WORLD ECONOMIC FORUM

A GLOBAL
PERSPECTIVE

MOODY'S
INVESTORS SERVICE




427

Four Twenty Seven
AN AFFILIATE OF MOODY'S



BLACKROCK

 Microsoft



Executive Order N-19-19

Mitigating the impacts of
climate change while
building a sustainable,
inclusive economy





GOALS

FOR CLIMATE RISK & SUSTAINABLE INVESTMENT

- Improve Industry Disclosure and Reporting Practices
- Engage in Climate-Conscious Investments





California Climate Investment Framework

Managing the financial risks of climate change while investing in new, sustainable technologies

State's 3 Largest Pension Funds - \$700B

Integrating climate risk strategies into a statewide approach for future investment & long-term security



Current Efforts by Pension Entities			
	CalPERS	CalSTRS	UC
Listed as Leaders in Responsible Asset Allocation in 2019	✓	✓	✓
Signatory of U.N. Principles for Responsible Investment	✓	✓	✓
Published or signed onto statements on environmental sustainability in an investment context	✓	✓	✓
Included language related to climate change in official investment policy	✓	✓	✓
Produces regular climate-related risk reports	✓	✓	✓
Support TCFD disclosure standards	✓	✓	✓
Support SASB disclosure standards	✓	✓	
Discloses carbon footprint of investment portfolio	✓	✓	✓
Investor for Climate Action 100+	✓	✓	✓
Steering Committee member of Climate Action 100+	✓		
Members of Ceres Investor Network	✓	✓	✓
Use stakeholder status to engage with companies and encourage exploring climate risk	✓	✓	✓
Invests in sustainable portfolios	✓	✓	✓



California Climate Risk Disclosure Work Group

A public-private
partnership to
develop common
climate risk
disclosure
standards

A photograph of construction workers on a building site. The workers are wearing orange and green safety gear and blue hard hats. They are standing on a grid of steel rebar that has been laid out on a wooden formwork deck, preparing for a concrete pour. In the background, a construction crane is visible against a clear sky. The overall scene is one of active construction work.

CA Joins Coalition for Climate Resilient Investment

“

California is putting our money where our values are. With this new framework, we're leveraging our state's investment power to reduce financial risk while capturing the enormous opportunity and innovation offered by the transition to a clean economy.”

Governor Gavin Newsom

Climate Catalyst Revolving Loan Fund



Driving private investment in climate smart technology

- Nurturing climate industries
- Connecting projects to capital
- Promoting job growth
- Streamlining government



THANK YOU!

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<https://opr.ca.gov/>



Bond Buyer - CDIAC

ESG Data and Disclosure

October 26, 2020



Better Data Can Highlight Climate Exposure



Agenda

1. Explain the Value of Environmental Data for Physical Risk
2. What is the Underlying Data
3. Highlights
4. Focus on Acute Risk Analysis

Explore Potential Environmental Exposure

- Challenges remain with respect to data and disclosure; better data could provide an enhanced foundation for understanding physical climate risks.
- The market continues to seek greater transparency and standardization with respect to green and ESG related risks and opportunities.
- ESG risks have always been a part of our analysis but we have increased our focus – just as the ESG risks have increased their frequency.
- Our Criteria do incorporate environmental risks as they impact credit as outlined in publications including ESG ‘Through the lens’ and ‘How local government criteria weather climate’ commentaries. Physical climate risks are incorporated into our ratings when we view them as certain and material.

Climate Hazards

- **Chronic risks** - manifesting through long-term shifts in climate patterns, such as higher temperatures that may cause heatwaves, sea level rise and/or droughts.
- **Acute risks** - event-driven, including increased severity and frequency of extreme weather events, such as hurricanes and/or floods.

Climate Hazard	Indicator	Definition
Water Stress	Water Stress Index	Projected future ratio of water withdrawals to total renewable water supply in a given area.
Flood	Flood Risk Index	Index representing the risk of flooding at a given location in a given year.
Heatwave	Heat Wave Days	The occurrence of periods of extreme heat relative to local climatic conditions, measured based on the Excess Heat Factor (three-day average temperature).
Cold wave	Cold Wave Days	The occurrence of extreme cold relative to local climatic conditions, measured based on the Excess Cold Factor (three-day average temperature).
Hurricane	Hurricane Index	Composite index representing the historical incidence and severity/strength of hurricane, typhoon or cyclone activity at a given location, weighted in favour of recent events.
Wildfire	Burnt Area	Risk of wildfire occurrence by location based on the area of burnt vegetation (fuel aridity).
Sea Level Rise	Inundation Depth	The extent and depth of coastal inundation due to sea level rise at a given location in a given year.

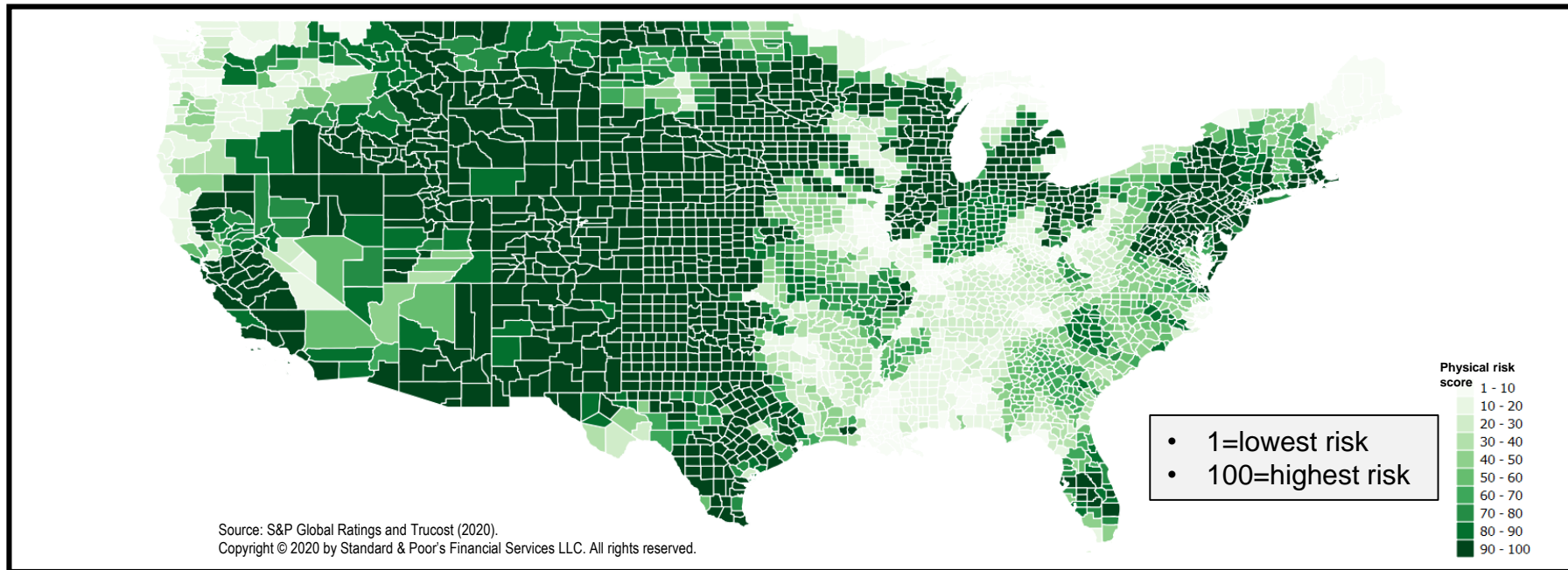
Source: Trucost (2020). Current as at September 2020.

What Do The Physical Risk Scores Mean?

- **DO**: Climate hazards are mapped and normalized scores are assigned from 1 (lowest risk) to 100 (highest risk) representing exposure of any given location to different climate hazards, relative to global conditions. Our analysis calculated the average for each county.
- **DO**: Provide relative physical risk scores for each climate hazard as well as a composite score for multiple hazards and for various RCPs or scenarios.
- **DO**: Provide individual metric conversions for some risks. For example:
 - Heat wave risk is calculated as the number of heat wave days per year where a 1-point change in the physical risk score is equivalent to an increase/decrease of 1.3 heat wave days, and
 - Cold wave risk is calculated as the number of cold wave days per year where a 1-point change in the physical risk score is equivalent to an increase/decrease of 0.2 cold wave days.
- **DO NOT**: The scores do not take into account adaptation efforts that entities have implemented or may implement in the future.
- **DO**: Provide a basis for conversation and understanding about the range of possible exposures that USPF entities face in the upcoming decades using multiple scenarios
- **DO**: Highlight potential increase in exposure over time which facilitates dialogue and learning about how entities consider different climate hazards and what measures they have in place, or not, to reduce risks.

Water Stress Scores Across The U.S. Under RCP8.5 In 2050

- A greater water stress score means that water demand is likely to outstrip the renewable supply and so water resources could deplete over time.
- 38% of US counties score 100 (the maximum risk score on our scale), whilst half of counties have high risk with scores of 70 or above in 2050 under RCP4.5 and RCP8.5.



Value Add to Analytics- Water Stress Example

- Can provide planning insights for **Local Governments** (*over 30 years*) as they build out their urban plans, growth and school district planning. **Not just a utilities issue.**
- **Constraints on water** can **constrain growth**, thus school enrollment and economic development.
- While counties in California have been coping with water stress for decades, counties in Texas, which are among the fastest-growing nationally, show the greatest **change** in water stress over the next 30 years posing a challenge for economic development and municipal infrastructure planning if these scenarios come to pass and are not address through either environmental or financial planning.



The Role of E data in Analysis

- Creditworthiness can weaken when environmental risks are material and not, in our view, mitigated by other credit factors such as capital and financial planning and coordination with other government entities.
- Enhanced analytics can provide greater transparency for market participants to identify and analyze potential longer-term risks and facilitate a dialogue with entities that are potentially exposed across USPF in the following ways:

Local Government Example



Institutional framework 10 %

Economy 30 %



Management 20 %

Liquidity 10 %



Budgetary performance 10 %



- Ongoing analysis of the adequacy of the entities' planning and response to growing environmental threats, including adaptation and mitigation plans, affecting financial and operating management across a variety of municipal asset classes;
- The potential long-term economic and demographic consequences, including the impact on tax bases;
- The adequacy of reserves or financial capital to respond to potentially increasingly volatile environmental conditions; and
- The potential impact on balance sheets as a means for financing adaptation and mitigation projects.

Budgetary flexibility 10 %

Debt & contingent liabilities 10 %

Considerations

Service balance:

Service provision and investment in adaptation projects

Issuer opportunity:

Increased transparency allows issuers to demonstrate the benefits of existing or planned adaptation actions.



Diverse issuers in USPF will likely lead to a consideration of a variety of data sources, including enhanced analytics related to physical risks

Acute Risk: How We Address Emergency Evolving Credit Quality

We look at credits individually to assess the damage and potential rating impact.

Factors that help support credit quality during a disaster:

- **Liquidity and/or reserves**
- **Availability of federal and state emergency assistance**
- **FEMA & Insurance**
- **Advance planning** *Issuers that have contingency plans for major environmental (or other) risks are better able to respond in a crisis, in terms of liquidity as well as deployment of resources.*



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Evaluating Climate Risk in Muni Bonds

CDIAC Preconference Session 1:

Market Expectation for Climate Change Disclosure

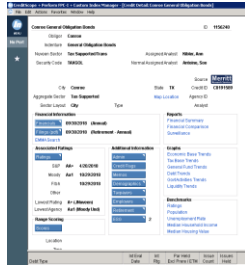
October 2020

Sarah Wilson

Senior Director, Responsible Investing, Nuveen

Responsible Investing in Munis at Nuveen

ESG Integration



~ 28,000 municipal issuers receive a proprietary data-driven ESG score, which is accessible by all Nuveen muni analysts and PMs

Engagement



Nuveen is an active member of industry working groups seeking to fill ESG disclosure gaps among municipal issuers and drive best practices

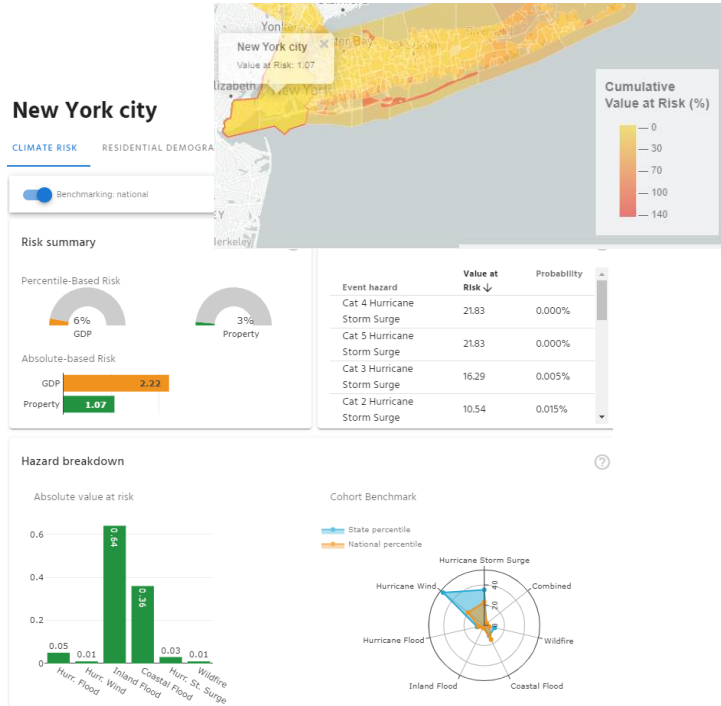
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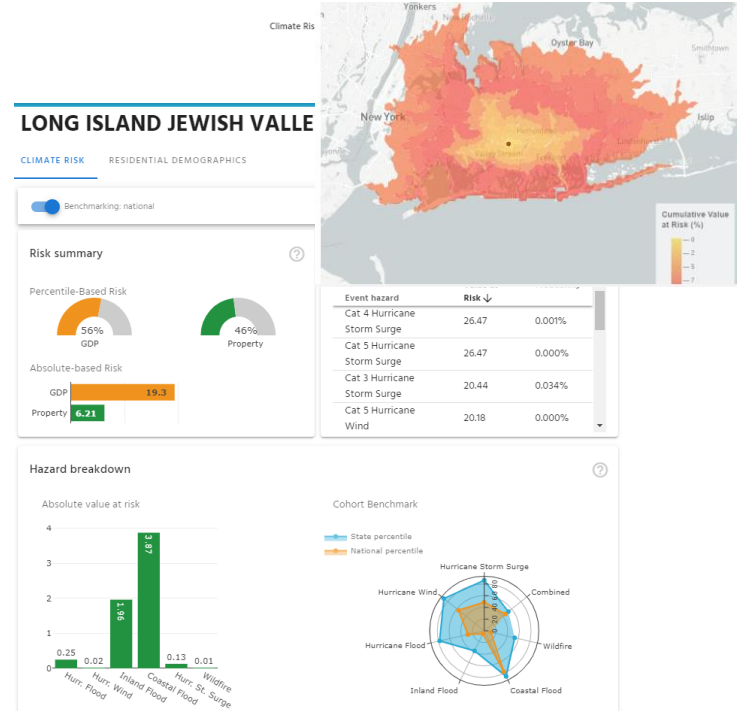
Nuveen's ESG Muni separate account strategy includes securities that have positive outcomes aligned with the SDGs

Climate Value at Risk Muni Data: RisQ

Geographic boundaries (city)



Point location (hospital)



Climate Disclosure Suggestions for Issuers

Physical and Transition Risk

Address exposure to both physical risk (from increasingly severe climate hazards) and transition risk (from the shift to a low carbon economy).

Mitigation and Adaptation Strategies

Describe any climate mitigation and adaptation strategies in place, including costs if known and any key dependencies such as the availability of property & casualty insurance or FEMA disaster relief funding

Material Costs from Past Climate Events

Disclose material costs associated with any past hazards or natural disasters projected to become more frequent in a changing climate (e.g. inland and coastal flooding, wildfires, hurricanes, droughts)



Consider CDP disclosure to reach more investors by using a standard platform

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Morgan Stanley



Climate Change Disclosure

CDIAC Conference

October 26, 2020

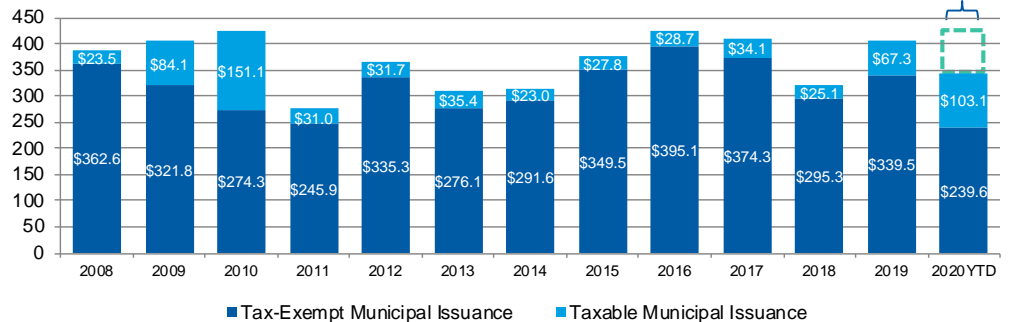
Municipal Market Issuance

The number of transactions using fewer ratings has increased over time

- Municipal issuance has ranged from \$277 billion to \$425 billion annually
- On an annualized basis, volume in 2020 would be \$439 billion, exceeding the prior peak of \$425 billion during 2010, when BABs issuance peaked

Annual Municipal Issuance

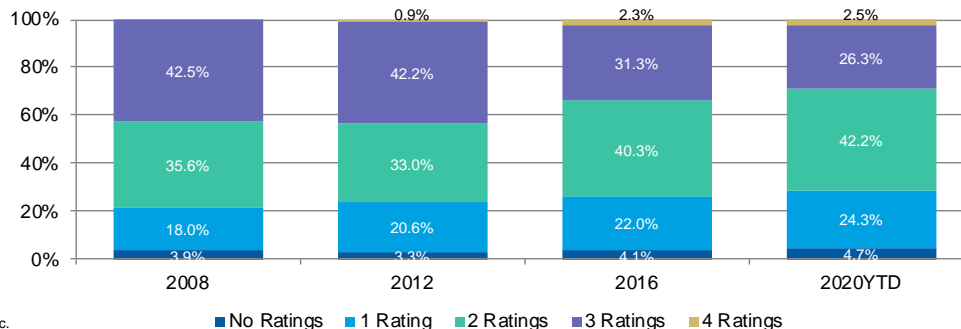
(\$ in Billions)



\$439 billion (2020 YTD annualized)

- The number of transactions with zero to two ratings has increased from 57.5% in 2008 to 71.2% this year

% of Newly-Issued Par, by Number of Ratings



Source: SDC Platinum, Municipal Market Analytics, Inc.

Principles Guiding Disclosure from the Perspective of an Underwriter

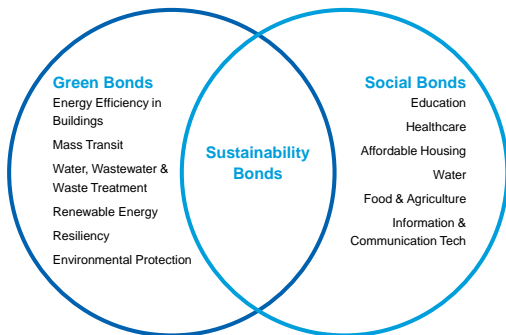
Climate change disclosure can be enhanced using these same principles

- **Underwriter serves as intermediary between investors and issuer**
 - Beyond strict legal obligations concerning anti-fraud and requirements to disclose material information, underwriter may suggest incorporating information that investors seek to make their investment decisions
 - Based on experience and questions fielded from investors in prior, similar transactions
- **Institutional investors are focused on long-term credit quality for long-term bonds**
 - Issuer may get questions on long-term planning, capital improvement program, and disaster response
 - Reserve policies and abilities to withstand negative shocks could also be a focus area
 - Opportunity for issuer to control the narrative and answer investor questions
- **Climate change disclosure will vary based on type of borrower, bond security, asset being financed**
 - Are bonds secured by assets being financed? If so, is asset at risk due to sea level rise, extreme heat, flooding or wildfire?
 - How might revenues of issuer be impacted? (e.g. What is reliance on property tax and how significant could impacts be to property tax?)
 - Could repair or replacement of assets cause significant expenditures in the future?
 - What are potential impacts on operational expenses of issuer?
- **Leverage other parts of organization and other public documents**
 - Many issuers may have other departments or plans that more specifically focus on these areas or portions of these areas, encompassing public works, sustainability, and disaster response
 - Regional JPAs and partners may also be leveraged for plans and resources

Continued and Growing Investor Interest in Tax-Exempt Green / Sustainability / Social Bonds Presents an Opportunity

Implications of Green or Sustainability Bond Designation on Climate Change Disclosure

Green, Social and Sustainability Bond Overlap



United Nations Sustainability Development Goals (“SDGs”)



Examples of Mapping of Selected GBP and SBP Project Categories to the SDGs:

SDG	GBP Category	SBP Category	Example Indicator
	<ul style="list-style-type: none"> Sustainable Water Sustainable Wastewater 	<ul style="list-style-type: none"> Affordable basic infrastructure (e.g. clean drinking water, sewers, sanitation, transport, energy) 	<ul style="list-style-type: none"> Sustainable infrastructure for clean and/or drinking water Wastewater treatment Sustainable urban drainage systems and river training Flooding mitigation
	<ul style="list-style-type: none"> Clean Transport Renewable Energy Terrestrial and Aquatic Biodiversity Conservation Pollution Prevention and Control Green Buildings 	<ul style="list-style-type: none"> Affordable Housing Affordable Basic Infrastructure Socioeconomic Advancement and Empowerment 	<ul style="list-style-type: none"> Inadequate housing Convenient access to public transport



Morgan Stanley

APPENDIX

Legal Disclaimer

Morgan Stanley

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