

GREEN BANK NETWORK

WEBINAR SERIES

*Integrating Climate Resilience into
Infrastructure Investments*



**GREEN BANK
NETWORK**



10 July 2018

Green Bank Network Members



**Green
Investment
Group**

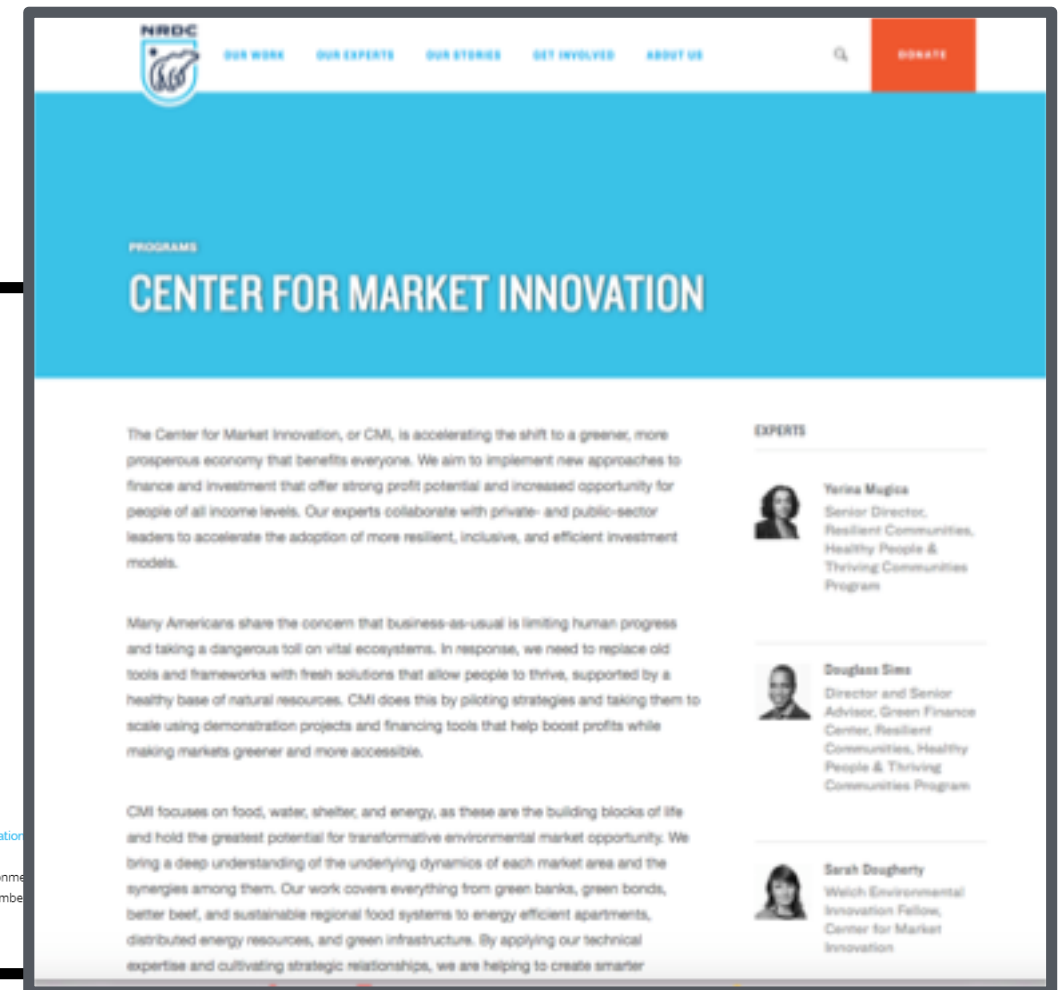


GBN Secretariat



GBN Knowledge Center and NRDC's CMI

greenbanknetwork.org



nrdc.org/about/center-market-innovation

Presenters



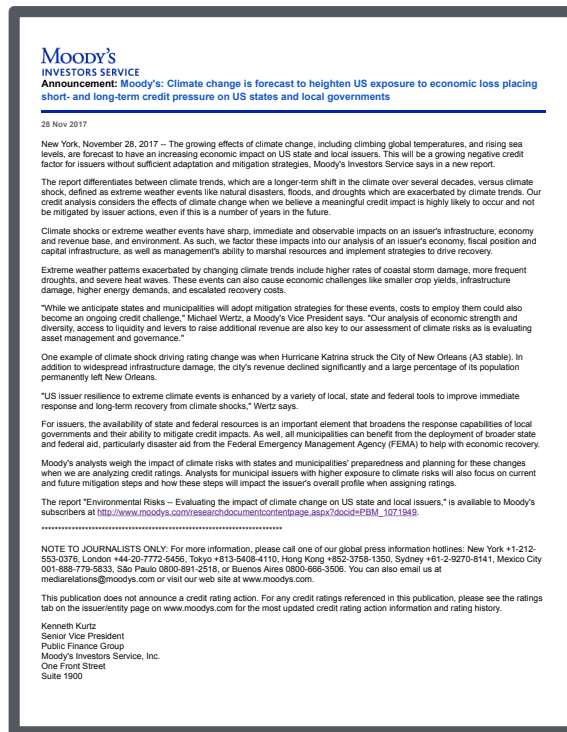
Stacy Swann, Founding Partner and CEO,
Climate Finance Advisors



Josh Sawislak, Senior Advisor, Center for
Climate and Energy Solutions (C2ES)

Moody's: Resilience Affects Local Credit

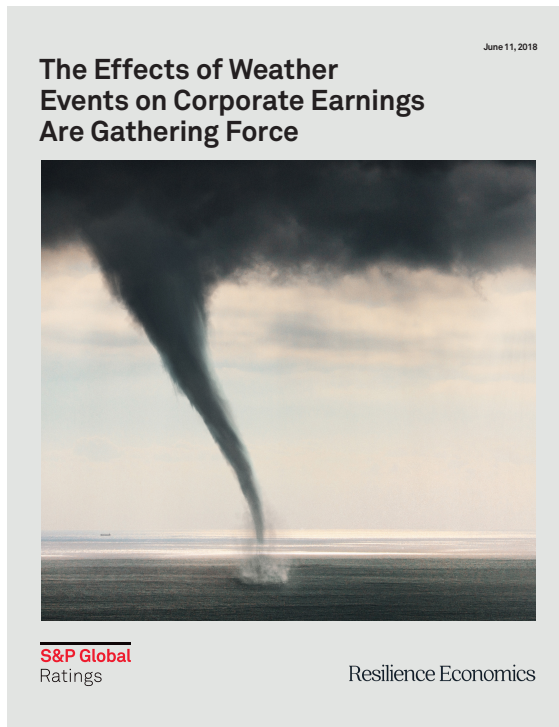
Moody's November, 2017, "Environmental Risks -- Evaluating the impact of climate change on US state and local issuers":



- “Growing negative credit factor for issuers without sufficient adaptation and mitigation strategies”
- When Hurricane Katrina struck the City of New Orleans was rated A3 stable
 - Widespread infrastructure damage
 - Dramatic decline in city's revenue
 - Significant share of residents permanently left
- Moody's analysts weigh the impact of climate risks with states' and municipalities' preparedness and planning for climate risk when analyzing credit ratings

S&P: And, Affects Corporate Earnings

S&P's June, 2018, "The Effects Of Weather Events On Corporate Earnings Are Gathering Force":



- In FY 2017, 73 companies (15%) on S&P 500 publicly disclosed effect on earnings from weather events, only 18 companies (4%) quantified effect
- Average materiality on earnings for 18 companies quantified effects was 6%
- Climate risk is prevalent topic of discussion for CEOs and management teams of publicly traded companies becoming increasingly accountable for understanding and mitigating the impact of climate risk
- Evidence of the impact of climate risk is found across all sectors, geographies and seasons

Integrating Climate Resilience into Infrastructure Investments

Josh Sawislak, AICP

Green Bank Network



C2ES.ORG

- **Independent, nonpartisan, nonprofit organization.**
- **Mission: To forge practical solutions to reduce greenhouse gas emissions, expand clean energy, and strengthen resilience to climate impacts.**
- **A key objective is a national market-based program to reduce emissions cost-effectively.**
- **Brings city, state, and national policymakers together with businesses and other stakeholders.**
- **Ranks regularly among the top environmental think tanks in the world.**

- **Infrastructure is a Long Term Investment – for Investors and Communities**
- **Climate Change and Others Perils are Impacting the Business Case for this Investment Class**
- **The Capital Markets are Learning How to Better Price Climate Risk**
- **This Presents both a Challenge to Investors and Opportunities**

- **Relative (not Absolute) Term: *you must be resilient to something***
- **Origins in Natural Science**
- **Literally Means the Action of Bouncing Back**

- **Understanding Risk**
- **Threats and Vulnerabilities**
- **Financing vs. Funding**
- **Data Quality and Uncertainty**
- **Investment Horizon vs. Useful Life**
- **Risk Pricing**

- **Risk Provides Opportunities**
- **Mitigate-Transfer-Accept**
- **Non-correlated Risk**
- **Transition and Physical Risks**

- **Climate Risk Transparency**
- **Managing Uncertainty**
- **Balancing Investor vs. Company Timeframes**



FOR MORE INFORMATION

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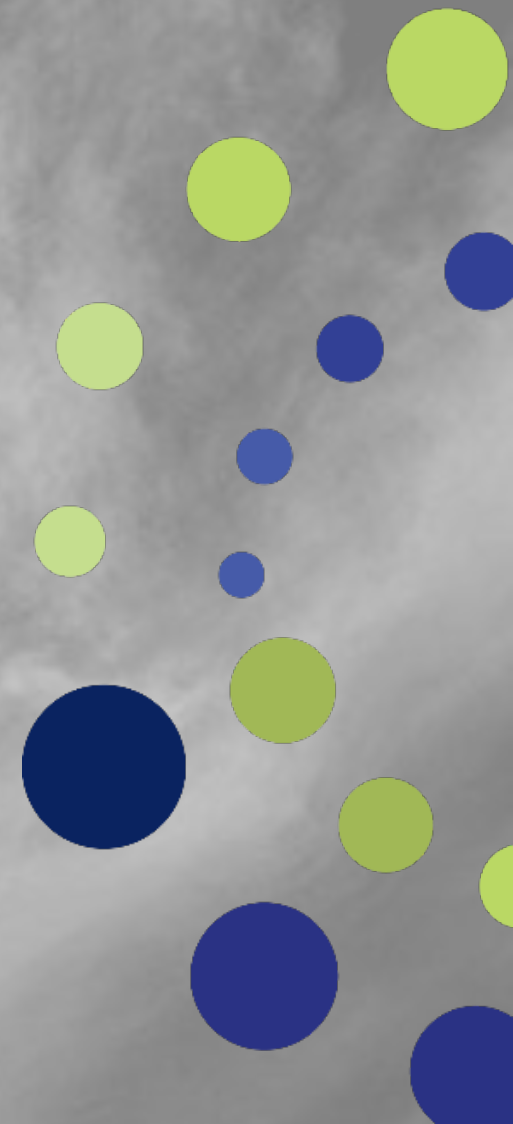
LENDERS GUIDE FOR CONSIDERING CLIMATE RISK IN INFRASTRUCTURE INVESTMENTS

**GREEN BANK NETWORK WEBINAR
JULY 10, 2018**

**STACY SWANN
CEO – CLIMATE FINANCE ADVISORS, BLLC**



**CLIMATE
FINANCE
ADVISORS**



HOW WE INVEST MATTERS

Climate Finance Advisor's mission is to **accelerate** sustainable, climate-smart investments, and to **integrate** climate considerations into financial products, services and policies.

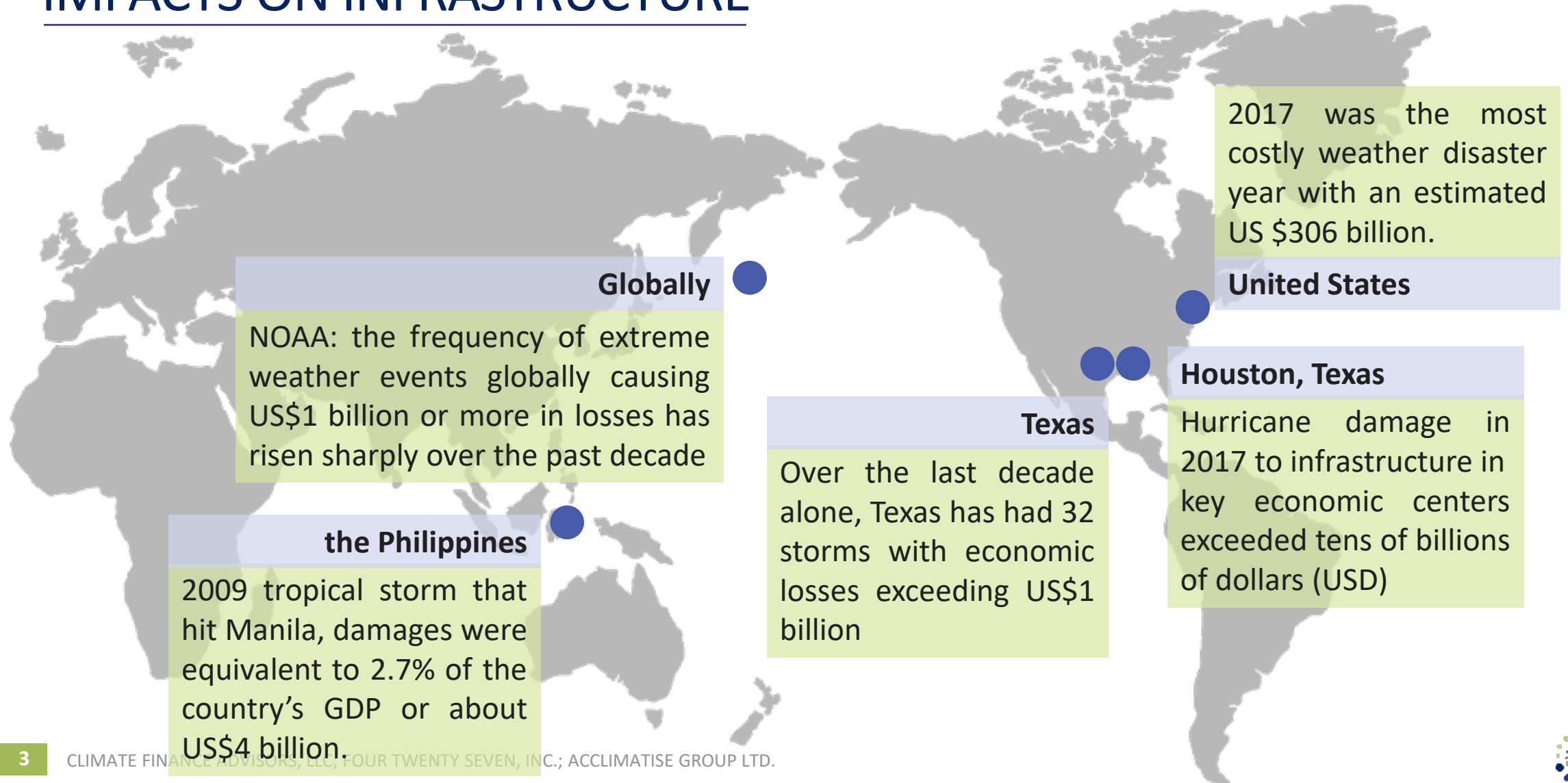
*Climate Finance Advisors works with **public** and **private** sector clients to:*

**Develop
Climate
Investment
Strategies**

**Appraise
& Structure
Climate Smart
Investments**

**Mobilize,
Catalyze,
Leverage
Public &
Private Capital**

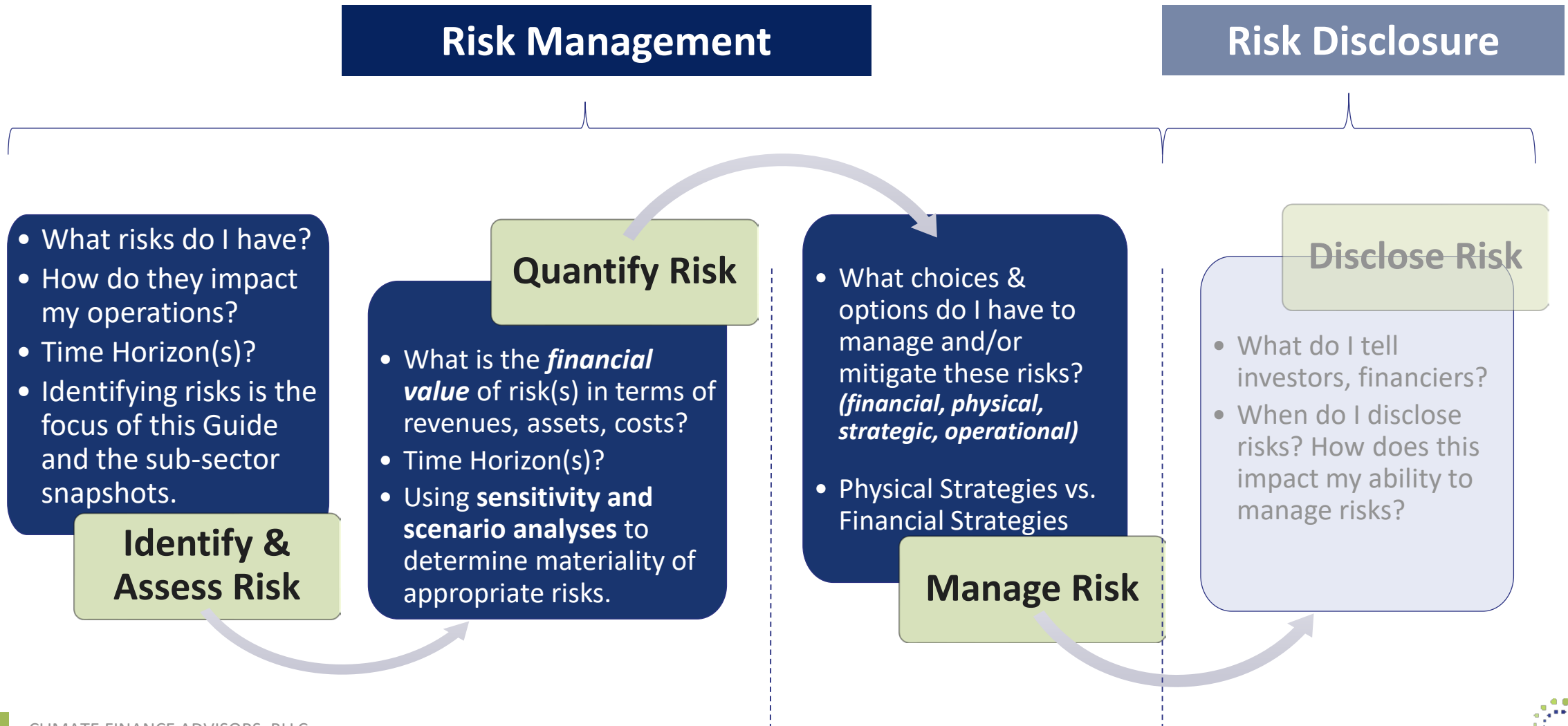
CLIMATE CHANGE ALREADY HAVING FINANCIAL IMPACTS ON INFRASTRUCTURE



A photograph of a wind farm on a mountain ridge. Several white wind turbines are visible, receding into the distance. The sky is a mix of orange, yellow, and blue, suggesting sunset or sunrise. A layer of white clouds or fog fills the valleys between the ridges. The foreground shows the grassy slope of the ridge.

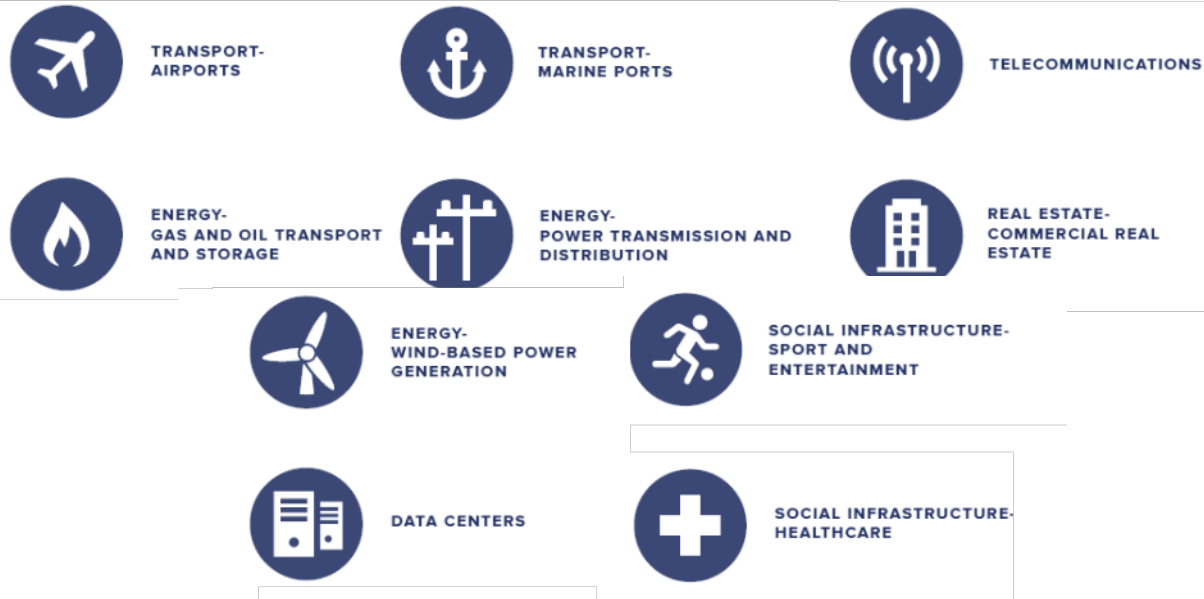
WHY AN “INVESTOR GUIDE”

FOCUS ON GOOD RISK MANAGEMENT PRACTICES VS. DISCLOSURE

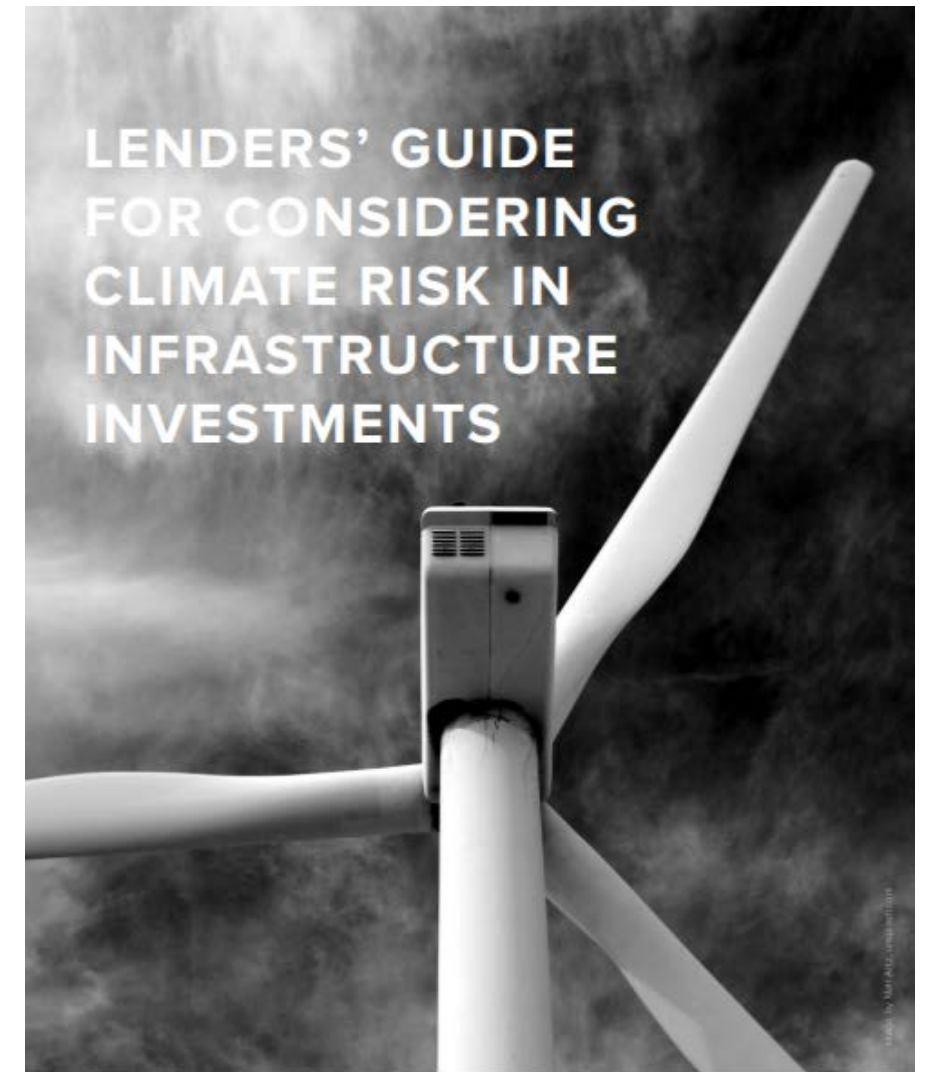


MAINSTREAMING CLIMATE RISK INTO INFRASTRUCTURE LENDING

This Guide includes “snapshots” of ten infrastructure sub-sectors:



How **loan and credit officers** might think about physical climate-related risks when appraising a new projects or corporate loans, or when evaluating an equity investment into an infrastructure project



ACCLIMATISE
Building Climate Resilience



Four Twenty Seven
Climate Solutions



CLIMATE
FINANCE
ADVISORS

Link: <https://goo.gl/9L38pU>



CLIMATE-RELATED “HAZARDS” THAT CAN HAVE A FINANCIAL IMPACT

- Six climate-related hazards that may have operational and financial impacts on infrastructure are considered in the snapshots:



Temperature



Sea-level Rise



Precipitation & Flood



Storms



Drought



Water Stress



WHAT PROBLEM ARE WE TRYING TO SOLVE?

Not all “financiers” are the same

- **Main Audience:** Banks, Infrastructure Lenders
- **Purpose of Guide:** Help financiers integrate climate risk considerations into their infrastructure investments
- **Key Guidance:** How these risks manifest in ***Revenues, Assets and Costs*** of a project
- **Snapshots:** Ten infrastructure sub-sectors illustrate ***how loan and credit officers might think about weather- and climate-related risks***

New Investments

- Identifying risks during project appraisal
- Help clients put efforts in place to better manage risks
- **Not just about Insurance.**

Portfolio Management

- Understand areas of risk, types of risk
- Understand concentrated risks
- Help clients manage risks better



COSTS: REAL MONEY AT STAKE FROM CLIMATE-RELATED RISKS

Costs of Climate-Related Risks

US\$1b+ x*32 Storms

Over the last decade alone, Texas has had 32 storms with economic losses exceeding US\$1 billion

US \$306 billion

Weather disaster damage in 2017 to infrastructure in key economic centers in the United States

Costs of Harvey (Houston)

HURRICANE HARVEY IMPACTS - STATEWIDE

- \$150 to \$180 billion++ in total damage

HURRICANE HARVEY IMPACTS - HOUSTON

- 311,859 housing units affected (estimate)
- 130,000 FEMA Individual Assistance claims (Apr'18)
- ***\$2.4 billion damaged city facilities & infrastructure***
- 2,500 roadway miles inundated
- 650,000 HPD overtime hours – city, state

Extreme weather events and climate change pose both **acute & chronic physical risks** to infrastructure



- Impact **key financial parameters**: revenues, expenditures, assets, capital, and financing
- Affect the **credit quality** of borrowers
- Affect **structuring decisions**, loan pricing, returns



A LOT OF VALUE IS POTENTIALLY AT RISK IN LENDING FOR INFRASTRUCTURE

US\$ 90 Trillion

- Global Demand for new infrastructure from 2015 to 2030

US\$ 50 Trillion

- World existing infrastructure stock by 2015

Even without considering climate-related risks, a range of barriers must be addressed to increase the quantity of new infrastructure, as well as improve the quality of both existing and new infrastructure – locally (cities, towns, municipalities) and globally.

Traditional tools to help banks assess credit risks may be only marginally useful for helping assess physical climate-related risks to an individual infrastructure projects.

Generalized approaches or broad “sectoral” assessments attempting to understand impacts on performance and value at risk may falsely estimate the sensitivity (high or low) of a particular asset to physical climate-related risks. Project specific appraisal of infrastructure vulnerability needed.

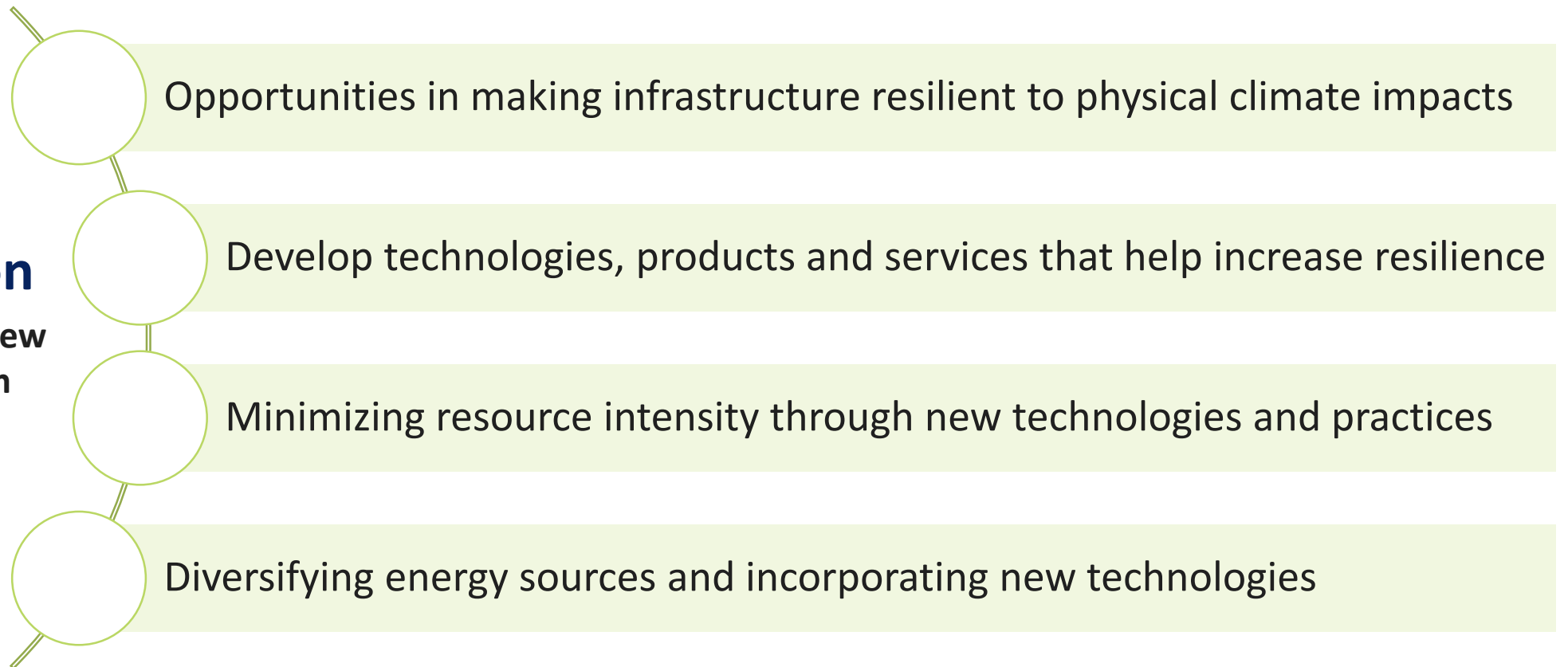


WEATHER AND CLIMATE-RELATED OPPORTUNITIES

OPPORTUNITIES: What are they? Why do they matter for infrastructure lending?

US \$90 trillion

Global demand for new
infrastructure from
2015 to 2030



CERTAIN TYPES OF INFRASTRUCTURE LENDING IS MORE AT RISK FROM WEATHER AND CLIMATE CHANGE

Weather- and climate sensitive locations



- Assets located in low-lying coastal areas will, for instance, be increasingly exposed to and affected by sea-level rise.
- Similarly, for infrastructure in sectors where activity is strongly weather-dependent, increased intensity and occurrence of extreme weather events will have substantial impacts.

Already stressed assets



- Extreme weather events and a changing climate may add stress factors or compound other problems, especially for infrastructure assets that are already facing difficulties.

The long-lived nature of infrastructure assets



- This long-term nature exposes these assets to changing climate conditions over future decades, as climate risks may accumulate within infrastructure portfolios.
- Investment time horizons for both debt and equity are typically shorter, usually less than 10 years.





INFRASTRUCTURE SNAPSHOT: PORTS

SECTORAL SNAPSHOTS



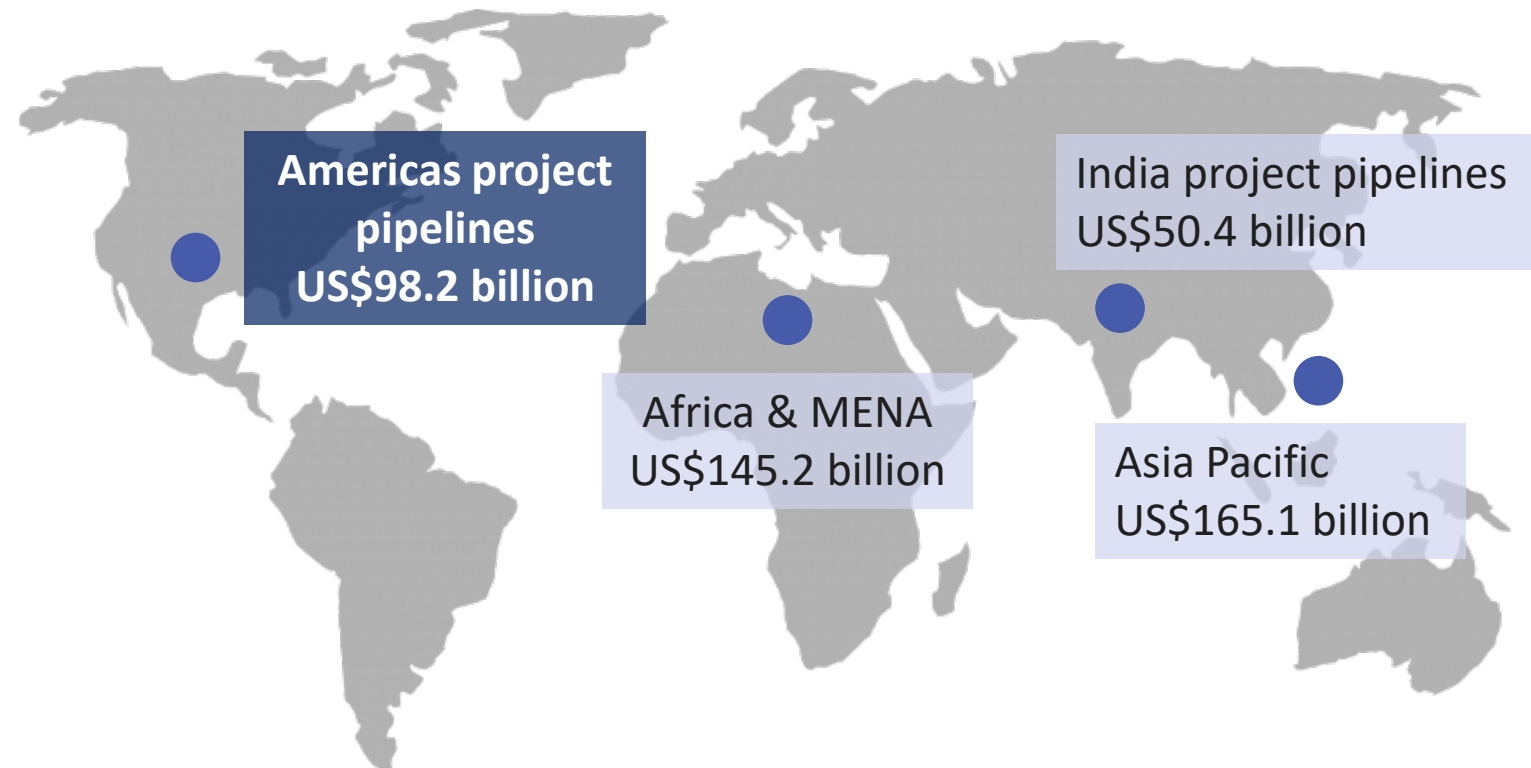
MARINE PORTS

DEFINITION & INVESTMENT

- Marine ports are a transportation sub-sector and can be categorized, depending on scale and location, as deep-water seaport, river port, harbour, pier/jetty/wharf, off-shore terminal, and port terminals
- Infrastructure usually includes piers, basins, stacking or storage areas, warehouses, and equipment such as cranes, all of which involve high levels of capital investment

Investment Potential

Global project pipelines
US\$459 billion
(May 2017)



SECTORAL SNAPSHOTS



MARINE PORTS

POTENTIAL FINANCIAL IMPACTS



REVENUES



Temperature (Acute): Extreme temperature events can compromise the integrity of asphalt, rendering access roads impassable and affecting movement within the port complex

Temperature (Chronic): Gradual temperature increases may melt ice along shipping routes and impact agricultural production and trade flows, affecting port traffic to/from certain locations



Storms Precipitation & Flooding (Acute): Given locations in coastal zones and other low-lying areas, ports face increasing risk of regular inundation due to hurricanes, cyclones, and typhoons.



Flooding & Sea-level Rise (Chronic): Nuisance flooding may cause chronic disruption to port facilities, especially access roads. Sea-level rise in inland waterways may impact bridge clearance.



Water stress (Chronic): Declining water levels in inland waterways may lead to weight restrictions



SECTORAL SNAPSHOTS



MARINE PORTS

POTENTIAL FINANCIAL IMPACTS



COSTS



Temperature (Acute): Maintenance expenses may increase due to needed asphalt repairs

Temperature (Chronic): An increased number of extreme-heat days and gradual temperature rise may escalate ongoing costs for maintenance if port traffic increases due to extended shipping/cruise ship seasons and changed trade flows.



Storms (Acute): Contingency and recovery costs may increase and/or become more and penalties may be payable if operating standards under concession are violated (if not a relief or force majeure event).



Flooding and Sea-level Rise (Chronic): Port infrastructure may have to be raised due to continuous flooding and sea-level rise.



SECTORAL SNAPSHOTS



MARINE PORTS

POTENTIAL FINANCIAL IMPACTS



ASSETS



Tangible (fixed assets, e.g., buildings, infrastructure):

- Frequent disruption and damage to port infrastructure could lead to a decrease in tangible asset value.
- Conversely, ports with enhanced infrastructure adapted to climate change that mitigates weather impacts (e.g., raised patios, better drainage systems, mitigation plans) may realize increased tangible asset value/valuation.

Intangible (e.g., goodwill, brand):

- Frequent climate-related disruption of operations may affect a port's brand and reputation, as well as service ratings by vessel operators and other customers/clients.



SECTORAL SNAPSHOTS

MARINE PORTS

Case Study: Port of Durban

- Largest South African Port with dedicated container handling facilities. ***Handles 65% of the containerized cargo for South Africa.***
- ***60% of all imports to- and exports*** from South Africa.
- Financial sustainability of port strongly linked to ***supply chain efficiency*** (including transport in/out of ports) and “***unlocking capacity in the bulk sector***” – e.g. agriculture exports and commodities
- Climate impacts have the ability to disrupt infrastructure, revenues – both volume and growth

Key natural capital impacts on the other capitals

Erratic weather patterns due to climate change, such as coastal storm surges and rising sea levels, could affect port infrastructure while inland floods could impact rail infrastructure.

Infrastructure impacts



Severe drought adversely affects bulk export commodities, such as grain, which negatively impacted volume performance and associated revenue.

Volume and revenue impacts



We transport mineral commodities for key customers, thereby growing revenue.

Revenue growth



TransNet 2017 Annual Report





Case Study: Port of Durban

- In October 2017, a “supercell thunderstorm” forced the *closure of the Port of Durban for 3 days*, one of the busiest in Africa.
- The harbor was closed after a container-laden ship was blown across the harbor mouth.



Damage Estimation in KwaZulu-Natal Province/City of Durban

R576+ million

Estimated cost to repair
infrastructure damaged



R7.7 million

Parks and Recreations

R2.6 million

Electricity

R250 million

Human Settlements

R2.3 million

Water and Sanitation

R4.1 million

Disaster Management
and Emergency Control

R308 million

Engineering Related
Repairs



Supercell Thunderstorm, Port of Durban, South Africa



3 days

Forced Closure
after a container-laden ship was blown across the harbor mouth.



\$3.38 million*

Disrupted Revenue
Estimation calculated using the harbor authority annual revenue and Durban revenue contribution



90%

Port and Stack Occupancy
while the port was operating with limited capacity



12 days

Congestion and Delays
Causing operational stoppages, and KPI's not being achieved



\$100 USD

Increase in Shipping Rate
increased General Rate by \$100 per container by MSC



THANK YOU!

FOR MORE INFORMATION, PLEASE VISIT OUR WEBSITE
WWW.CLIMATEFINANCEADVISORS.COM



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Questions and Thank You



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