



**Department of  
Financial Services**

# **The Fundamentals of Financial Risks from Climate Change**

## **Community and Regional Banking Institutions**

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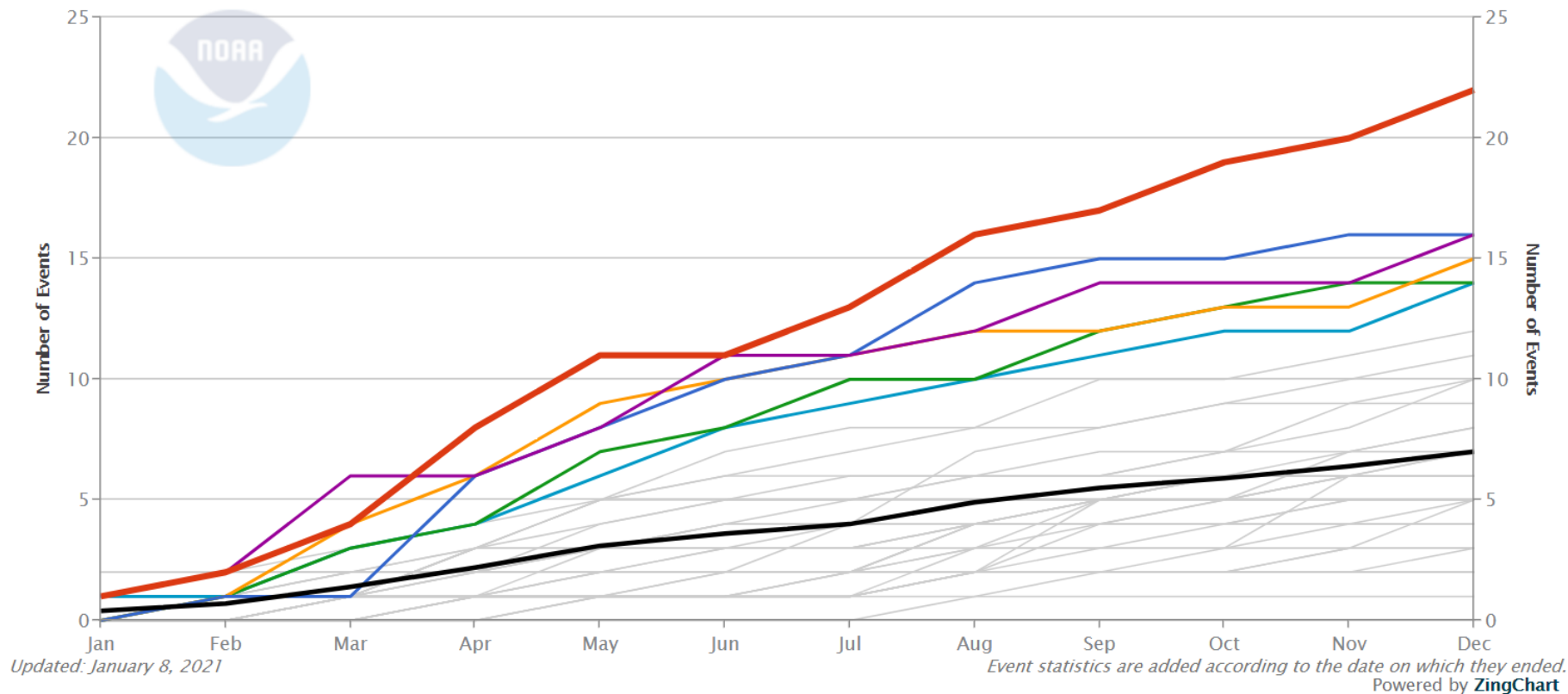
**February 18, 2021**

# Goals of the Webinar

- Orientate you to current climate change issues
- Identify financial risk from climate change
- Share ways to identify and manage climate risks, opportunities, and support for best practice
- Update on federal climate actions

# 1980–2020 Year-to-Date United States Billion-Dollar Disaster Event Count (CPI-Adjusted)

2018 2019 2016 2011 2017 2020 Average



Source: [National Oceanic and Atmospheric Administration](https://www.noaa.gov/data/analyses/disasters)

# Primary Climate Risk Factors on Financial Markets

## Physical Risks

- Direct
  - Flood
  - Hurricanes
  - Wildfire
  - Heat Waves
- Indirect
  - Disruption to supply chains

## Transition Risks

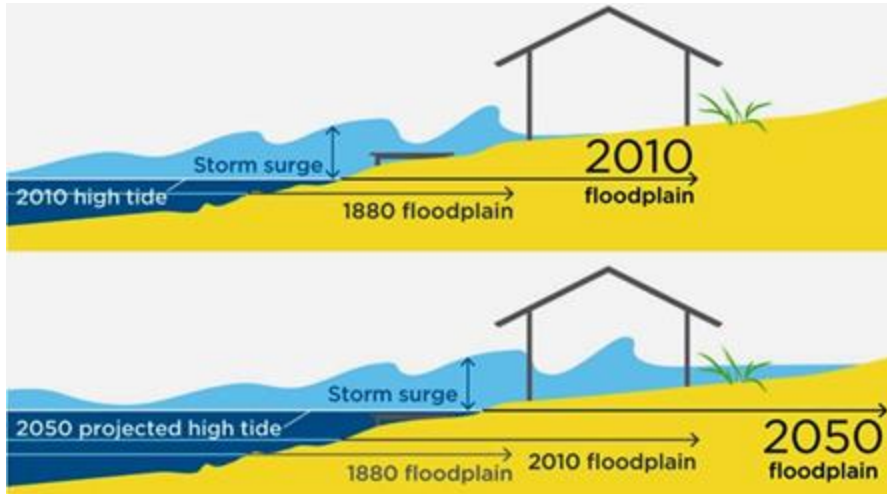
- Driven by the transition to a low-carbon economy
- Re-pricing of carbon-intensive financial assets

# Climate Change and Flooding – Sea Level Rise



Source: [Climate Central](#)

# Storm Surge + Sea Level Rise → More Flooding



Source: [Climate Change.com](https://www.climatechange.com)

## NYC Properties at Risk of Storm Surge

	Total Estimated Reconstruction Value
Single Family Residential	\$285 billion
Multifamily Residential	\$49 billion
Combined	\$334 billion

Source: [CoreLogic 2020 Storm Surge Report](#)

# Nuisance Flooding from Sea Level Rise



- The Battery, Kings Point, and Montauk could have 100 days a year of [nuisance flooding](#) by 2050.

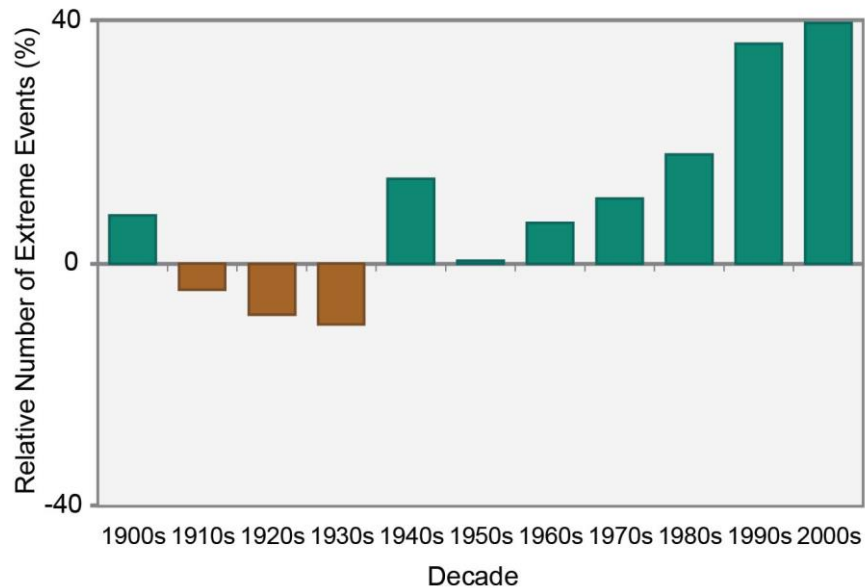
In Florida, areas with higher risks to sea level rise → [Lower home prices](#)

Source: [New York City Panel on Climate Change 2019 Report Chapter 4: Coastal Flooding](#)



# Climate Change and Flooding – Heavier Rains

Observed U.S. Trend in Heavy Precipitation



Source: [U.S. Climate Resilience Tool Kit](#)

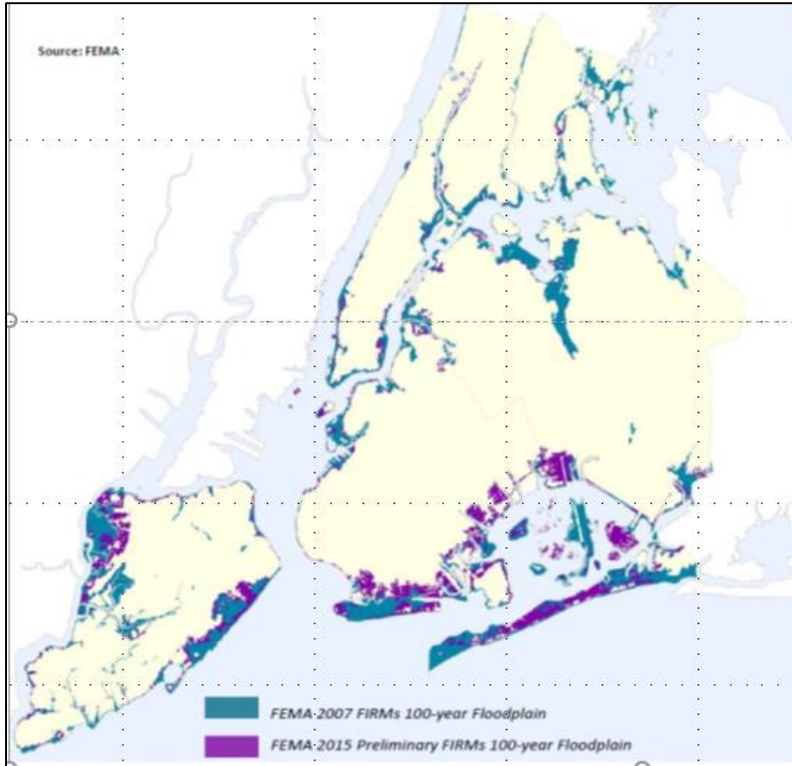
Hurricane Irene Damage in Keene, NY



Source: [Adirondacks Lifestyle](#)



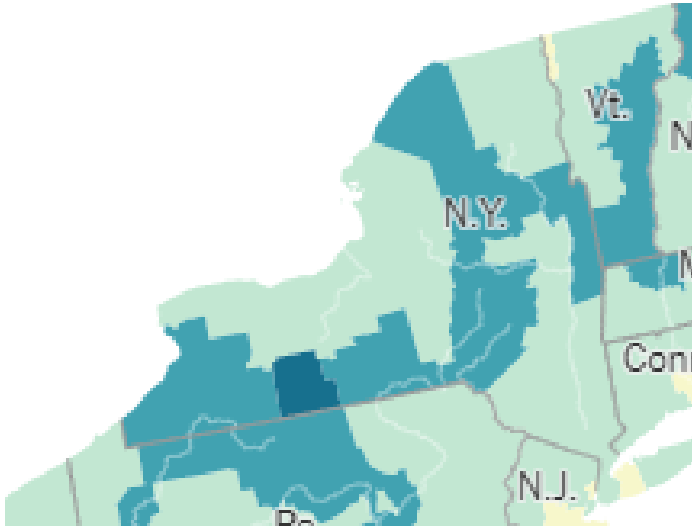
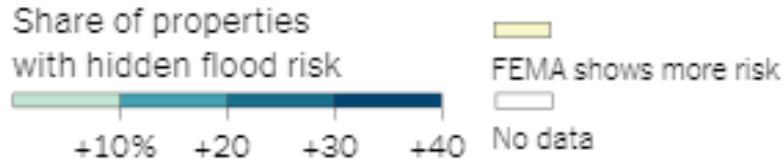
# What is the Flood Risk in New York City?



Comparison of FEMA 2007 Map vs.  
2015 Preliminary Map

In Flood Zones	2007 Map	2015 Map
Residents	218,000	400,000
Jobs	214,000	290,800
Buildings	36,000	71,500
1-4 Family	26,000	53,000
Multifamily	3,200	5,300

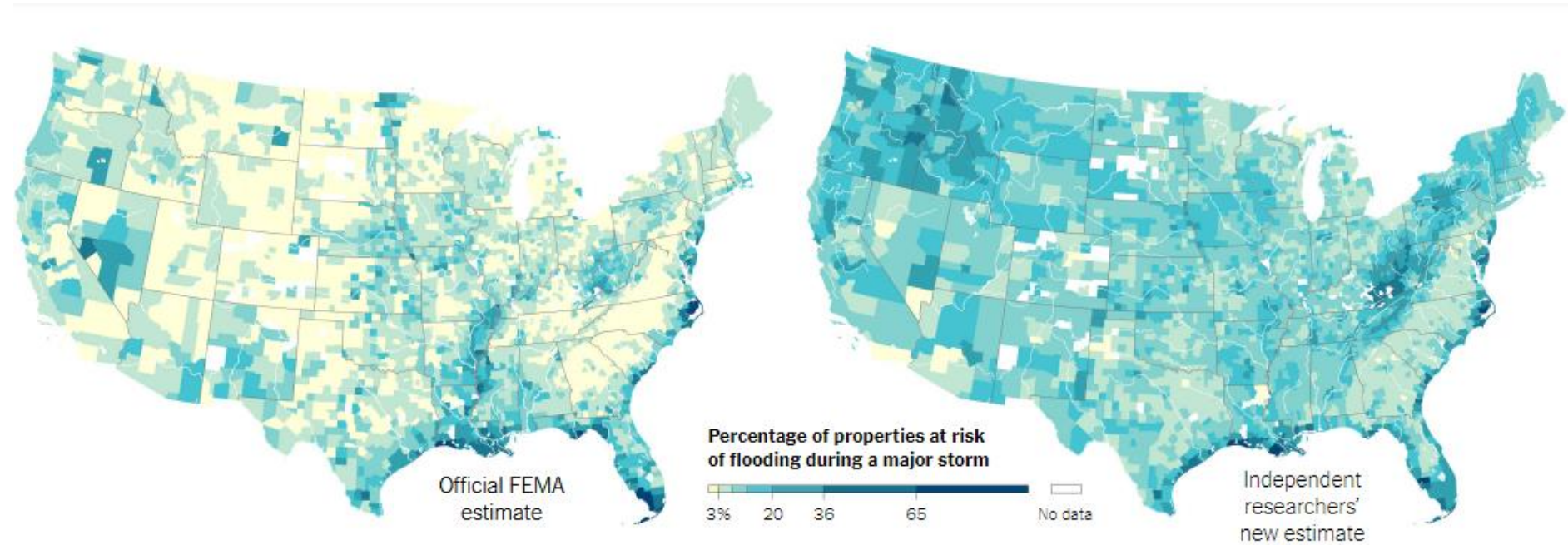
# Flood Risk in Buffalo



Estimation Source	Share of Properties at Risk
FEMA	0.4%
First Street Foundation	17.5%

- Additional properties at risk:  
16,010

# National Flood Risk Comparison



Source: [New Data Reveals Hidden Flood Risk Across America](#)

# Commercial Mortgages' Flood Exposure

- Eighty percent of the commercial properties damaged in Hurricanes Harvey and Irma lay **outside** of official FEMA flood zone maps  
→ They were likely to have insufficient flood insurance.
- Around two thousand commercial mortgage-backed securities, ~\$56+ billion, were exposed to flooding.
  - More than half estimated to lie **outside** FEMA flood zones.

# Flood Risk and Municipal Bond Market

- Higher sea level rise exposure → higher municipal bond spread, especially for longer durations.
  - [Sea Level Rise Exposure and Municipal Bond Yields](#)
- [Sea levels are rising faster than most pessimistic forecasts](#)

# Flood Risk and Community and Regional Banks

- “Regional and community banks ... are more vulnerable to regionally concentrated physical risk, including to sudden extreme events.”
- “These banks’ property loans tend to be more geographically concentrated than the loans of larger banks. In addition, CRE [commercial real estate] loans constitute a much larger share - nearly a third - of the loan books of small banks.”

– U.S. Commodity Futures Trading Commission’s Climate-Related Market Risk Subcommittee of the Market Risk Advisory Committee, [Managing climate risk in the U.S. Financial system](#)



# Climate Change's Impact on Agriculture

- Current high value crops in NYS rely on cool temperature.



## Potential climate stressors:

- Increased pressure from weeds, insects, and diseases due to warmer winters
- Increased summer heat
- Increased late summer drought
- Change of rain patterns

# Climate Change's Impact on Tourism

## Gore Mountain Ski Resort



Source: [Wikipedia](#)

## Algae Bloom in Cayuga Lake



Source: [The Ithaca Voice](#)

Financial contagion (market losses, credit tightening) feeding back to the economy

## Economy

Business disruption

Capital scrapping

Reconstruction and replacement

Increase in commodity prices

Migration

## Direct transmission channels

Lower residential property values

Lower commercial property values

Lower household wealth

Lower corporate profitability and increased litigation

## Financial system

Financial market losses  
(equities, bonds and commodities)

Credit market losses  
(residential and corporate loans)

Underwriting losses

Operational risk  
(including liability risk)

## Indirect transmission channels

Wider economic deterioration (lower demand, productivity and output)  
impacting financial conditions

## Physical risk drivers

- Extreme weather events
- Gradual changes in climate

# Credit Rating Agencies on Physical Risks

- Moody's
  - Twenty-five sectors representing \$8.7 trillion in rated debt have very high or high inherent exposure to climate risk.
  - Eighteen sectors with \$7.2 trillion in rated debt have high inherent exposure to physical risk.
  - The largest sectors: emerging market governments, regulated electric and gas utilities, and integrated oil and gas companies.
- S&P
  - Sixty percent of the companies in the S&P 500 (with a market capitalization of \$18 trillion) hold assets that are at high risk of at least one type of physical risk.

# Transition Risks

- Drivers of the low carbon transition

## Policy or regulation change

- Paris Agreement commitment
- A price on carbon emission
- Phase out of fossil fuel

## Technology advancement

- Lower cost of renewable energy
- Competitive electric vehicles vs. internal combustion engine vehicles

## Consumer Preferences

- Voluntary purchase of clean energy

# Low Carbon Transition is Happening

- Renewables are the cheapest sources of new-build power generation for at least two-thirds of the global population.
- In June 2020, BP wrote off \$17.5bn of its oil and gas assets. Shell wrote off \$22 bn assets.
- In Feb. 2021, Shell announced it has reached peak carbon emissions and oil production, and laid out a detailed plan for its transition to cleaner energy.
- Gasoline cars phase out
  - Twenty-two countries plan to phase out new internal combustion engine cars between 2027-2040
  - California Executive Order in September 2020 – phase out by 2035



# Spill-Over Effect of Low-Carbon Transition

What would happen to the gas stations and convenience stores?



Source: [WNYC](#)

VS.



Source: [electrek](#)

# Shale Gas Leasing in Pennsylvania

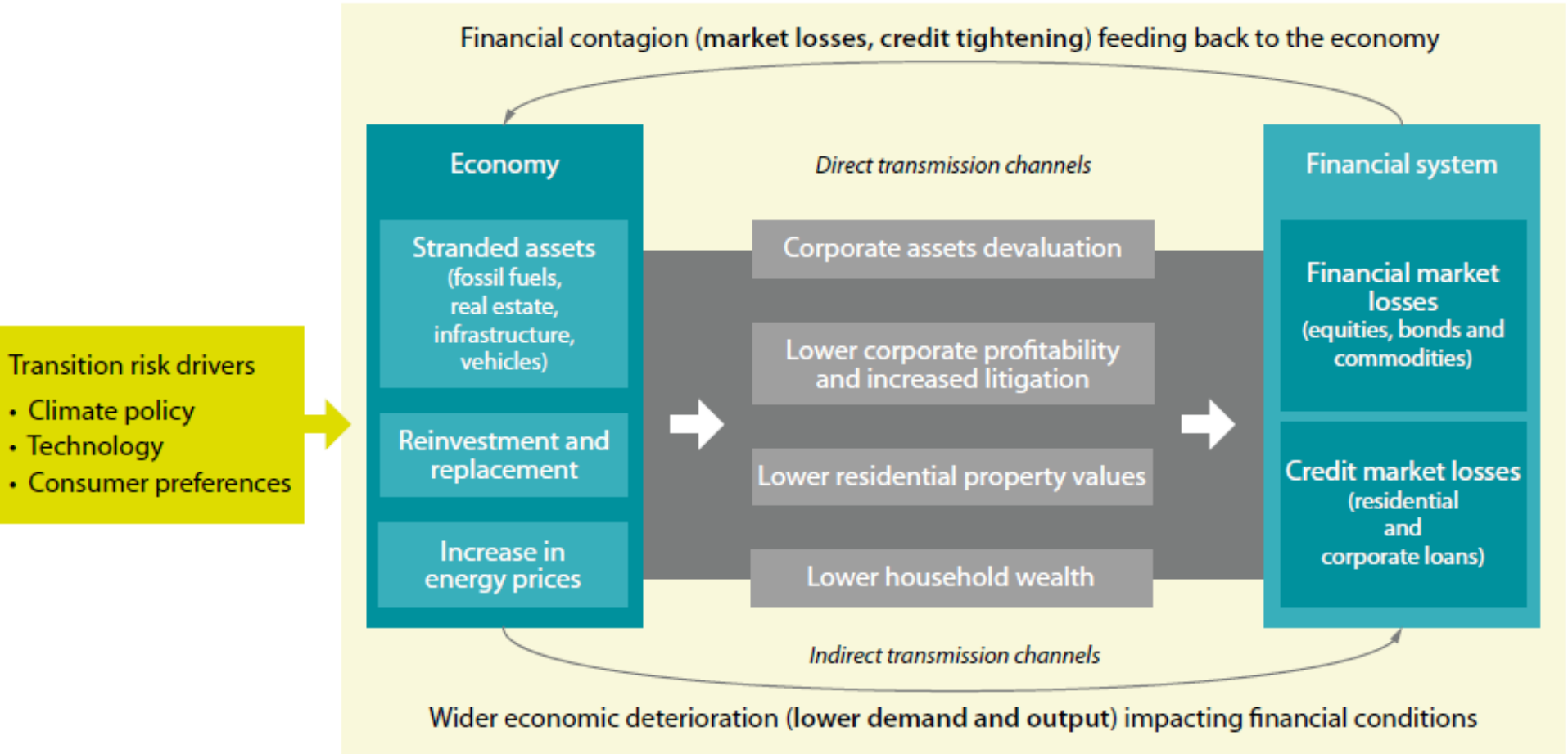


Source: [National Geographic](#)

What would happen to the property value and the leasing revenue?

# Transition Risk and Opportunity in Real Estate

- Transition risk
  - NYC buildings – 70% of the city's carbon emissions.
  - NYC Local Law 97 requires largest buildings to significantly reduce carbon emissions.
- Transition opportunity
  - High energy efficiency → [low mortgage default rate](#)



# Rating Agencies on Transition Risks

- Moody's
  - Sixteen sectors with \$4.5 trillion in rated debt have very high or high inherent exposure to transition risk
  - Most impacted sectors:
    - Oil and gas
    - Auto manufacturers and suppliers
    - Regulated and unregulated electric utilities
    - Surface transportation & logistics
    - Chemicals
    - Airlines
    - Shipping
    - Asset-backed securities - aircraft
- S&P
  - Downgraded Exxon, Chevron, Conoco by a notch on climate risks and earnings.

# Potential Impact of Transition Risks on Banking

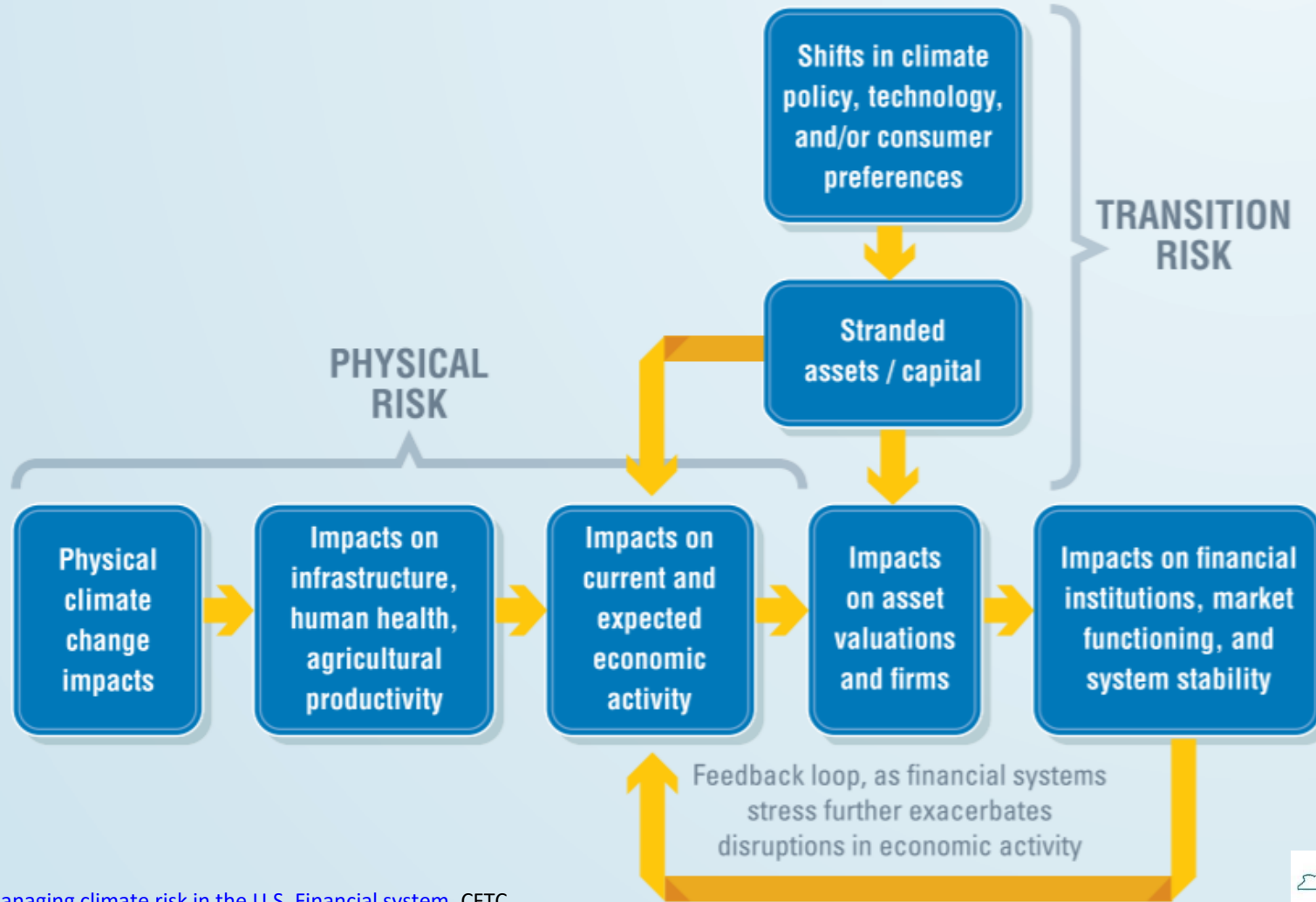
An abrupt transition to a green economy could trigger an increase in banking-system losses of **up to 60%**.

- Andrea Enria, [\*ECB Banking Supervision's approach to climate risks\*](#)

**“Over half** the syndicated lending of major U.S. banks is exposed to climate transition risk.”

- Ceres, [\*Financing a Net-Zero Economy: Measuring and Addressing Climate Risk for Banks\*](#)





# Financial Risks from Climate Change are Singular and Unprecedented in Nature

## Scope

- Global in scale and scope
- Cannot be contained regionally or diversified away

## Size

- Assets exposed ~ 30% of total financial markets

## Probability

- It is happening

## Duration

- Decades to Millennia

## Dependency

- Future impact heavily determined by actions today

# The Green Swan Risk



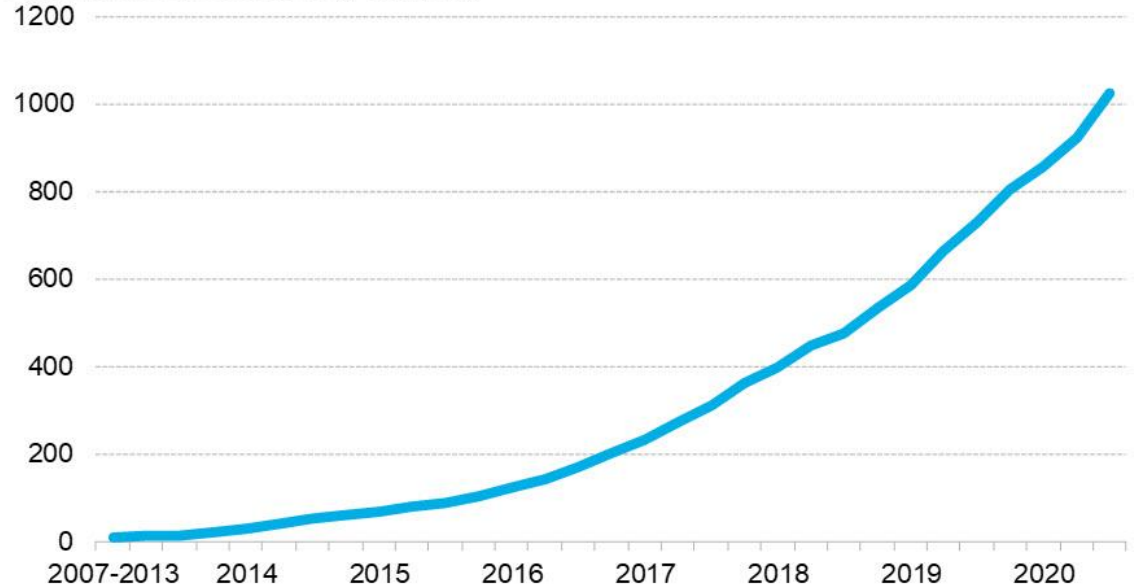
Source: [The Green Swan - Central banking and financial stability in the age of climate change](#)

# Climate-Related Business Opportunities

Investment needed globally for net-zero carbon emission by 2050: \$1-2 trillion/year

Figure 1: Cumulative green bond issuance by quarter, 2007-3Q 2020

Cumulative issuance (\$ billion)



Source: BloombergNEF, Bloomberg L.P.

# What are Your Peers Doing?

## Lending

- Invest in utility scale solar and other clean energy technologies.
- Finance energy efficiency and climate resilience projects for public agencies
- Credit unions finance clean energy and energy efficiency projects.

## Deposits & Investments

- A corporate sustainable deposit product exceeded \$2bn after 1 year of launch.
- Launch impact certified deposits to invest in energy efficiency and clean energy projects
- Offer fossil fuel free investment products

# What are Your Peers Doing?

## Risk manage- ment

- Board involvement in climate risk discussions
- Analyze flood risk using new flood map in mortgage underwriting

## Capacity Building

- Participate in international networks on responsible banking
- Account for carbon emissions that are financed on portfolio.



# International Regulators' Work on Climate

## Network for Greening the Financial System (NGFS)

- Founded in December 2017
- Currently 83 Members and 13 Observers
  - U.K.
  - France
  - The Netherlands
  - European Central Bank
  - Italy
  - Abu Dhabi
  - China
  - Malaysia
  - Russia
  - West African States
  - Columbia
  - Mexico
  - Chile
  - Australia
  - New Zealand
- DFS – joined in Sep. 2019
- Federal Reserve Board – joined in Dec. 2020

# Global Climate-Related Supervision

- Bank of England Supervisory Statement [Enhancing banks' and insurers' approaches to managing the financial risks from climate change](#) – April 2019
- NGFS [Guide for Supervisors: Integrating climate-related and environmental risks into prudential supervision](#) – May 2020
- European Central Bank [Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure](#) – November 2020

# DFS's Climate-Related Actions

- Industry Letter on [Climate Change and Financial Risks](#)
  - Its purpose
  - Set expectations for all New York banks and non-depository mortgage companies to **start**
    - Integrating **financial risks** from climate change into their **governance, risk management, and strategies**; and
    - Developing a **disclosure** approach.
  - Institutions should take a **proportionate** approach.
- Coordinating with federal (FRB, NCUA, FHFA, FHLBanks), National Association of State Credit Union Supervisors, and Conference of State Bank Supervisors

# Community Reinvestment Act and Climate

- Industry Letter on [CRA Consideration for Activities that Contribute to Climate Mitigation and Adaptation](#)
- Potential eligible tests: community development test, lending test, and innovative investments.
- Example activities:
  - Renewable energy, energy-efficiency, and water conservation equipment
  - Community solar
  - Microgrid or battery storage
  - Flood and stormwater projects
  - Projects to reduce heat risk

# U.S. Federal Level Climate Updates

- The White House
  - Rejoined the Paris Climate Agreement - Aim to reduce 26-28% greenhouse gas emission below 2005 levels by 2025;
  - Plan to move the US economy to net zero emissions no later than 2050;
  - Plan to achieve 100 percent clean energy by 2035 and create 10 million new jobs.

# The Federal Reserve Board

- Recognized climate change as a financial risk in the [Supervision and Regulation Report](#) and [Financial Stability Report](#) – Nov. 2020
- Joined NGFS – Dec. 2020
- Speech by Governor Lael Brainard on [Strengthening the Financial System to Meet the Challenge of Climate Change](#) – Dec. 2020
- Formed a system-wide Supervision Climate Committee, chaired by Kevin Stiroh – Jan. 2021
- SF Fed Economic Letter [Climate Change Is a Source of Financial Risk](#) – Feb. 2021
- Governor Brainard backs [mandatory climate disclosure](#) – Feb. 2021

# Department of Treasury

- Treasury secretary's focus on climate
  - Vowed to create a climate hub during senate hearing
  - “Forcefully addressing the threat of climate change” in calls with international counterparts.

# Securities and Exchange Commission

- SEC appointed a Senior Policy Advisor for Climate and ESG



# Federal Housing Finance Agency (FHFA)

- Request for information on climate and natural disaster risk management at the regulated entities – January 2021
- Areas for inputs
  - Identifying and assessing climate and natural disaster risk
  - Enhancing FHFA's supervisory and regulatory framework

# Managing Climate Risk vs. Other Risks

- Similar approach as managing other risks
- Does need new expertise but everyone can get started
- DFS's support and supervision
  - Webinars
  - Roundtables
  - A voluntary and anonymous survey
  - Development of climate-related exam process

# Questions? Feedback?

Contact: [climate@dfs.ny.gov](mailto:climate@dfs.ny.gov)

