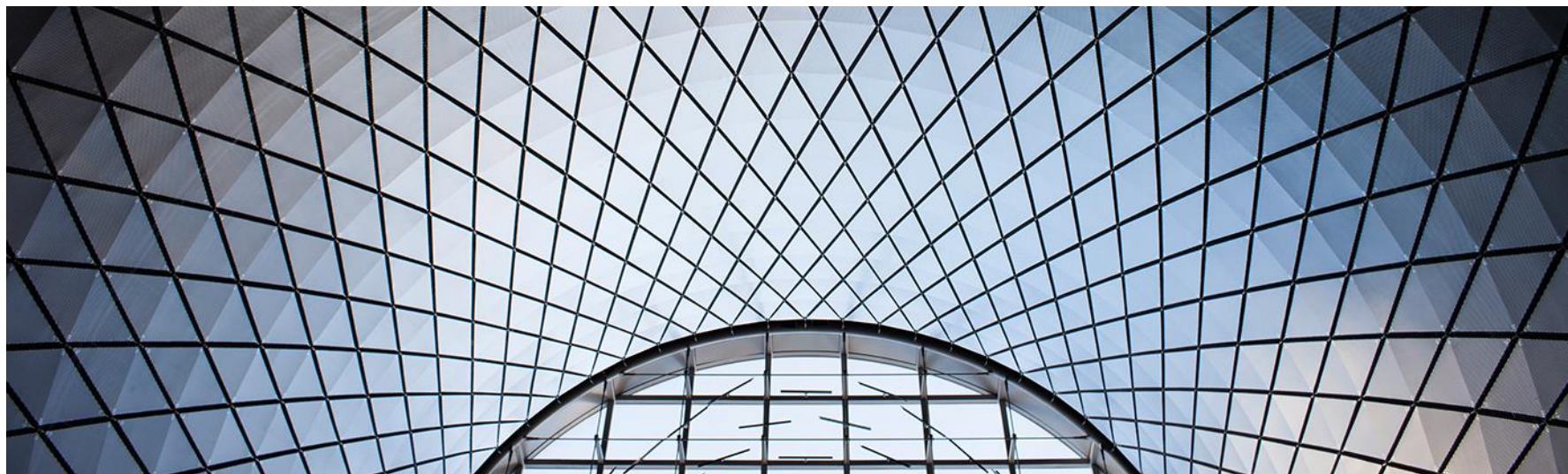


Financial risk implications of climate change: Stranded assets and credit ratings

October 18, 2017

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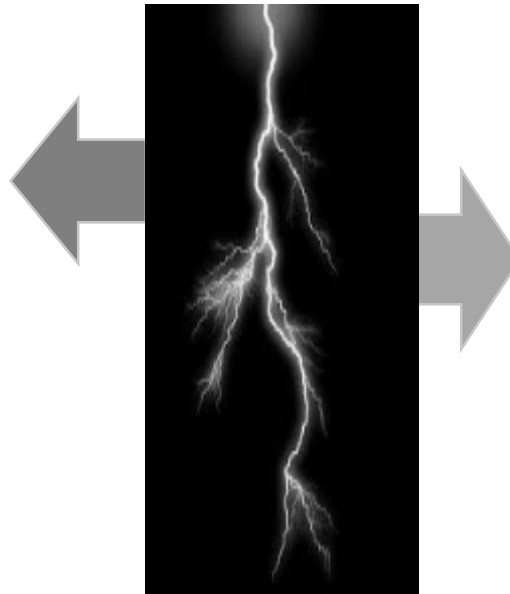
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Macro-Economic Trends: The Resource Revolution

Demand Side

- **Population increase to 9bn by 2040:** Since 1900 the population has increased from 1.6 billion to 6 billion in 2000 and projected to hit 9 billion by 2040
- **2bn more middle class consumers expected by 2030**
- **1/5th of the world's population live in water stressed areas &**
Water demand per year increased from 500 cubic km in 1900 to 3,830 cubic km in 2000

Resource Pressures The Perfect Storm



Supply Side

- **Erosion of Natural Resources:**
Pollution, over exploitation
- **Climate Change:** More extreme & unpredictable weather events, more severe weather events e.g. droughts, floods, hurricanes

SOURCES:

United Nations DESA/Population Division: <https://esa.un.org/unpd/wpp/Graphs/Probabilistic/POP/TOT/>

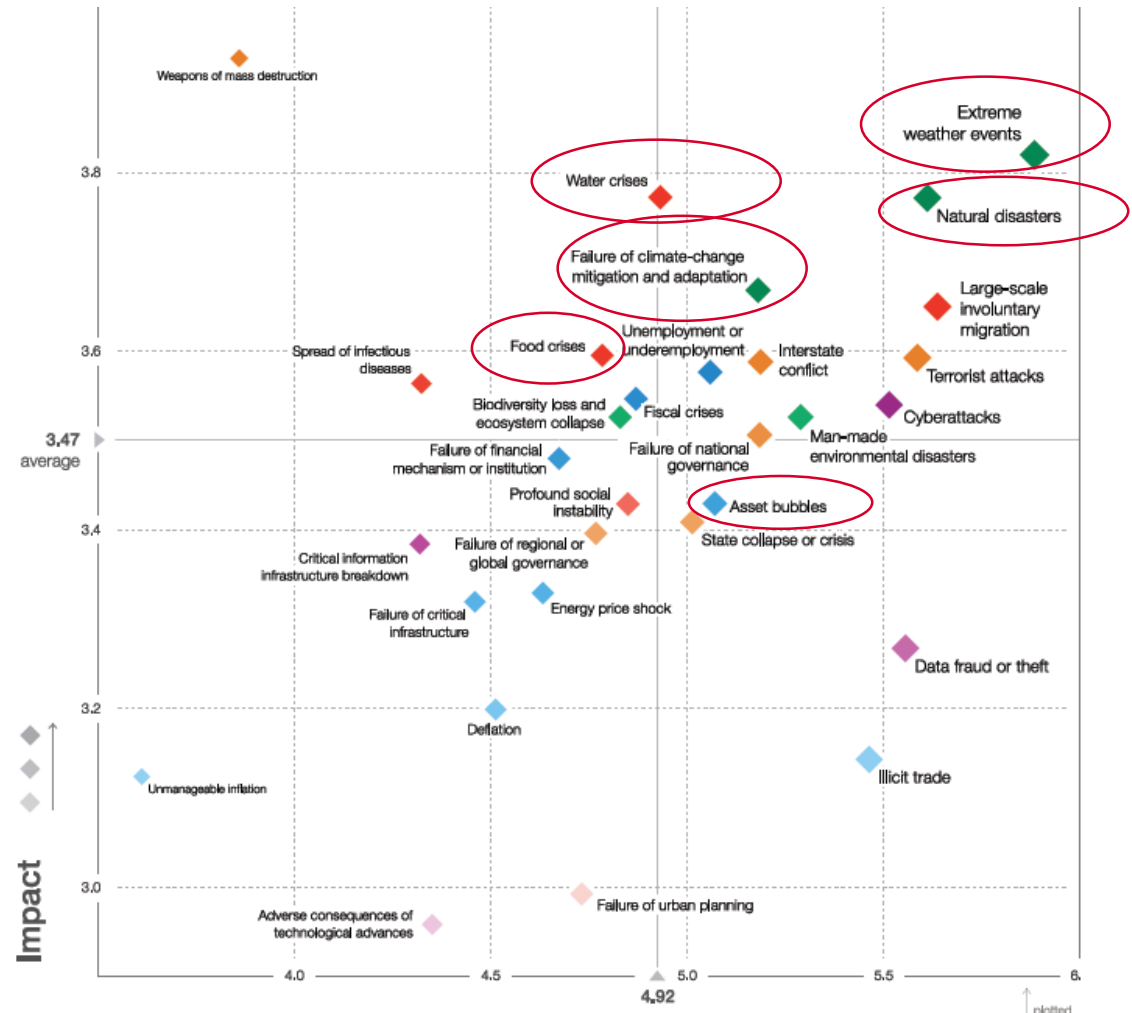
United Nations: <http://www.un.org/waterforlifedecade/scarcity.shtml>

Brookings Institute: https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf

The World Economic Forum: The Global Risk Landscape



- Extreme weather events
- Natural disasters
- Water crises
- Failure of climate-change mitigation & adaptation
- Food crises
- Asset bubbles
- Geo-political conflict
- RISK-MULTIPLIERS



Carbon & Climate Change: Why Does it Matter to the Finance Industry?



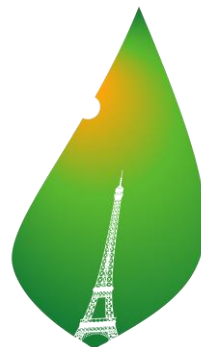
BANK OF ENGLAND

“Shifts in our climate bring potentially profound implications for insurers, financial stability & the economy” (Carney 2015)



**Breaking the tragedy of the horizon:
climate change & financial stability
Sept. 2015 speech to Lloyds of London**

“The past is not prologue and the catastrophic norms of the future can be seen in the tail risks of today....Risks to financial stability will be minimised if the transition begins early and follows a predictable path, thereby helping the market anticipate the transition to a 2 degree world”.



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

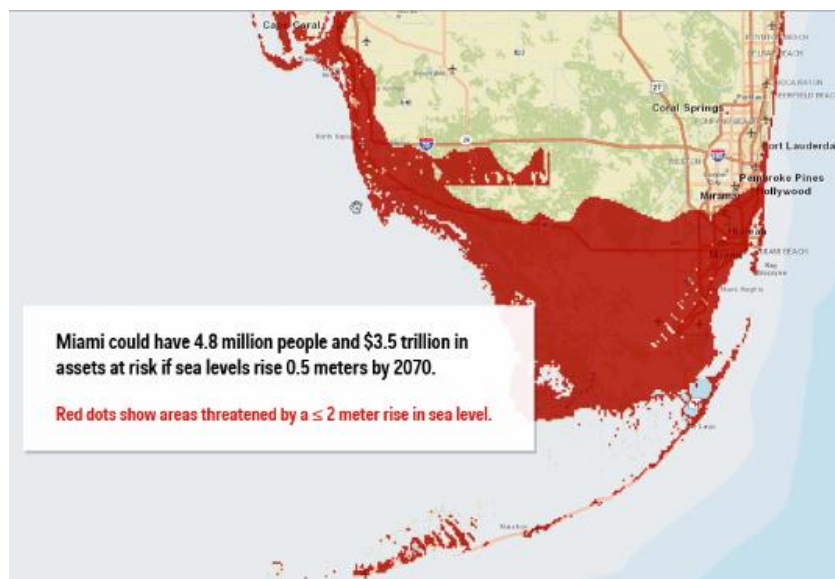
The **Paris Agreement** entered into force globally in 2015 ratified by **131 countries**.

Commitment to hold the increase in the global average temperature to below 2 °C & “make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development”.

A rise in temperature of 6C could, by 2100, result in losses for global assets of USD 43tn – or 30% of the world’s entire stock of managed assets.

Physical Risk

“The challenges currently posed by climate change pale in significance compared with what might come” (Mark Carney 2015)



- In the U.S. **\$238-507bn** worth of coastal property could be **below sea level by 2100** (*Risky Business 2014*)
- Since the 1980s the number of weather related loss events has tripled to **\$50bn**.
- It is estimated that the 20cm rise in sea levels at the tip of Manhattan since the 1950s increased **insured losses from Superstorm Sandy by 20%** (*Lloyds*)
- **Hurricane Andrew**: price of reinsuring weather events spiked, lead to a rise of up to **40% in premiums** in some parts of Florida.

Source: <http://www.businessinsider.com/map-of-miami-when-sea-levels-rise-2014>

Source: Bank of England Prudential Regulation Authority: “The impact of climate change on the UK insurance sector” Sept 2015/

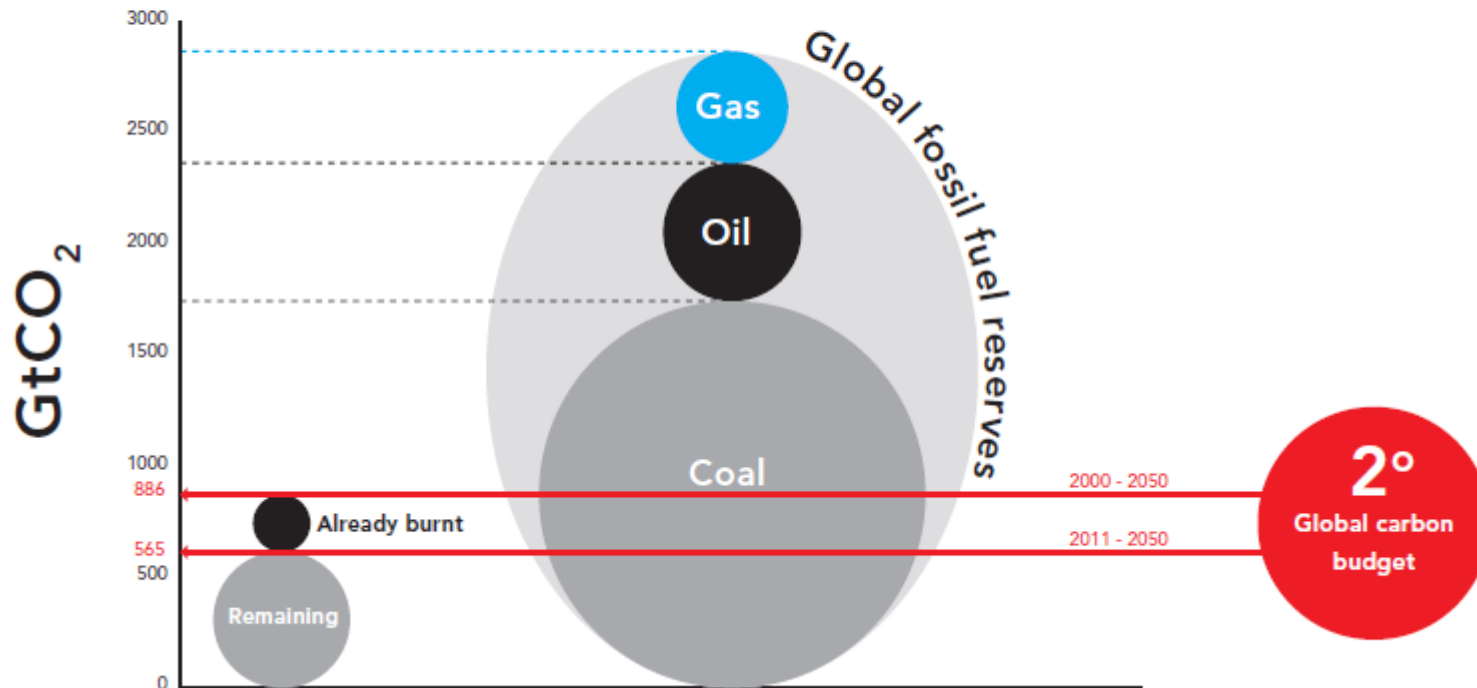
Transition Risk



What are “stranded assets”?

Comparison of the global 2°C carbon budget with fossil fuel reserves CO₂ emissions potential

Fig.1



Source: Carbon Tracker “Unburnable Carbon” - <https://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>

Climate Change: A Different Kind of Risk

Trucost by
S&P Dow Jones Indices
ESG Analysis



“Climate risk is inevitable – Some impacts on investment returns is inevitable... Investors can improve outcomes by being prepared”

- “Climate Risk is more complex and longer-term than most investment risks”
- “Managing climate risk is outside the average investor focus areas”
- **“Some action will lead to better investment outcomes than no action”**
- “Uncertainty about the future should not be a barrier to action”

Government & Investor Action Mounts




- Article 173, France
- Swedish Funds Association
- Dutch Pension Fund Initiatives
- Norwegian Sovereign Wealth Divestment
- California divestment & transparency
- UNPRI Montreal Pledge
- UNEPFI Portfolio Decarbonisation Initiative
- FSB TCFD TaskForce supported by G20

The Carbon Scorecard

For the first time, S&P Dow Jones Indices and Trucost integrate five unique metrics to provide deeper insight into the climate risks and opportunities in major global economies.

Index	Region	Carbon Footprint	Reserve Emissions	Coal Exposure	Energy Transition	Green-Brown Share
S&P 500® Growth	U.S.					
S&P 500	U.S.					
S&P/TSX 60	Canada					
S&P 500 Value	U.S.					
S&P Global 1200	Global					
S&P/ASX All Australian 50	Australia					
S&P United Kingdom	UK					
S&P Asia 50	Asia					
S&P Europe 350	Europe					
S&P/TOPIX 150	Japan					
S&P/Latin America 40	Latin America					
S&P/IFCI	Emerging Markets					

Lowest Impact  Highest Impact

Source: S&P Dow Jones Indices LLC and Trucost. Data as of Dec. 31, 2016. Table is provided for illustrative purposes.

Source: S&P Dow Jones Indices

**S&P Dow Jones
Indices**

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Transition: A \$93trn Opportunity?

What we need for the transition to a more resource efficient, lower carbon world....

Clean Energy



Sustainable Agriculture



Water Efficiency



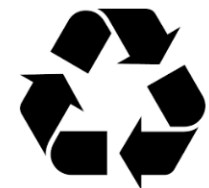
Low Carbon Transport Infrastructure



Smart Technology



Waste Reduction/ Recycling

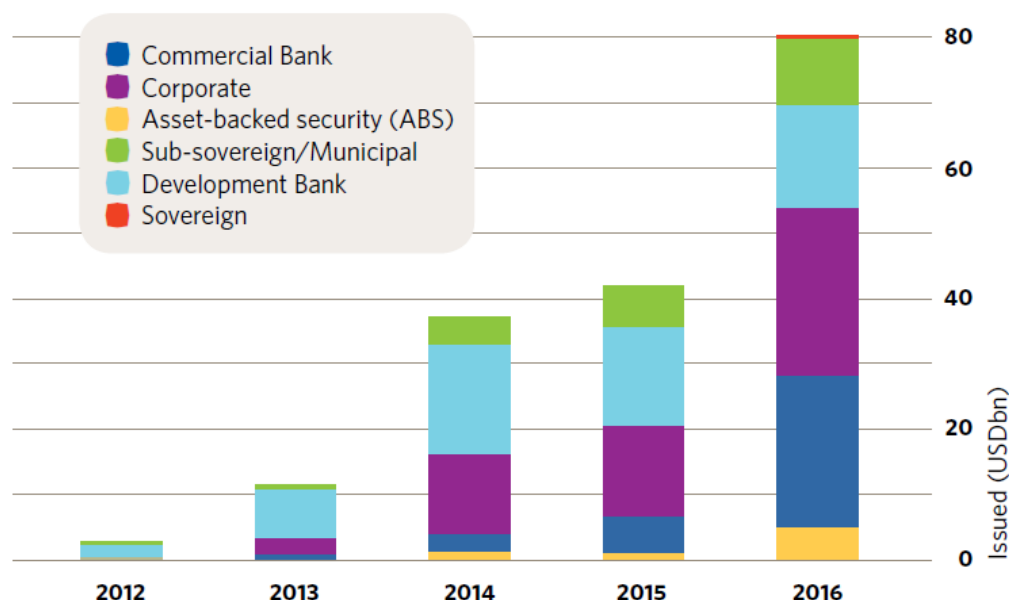


Over the next 15 years, approximately **\$93 trillion** will be needed for investment in low carbon infrastructure across the world

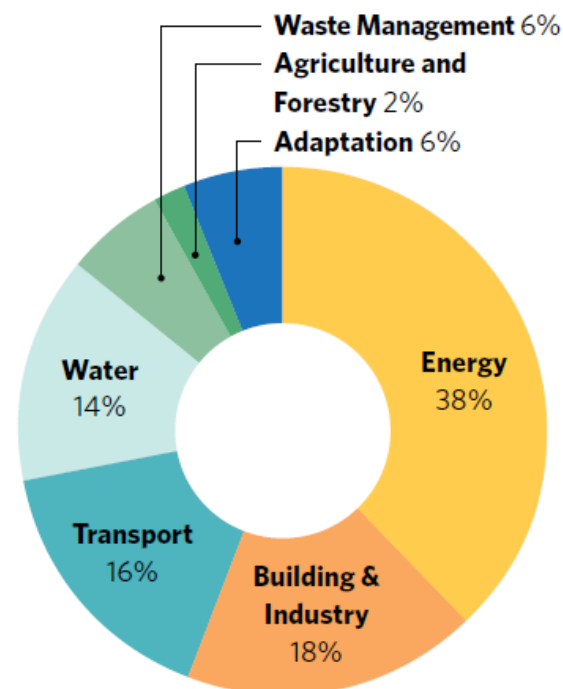
Transition Opportunities: Green Bonds

\$694bn of climate-aligned bonds, includes (an increase of **\$96bn** on last year),
\$118bn of labelled green bonds
3,590 bonds from 780 issuers

The green bond market 2012-2016



There was a broad range of use of proceeds in 2016



Quantifying the Positives

CARBON FOOTPRINT

- Listed equities
- Corporate fixed income



CARBON SAVINGS

- Green bonds
- Green real estate
- Green infrastructure

**AMBITION: BALANCE PORTFOLIO
FOOTPRINT**

Source: Trucost. Chart is provided for illustrative purposes.

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