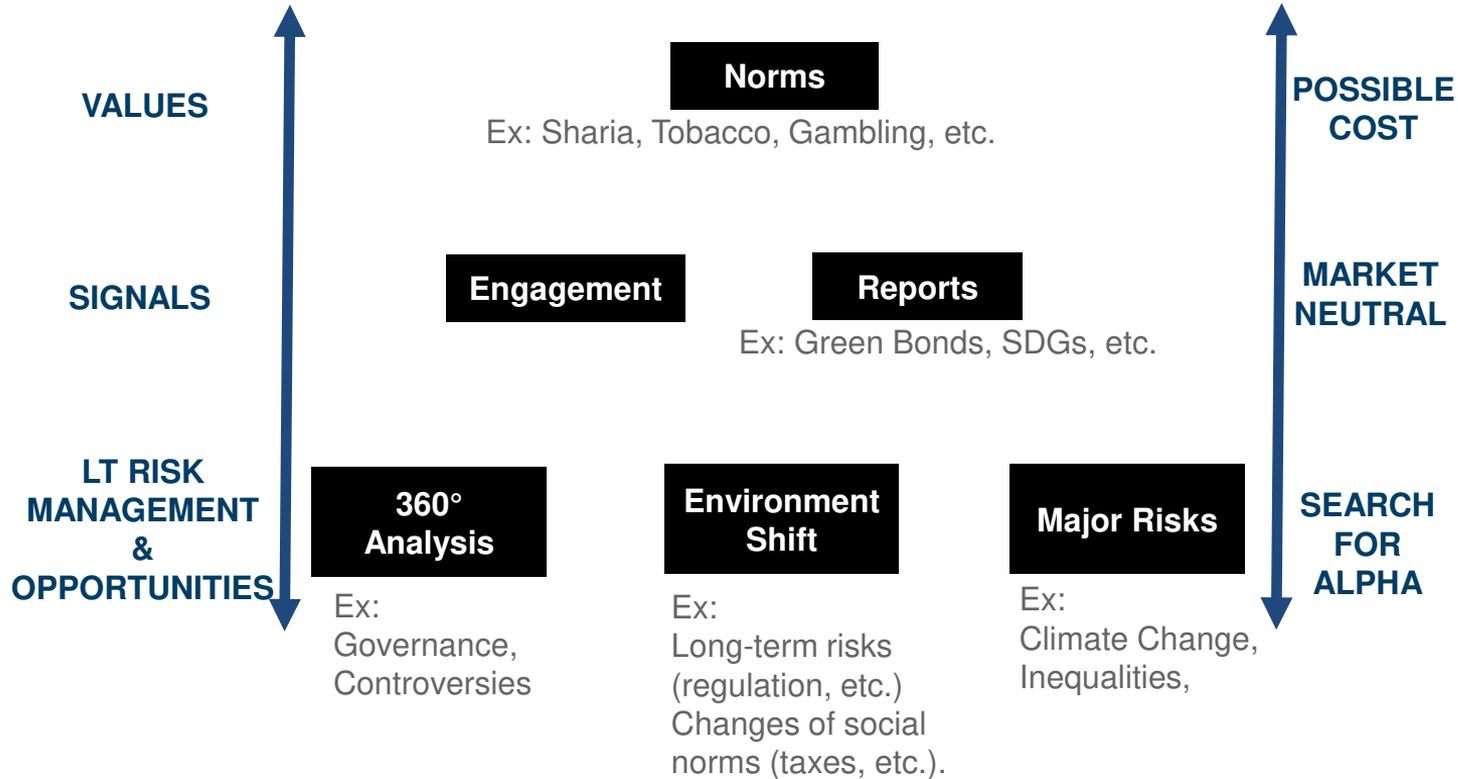


GREEN SWANS AND CONSEQUENCES

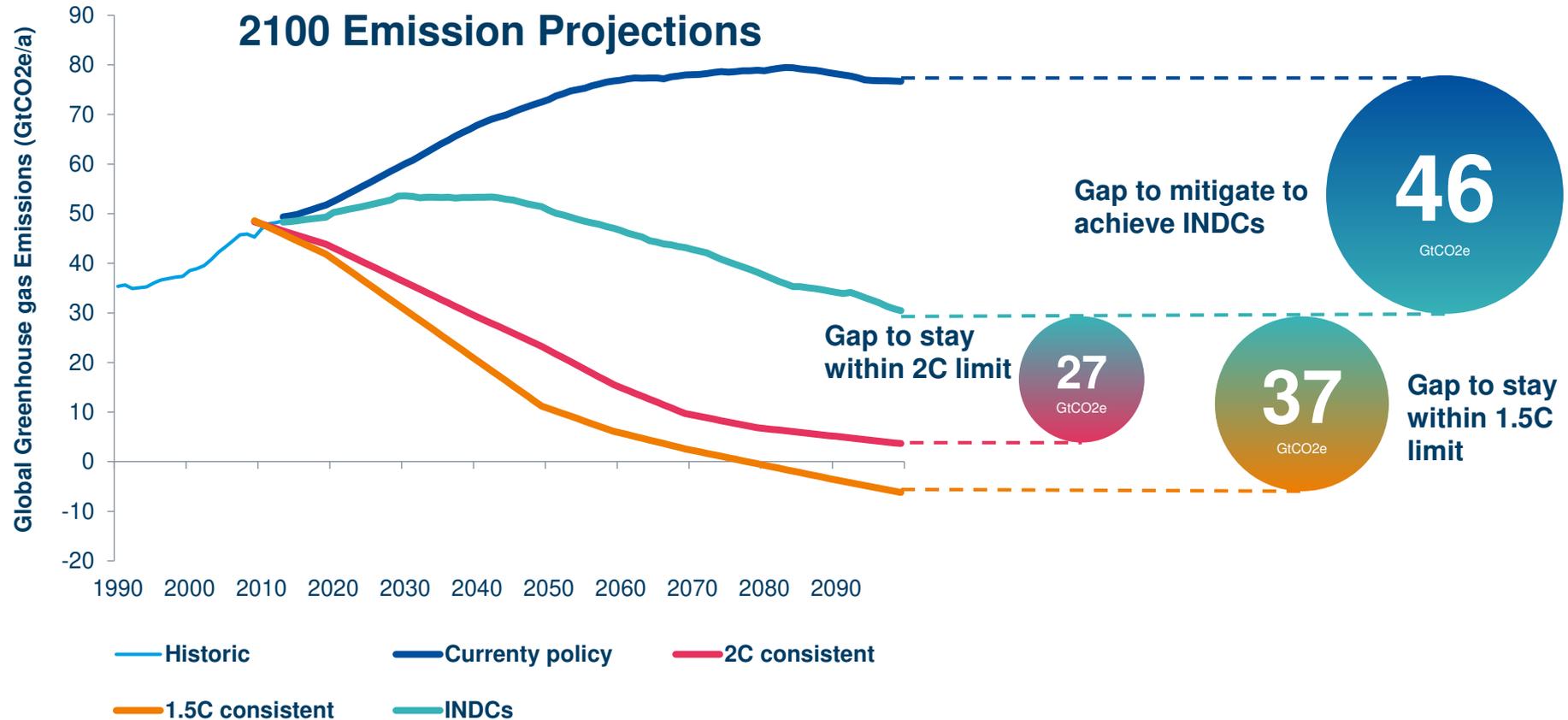
Frederic SAMAMA

Head of Responsible Investment at Amundi

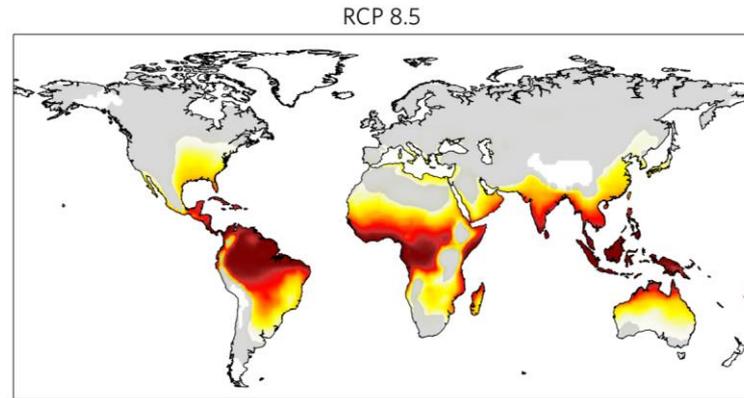
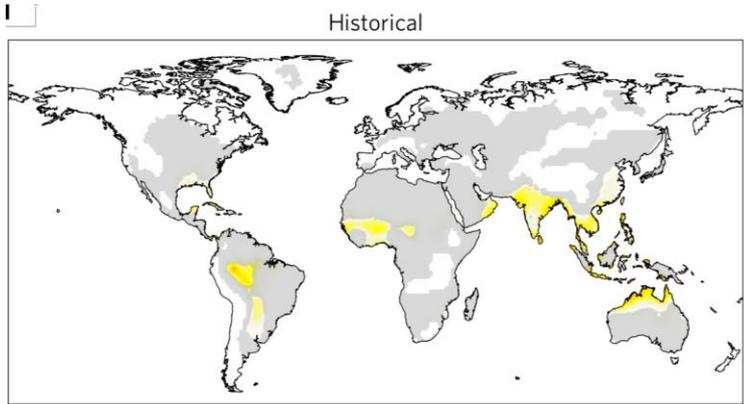
ESG: A SPLIT OF OBJECTIVES



GLOBAL EMISSION'S GAP



IMPACT OF TEMPERATURES



- **Human beings must regulate their internal heat, and so they are exposed to the mix of :**
 - External temperatures and
 - Humidity
- **In 2000* , this was already a severe risk:**
 - 13.2% of the planet's land area where 30.6% of the population resides...
 - was exposed to 20 or more days when temperatures and humidity surpassed the threshold beyond which such conditions become deadly.
- **By the end of the century, in a BAU scenario, entire regions of the world would be inhabitable.**

CENTRAL BANKS (1/2)

ONE PLANET SUMMIT

— Reiterate France's commitment

- Organized by President Macron on Dec. 12, 2017
- Gather international leaders and committed citizens
- Creation of One Planet Coalition, 12 commitments
- Article 173 cited as an example



— Call for action

- Scale up finance for climate action
- Green finance for sustainable business
- Accelerate local and regional climate action
- Strengthen policies for ecological and inclusive transition

CENTRAL BANK NETWORK TO GREEN THE FINANCIAL SYSTEM¹

- 65 Central Banks and supervisors
- 3 missions:

**Share
experience
and best
practices**

**Contribute to
environmen-
tal and
climate risk
management
development**

**Mobilize
mainstream
finance to
support the
energy
transition**

« NGFS Members acknowledge that climate-related risks are a source of financial risk.

It is therefore within the mandates of Central Banks and Supervisors to ensure the financial system is resilient to these risks”

THE GREEN SWAN



The green swan

Central banking and financial stability
in the age of climate change

Patrick BOLTON - Morgan DESPRES - Luiz Awazu PEREIRA DA SILVA
Frédéric SAMAMA - Romain SVARTZMAN

January 2020

The Green Swan:

- Co-written by Patrick Bolton, Morgan Despres, Romain Luiz Pereira da Silva, Frédéric Samama and Romain Svartzman
- Published by BIS and Banque de France

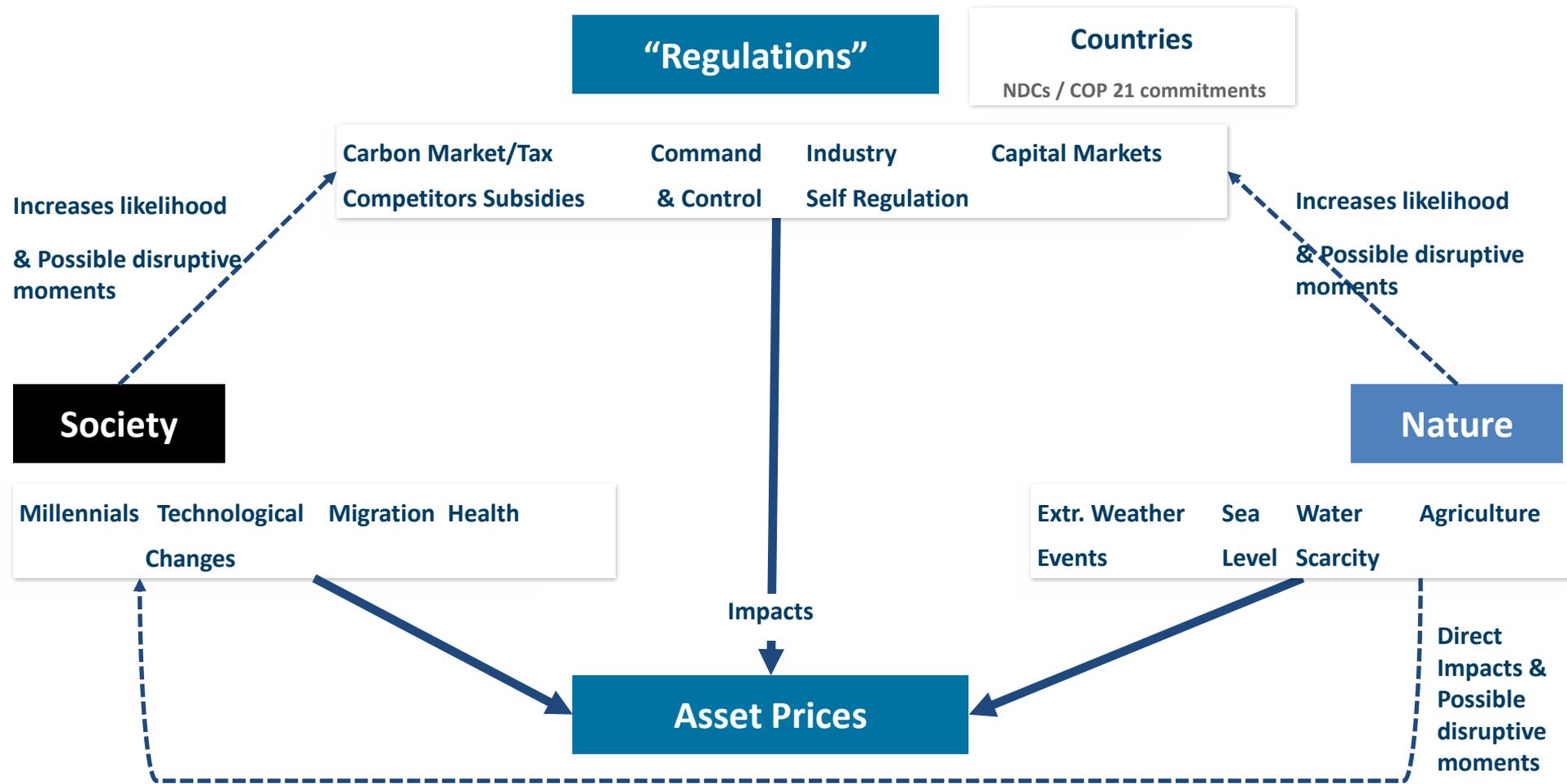
A new concept:

- A Green Swan is a very likely event with multiple non-linear and interacting causes that threatens life on Earth.

Climate change is an example of a Green Swan (as well as Covid 19) as it:

- Is certain
- Carries a variety of non-linear and interacting risks: physical, regulatory, and societal. It is very challenging to make such a complex model.
- Could lead to extreme losses in the short term. And even to the possible extinction of part of humanity in the long term.

MULTIPLE FORCES



LOW CARBON: A GAME CHANGER

Climate Change: a risk “in the future”

- **Assumption:** climate change is a risk that is not rewarded
- **Challenges:**
 - Need for scalable, low cost and easy to implement solutions
 - Need to address the “Tragedy of the time horizon”

Innovative Solution

Provider’s Selection

- Index Provider
- Carbon Data

Climate Risk Reduction

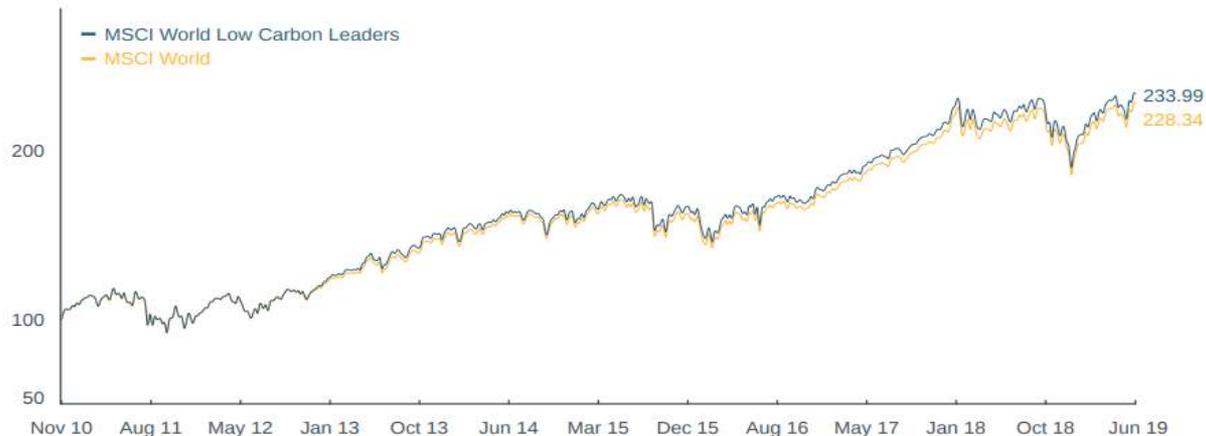
- **CO₂ emissions**
X% reduction of companies with the highest CO₂/Sales
- **Stranded assets**
Z% reduction of CO₂ reserves/Mkt Cap

Tracking Error Reduction

- **Optimization of the weights**
- **Rebalancing**

PERFORMANCES

CUMULATIVE INDEX PERFORMANCE - GROSS RETURNS (USD) (NOV 2010 – JUN 2019)



In bps



— Annualized outperformance (2010-2019):

- World: +31 bp ⁽¹⁾
- North America: +36 bp
- Europe: +32 bp

— Even if supposed to be forward-looking

— Performance of concrete investments :

- Nov 2014 – Jun 2019
- Annualized outperformance: +24 ⁽²⁾ bp
- Information ratio⁽³⁾ : 0.56

ACADEMIC WORLD

Harvard
Business
Review



Financial Analysts Journal
Volume 72 • Number 3
©2016 CFA Institute



PERSPECTIVES

Hedging Climate Risk

Mats Andersson, Patrick Bolton, and Frédéric Samama

We present a simple dynamic investment strategy that allows long-term passive investors to hedge climate risk without sacrificing financial returns. We illustrate how the tracking error can be virtually eliminated even for a low-carbon index with 50% less carbon footprint than its benchmark. By investing in such a decarbonized index, investors in effect are holding a “free option on carbon.” As long as climate change mitigation actions are pending, the low-carbon index obtains the same return as the benchmark index; but once carbon dioxide emissions are priced, or expected to be priced, the low-carbon index should start to outperform the benchmark.



Pre-Release Version

Case Study

MSCI Low Carbon Indices

A Free Option on Carbon



© 2016 MSCI

Harvard Business Review (May June 2019)

- By Bob Eccles
- Underscores the adoption by CalSTRS, NY Common Retirement Fund, GPIF, etc.
- Refers to “Hedging Climate Risk”
- \$50bn market

Financial Analysts Journal

- Very high grades for the paper
- Freely online and webinars

Insead case study (forth coming)

- By L. Tepla

IFC: ELEGANT SOLUTION



Green Bonds
(Tackles problem #2)

Risk Sharing Mechanism
(Tackles problem #1)

Financial Institutions in EM

Green Bonds Fund in EM

Asset Owners

Channeling of the financing

Investment

Fund Management

Green Activities (including Green Projects)



HIGH RECOGNITION

Partnership launch

FINANCIAL TIMES

IFC invests \$325m in green bond fund for emerging markets

Arm of World Bank to support environmentally friendly projects in developing markets



REUTERS

World Bank's IFC, Amundi to create \$2 billion green bond fund

Fund closing

FINANCIAL TIMES

Green investing generates returns, not just a warm glow

Sustainability is now seen as a way of looking at often ignored externalities

GILLIAN TETT [+ Add to myFT](#)



ASSET MANAGEMENT

Amundi and World Bank close largest green bond fund at \$1.4bn



G20 Report

Presented by **X. Musca**, former Head of the French Treasury and President Sarkozy Chief of Staff.

Making the case of the IFC deal being a case study of a new business model for developing banks

Already won 6 Awards

ACADEMIC WORLD

Global Public-Private Investment-Partnerships: A Financing Innovation with Positive Social Impact

by Patrick Bolton, Columbia University, Xavier Musca, Credit Agricole Group, and
Frédéric Samama, Amundi Asset Management*

The energy transition away from fossil fuels is already underway in some of the most advanced economies. Unfortunately, however, the most climate-virtuous countries produce only a small fraction of global carbon emissions. One of the greatest challenges in achieving the energy transition on a global scale is to wean emerging market economies from their fossil fuel dependence and so encourage their development on a sustainable, carbon-free basis.

Imperial College
Business School

Imperial means
Intelligent Business

Converting Emerging Markets to
Green Finance: Amundi and the IFC

March 2020



Journal of Applied Corporate Finance

- Patrick Bolton, Xavier Musca, Frederic Samama
- Global Public-Private Investment Partnerships: A Financing Innovation with Positive Social Impact
- Forthcoming July 2020

Imperial College case study

- By Bob Buhr
- Converting Emerging Markets to Green Finance: Amundi and the IFC
- March 2020