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Climate Change and Energy Transition

Managing Risks, Seizing Opportunities

CONFIDENCE
MUST BE EARNED
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Sept 2016

Frederic Samama
Deputy Global Head of Institutional Clients

Executive Summary

- Asset owners are increasingly handling climate change-related risks
- 5 reasons at stake:

1. Risk Management approach:
   - Markets are short-term oriented and do not price forthcoming taxation on polluting companies
   - Risk disclosure: Montreal Pledge (120 signatories[1])
2. Simple and transparent products to handle risks:
   - Low carbon indexes: risk reduction over the long run without impacting market exposure over the short run
   - First step to enter the game: easy to implement, transparent, low cost, …
3. Sharing of best practices:

   Portfolio Decarbonization Coalition : $600bn[1] + commitment (Ytd)
4. New voices from business and civil society supporting climate action:

   Pope Francis, Martin Wolf, Henry Paulson, Mark Carney, etc.
5. Acceleration by policy makers:

   Ex: France and the carbon footprint (almost) mandatory at the AO level, BOE, PBOC,…

1. Data as end-November 2015.

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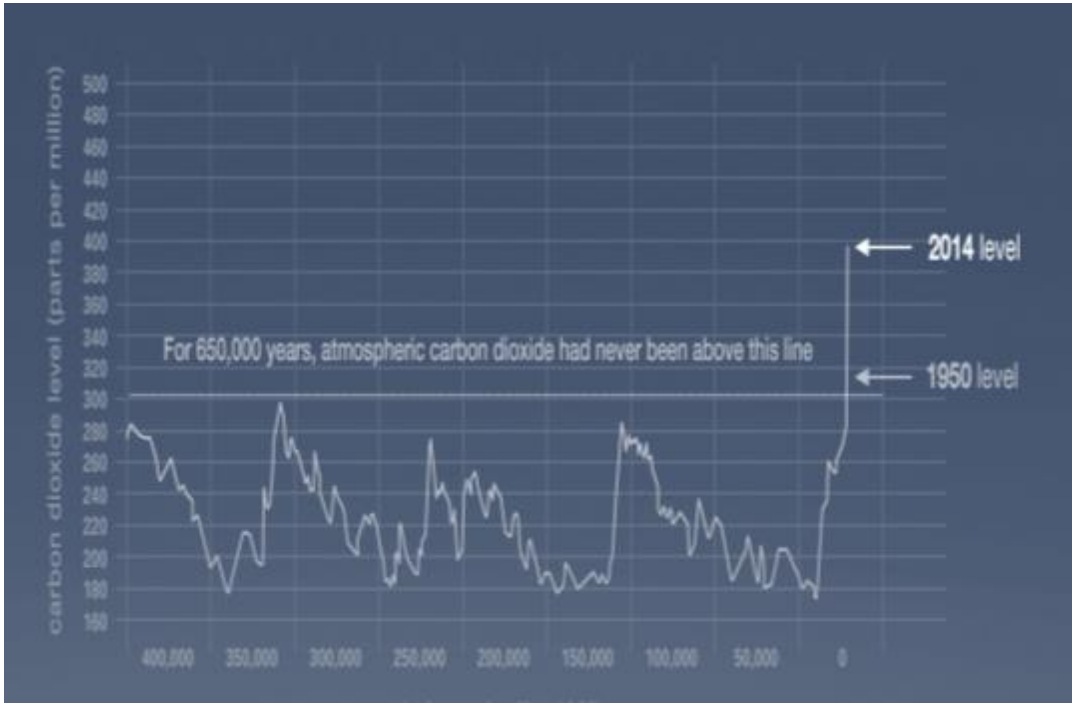
Risks for the Planet: NASA [1]

Evidence that atmospheric CO_2 has increased



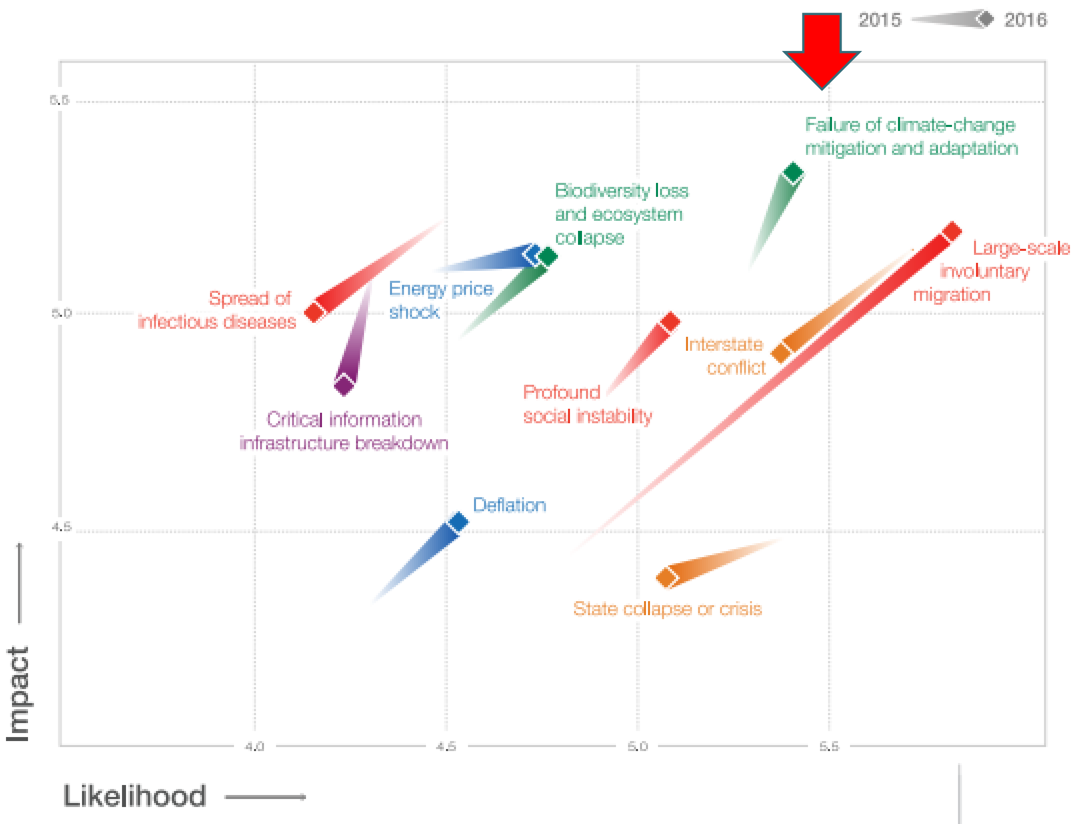
Vostok ice core data/J.R. Petit et al.; NOAA Mauna Loa CO2 record (http://climate.nasa.gov/evidence/)

- **Sea level rise:**
  - Global sea level rose about 17 centimeters in the last century.
- **Global temperature rise:**
  - 10 of the warmest years in the last century occurred in the past 12 years,
  - 2015, warmest year since record began (1880).
- **Shrinking ice sheets:**
  - Greenland loses 150 to 250 cubic km of ice per year ('02 to '06).
- **Ocean acidification:**
  - Acidity of surface ocean waters has increased by about 30%.
- **Warming oceans:**
  - Top 700 meters of ocean showing warming of 0.302 degrees F.

(1) http://climate.nasa.gov/evidence/ January 2016

Climate Change: Global Risk for Investors

The Global Risks Landscape 2016



- Failure of climate-change mitigation:
  - Most impactful risk,
  - 3rd most likely,
  - More impactful then sever energy price shock.
- Since COP21:
  - Much stronger climate policy risk for investors.

Source: World Economic Forum 2016, Global Risks Report 11th Edition

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Carbon Risk: A Shifting Debate

"If that happened, fossil fuel reserves would indeed be stranded. Investor beware: the risk of that cannot be zero." [1]

Martin Wolf (17th June 2014)

"We're staring down a climate bubble that poses enormous risks to both our environment and economy." [2]

Henry Paulson (21st June 2014)

« Cases like Arch Coal and Peabody Energy – where it is alleged that the directors of corporate pension schemes failed in their fiduciary duties by not considering financial risks driven at least in part by climate change – illustrate the potential for long-tail risks to be significant, uncertain and non-linear »

"Once climate change becomes a defining issue for financial stability, it may already be too late." [3]

Mark Carney (September 2015)

- Shift from a "risk to society" to a "risk to investors"
- Not rewarded risks
- Fiduciary responsibility to:
  - Identify them
  - Reduce them
  - With long-term investment horizons
- Even a threat for financial stability

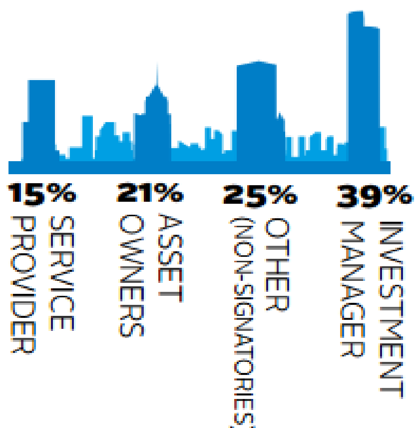
(1) See article from Martin Wolf published in FT 17/06/2014
(2) See article from Henry Paulson published in New York Times 21/06/2014
(3) Hearings at the Bank of England http://www.bankofengland.co.uk/publications/Pages/speeches/2015/844.aspx

Carbon Risk Analysis: Montreal Pledge

PRI Montréal PLEDGE

Repartition by Region[1]

Repartition by Category



- 120 signatories
- Signatories represent $10 trillion
- Asset Owners: AP4, CalPERS, ERAFP, FRR, Local Government Super, PGGM…
- Reinforces the ecosystem:
  - Providers are getting more resources
  - Debates on the methodology/data

(1) PRI in Person, 8th conference, conference highlights 2014
http://2xjmlj8428u1a2k5o34l1m71.wpengine.netdna-cdn.com/wp-content/uploads/PRIinPersonConferenceReport2014.pdf
http://montrealpledge.org/signatories/

Two Major Risks to Investors

Polluting **And** **Stranded Assets**

Polluting

- No taxation:
  - No cost for negative externalities: impact on the planet, assets, health…
  - But a form of taxation will be implemented in the long-term
- Direct subsidies:
  - Fossil fuel : **$548bn** [(1)]
  - Eliminating these subsidies would result in a **4.1%** reduction in energy demand in 2020 [(4)]

Stranded Assets

- Fossil fuels companies: mainly valued on their reserves
- Reserves exceed the budget of the planet:
  - *Reserves* : 2,795 $GtCO_2$ [2]
  - *Budget* : 1,437 $GtCO_2$ [3]

(1). "Energy Subsidy Reform: Lessons and Implications", IMF (2013)

(2). Carbon budget 2000-2050 for a 50% probability to stay under 2°C increase over pre-industrial level scenario. Source "Greenhouse-gas emission targets for limiting global warming to 2 °C", Meinshausen et al, 2009

(3). For a 50% probability to stay under a 2° increase scenario. Quantity of CO_2 trapped in the world's top 200 fossil fuel reserves, excluding unconventional sources. Source: Carbon Tracker Initiative

(4). McKinsey (2010): Energy Efficiency: a compelling global resource, as a percentage of the global GDP.

Methodology: Carbon Reduction Constraints

Provider's Selection	Then	Climate Risk Reduction	Then	TE Reduction

Provider's Selection

- Index Provider (MSCI)*
- Carbon Data Provider (MSCI)*

Climate Risk Reduction

- Carbon footprint:

X% reduction of companies with the highest carbon footprint (Emission intensity)[1]

- Stranded assets

Z% reduction of carbon reserves (Reserves intensity)[2]

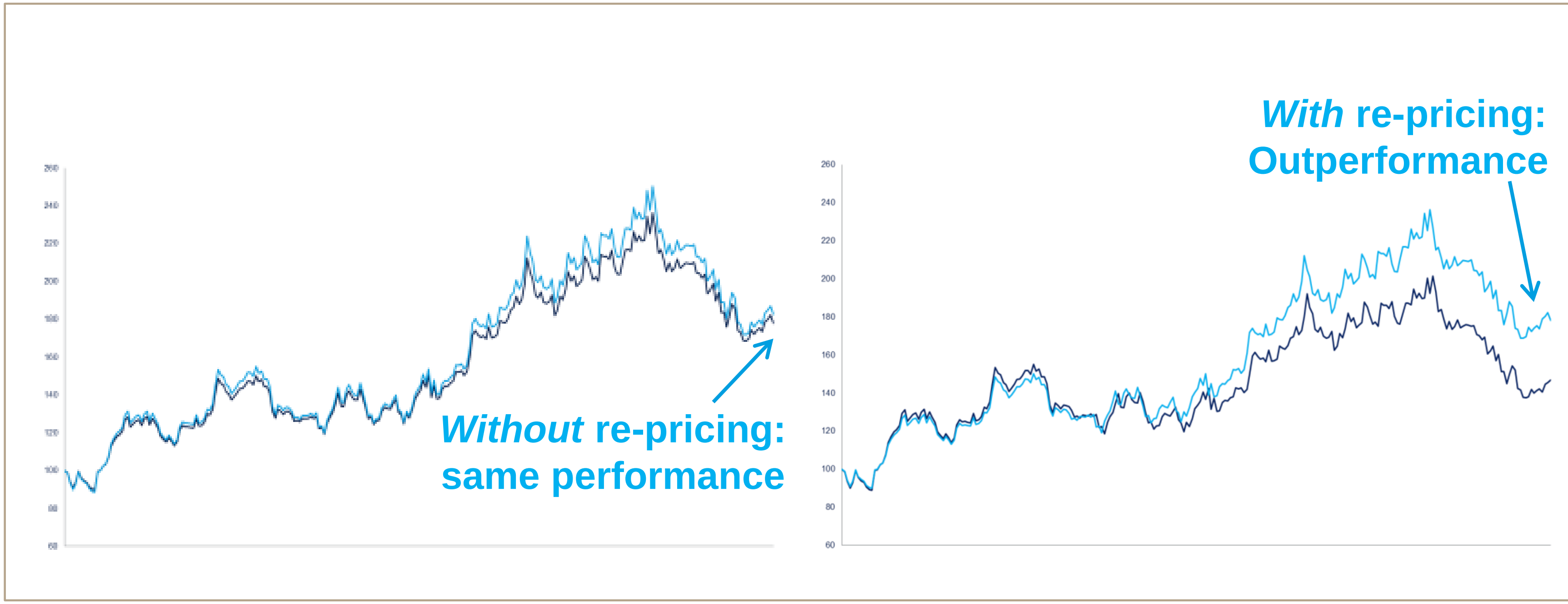
TE Reduction

- Optimization of weights
- Regular rebalancing

A Simple, Transparent and Rule-Based Approach

(1) Carbon footprint divided by sales
(2) Reserves divided by market cap
* As an example

Decarbonization: Free Option on Carbon Repricing



Benchmark — Low Carbon Low TE — Benchmark — Low Carbon Low TE

Free Option :

- Either no *climate change impact*: same performance
- Or a *climate change impact*: outperformance

Source: Amundi Investment Solutions / Random simulations with annual volatility at 20%, annual expected return 7% and a 0,5% TE.

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MSCI Europe Low Carbon Leaders

Key Metrics	MSCI	MSCI Europe Low Carbon Leaders
Total Return* (%)	**12.7**	**13.1**
Total Risk* (%)	13.2	13.3
Sharpe Ratio	0.95	0.99
Active Return* (%)	0	0.4
Tracking Error* (%)	0	**0.6**
Information Ratio	NA	0.72
Turnover** (%)	1.7	6.9
Securities excluded	NA	328
Market cap excluded (%)	NA	17.4
Carbon *Emission* intensity reduction (tCO2/mm USD) (%)	NA	**50**
Carbon *Reserves* intensity reduction (tCO2/mm USD) (%)	NA	**68**

- Excludes:
  - **Largest 20% emitters** with a maximum 30% by weigh form any sector
  - **Largest owners' reserves** up to 50%
- Major reduction of:
  - Carbon *Emissions* Intensity **(-50%)**
  - Carbon *Reserves* Intensity **(-68%)**
- Low tracking error: **0.6 %**

Source: MSCI

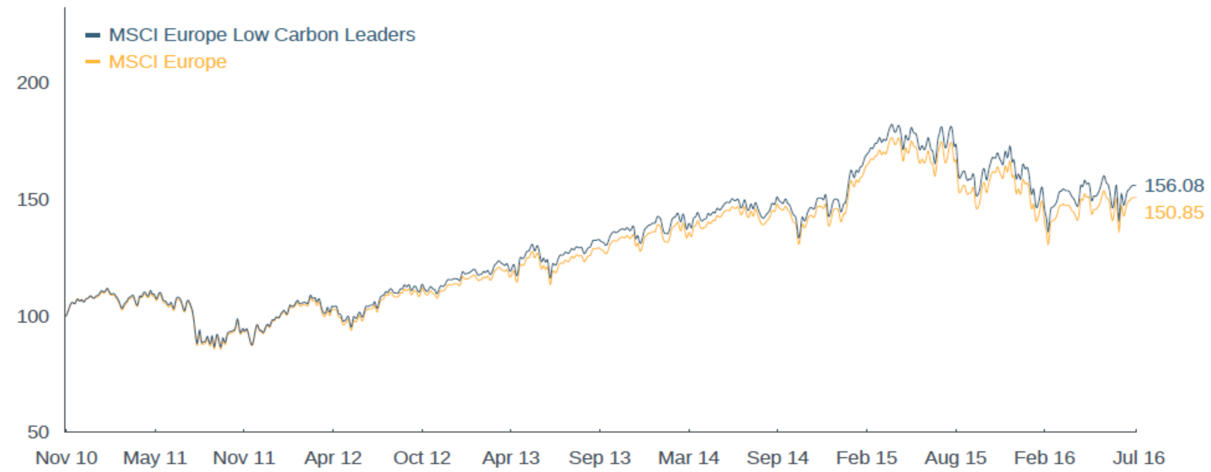
* Gross returns annualized in EUR for the 11/30/2010 to 08/29/2014 period.

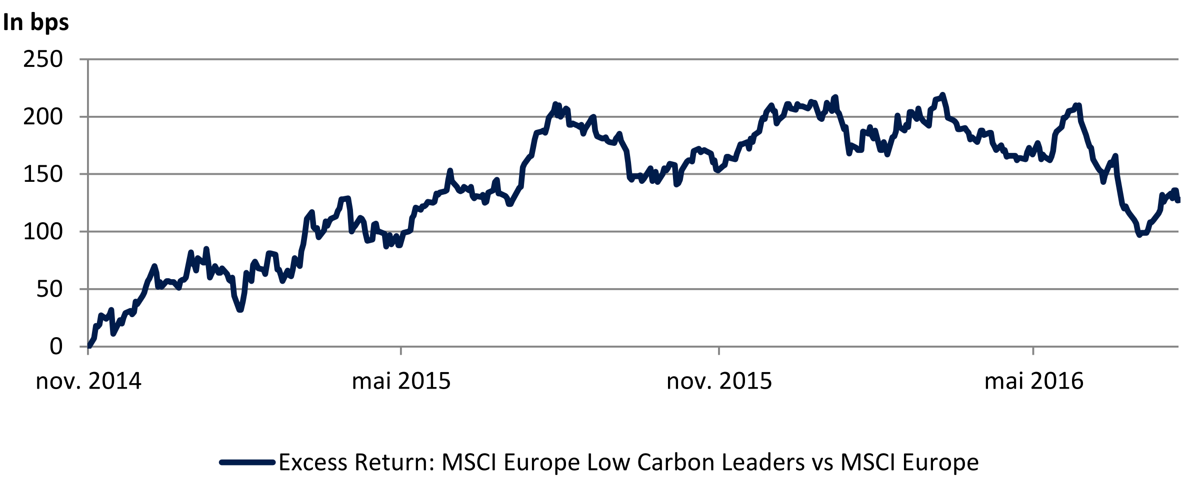
** Annualized one-way index turnover for the 11/30/2010 to 06/30/2014 period.

The cumulative index performance is from MSCI

MSCI Europe Low Carbon Leaders: Outperformance

CUMULATIVE INDEX PERFORMANCE - NET RETURNS (EUR) (NOV 2010 – JUL 2016)





- Annualized outperformance (2010-2016):
  - Europe: +65bp [(1)]
  - North America: +44bp
  - World: +43bp
- Even if supposed to be forward-looking
- Performance of concrete investments :
  - Nov 2014-June 2016
  - Outperformance: +127 [(2)] Bps
  - **Information ratio [(3)] : 1.27**

Source: MSCI

(1) Net returns annualized in EUR for the 11/30/2010 to 5/31/2016 period. Data prior to the launch date (Sep 16, 2014) is back-tested data

(2) Net returns annualized in EUR for the 11/7/2014 to 6/28/2016 period. Outperformance in basis points. The cumulative index performance is from MSCI

(3) A ratio of portfolio returns above the returns of a benchmark (usually an index) to the volatility of those returns

Mix of Different Approaches

Exclusion

+ Strong Signal
- Does not fit with constraints of most investors
- Scalability? Limits?

Risk Management

Targeted and dynamic exclusion*

+ Combines exclusion and engagement
+ Fits with investors constraints & is scalable
+ Competition within each sector to accelerate carbon transition [1]
- Middle-road approach

Engagement

+ Easy to Implement
- Possible light impact

* Low carbon leaders: exclusion based on transparent rules and with a cap per sector

(1) For polluting companies

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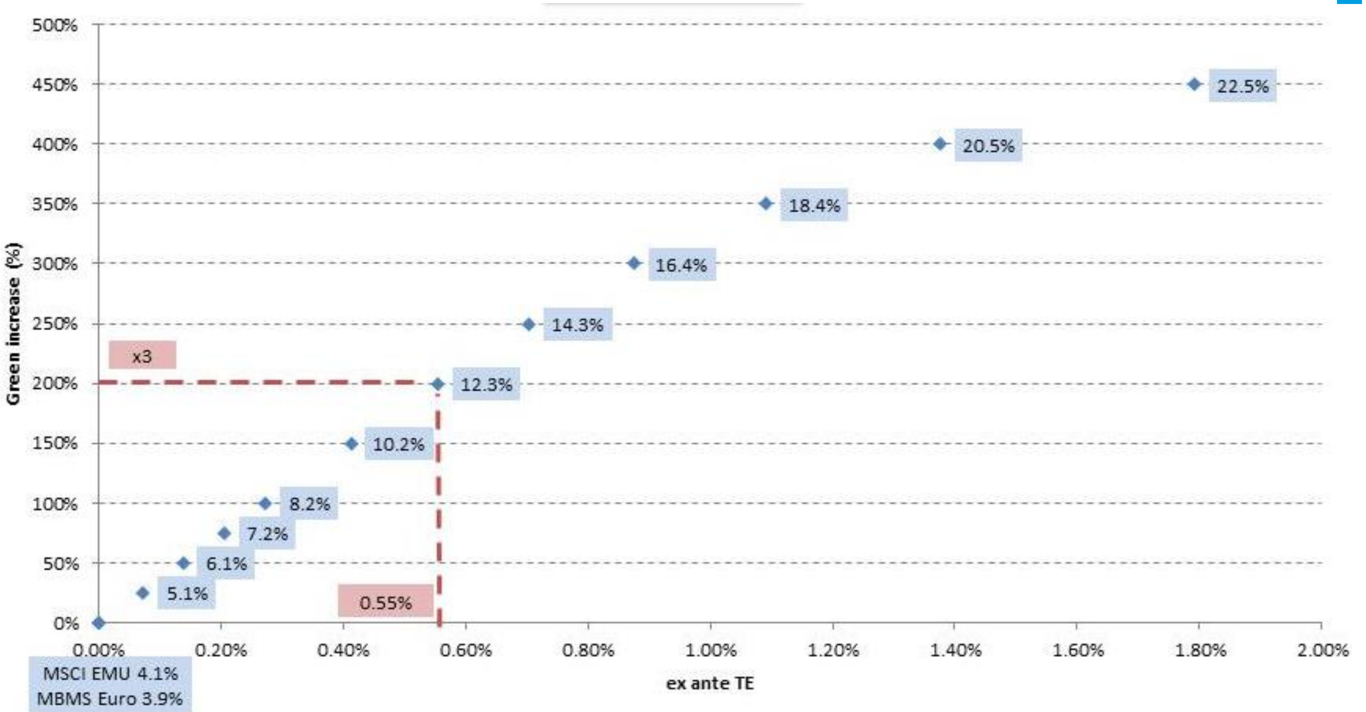
Maximizing Green exposure

Green Efficient Frontier



Additional constraints
Countries: bench +/- 0.2%
Sector GICS 1: bench +/- 0.2% - Sector GICS 2: bench +/- 0.2%
Sector GICS 3: bench +/- 0.2% for Materials only – Sector GICS 4: bench +/- 0.2% for Energy only

- Green efficient frontier:
  - Efficient frontier between Green exposure & ex ante TE (1)
  - Green exposure: % of sales in green technologies' dev.
  - Green sectors:
    - Alternative energy
    - Energy efficiency
    - Green building
    - Pollution prevention & sustainable water
- Ex: Green exposure :
  - Can be **multiplied by 3**
  - For an ex ante **TE budget of 0.55%**
  - To reach **12.3%**

Source: MSCI
(1) Eurozone, as of 12/31/2015
(2) MSCI ESG Research data
(3) A ratio of portfolio returns above the returns of a benchmark (usually an index) to the volatility of those returns

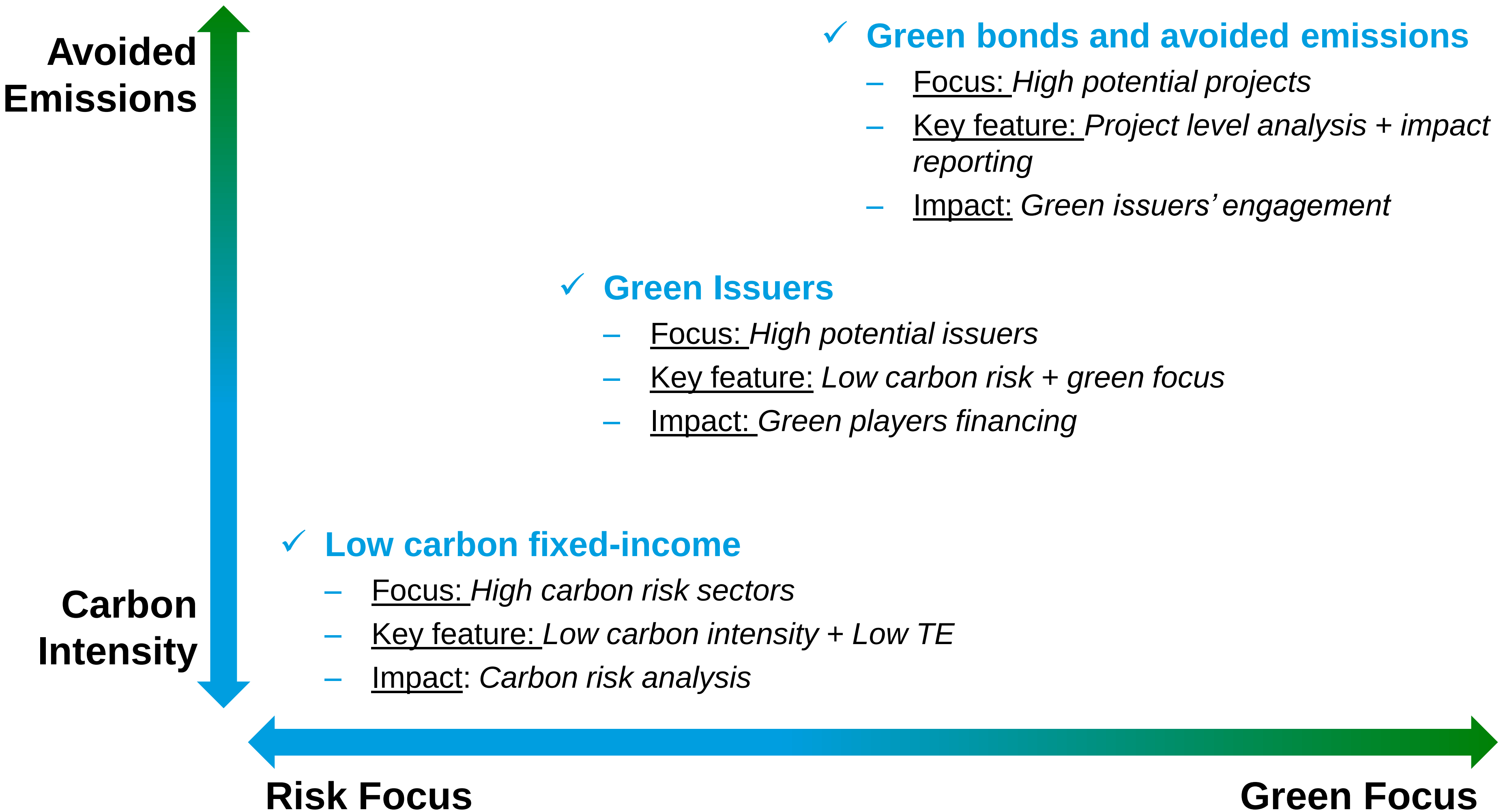
A Potential Game Changer

Up to now Investors Obstacles	Being Addressed
Time Horizon	No impact on expected returns until pressure on polluting companies takes place
Complexity	Easier to identify the potentially penalized companies
Scalability	Passive management: $6tn

An easy first step (transparent, low cost,…) that can trigger the entry of investors into the game of tackling climate change

1. Data as end-November 2015.

Fixed-Income : Mapping and Product Development



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Fixed Income: Decarbonization

1 **Investment universe/ Benchmark index**

	Barclays Euro Corporates
# bonds	~ 1500
# issuers	~ 480
Interest rate sensibility[1]	498
Bonds sensibility[2]	525
Carbon intensity	145

2 **Exclusion of 20% of the most polluting issuers**
(up to 30% maximum per sector)

# bonds	~ 1300
# issuers	~ 380
Carbon reduction	36%
Tracking Error	0.08%

3 **Sampling process**
aimed at reducing the amounts lent to polluting issuers

# bonds	~ 110
# issuers	~ 110
Interest rate sensibility	498
Bonds sensibility	525
Carbon reduction	**58%**
Tracking Error	**0.17%**

- Decarbonization of Barclays Euro Corporate
- Process:
  - **58% carbon footprint reduction**
  - Same market exposure (yield/spread)
  - **Low TE: 0.17%**
- Discussions with index providers to launch:
  - ETF
  - Mainstream index
- Alternative to green bonds.

1. Modified duration. 2. Spread modified duration.

Green Bonds : Green Issuers

- Green Bonds, as one of the ways to address the energy transition funding needs
  - Funding needs: +$800bn a year by 2020(1)

- A small but booming market
  - $86bn outstanding, 2015 YTD issuance: $40bn(2)

- Caveats:
  - Ratings, size & sector issues
  - Greenwashing risk

- Solving the issues:
  - Focus on issuer « green » strategy
  - Widening the inv. universe
  - Mix of risk approach & impact investing

		Invest in	Impact	Example	Size(3)
1	Labeled Green Bonds	Projects generating a direct environmental benefit	Finance directly the energy transition or climate mitigation	EDF	€37bn
2	Natural Green Bonds	Companies developing green technologies	Support pure players in energy transition	Schneider	€66bn
3	Quasi Natural Green Bonds	Best players in key sectors for climate change mitigation	Support global players to finance transition towards a low carbon economy	Toyota	€685bn

(1) To comply with the 450 IEA scenario

(2) Source: HSBC's « Corporate Green Bonds – Initiation: Four Ways to Scale Up the Market » Nov. 2015

(3) At the end of January 2016, for indicative purposes only.

Capital Investment Fund: Amundi AM / EDF

- New asset management company dedicated to financing the energy transition: « Amundi Energy Transition »

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- ✓ Financial expertise on all asset classes
- ✓ Important resources guaranteeing a renowned quality of asset management

Amundi Energy Transition

EDF

- ✓ Important *pipeline* of green premium assets
- ✓ Industrial expertise
- ✓ Pioneer in developing innovative technologies

- Direct offer in infrastructures related to the energy transition[1]:
  - **Themes** : Renewable Energies (wind, solar, etc.), Energy Efficiency (heating networks, cogeneration, etc.), Innovative Solutions to support the energy transition (*Energy Saving Cies – ESCOs,* batteries, etc.)
  - **Unique Opportunity** for investors to leverage the profitability of EDF's *pipeline* of green projects by relying on Amundi Energy Transition's expertise and its independent management team

Source : Amundi AM 2016

Academic Papers: Columbia/AP4/Amundi

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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 optio... are pending, the low-carbon index obtains the sa... emissions are priced, or expected to be priced, the l...

Whether or not one agrees with the scienti... consensus on climate change, both clima... risk and climate change mitigation poli... risk are worth hedging. The evidence on rising glob... average temperatures has been the subject of rece... debates, especially in light of the apparent slowdov... in global warming over 1998–2014.[1] The perceiv... slowdown has confirmed the beliefs of climate chan... doubters and fueled a debate on climate scien... widely covered by the media. This ongoing deba... is stimulated by three important considerations.

The first and most obvious consideration is th... not all countries and industries are equally affected l... climate change. As in other policy areas, the introdu... tion of a new regulation naturally gives rise to poli... debates between the losers, who exaggerate the cos... and the winners, who emphasize the urgency of t... new policy. The second consideration is that clima... mitigation has typically not been a "front burne... political issue. Politicians often tend to "kick the c... down the road" rather than introduce policies that a... costly in the short run and risk alienating their co... stituencies—all the more so if there is a perception th...

Mats Andersson is CEO of AP4, Stockholm. Patri... Bolton is the Barbara and David Zalaznick Profess... of Business at Columbia University, New York Ci... Frédéric Samama is deputy global head of institution... clients at Amundi Asset Management, Paris.

Editor's note: The views expressed in this article a... those of the authors and do not necessarily reflect t... views of the Amundi Group, AP4, or MSCI.

Editor's note: This article was reviewed and accept... by Executive Editor Stephen J. Brown and Executi... Editor Robert Litterman.

Governance and Climate Change: A Success Story in Mobilizing Investor Support for Corporate Responses to Climate Change

by Mats Andersson, AP4, Patrick Bolton, Columbia University, and Frédéric Samama, Amundi and SWF RI

Effective action in limiting the extent and effects of climate change will have to include changes in business and massive investment by the private sector in making the energy transition from fossil fuels to clean energy and the development of a low-carbon economy.[1] Until fairly recently, the main approach to getting business to respond to climate change has been through top-down efforts to regulate emissions and enact various forms of "carbon pricing." The advantage of this approach is conceptual clarity and sound economic logic. The basic idea is that, by reaching an international agreement on emissions quotas and carbon pricing that aims to make businesses "internalize" the costs associated with greenhouse gas (GHG) emissions, and fairly allocate GHG abatement costs across countries, governments will set the environmental protection rules for companies in their respective countries, and markets will adjust to the new regulations and carbon prices. And this, of course, is the approach to economic policy in general: the political process and government administration set the rules, and businesses respond by managing their operations as best they can under the rules imposed on them by government.

Nevertheless, as the intergovernmental agreement process following the signing of the Kyoto Protocol in 1997 has amply demonstrated, this classical approach to economic policy does not work when applied to a global "public goods" problem like climate change mitigation. Given the notorious difficulty of reaching international trade agreements even among a small subset of countries, it should not have been too surprising that there would be little progress toward a global climate change agreement among 196 countries. Indeed, by the time the negotiations around the Paris climate agreement of 2015 were starting, the coalition of willing nations had shrunk to a few dozen countries, mostly in Europe. Given this context, it is remarkable that COP21 in Paris managed to bring essentially all nations back into the climate change mitigation process.

This achievement can be attributed to a complete change of tack in bringing about a climate change agreement. Instead of a top-down approach, in which most economic actors passively respond to regulations imposed on them, the Paris agreement is built on a bottom-up approach centered around Intended Nationally Determined Contributions (INDCs), and a process that includes all economic actors, not just governments. This new approach was nicely summed up in the following comment by David Pitt-Watson in his introduction to a conference at Columbia University in March 2015:[2] "When it comes to climate change we are all players, we are not spectators."

The new bottom-up approach is inevitably less coherent, but it is certainly more broad-based. And it is far more realistic, taking better account of the limits of government action in an increasingly complex world. It invites complementary action and leadership from civil society and the business community. Indeed, it may well prove to be a "game changer," with potentially far-reaching implications for corporate governance that we explore in this article. Today's proponents of the integration of ESG factors into financial analysis, by raising investor awareness about the financial risks associated with climate change, promoting the use of appropriate risk management tools to hedge climate-related risks, and coordinating investor engagement with companies, can play an important role in encouraging climate change mitigation action and so help overcome some of the limits of government leadership.

Admittedly, this could all be mere wishful thinking. We attempt to dispel this impression by providing in this article an account of concrete, though as yet modest, successes already achieved around one private sector climate change mitigation initiative—an initiative that has led to the founding of the "Portfolio Decarbonization Coalition" under the auspices of the United Nations.[3] The PDC, as the coalition has become

2. David Pitt-Watson is the Chair of the United Nations Environmental Program Finance Initiative (UNEP-FI).

- *Financial Analysts Journal* (2016):
  - Signaling is key to generating the right incentives;
  - Risk analysis.
- High visibility:
  - "Long-termism, the problems with capitalism and other holiday reading" (Dec 2014) [1]
  - Sept 6: Seminar organized by FAJ
- *Journal of Applied Corporate Finance (2016)*
  - New bottom-up approach: mobilization of asset owners
  - From idea to implementation

(1) http://www.top1000funds.com/opinion/2014/12/18/long-termism-the-problems-with-capitalism-and-other-holiday-reading/

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Portfolio Decarbonization Coalition

UNITED NATIONS ENVIRONMENT PROGRAMME

Programme des Nations Unies pour l'environnement Programa de las Naciones Unidas para el Medio Ambiente

Программа Организации Объединенных Наций по окружающей среде برنامج الأمم المتحدة للبيئة

联合国环境规划署

UNEP

United Nations and leading investors launch Coalition to decarbonize institutional investment worldwide at UN Summit

Commitment to decarbonize $100 billion of investment

- UNEP FI, AP4, Amundi and CDP launch global Portfolio Decarbonization Coalition at Ban Ki-moon's Summit on Climate Change
- UN Secretary General Ban Ki-moon recognizes the coalition as an effective approach to rapidly mobilize financial markets to help decarbonize economic activity on the ground

- Commitment to decarbonize:
  - **$600bn+ achieved up to now**
- Open platform:
  - Investors share best practice
  - Governance: UNEP-FI
- Members:

  Allianz, Amundi,AP4, APG, Australian Ethical Investment, Church of Sweden, Environment Agency Pension Fund, ERAFP, Fonds de Reserves des Retraites, KLP, Local Government Super, Mandatum, Mirova, Point Capital Management, Robeco SAM, Sonen capital, Storebrand, Toronto Atmospheric Fund, University of Sydney

Portfolio Decarbonization Coalition

http://unepfi.org/pdc/

PDC 2016: Open Call for Research

“Aligning Investment Portfolios with a Low Carbon Economy”

OPEN CALL FOR RESEARCH PROJECT

“Aligning Investment Portfolios with a Low Carbon Economy”

a Portfolio Decarbonization Prize

supported by Trucost and SWF RI

Submission deadline: August 31, 2016.

Research grant details:

- A €12,500 grant
- 2 years access to Trucost academic platform
- Be awarded at the UNEP FI global roundtable in Dubai, October 25-26, 2016

Background

Investors and financial regulators are increasingly aware of climate-related risks. In a recent speech to the insurance industry, the Governor of the Bank of England warned of huge losses faced by investors exposed to such risks. These risks are twofold. Firstly, there are the risks (and opportunities) posed by climate change itself, for example through the destruction of infrastructure assets due to extreme weather. Second, there are the risks and opportunities posed by the necessary transition to a low-carbon economy, if we are to avoid the worst effects of climate change. What are the implications for investors if such risks remain largely unexplored?

Against this background, the Portfolio Decarbonization Coalition (PDC) is supporting research projects with potential applications in the field of investment management with a grant of € 12.500 and full access to Trucost’s database. The PDC represents investors worth $3.2 trillions in assets under management and oversees the decarbonization of $600bn AUMs. It is the only investor network focused on portfolio design and portfolio level action to adapt to a changing climate.

Data

Trucost will make available a comprehensive set of carbon/climate change related data for the Global 200 Universe (top 200 companies worldwide in terms of market value). Examples of data include past and current Scope 1, 2 & 3 GHG emissions, costs of externalities, revenue etc.

Further information on application process

The research proposal should be submitted to pdc@unepfi.org. See PDC Rsearch Prize Webpage for further information.

Research grant details:

- €12,500 grant
- 2 years access to Trucost data
- Award at UNEP FI global roundtable in Dubai

Amundi’s involvement:

- Founding member of the Coalition
- Financial support through SWF RI

Renowned partners:

- Selection committee: LSE, Columbia, TSE
- Email blast to 20,000+ UNEP FI network
- Leverage on academic partners, institutional clients with academic partners

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PDC Sharing Best Practice

- *March 9th 2015*: Columbia University
  - 30 asset owners, $6tn
  - Including: CalPERS's CEO, AP4's deputy CEO, APG's CIO, ERAFP's CEO, etc.
  - Materiality of climate risk for investors
- *April 7th 2015*: Rockefeller seminar at Bellagio
  - PDC members, practitioners, academics, policy makers
  - Including: Church of England, Church of Sweden, FRR, Erafp, NZSF, WWF, AP4, etc.
  - Carbon risks, decarbonization of listed securities portfolios, data issues, companies engagement, etc.
- *October 31st 2015*: PDC Seminar at Villa Medici
  - PDC members, practitioners, academics, regulators
  - Including: EDF, French Treasury, DNB, PGGM, Storebrand, IFAD, etc.
  - Green bonds & impact investing, real estate, direct financing of energy transition, etc.
- *March 19th 2016:* Rockefeller seminar at Bellagio
  - Co-organized with the UNEP Inquiry
  - PDC members, practitioners, academics, regulators
  - Including: French Treasury, CDG Capital, Green Finance Committee, Italian Ministry, Allianz, etc.
  - China, Emerging market INDCs, Sovereign bonds, G7/G20/COP22

Bellagio 2016: Scaling up Market and Policy Innovation

Inquiry: Design of a Sustainable Financial System

Post COP21 environment:

- Post COP21, 195 countries commit to reduce CO_2 emissions to achieve 2°C scenario
- Ambitious INDC plans require extensive private funding
- Financial policies to mobilize investors become center-stage

Bellagio 2016: engaging policymakers

- 22 experts, policy makers and investors brought together
- Representatives of UK, China, Morocco, France, Italy, Norway, Sweden
- Focus on policy innovation to meet INDCs
- Preparing for critical milestones: COP22 & G20 in Hangzhou

Thinking together about innovative solutions to finance the energy transition

- Green bonds and low carbon equities in China
- Asset owner roles in the investment chain
- Materialization of transition risks
- Competitiveness of renewables

PDC Supports

"Some of the ***biggest – and potentially transformational announcements at my Climate Summit*** *came from the private sector. A coalition of institutional investors has committed to* ***decarbonize $100bn in institutional equity investments****"*
Ban Ki-moon, UN Secretary General

"Portfolio decarbonization. *I know that a Portfolio Decarbonization Coalition* ***has been put in place*** *and announced at the Climate Summit in NYC and that after only a few months of existence* ***it has already received a $45bn of commmittments.*** *French actors are part of this mobilization »*
François Hollande, President of the French Republic

*"****The Decarbonization Portfolio Coalition is a positive step in this direction. I salute the mobilization of its founders Amundi, AP4, CDP and UNEPFI,*** *and investors that have signed up since its launch at the Climate Summit, and encourage all institutional investors to take these commitments even further by the COP21."*
Laurence Tubiana, French Representative for the COP21

*"****We have the PDC****, we have the Montreal Pledge, all of which are evidences of a true commitment from the financial sector to move in an orderly transition and shift capitals."*

Christiana Figueres, Executive Secretary Of The U.N. Framework Convention On Climate Change

PDC in the Press

WALL STREET JOURNAL

"Some of the biggest – and potentially transformational announcements at my Climate Summit" 25/09/14

Le Monde

"Mettre la finance au service du climat" 10/10/14

Les Echos

"Des fonds qui "flèchent" votre épargne vers une économie verte" 11/06/15

FINANCIAL NEWS

"Big names pledge $100bn switch to low-carbon strategy" 11/23/15

Handelsblatt

"Klimawandel unter Anlegern" 11/11/15

manager magazin – Wirtschaft aus erster Hand

"Diese Investoren kämpfen gegen CO2-aber vor allem für Rendite" 11/24/15

FT FINANCIAL TIMES

"COP21: Public-private collaboration key to climate targets" 12/12/15

"Large US companies fail to disclose climate change risk" 29/11/15

INVESTMENT EUROPE

"Portfolio decarbonisation coalition initiative exceeds target" 11/27/15

Environmental Finance

"Personality of the Year: Mats Andersson" 04/01/15

IPE INVESTMENT & PENSIONS EUROPE

"PensionDanmark, AP4 commit to initiatives at UN Climat Summit" 09/24/14

"Pensions in Nordic Region: Time for action on carbon" Nov. 2014

Other blogs and websites: Justleans.com ; allafrica.com ; cleantechnica.com ; foreignaffairs.co.nz ; Sustainablejapan.jp

New Influential Voices

- ## Religious leaders:
  - **Exegesis of Pope Francis:**
    - On 18th June 2015, the pope released a 180-page encyclical on the environment
    - Call for action on climate change
  - **Islamic leaders:**
    - Muslim world to phase out greenhouse emissions by 2050 and a 100% renewable energy(1)
- ## Major businessmen:
  - **Michael J. Bloomberg:**
    - C40 Cities Climate Leadership Group
    - Chairman of FSB's Task Force on Climate-related Financial Disclosures
  - **Paul Polman:**
    - "There are many companies now that would tell you that climate change is directly impacting the bottom line."(2)
    - Commitment to reach net zero emissions by 2050 (3)
- ## An unprecedented mobilization from non-state actors around COP21(4):
    - 2254 cities,150 regions, 2034 companies, 425 investors, 235 civil society organizations

(1) Istanbul meetings, August 17th 2015.
(2) http://weather.climate25.com/project/paul-polman/
(3) http://edition.cnn.com/2015/10/29/opinions/polman-business-case-tackling-climate-change/
(4) See: http://climateaction.unfccc.int/

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Policy Makers' Acceleration: Brief Overview

Country	Organization	Initiative
Brazil	**Central Bank**	• Banks are **encouraged to assess their individual exposure to carbon risk** in the Internal Capital Adequacy and Assessment Process (ICAAP)[1]
California	**State**	• SB 185 requires CalPERS and CalSTRS to **divest from coal companies**[4]
USA	**ERISA (pension fund regulation authority)**	• Interpretative Bulletin 2015-01 **makes ESG factors a proper component of the ERISA fiduciaries' duty when they might directly affect economic and financial value** of the plan's investment.
China	**Central Bank**	• Green Finance Track at the G20 • First official rule on Green Bonds
France	**State**	• **Evaluation of exposure to climate-change related risks** (notably through carbon footprint) • **Contribution to 2°C scenario and energy transition** • No standard disclosure yet, and review of best practices in two years.
Singapore	**Stock Exchange**	• The Singapore stock exchange wants to **make energy disclosure mandatory** • To date 53% of listed companies have disclosed their emissions
UK	**Stock Exchange**	• The climate change act (2008) **requires all UK quoted companies to report** on their greenhouse gas emissions as part of their annual Directors' Report[2]

- Different approaches to mobilize new inflows towards the low carbon economy:
  - *Banks* through CB (Brazil)
  - *Financial institutions* through prudential regulation (China)
  - *Investors* through regulatory environment (California, France, USA)
  - *Shareholders* through stock exchanges (UK, Singapore)

(1) http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf
(2) Environmental reporting Guidelines: British Government
(3) Article173
(4) SB 185

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Policy Makers' Acceleration: France

TITRE VIII

DONNER AUX CITOYENS, AUX ENTREPRISES, AUX TERRITOIRES ET À L'ÉTAT LE POUVOIR D'AGIR ENSEMBLE

CHAPITRE Ier

Outils de la gouvernance nationale de la transition énergétique : programmation, recherche et formation

Article 173

I. – La section 1 du chapitre II du titre II du livre II du code de l'environnement est ainsi modifiée :

1° L'intitulé est ainsi rédigé : « Stratégie nationale de développement à faible intensité de carbone et schémas régionaux du climat, de l'air et de l'énergie » ;

2° Au début, est ajoutée une sous-section 1 ainsi rédigée :

« *Sous-section 1*

« *Budgets carbone et stratégie bas-carbone*

« *Art. L. 222-1 A.* – Pour la période 2015-2018, puis pour chaque période consécutive de cinq ans, un plafond national des émissions de gaz à effet de serre dénommé "budget carbone" est fixé par décret.

« *Art. L. 222-1 B.* – I. – La stratégie nationale de développement à faible intensité de carbone, dénommée "stratégie bas-carbone", fixée par décret, définit la marche à suivre pour conduire la politique d'atténuation des émissions de gaz à effet de serre dans des conditions soutenables sur le plan économique à moyen et long termes. Elle tient compte de la spécificité du secteur agricole, veille à cibler le plan d'action sur les mesures les plus efficaces en tenant compte du faible potentiel d'atténuation de certains secteurs, notamment des émissions de méthane entérique naturellement produites par l'élevage des ruminants, et veille à ne pas substituer à l'effort national d'atténuation une augmentation du contenu carbone des importations. Cette stratégie complète le plan national d'adaptation climatique prévu à l'article 42 de la loi n° 2009-967 du 3 août 2009 de programmation relative à la mise en œuvre du Grenelle de l'environnement.

« II. – Le décret fixant la stratégie bas-carbone répartit le budget carbone de chacune des périodes mentionnées à l'article L. 222-1 A par grands secteurs, notamment ceux pour lesquels la France a pris des engagements européens ou internationaux, ainsi que par catégories de gaz à effet de serre lorsque les enjeux le justifient. La répartition par période prend en compte l'effet cumulatif des émissions considérées au regard des caractéristiques de chaque type de gaz, notamment de la durée de son séjour dans la haute atmosphère. Cette répartition tient compte de la spécificité du secteur agricole et de l'évolution des capacités naturelles de stockage du carbone des sols.

« Il répartit également les budgets carbone en tranches indicatives d'émissions annuelles.

« La stratégie bas-carbone décrit les orientations et les dispositions d'ordre sectoriel ou transversal qui sont établies pour respecter les budgets carbone. Elle intègre des orientations sur le contenu en émissions de gaz à effet de serre des importations, des exportations et de leur solde dans tous les secteurs d'activité. Elle définit un cadre économique de long terme, en préconisant notamment une valeur tutélaire du carbone et son utilisation dans le processus de prise de décisions publiques.

« III. – L'Etat, les collectivités territoriales et leurs établissements publics respectifs prennent en compte la stratégie bas-carbone dans leurs documents de planification et de programmation qui ont des incidences significatives sur les émissions de gaz à effet de serre.

« Dans le cadre de la stratégie bas-carbone, le niveau de soutien financier des projets publics intègre, systématiquement et parmi d'autres critères, le critère de contribution à la réduction des émissions de gaz à effet de serre. Les principes et modalités de calcul des émissions de gaz à effet de serre des projets publics sont définis par décret.

« *Art. L. 222-1 C.* – Les budgets carbone des périodes 2015-2018, 2019-2023 et 2024-2028 et la stratégie bas-carbone sont publiés au plus tard le 15 octobre 2015.

« Pour les périodes 2029-2033 et suivantes, le budget carbone de chaque période et l'actualisation concomitante de la stratégie bas-carbone sont publiés au plus tard le 1er juillet de la dixième année précédant le début de la période.

- The Law for the Energy Transition and Green Growth(1) requires institutional investors to communicate about how they address climate change issues:
  - Evaluations of exposures to climate risks (Physical and Transition risks)
  - Contribution to the 2°C scenario and the energy transition objectives
- Comply or explain approach
- French institutional investors concerned :
  - Pension and social security funds, supplementary pension schemes
  - Insurance companies
  - Asset management companies also concerned
- Will apply from the fiscal year ending on December 31, 2016(2). Assessment before the end of 2018.

(1) The law was adopted in August 2015 by the French parliament; The implementation decree of the Article 173 has been published the December 31th 2015 in the Official Journal of the French Republic

(2) Information should be included in the 2016 annual report and published on the entity's the website by June the 30 2017 at the latest

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Conclusion

- **Climate change :**
  - Is now perceived as a real risk for long-tem investors;
  - Financial innovation allows investors to handle such risks.

- **Sharing of best practice is key, Portfolio Decarbonization Coalition:**
  - **$600bn+ commitment** already achieved;
  - Alignment of portfolios with a low carbon economy;
  - Sends a strong message: feasible and scalable.

- **Governments are increasingly involved into AOs' mobilization:**
  - French example of carbon footprint (almost) mandatory for all asset owners:
    - Costless solution;
    - Particularly true for public money.
  - China: 85% of the needed money will come from capital markets

- **Possible mobilization of a vast amount of money:**
  - Investors with a green interest represent: $92 trillion [1];
  - **0.1% adoption means a $10bn shift.**

(1) Source: www.CDP.net as at 2014. "CDP Initiative is backed by more than 767 institutional investors representing an excess of US$92 trillion in assets."

Appendix

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The Paris Agreement

First universal climate agreement:

- Unanimously approved by 196 delegations
- More than 180 countries submitted emissions targets

Key points of the deal:

- Keep global warming below 2°C and pursue efforts towards 1.5°C
- Long-term goal for net zero emissions
- Review mechanism to assess progress and update pledges (every 5 years)[1]

Recognizes the role of finance and pricing mechanism:

- "Important role of providing incentives for emission reduction activities (…) **including carbon pricing**"
- "**Making finance flows consistent with a pathway towards lo greenhouse gas emissions** and climate-resilient development."[2]

"The Paris agreement marks an unprecedented political recognition of the risks of climate change."

*"Perhaps the most significant effect of the Paris agreement in the next few years **will be the signal it sends to investors:** the united governments of the world say that the age of fossil fuels has started drawing to a close."*

The Economist (December 2015)

(1) Current pledges are not sufficient to meet 2°C goals but targets should be reviewed in the coming years. See http://www.theguardian.com/environment/2015/dec/12/paris-climate-deal-key-points*

(2) UNFCCC/CP/2015/L.9/REV.1

Amundi: A Major Global Player

As the leading European asset manager, Amundi has a successful track record of implementing and consolidating its expertise around the world.

987

billion euros of assets under management(1)

N°1

European Asset Manager(2)

TOP10

Worldwide(2)

Over 4,000 employees

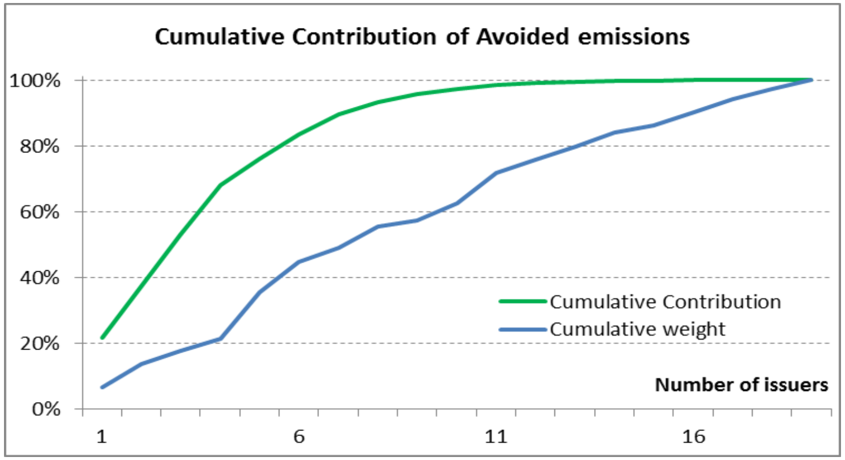
+20 years' presence In the Middle East

+30 years' presence in Asia

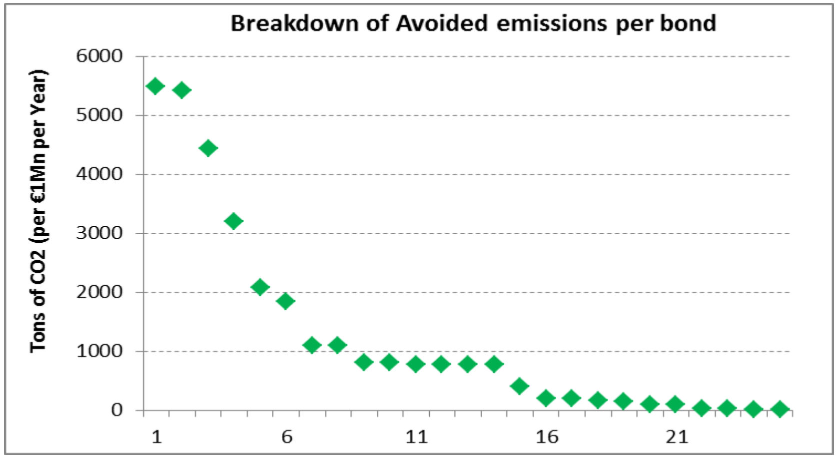
(1) Amundi figures as of 30 September 2015 - (2). No.1 European asset manager based on global assets under management (AUM) and the main headquarters being based in Europe – Source IPE " Top 400 asset managers" published in June 2015 and based on AUM as at December 2014.

Green Bonds: Avoided Emissions

Cumulative Contribution of Avoided Emissions



Breakdown of Avoided Emissions per Bond



- Impact reporting is a core development focus of the GB market:
  - Supported by the Green Bonds Principles
  - Fosters transparency and prevents green washing[1][2]
- Assessing performance on *avoided CO_2 emissions*:
  - Focus on Energy Efficiency & Renewable Energy projects
  - In line with current development of GB market & global decarbonization goals
  - Data available for 52%[3] of the MSCI Barclays GB Index
- Amundi Green Bond Impact Investment Strategy proposal is threefold:
  a. Launch strategy with GBs where data on avoided CO_2 emissions available
  b. Analyze future issuance on a case-by-case basis to extend investment universe
  c. Engage issuers to improve impact reporting
- FCP under construction

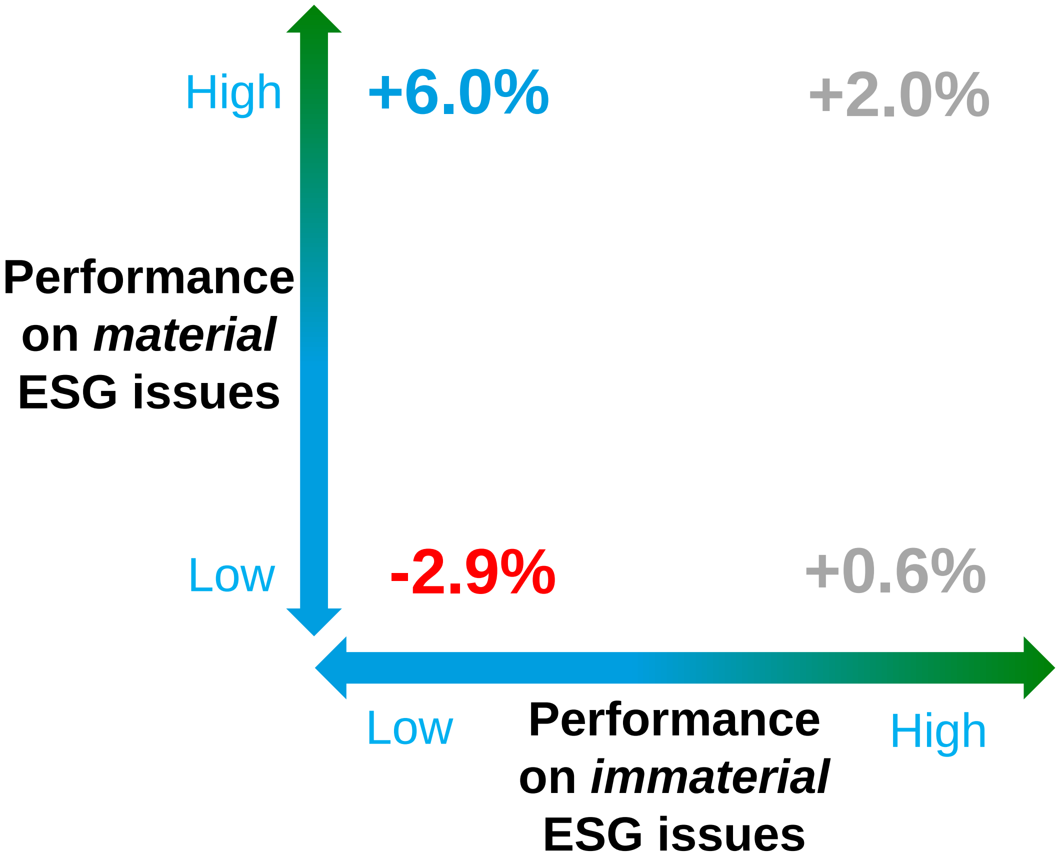
Source: Amundi

(1) FT, "'Green finance environmental impact is hard to measure", Todd Cort and Cary Krosinsky, Yale University, 4 November 2015

(2) HSBC, Corporate Green Bonds. Initiation: Four ways to scale up the market, Nov. 2015

(3) Market value outstanding as of May 2nd 2016

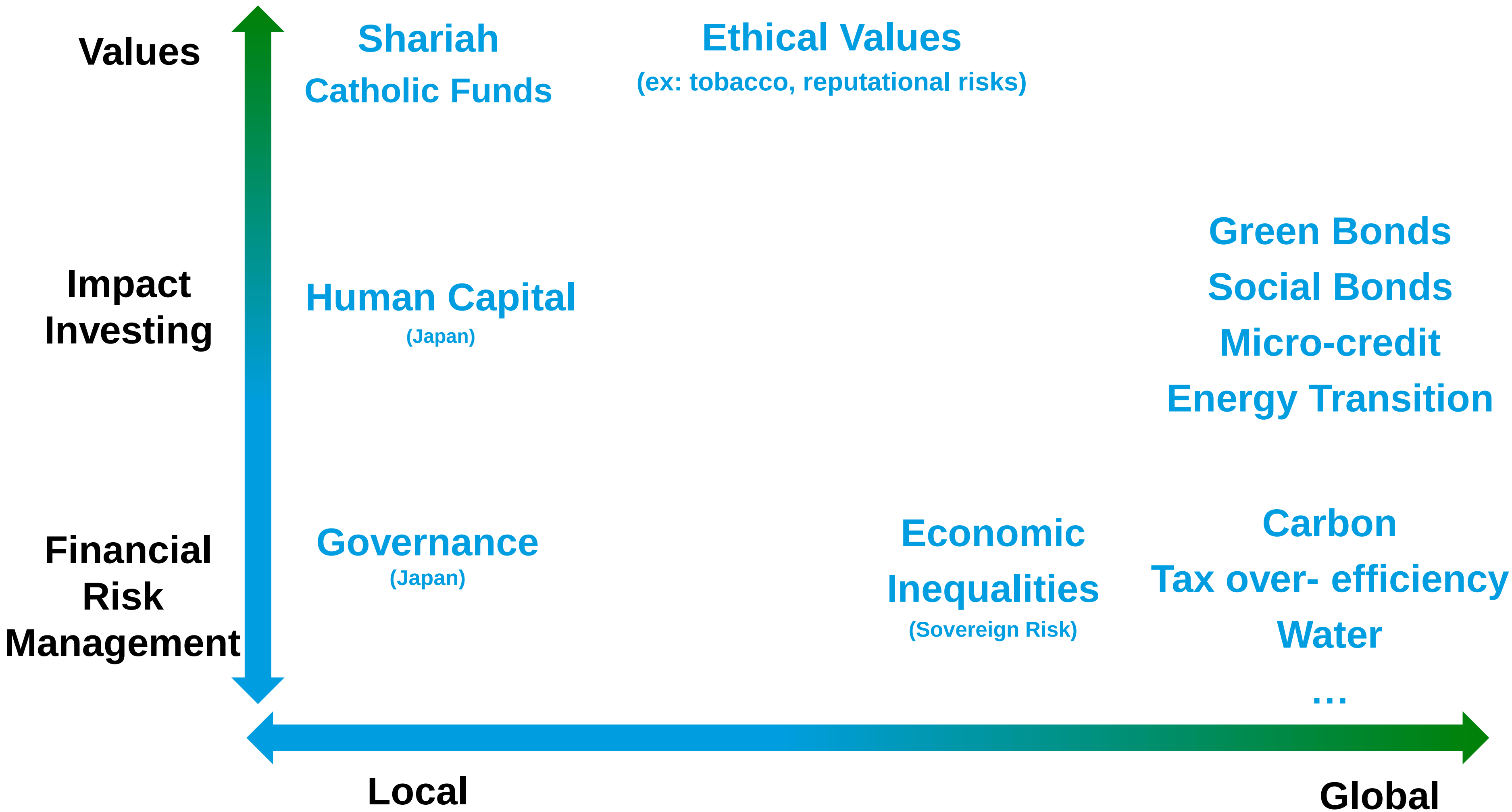
McKinsey: June 2016



- **"Investors face a moment of truth about their ESG factors"**
- **"Other institutions are embracing risk-factor investing: (...) In both stress-test and risk-factor investing, material ESG considerations are not always taken into account, but they should be."**
- **"$2 billion committed by six big institutions to the Long-Term Value Creation Global Index, designed for them by S&P. Investors should also think beyond passive equities and consider how they can use *ESG factors to reduce risk*"**
- **"Public concern over climate change is a particularly acute risk factor and source of value at risk."**

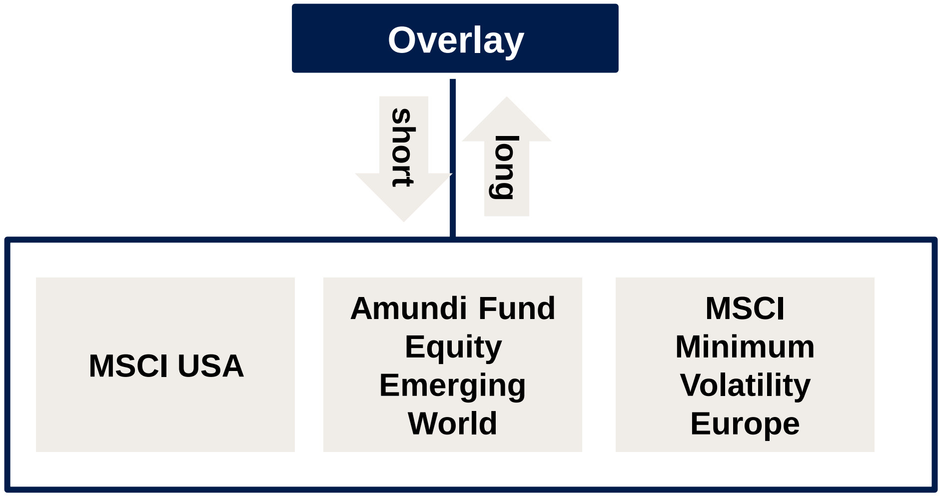
Source: McKinsey (2016) "Sustaining sustainability: What institutional investors should do next on ESG"
Figure: *A focus on material ESG issues drives greater returns* (McKinsey 2016). Study from 1992 to 2012. See Mozzafar Kahn, George Serafaim, and Aarin Yoon 2015.

ESG Mapping



Source: Amundi. Internal work, in progress.

Low Carbon Overlay



- As a test, we set-up of a portfolio*:
  - 1/3 MSCI USA (same)
  - 1/3 Amundi Fund Equity Emerging World (MSCI Emerging Market)
  - 1/3 MSCI Minimum Volatility Europe (MSCI Europe)
- The risk reduction goes through a long/short strategy:
  - *Short sell* of the *most* polluted stocks/indices
  - *Long position* in the *less* polluted stocks/indices
- A very efficient strategy:
  - **50% carbon reduction**
  - **Limited short position: <2%****
  - **Low TE : <0.10%**

* with the associated benchmark

** 12 out 1,740 stocks/indices

Source: Amundi Quantitative Research 31/08/2015

ERISA change – USA Pension and Health Plans

- Employee Retirement Income Security Act of 1974 (ERISA):
  - Federal law
  - Sets minimum standards for most voluntarily established pension and health plans in private industry to provide protection for individuals in these plans(1)

- Key features:
  - Provides **fiduciary responsibilities for those who manage and control plan assets**
  - Gives participants the **right to sue for breaches of fiduciary duty**

- **About $4.5 trillion** of assets subject to ERISA regulations(3)

- 2015 Regulatory Change:
  - The Department of Labor (DOL) **2008 Interpretative Bulletin** resulted in **discouraging pension funds to take account of ESG criteria** and undertake ETI investments
  - DOL **2015 Interpretative bulletin makes ESG considerations proper components of fiduciary duty**

> "**Environmental, social and governance issues** may have a direct relationship to the economic value of the plan's investment. In these instances, such issues are not merely collateral considerations or tie-breakers, but rather **are proper components of the fiduciary's primary analysis of the economic merits of competing investment choices**."(4)

(1) Source: https://www.dol.gov/general/topic/health-plans/erisa (02.06.2016)
(2) Also requires plans to provide participants with plan information (features, funding, etc) and to establish a grievance and appeals process for participants to get benefits from their plans.
(3) Source: https://www.ici.org/pdf/ppr_15_dcplan_profile_403b.pdf and https://www.ici.org/pdf/per12-02.pdf (Exhibit I.1. with ERISA only regulating 40% of 401(k) and part of 403(b) plans).
(4) Source: https://s3.amazonaws.com/public-inspection.federalregister.gov/2015-27146.pdf

Process of Exclusion for MSCI Low carbon Leader

1

Ranking of companies based on their carbon footprint

Energy 1
Energy 2
Utility 1
Energy 3
Materials 1
Materials 2

Stock X-2
Stock X-1
Stock X

2

Exclusion of the worst performers (up to 30% of the market cap of the sector)

3

Exclusion up to 20% of constituents*

4

Reweighting of the 80% remaining stocks (with a sector neutrality constraint of +/- 2%)

- Focus on the most polluting sectors combined with a best in class approach:
  - Ranking of companies based on their carbon footprint
  - Exclusion of the worst performers per sector
  - Exclusion cap per sector
- TE minimization target:
  - Reweighting of remaining stocks in order to reduce TE
  - TE minimization is key in order to buy time
- Stranded assets risk reduction does not increase significantly the number of shares being excluded.

* Check if we have reduced by 50% the stranded assets exposure: if not additional exclusion takes place

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