



UNEP **Finance Initiative**  
Changing finance, financing change

July 2013

# UNEP FI Investor Briefing

A document of the UNEP FI Climate Change Advisory Group and Investment Commission

## **PORTFOLIO CARBON**

Measuring, disclosing and managing  
the carbon intensity of investments and  
investment portfolios

*Why now is the time and how to get started*



UNEP

## **DISCLAIMER**

The information contained in the report is meant for informational purposes only and is subject to change without notice. The content of the report is provided with the understanding that the authors and publishers are not herein engaged to render advice on legal, economic, or other professional issues and services.

Subsequently, UNEP FI is also not responsible for the content of websites and information resources that may be referenced in the report. The access provided to these sites does not constitute an endorsement by UNEP FI of the sponsors of the sites or the information contained therein. Unless expressly stated otherwise, the opinions, findings, interpretations and conclusions expressed in the report are those of the various contributors to the report and do not necessarily represent the views of UNEP FI or the member institutions of the UNEP FI partnership, UNEP, the United Nations or its Member States.

While we have made every attempt to ensure that the information contained in the report has been obtained from reliable and up-to-date sources, the changing nature of statistics, laws, rules and regulations may result in delays, omissions or inaccuracies in the information contained in this report.

As such, UNEP FI makes no representations as to the accuracy or any other aspect of information contained in this report. UNEP FI is not responsible for any errors or omissions, or for any decision made or action taken based on information contained in this report or for any consequential, special or similar damages, even if advised of the possibility of such damages.

All information in this report is provided 'as is', with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this information, and without warranty of any kind, expressed or implied, including, but not limited to warranties of performance, merchantability and fitness for a particular purpose. The information and opinions contained in the report are provided without any warranty of any kind, either expressed or implied.

## **COPYRIGHT NOTICE**

The report and the content of the report remain the sole property of UNEP FI. None of the information contained and provided in the report may be modified, reproduced, distributed, disseminated, sold, published, broadcasted or circulated, in whole or in part, in any form or by any means, electronic or mechanical, including photocopying, or the use of any information storage and retrieval system, without the express written permission from the UNEP FI Secretariat based in Geneva, Switzerland, or the appropriate affiliate or partner.

The content of the report, including but not limited to the text, photographs, graphics, illustrations and artwork, names, logos, trademarks and service marks, remain the property of UNEP FI or its affiliates or contributors or partners and are protected by copyright, trademark and other laws.

UNEP promotes environmentally sound practices globally and in its own activities. This publication is printed on 100% recycled paper, using vegetable - based inks and other eco-friendly practices. Our distribution policy aims to reduce UNEP's carbon footprint.

# FOREWORD

The new reality that the concentration of carbon dioxide (CO<sub>2</sub>) in the Earth's atmosphere has surpassed 400 parts per million for the first time in several million years underscores the urgency of a transition to a low-carbon economy. This transition will require the participation of the global financial sector and will also have tremendous implications for the sector itself. It is in the self-interest of financial intermediaries to start preparing to take action now, rather than later, to prepare for this transition.

Investor action to support the global effort to peak and gradually reduce greenhouse gas (GHG) emissions is needed on several fronts.

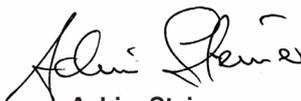
Institutional investment needs to be mobilised on a large scale to close the 'funding gap' for sustainable energy infrastructure, particularly in developing and emerging economies. Mobilising this investment is currently the primary objective of the international agenda as regards institutional investment and climate change, and it is indeed a crucial step on the path toward a sustainable future. The potential role that institutional investors can play in addressing climate change, however, goes far beyond the issue of 'infrastructure finance'. Institutional investors are more than infrastructure financiers: they are owners and creditors of large segments of the global economy.

With this in mind, we need to ask ourselves whether the owners and creditors of the global economy can and should play a driving role in decarbonising it, across all industry sectors, all regions, and all asset classes? And if they can and should, then how? One of the answers to this question is, in our view, to systematically measure, disclose and over time reduce the greenhouse gas (GHG) emissions embedded in global institutional investment portfolios. Ultimately, a decarbonised 'financial economy' will make the decarbonisation of the 'real economy' much more likely and easier to achieve.

Through this Investor Briefing, UNEP FI provides a clear and compelling case for why and how investors and their service providers should start measuring, disclosing and reducing the GHG emissions associated with their investments and investment portfolios. Not only can institutional investors play a catalytic role in the decarbonisation of the economy; increasingly, regulators, policy-makers, investee companies, pension beneficiaries and the public at large are expecting investors to fulfil precisely that responsibility.

The Investor Briefing document is organised as follows. The first two sections present current political, social and economic trends towards greater scrutiny and regulations of GHG emissions. The next two sections detail various ways in which investors can begin to measure and address the GHG emissions embedded in their portfolios, including advantages and obstacles associated with different methods. The document concludes with a short explanation of some of the future work that UNEP FI will undertake to assist investors and other financial intermediaries (FIs) in addressing their financed emissions, as well as a number of case studies on how leading FIs have already begun addressing theirs.

While the briefing is targeted primarily at investors themselves, it will also be of interest to other stakeholders, including policymakers, members of civil society and researchers. UNEP FI hopes that the briefing will serve to inform and to catalyse discussion and innovation on this important topic at various levels - within individual FIs, in the global financial sector and in the broader sustainable development community.



**Achim Steiner**

Executive Director  
United Nations Environment Programme



**Leon Kamhi**

Executive Director  
Hermes Equity Ownership Services  
Chair, UNEP FI Investment Commission



**Nick Robins**

Head of Climate Change Centre  
HSBC  
Co-Chair, UNEP FI Climate Change Advisory Group

# EXECUTIVE SUMMARY

## **Why are corporate greenhouse gas (GHG) emissions important to you now more than ever?**

- Despite the lack of a global agreement to price carbon, recent data shows that a global landscape of policies and regulation to cap and/or reduce GHG emissions continues to emerge at the national and sub-national levels. These GHG-relevant regulations will increasingly impact the profitability of businesses across various sectors, even when policy development at the global level stagnates.
- Furthermore, the current lack of policy ambition on climate change will likely lead to more sudden and radical policy interventions in the future. The public and political prioritisation of GHG emissions is expected to sharpen as the physical impacts of climate change continue to intensify with increasingly disruptive economic consequences.
- The growing mainstream perception among policymakers, political and economic leaders and civil society is that GHG emissions are among the most important global risk-drivers. Climate change related risks are accepted to have a high likelihood of materialising in the near future with a high economic impact; see, for example, the World Economic Forum's Global Risks 2013 report (World Economic Forum 2013). This conveys the level of priority and political focus that is likely to be put on reducing GHG emissions in the future.

## **Why should you start measuring and disclosing the GHG emissions associated with your investments?**

- Mandatory reporting frameworks are emerging for both companies and investors. These include Grenelle II in France and mandatory carbon reporting for companies listed on the Main Market of the London Stock Exchange. Furthermore, these requirements might expand to the European Union as the European Commission considers requiring retail investment funds to report on their approach to Environmental, Social and Corporate Governance (ESG) issues.
- Civil society organisations are exerting more pressure on institutional investors to be more transparent about the ways in which they are addressing climate change challenges. For instance, following the success of the Carbon Disclosure Project (CDP), the Asset Owners Disclosure Project (AODP) is mobilising pension fund beneficiaries to request further transparency on how their investment agents are addressing climate change.
- Increasing pressure is also arising from companies that are becoming frustrated because they perceive their own carbon disclosure under investor-backed initiatives, such as the CDP, as not having the impact it should have. This perception stems from the fact that the extent to which investors are systematically integrating the data disclosed under such initiatives (to the degree justified by financial materiality) into their investment decisions remains unknown to disclosing companies.

## How can you address the GHG emissions associated with your investments and portfolios?

### Understanding and identifying costs and risks associated with GHG emissions

- Over the past few years, institutional investors have developed a sophisticated understanding of the implications of climate change and climate change policy for their investments.
- GHG emissions are relevant to investors particularly because they can be a source of two types of financial risk: **i)** regulatory risk, and **ii)** reputational risk. When analysed together, these two risk categories can be jointly referred to as ‘carbon risk’.
- To account for carbon risk, institutional investors need to understand their overall risk exposure through ownership of investee companies and be able to assess changing conditions (for instance: regulatory, physical, demand patterns, etc.) in order to identify sources of risk for companies, sectors and geographies.

### Measuring carbon risk exposure and performance

- The carbon risk exposure of a company is a function of two sets of factors: internal (the relative GHG emissions of the activities and business model of the company viewed in a dynamic context over time and normalised to the size of the company and to the sector in which it operates, as well as its marginal carbon abatement costs) and external (primarily, GHG emissions-related policies, regulations, sanctions and incentives, and, secondarily, client sensitivity).
- Meaningful assessment of carbon risk requires that both internal and external factors be considered using qualitative and quantitative tools.
- Qualitative tools can help understand how external factors can increase liabilities for companies, as well as to gain a more comprehensive understanding of the internal characteristics of the company relative to the sector.
- Quantitative tools are necessary to assess company internal factors, such as carbon intensity relative to peers and competitors. They also track changes in carbon intensity over time and assess the contribution of internal factors to carbon risk exposure.
- Carbon footprint analysis is one of the quantitative tools that can be used to better understand how the internal factors of the company can contribute to carbon risk exposure. In GHG accounting terminology, the carbon footprint of a company is referred to as its ‘emissions inventory’ over any given period of time.
- The Greenhouse Gas Protocol, the most widely used international accounting tool for government and business leaders to assess GHG emissions, classifies a company’s direct and indirect GHG emissions into three ‘scopes’: Scope 1 (or ‘direct’) GHG emissions occur from sources that are owned or controlled by the company; Scope 2 GHG emissions occur from the generation of purchased electricity, steam, or heat, consumed by the company; Scope 3 GHG emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company.
- For investors and their investment agents, the greatest proportion of GHG emissions by far will be those associated with their ‘investments’; therefore, an important fraction of investors’ GHG emissions will likely be Scope 3 emissions.

## **Carbon footprint analysis at the company and portfolio levels**

- Carbon footprint analysis can be undertaken at two different levels: the individual investment position and the investment portfolio level.
- The approaches differ significantly from a cost/benefit perspective and may serve different but complementary purposes.
- To determine the carbon footprint of an investment portfolio, it is necessary to aggregate the carbon footprint of the individual positions.
- Assessing carbon risk exposure in a comprehensive and accurate way requires carbon footprinting analysis at the investment position level, as both the internal and external factors mentioned above must be considered in tandem for each position.
- However, calculating the portfolio carbon footprint can serve many complementary purposes, including but not limited to: **i)** reporting to clients and beneficiaries; **ii)** monitoring of asset managers by asset owners (some asset owners are already using portfolio carbon footprint analysis to monitor fund managers' integration of climate change considerations into portfolio management); **iii)** tracking carbon efficiency gains at portfolio level over time; **iv)** mandatory and voluntary public disclosure; **v)** carbon risk assessment and management (portfolio footprint analysis can be used to determine differences in risk exposure between similar investment funds).

## **Barriers to wider adoption of carbon risk assessment and carbon footprint analysis**

- Lack of 'materiality' as a result of a lack, to date, of carbon pricing at the international level and uncertainty about its existence in the future.
- Issues around quality and availability of data, including difficulty in comparing GHG emissions data.
- Portfolio carbon footprint service providers seldom offer analysis and interpretation of data that could inform carbon risk assessment and management.
- The cost associated with hiring a service provider to undertake the carbon footprint analysis can be burdensome.

## **How can carbon footprint analysis be employed to understand carbon risk exposure?**

- The carbon risk exposure of a portfolio can be interpreted as a weighted mean of the carbon risk exposures of the single positions of the portfolio.
- To accurately assess the carbon risk exposure of a portfolio on a relative basis, as well as in a dynamic context, it is necessary first to assess the carbon risk exposure of each individual position in the portfolio.
- In order to assess the carbon risk exposure of the different positions in the portfolio, the carbon footprint analysis must be conducted in conjunction with insights derived from other analytical tools, in particular qualitative tools. The results of carbon footprint analysis, if used on their own without consideration of their context, do not reflect any of the external factors and likely provide an inaccurate assessment of portfolio carbon risk exposure.

## **Reducing the carbon footprint of investments and investment portfolios as a means to mitigate carbon risk exposure**

Once an investor has undertaken carbon footprinting analysis and has subsequently assessed the carbon risk exposure of individual investments and/or portfolios, there are some potential ways to reduce carbon risk exposure. Most of them fall into one of two categories:

- **Quantitative approaches** that reduce carbon risk exposure by reducing carbon footprints at either of the levels described above. These approaches reduce both the regulatory and 'reputational' drivers of carbon risk exposure.
- **Geographic approaches** that shift investment to jurisdictions where regulation of GHG emissions is less advanced or less likely to materialise in the future. These approaches only reduce the regulatory and may increase the reputational drivers of carbon risk exposure.

There are three key quantitative approaches that investors can take to reduce carbon risk exposure:

- Invest in assets belonging to less carbon-intensive<sup>41</sup> sectors relative to benchmark (asset allocation).
- Select assets with a lower carbon footprint *within* each sector relative to benchmark (stock selection) or select companies with particularly sound decarbonisation strategies and ambitious targets even if, momentarily, they may seem relatively carbon-inefficient.
- Engage with carbon-intensive investee companies to encourage carbon efficiency gains over time (shareholder engagement).

## Why are corporate greenhouse gas (GHG) emissions important to you, now more than ever?

A. GHG emissions are increasingly subject to public scrutiny, legislation and regulation

### 1. Climate change is here to stay – and GHG policy ambition continues to grow

**“Our analysis shows that it is no longer enough to say that global warming will increase the likelihood of extreme weather and to repeat the caveat that no individual weather event can be directly linked to climate change. To the contrary, our analysis shows that, for the extreme hot weather of the recent past, there is virtually no explanation other than climate change.”**

*Dr. James E. Hansen, Goddard Institute for Space Studies, NASA  
(August 2012)<sup>1</sup>*

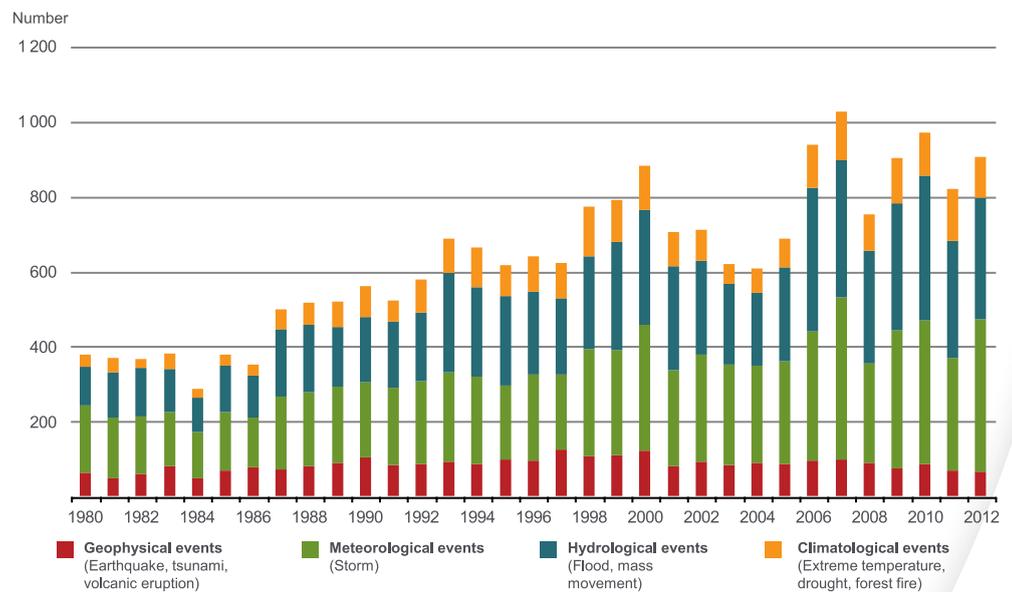
GHG emissions become financially relevant primarily through public intervention aimed at capping or reducing emissions. Despite the steady built-up of regional and national interventions, the current scope of the global regulatory landscape does not yet demand that GHG emissions be considered in mainstream financial decision-making.<sup>2</sup>

The coming years and decades, however, will see a major increase in the ambition and reach of GHG regulation as public perception and prioritisation of climate change mitigation sharpen. In fact, the current lack of policy ambition may result in more radical public intervention in the future as the physical impacts of climate change – extreme hydrological and meteorological events – intensify and grow in frequency, with disruptive consequences for human life.<sup>3</sup>

**Figure 1** illustrates the significant growth of extreme meteorological and hydrological events independent of geophysical events. The world today is roughly 1 °C warmer than the pre-industrial world, and scientific consensus points to a 2.4-6.4 °C increase if GHG emissions are left uncapped by public policy. In addition to increasing the intensity and frequency of extreme events such as storms, heat waves and floods, climate change will result in ‘slow-onset events’ not considered in **Figure 1**, including sea-level rise, desertification and long-term droughts.<sup>4</sup>

FIGURE 1

### Natural catastrophes worldwide, 1980-2012 (number of events by peril with trend)



Source: MunichRe 2013<sup>5</sup>

The intensity and frequency of extreme weather events today are already changing public perceptions and prioritisation of climate change, particularly in industrialised countries. A recent poll suggests that 90% of Australians and 89% of Britons believe that human activities are the source of climate change, and 78% of Australians think that climate change presents a serious problem for their country.<sup>6</sup> A 2012 Yale University survey, the most detailed to date on the public perception of weather extremes, shows that a large majority of Americans (60-70%) now believe climate change has intensified recent extreme weather events.<sup>7</sup> Furthermore, a 2012 poll by Stanford University and the Washington Post indicates that approximately two-thirds of Americans want the US to be a world leader in addressing climate change, even if other industrialised countries fail to participate in mitigation efforts.<sup>8</sup>

**“Most people in the country are looking at everything that’s happened; it just seems to be one disaster after another after another... People are starting to connect the dots.”**

*Anthony Leiserowitz, Director, Yale Project on Climate Change Communication (April 2012)<sup>9</sup>*

An important question is how these and other public constituencies will react as the globe warms by an additional 2.4-6.4 °C in the coming years and decades. Their reactions will have meaningful political and regulatory consequences as public policy addresses the root cause of the problem, i.e., GHG emissions.

The return of political and policy impetus to reduce GHG emissions is already evident in key jurisdictions around the world: In the US in 2012, for instance, following a summer that featured record-breaking temperatures and drought across the Midwest and South, as well as an extremely destructive Atlantic hurricane season, the need to regulate and cap GHG emissions more stringently featured prominently in public and political discourse.

**“Our climate is changing. And while the increase in extreme weather we have experienced in New York City and around the world may or may not be the result of it, the risk that it might be -- given this week’s devastation -- should compel all elected leaders to take immediate action.”**

*Michael Bloomberg, New York City Mayor (October 2012)<sup>10</sup>*

**“But if Congress won’t act soon to protect future generations, I will. I will direct my Cabinet to come up with executive actions we can take, now and in the future, to reduce pollution, prepare our communities for the consequences of climate change, and speed the transition to more sustainable sources of energy.”**

*President Barack Obama, USA (February 2013)<sup>11</sup>*

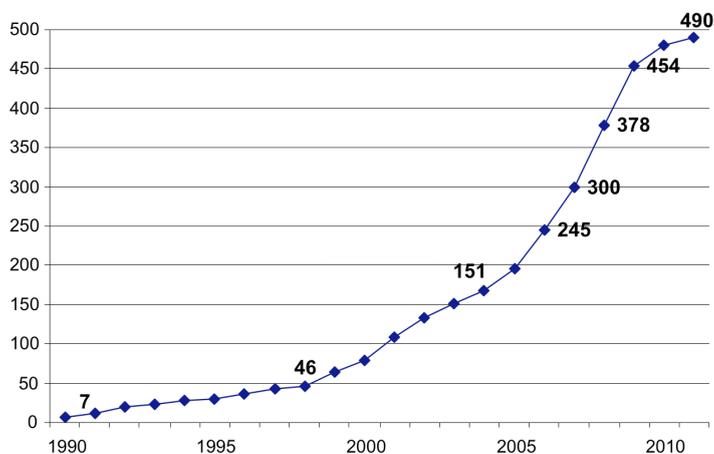
## 2. Steady, bottom-up build-up of public policy continues today

At the international level, negotiations towards a global agreement on reducing GHG emissions have made little progress. World governments agreed in 2011 that a new global deal should be reached by 2015, with binding emissions-reduction commitments coming into effect from 2020 onwards. This inertia has signalled to capital markets that world governments are not yet prepared to reduce GHG emissions at the speed and scale necessary. Climate change policy and regulatory regimes can emerge in a top-down fashion, with international law being ratified into national and, eventually, sub-national law, as in the case of the Kyoto Protocol. However, a policy and regulatory landscape can also emerge in a bottom-up direction, with accumulating public interventions at sub-national and national levels resulting in an uncoordinated but de-facto global regime. Over last two decades, the trend has been toward this latter, bottom-up-type emergence of a global landscape of GHG emission regulation and public intervention.

Consequently, the global volume of carbon- and sustainable-energy-focused regulation has continued to grow even though global policy development has stalled: data collected by the International Energy Agency (IEA) show that the number of public interventions at the national and sub-national level that penalize GHG emissions and promote decarbonisation and low-carbon options has shown steady growth over the past two decades. **Figure 2** displays the growth of regulatory measures that qualify as “fiscal/financial incentives” and “market-based instruments” and which have remained in place and operational through 2012. Other forms of public intervention on carbon and sustainable energy include direct public investment, performance labelling, codes and standards and obligation schemes.<sup>12</sup>

FIGURE 2

### Bottom-up emergence of a regulatory landscape for carbon and sustainable energy



Pieces of carbon- and clean-energy focused legislation and/or regulation – worldwide

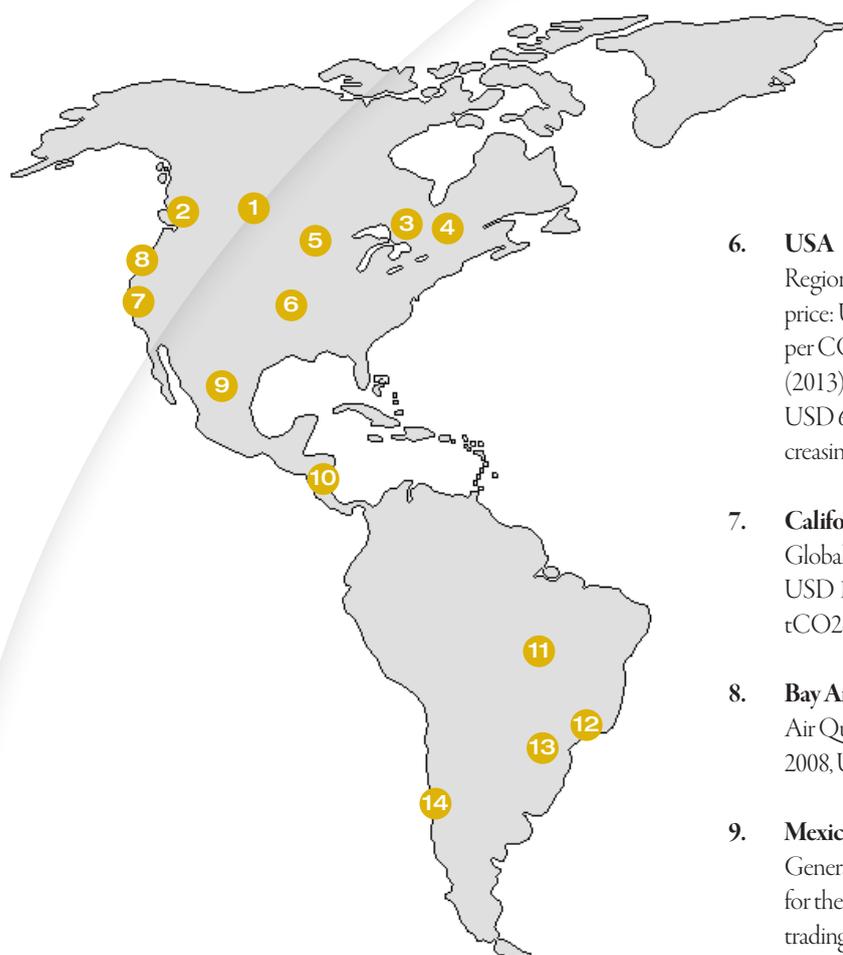
Source: UNEP FI; data from IEA

**Figure 2** covers a broad spectrum of policies and public interventions in terms of both type and financial significance. Interventions range from the introduction of an economy-wide “price on carbon,” as via the European Emissions Trading Scheme (EU ETS), to household financial incentives in specific countries, such as public grants to install solar water heaters in New Zealand. Not all of these interventions will have the same relevance to and impact on the bottom line of companies in investor portfolios, but it is clear that public interventions to cap or reduce GHG emissions are occurring in a growing number of jurisdictions. This emerging global landscape of GHG regulation will have a bearing on the profitability of businesses across the global economy.

It is also worth noting that among the available public interventions, establishing an economy-wide price on carbon – whether through a carbon tax or carbon trading scheme – is widely considered one of the most effective approaches to curbing GHG emissions.

FIGURE 3

## 'A price on carbon' around the world

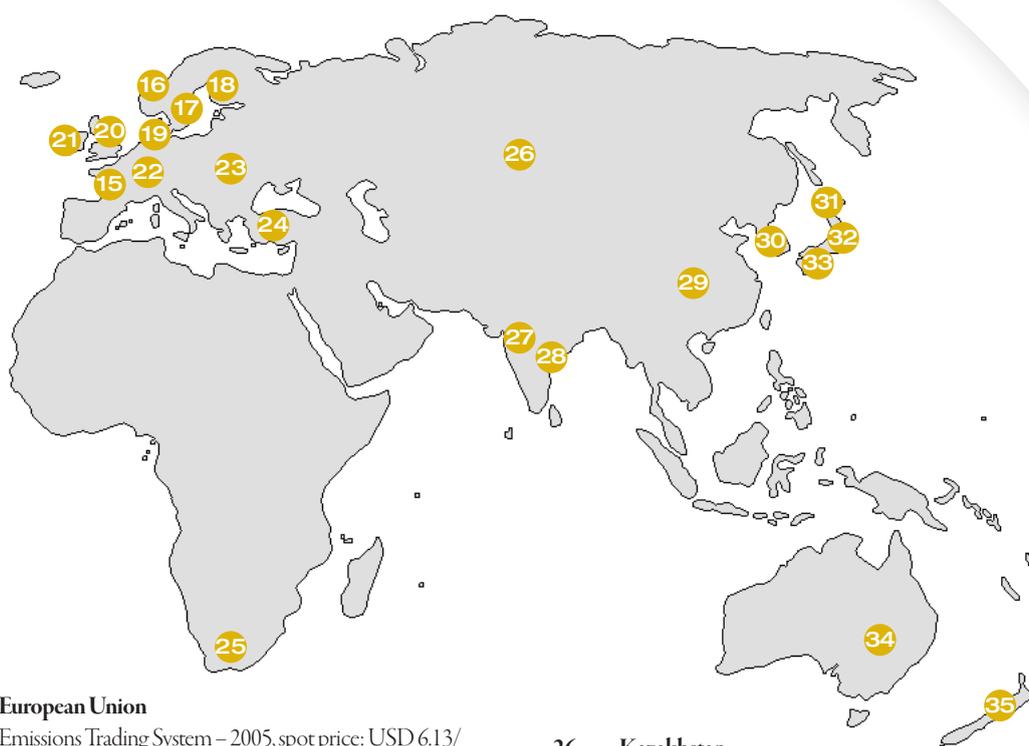


1. **Alberta**  
Carbon Tax – 2007, USD 14.69/tCO<sub>2</sub> (2013)<sup>19</sup>
2. **British Columbia**  
Carbon Tax – 2008, USD 29.37/tCO<sub>2</sub>e (2013)<sup>18</sup>
3. **Quebec**  
Cap-and-trade system, – 2012 (cap-and-trade), floor: USD 9.75/tCO<sub>2</sub>e (increasing at 5% a year plus inflation until 2020) (2012), reserve sale price: USD 39.02 – 48.77 (increasing at 5% a year plus inflation from 2014) (2012)<sup>16</sup>
4. **Quebec**  
Carbon Tax – 2007, USD 3.41/tCO<sub>2</sub> (2012)<sup>17</sup>
5. **USA/Canada**  
Western Climate Initiative – 2007, expected allowance price: USD 15.15/tCO<sub>2</sub>e (2013)<sup>21</sup>

6. **USA**  
Regional Greenhouse Gas Initiative – 2005, market price: USD 2.80/tCO<sub>2</sub> (2013)<sup>23</sup>, floor: USD 1.98 per CO<sub>2</sub> allowance (increasing at rate of inflation) (2013)<sup>24</sup>, reserve sale trigger price: USD 4 in 2014, USD 6 in 2015, USD 8 in 2016, USD 10 in 2017 (increasing at 2.5% a year after 2017) (2013)<sup>25</sup>
7. **California**  
Global Warming Solutions Act – 2006, market price: USD 13.62/tCO<sub>2</sub>e (Feb. 2013)<sup>40</sup>, floor: USD 10.71/tCO<sub>2</sub>e (increasing at 5% a year, plus inflation) (2013)<sup>41</sup>
8. **Bay Area**  
Air Quality Management District, Carbon Tax – 2008, USD 0.044/tCO<sub>2</sub>e (2013)<sup>20</sup>
9. **Mexico**  
General Law on Climate Change – 2012, foundation for the creation of a voluntary national emissions trading system (2013)
10. **Costa Rica**  
Carbon Tax – 1997, tax on carbon pollution set at 35% of the market price of fossil fuels (2012)<sup>26</sup>
11. **Brazil**  
Carbon Tax /Emissions Trading Scheme – 2011, National ETS and carbon tax under consideration (2013)<sup>15</sup>
12. **Rio de Janeiro**  
Emissions Trading Scheme – 2013, Creation of Brazil's first carbon market for the oil, gas, steel, chemical, petrochemical and cement sectors (2013)<sup>15</sup>
13. **Sao Paulo**  
Emissions Trading Scheme – 2013, Emissions trading scheme under consideration (2013)<sup>15</sup>
14. **Chile**  
Emissions Trading Scheme – 2011, National ETS under consideration (2013)<sup>15</sup>

FIGURE 3

## 'A price on carbon' around the world



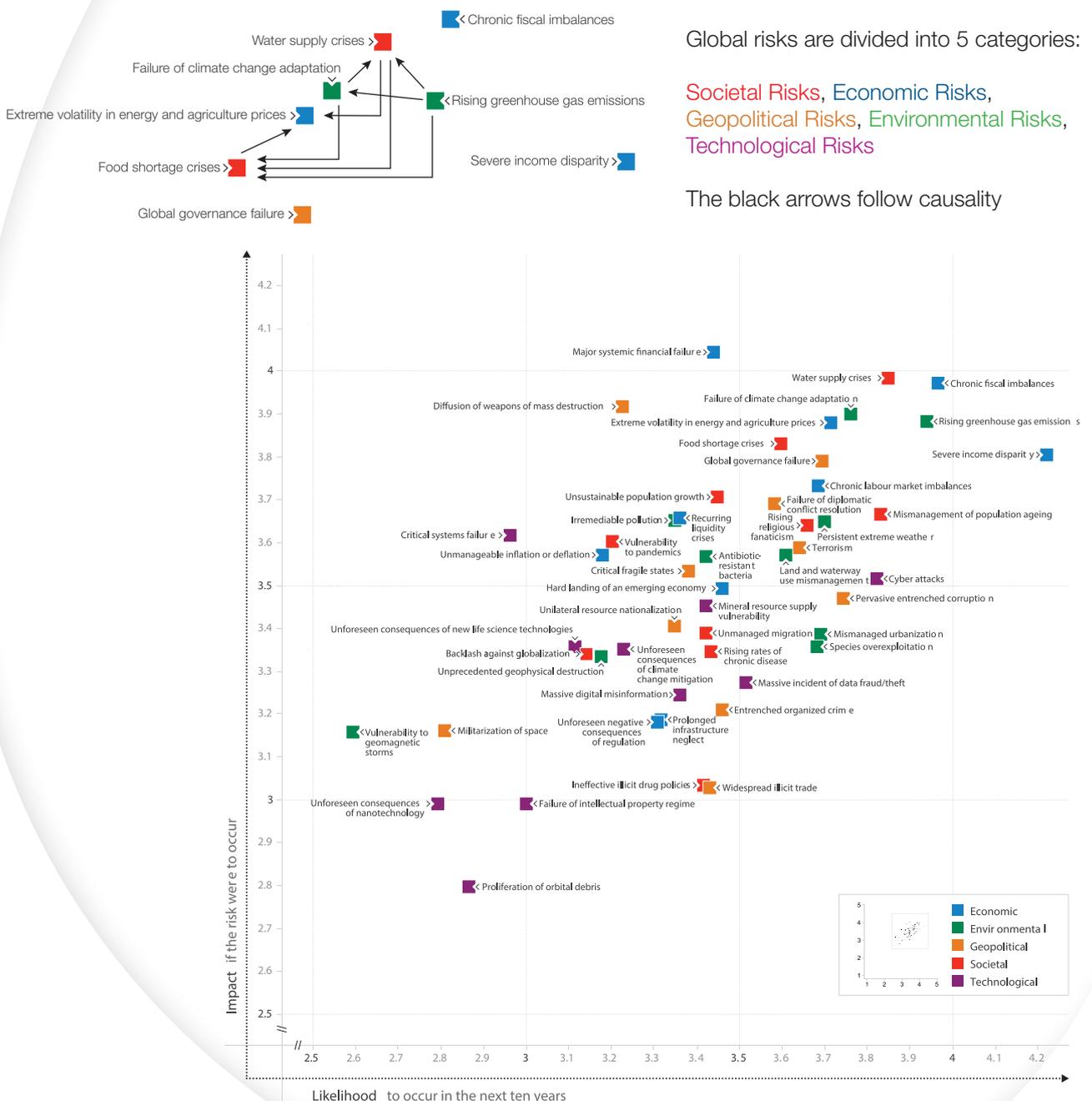
15. **European Union**  
Emissions Trading System – 2005, spot price: USD 6.13/tCO<sub>2</sub> (2013)<sup>21</sup>
16. **Norway**,  
Carbon Tax – 1991, USD 71.26/tCO<sub>2</sub> for offshore petroleum (2013)<sup>14</sup>
17. **Sweden**  
Carbon Tax – 1991, Normal rate: USD 149.83/tCO<sub>2</sub>, industry rate: USD 44.69/tCO<sub>2</sub> (2011)<sup>30</sup>
18. **Finland**  
Carbon Tax – 1990, USD 78.84/tCO<sub>2</sub> for traffic fuels and USD 39.43/tCO<sub>2</sub> for heating fuels (2012)<sup>29</sup>
19. **Denmark**  
Carbon Tax – 1991, USD 15.85/tCO<sub>2</sub> (2012)<sup>27</sup>
20. **UK**  
Carbon Reduction Commitment – 2010, fixed allowance price: USD 18.28/tCO<sub>2</sub> (2013-2014) (rising to USD 24.38/tCO<sub>2</sub> in 2014-2015 and at inflation thereafter) (2012)<sup>13</sup>
21. **Ireland**  
Carbon Tax – 2007, USD 14.72/tCO<sub>2</sub> (2012)<sup>22</sup>
22. **Switzerland**  
Carbon Tax/Emissions Trading System – 2008, tax rate of USD 38.91/tCO<sub>2</sub>; companies participating in ETS are exempt from tax (2013)<sup>28</sup>
23. **Ukraine**  
Emissions Trading System – 2011, National ETS under consideration (2013)<sup>15</sup>
24. **Turkey**  
Emissions Trading System – 2011, National ETS under consideration (2013)<sup>15</sup>
25. **South Africa**  
Carbon Tax – 2013, USD 13.10/tCO<sub>2</sub>e from 2015 (2013)<sup>32</sup>
26. **Kazakhstan**  
Emissions Trading System – 2011, Mandatory national ETS starting in 2013 (2013)<sup>15</sup>
27. **India**  
“Perform, Achieve and Trade” Mechanism – 2008, mandatory emissions trading scheme from 2012 (2013)<sup>37</sup>
28. **India**  
Carbon Tax on Coal – 2010, USD 0.92/t of coal (2010)<sup>38</sup>
29. **China**  
Pilot Emissions Trading Schemes – 2011, carbon trading in five cities and two provinces starting in 2013; one additional city and national ETS under consideration (2013)<sup>15</sup>
30. **Republic of Korea**  
Act on Allocation and Trading of GHG Emissions Allowances – 2012, implementation of a nationwide emissions trading scheme starting in 2015 (2013)<sup>15</sup>
31. **Japan**,  
Voluntary Emissions Trading Scheme – 2005 (VETS), average price: USD 7.68/tCO<sub>2</sub> (2009)<sup>33</sup>; mandatory national ETS under consideration since 2010 (2013)<sup>15</sup>
32. **Japan**,  
Carbon Tax – 2012, USD 2.96/tCO<sub>2</sub> (2012)<sup>34</sup>
33. **Tokyo**  
Tokyo Metropolitan Government Emissions Trading System – 2010, reported price: USD 142/tCO<sub>2</sub> (2010)<sup>35</sup>
34. **Australia**  
Clean Energy Legislative Package – 2011, fixed price: USD 24.94/tCO<sub>2</sub> (2013), rising at 2.5% a year until 2015, price floor: USD 15.50/tCO<sub>2</sub> rising at 4% per year from 2015-2018, price ceiling: USD 20.66 above expected international price rising at 5% a year from 2015-2018 (2013)<sup>36</sup>
35. **New Zealand**  
Emissions Trading Scheme – 2008, USD 1.79/tCO<sub>2</sub> (2013)<sup>39</sup>

### 3. GHG emissions and climate impacts are increasingly recognised as global risk drivers

The public perception that climate change is a key global risk and, therefore, a political priority, is shared by business, government, academic and civil society leaders worldwide, as shown by the World Economic Forum's Global Risks 2013 report.<sup>42</sup> Based on a survey of over 1,000 experts, the report examines 50 global risks across five categories. **Figure 3** shows the average ratings for each global risk in terms of likelihood to materialise and level of impact.

FIGURE 3

#### 2013 Landscape of global risks - expert perceptions of likelihood and impact

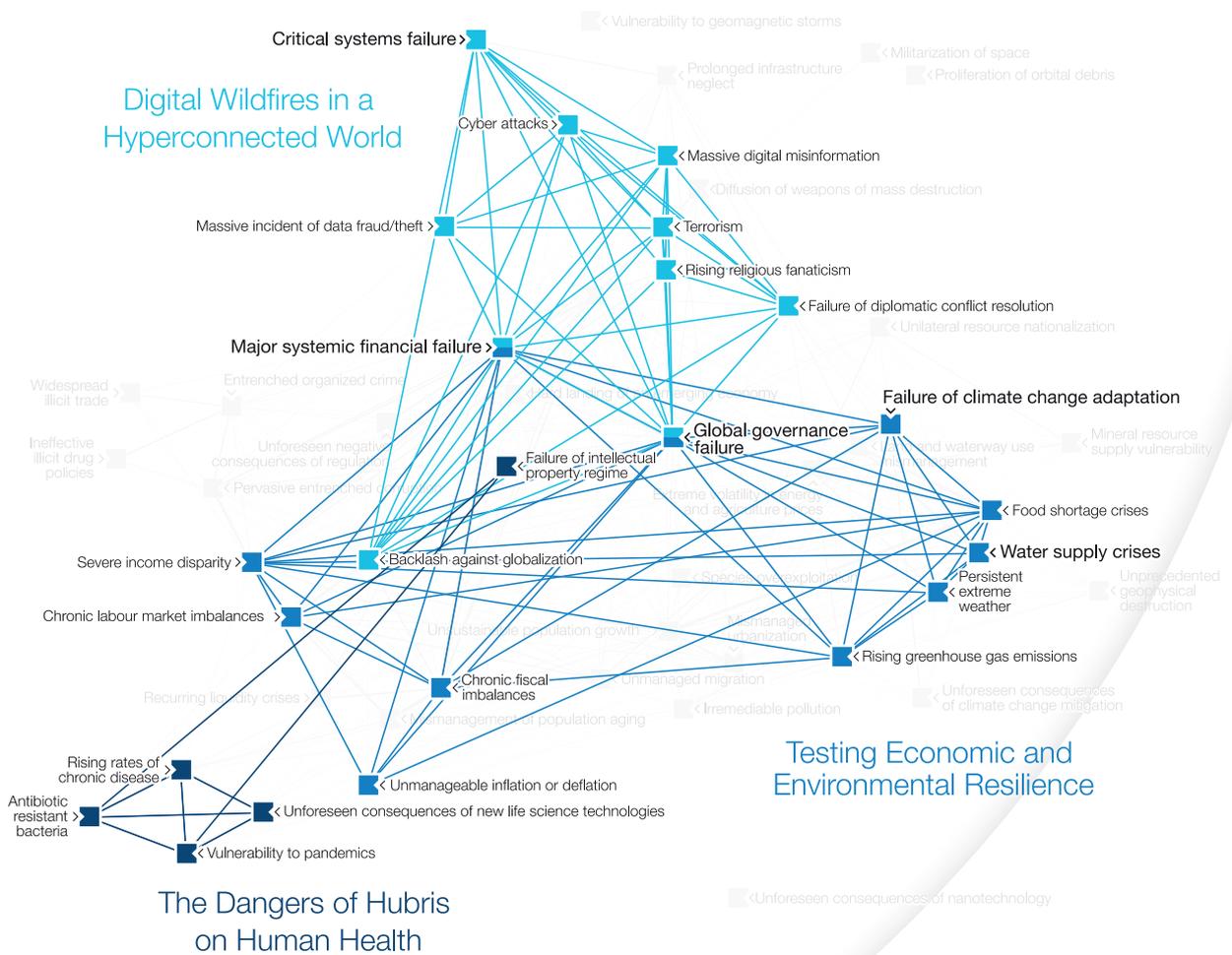


Source: Howell 2013<sup>42</sup>

Rising GHG emissions and failure to adapt to climate change are the two global environmental risks considered most likely to materialise with high impact. Two other risk categories should also be noted, given their potential levels of impact: water supply crises and food shortages, which are considered among the most potentially disruptive global risks, and are also viewed as highly interconnected with climate change caused by rising GHG emissions, as depicted in **Figure 4**. These significant and interconnected risks will increasingly demand that policy makers act to: **i)** reduce GHG emissions to avoid the most dangerous form of climate change, and **ii)** enable economies and societies to adapt to unavoidable changes in the climate.

FIGURE 4

### Interconnections within major risk clusters



Source: Howell 2013<sup>42</sup>



# Why should you start measuring and disclosing the GHG emissions associated with your investments?

## A. Expectations, credibility and reciprocal accountability

The last decade has seen significant progress in corporate disclosure of both greenhouse gas emissions and company exposure to climate change risks and opportunities. Over 4,000 companies around the world now disclose information under the CDP, which acts on behalf of more than 650 institutional investors. Institutional investors have clearly been leaders in advancing corporate disclosure of GHG emissions.

Corporations, in their efforts to maximise shareholder value, have responded to investor demands for information by increasing disclosure, with the expectation that sound disclosure and environmental over-performance are rewarded by investors – and hence the overall capital market – while incomplete disclosure and underperformance are penalised. This link hinges, however, on investors making use of disclosed information and integrating it into decision-making. While there is reason to believe that (to the extent justified by financial materiality) investors occasionally consider the carbon intensity and performance of investee companies, the degree to which the investment community is integrating carbon into decision-making more systematically is unknown. In summary, while information on the carbon intensity, performance and climate risk exposure of many listed companies is readily and publicly available today, information on how investors themselves are performing in these areas remains anecdotal. This lack of transparency is regarded as one of the main barriers to corporate action on GHG emissions. It is also contributing to frustration among investee companies, who increasingly view their carbon disclosure as pointless.<sup>44, 45</sup>

Consequently, civil society is shifting its focus from the environmental record of corporations to that of investors and other financial intermediaries, who are now under increasing pressure to disclose the carbon intensity, performance and climate risk exposure of investments and investment products. Following the success of the CDP, 2012 saw the launch of a major global campaign by the Asset Owner Disclosure Project (AODP) to mobilise pension and other investment beneficiaries to request increased transparency on GHG emissions and, additionally, on broader climate change-related risks, from their investment agents. Another example is the Go Fossil Free campaign, which asks pension funds to stop new investment in fossil fuel companies, and divest entirely from certain companies active in fossil fuel exploration and extraction, within the next five years.<sup>46</sup>

## B. A shift to mandatory carbon reporting, for companies and investors

As carbon disclosure has improved over the last decade, broader corporate sustainability reporting has also made substantial advancements. In addition to the CDP framework, over 4,000 companies today report on their broader sustainability performance using the guidelines of the Global Reporting Initiative.<sup>47</sup> Global accountancy firms are anticipating an upcoming surge in sustainability-related auditing and have instituted sustainability departments with carbon accounting expertise.<sup>48, 49, 50, 51</sup>

Despite significant advancements in corporate carbon and sustainability disclosure, disclosure remains largely voluntary and is usually prompted by critical stakeholder groups who mobilise successfully to exert pressure on a specific target group (e.g., investors mobilised to pressure companies, beneficiaries mobilised to pressure investors). Increasingly, however, carbon and sustainability reporting is becoming an area of focus for public policy and regulation, which could again shift the dynamic in the coming years:

- 
- **In South Africa, King Code III requires all companies listed on the Johannesburg Stock Exchange to publish an integrated annual report that combines disclosure of financial corporate performance with disclosure of corporate sustainability performance on a ‘comply or explain’ basis.**
  - **In the United Kingdom, all businesses listed on the Main Market of the London Stock Exchange are now required to report their levels of greenhouse gas emissions under plans announced by the UK’s Deputy Prime Minister at the Rio+20 Conference.**
  - **Legislation in Denmark mandated integrated reporting, verified by auditors, from the financial year 2010 onwards and for the largest 1,100 enterprises (both private and state-owned) exceeding 250 employees and certain financial thresholds.**
  - **At the Rio+20 Conference, the governments of four countries – Brazil, Denmark, France, and South Africa – announced the creation of an informal intergovernmental group to advance the corporate sustainability reporting agenda and invited UNEP and GRI to provide technical support for this effort.**
- 

Most investors interviewed for this briefing do not report on the carbon emissions associated with their portfolios or individual stocks, and industry public disclosure is still anecdotal. As explained in further detail below, issues around data quality, comparability and the lack of evidence linking carbon performance to risk and financial performance limit the use of GHG emissions data from an investment perspective. Nevertheless, investors are expected to start disclosing the carbon intensities of their portfolios over the coming years as policy increasingly mandates climate change reporting. France is currently pioneering mandatory investor disclosure, with the recent Grenelle II law requiring that investors and fund managers disclose how environmental, social and governance (ESG) criteria are integrated into decision-making.<sup>52</sup> Furthermore, the European Commission is currently considering requiring retail funds to report on their ESG approach.<sup>53</sup>

FIGURE 6

**Mandatory carbon reporting schemes around the world**



1. **Canada**  
GHG Emissions Reporting Program, 2004. Scope 1 for emitters > 50,000 tCO<sub>2</sub>e.<sup>54</sup>
2. **Quebec**  
Emissions Trading Scheme, 2013. Scope 1 for all facilities covered.<sup>55</sup>
3. **USA**  
EPA GHG Reporting, 2009. Scope 1 for emitters > 25,000 tCO<sub>2</sub>e/year; some Scope 3 requirements<sup>57</sup>
4. **California**  
Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, 2007. Scope 1 and 2 for emitters > 10,000 tCO<sub>2</sub>e/year; some Scope 3 requirements.<sup>56</sup>
5. **EU**  
Emissions Trading Scheme, 2005. Scope 1 for all facilities covered.<sup>15</sup>
6. **UK**  
Mandatory reporting on GHG emissions from 2013 onwards. All companies listed on the Main Market of the London Stock Exchange<sup>58</sup>
7. **France**  
Grenelle II Bill, 2011. Scope 1 and 2 for companies with > 500 employees.<sup>59</sup>
8. **Switzerland**  
Emissions Trading Scheme, 2013. Scope 1 for all facilities covered<sup>15</sup>
9. **Turkey**  
Regulation on Monitoring of GHG Emissions, 2012. Scope 1 for facilities in specified sectors from 2016<sup>60</sup>
10. **Republic of Korea**  
Emissions Target Management Scheme, 2010. Scope 1 for businesses with annual average CO<sub>2</sub> emissions over past 3 years > 50,000 tonnes or energy consumption > 200 TJ or business units with 3-yr avg. CO<sub>2</sub> emissions > 15,000 tonnes or energy consumption > 80 TJ<sup>63</sup>
11. **Japan**  
GHG Reporting Scheme, 2006. Scope 1 for emitters > 3,000 tCO<sub>2</sub>e/year and > 21 employees<sup>61</sup>
12. **Tokyo**  
Cap-and-Trade Program, 2010. Scope 1 for all facilities covered.<sup>62</sup>
13. **Australia**  
National Greenhouse and Energy Reporting Act, 2007. Scope 1 and 2 mandatory, Scope 3 voluntary, for emitters > 50,000 tCO<sub>2</sub>e/year, or energy consumption > 200 TJ/year<sup>64</sup>
14. **New Zealand**  
Emissions Trading Scheme, 2008. Scope 1 for all facilities covered<sup>65</sup>

# How can you address the GHG emissions associated with your investments and portfolios?

## A. Understand and identify costs and risks associated with GHG emissions

Over the past few years, institutional investors have developed a more sophisticated understanding of the implications of climate change and climate change policy for their investments and investment portfolios. This development is consistent with investors' fiduciary responsibility as outlined in UNEP FI's Freshfields report (2005), which concludes that "integrating ESG considerations into investment analysis to more reliably predict financial performance is not only permissible but is arguably required"<sup>66</sup> by fiduciaries. The 2011 Global Investor Survey on Climate Change revealed that climate change issues are viewed as a material investment risk across the entire investment portfolio by more than 83% of asset owners and 77% of asset managers.<sup>67</sup> A recent study looking at ESG data hits at Bloomberg from November 2010 to April 2011 confirms the perception that there is increased market interest in climate change and corporate GHG emissions data.<sup>68</sup> Despite increased interest in these data, however, limited transparency remains a challenge and there is scarce evidence on the role that GHG information plays in investment decisions.<sup>69</sup>

As described in detail in the first section of this Briefing, GHG emissions<sup>70</sup> are relevant to investors particularly because they can be a source of two types of financial risk: i) regulatory risk and ii) reputational risk. Section 1.A details why GHG emissions are increasingly a source of regulatory risk and sections 1.B and 1.C explain why GHG emissions are increasingly a source of reputational risk. When analysed together, these two risk categories can be jointly referred to as 'carbon risk'.

According to the 2010 Global Investor Survey on Climate Change, carbon risk could arise from emerging and evolving regulations on GHG emissions.<sup>71</sup> To account for carbon risk within portfolios, investors must understand their overall exposure through, for instance, ownership of investee companies, and be able to assess changing market conditions to identify sources of risk for companies, sectors and geographies. For example, in the case of listed equities, GHG emissions can be used to assess potential future liabilities arising from emerging carbon pricing schemes. Resulting operational and regulatory costs can lower company profitability and, in some cases, increase reputational risks.

## B. Measure carbon risk exposure and performance

**“Climate change means that investors will have to work on three fronts: risk management, market positioning and stakeholder disclosure. They won’t be able to effectively do any of these unless they can quantify the carbon intensity of investments and portfolios. Merrill Lynch already offers a service that supports fund managers in doing exactly that.”**

*Valéry Lucas-Leclin, Director, Thematic Investment, Bank of America Merrill Lynch*<sup>72</sup>

### The carbon risk exposure of a company

The carbon risk exposure of an investee company can be thought of as a function of two sets of variables:

- **External factors** faced by the company, including, primarily, carbon-focused policies, regulations, sanctions and incentives, and, secondarily, the level of sensitivity of clients, consumers and the public at large. There are reasons to assume, as previously outlined, that these two factors are intensifying at a global level and will continue to do so.
- **Internal factors** underpinned by the company itself, which tend to be the object and focus of the external pressures mentioned above. The GHG emissions associated with the activities and business model of the company (the company’s ‘carbon footprint’ or its ‘emissions inventory’, see below) can arguably be considered the central internal factor of relevance. The company’s GHG emissions, however, if viewed as an absolute figure, and as a snapshot of one particular moment in time, might be insufficient or misleading in providing a sense of the company’s carbon risk exposure. Rather, the internal factor of relevance is the relative GHG emissions viewed in a dynamic context over time. In particular, GHG emissions figures must be normalised to the size of the company and the sector in which the company operates.

In order to measure carbon risk exposure meaningfully and take action to reduce exposure, these two sets of variables must be taken into account using a combination of qualitative and quantitative analysis tools. Qualitative tools will help the investor understand, in particular, the external factors, as well as some of the sector-related factors of a company’s carbon risk exposure. Quantitative tools, on the other hand, will be required when assessing the internal factors of carbon risk exposure, particularly the carbon intensity of the company relative to peers and competitors, as well as their changes over time. Carbon footprint analysis is one of these quantitative tools.

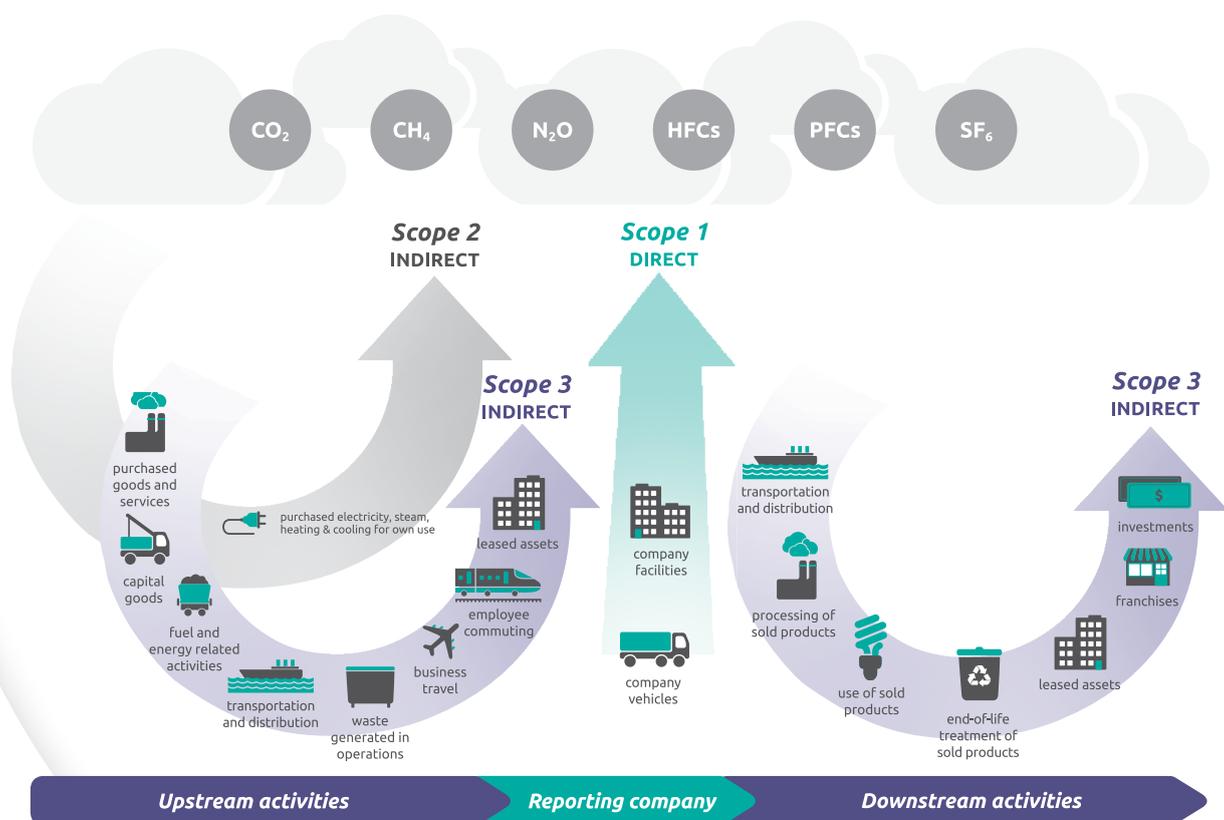
## The carbon footprint of companies and investors: 3 different scopes

In GHG accounting terminology, the carbon footprint of a company is referred to as its ‘emissions inventory’ over any given period of time. The Greenhouse Gas Protocol, the most widely used international accounting tool for government and business leaders to assess GHG emissions, classifies a company’s direct and indirect GHG emissions into three ‘scopes’:

- **Scope 1** (or ‘direct’) GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.
- **Scope 2** GHG emissions occur from the generation of purchased electricity, steam, or heat, consumed by the company. Scope 2 emissions physically occur at the facility where electricity is generated.
- **Scope 3** GHG emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services.

FIGURE 7

### The 3 scopes of corporate GHG emissions



Source: *The Greenhouse Gas Protocol, 2011*<sup>73</sup>

For investors and their investment agents, the greatest proportion by far of the GHG emissions associated with their activities will be those associated with their investments. Therefore, a very important fraction of investors’ GHG emissions will likely be Scope 3 emissions.<sup>74</sup>

---

## **A Scope 4 for unburnable carbon? The accounting and reporting of future GHG emissions**

The accounting and reporting of GHG emissions has traditionally been an exercise in reporting on past performance. This enables benchmarking across sectors, as well as review of progress over time. A recent comparison of fossil fuel reserves to carbon budgets has led to the current contradiction that exists in financial markets between existing assets and potential emissions constraints. The International Energy Agency confirmed this principle in its World Energy Outlook 2012, stating that two-thirds of fossil fuel reserves could not be burnt unmitigated if the world is to have a 50% chance of limiting global warming to 2°C.<sup>76</sup>

This leads to a demand for data on the currently known reserves of fossil fuels and, hence, on the future emissions of GHGs, in addition to data on current, annual emissions. Essentially, this can be considered an expansion of the current reporting frameworks for products and organisations, including for financial intermediaries, to include a forward-looking dimension. Companies are able to translate the combustion of coal, oil and gas into GHG emissions using existing standards and guidelines, such as those provided by the Greenhouse Gas Protocol. For instance, in the past, companies such as Shell and BP have reported the emissions that would be associated with their annual production level. BHP Billiton currently reports emissions that would result from the use of its annual coal production. This demonstrates that undertaking GHG accounting and reporting by companies, particularly in fossil fuel sectors, has become common practice – the underlying methodologies, however, should add a temporal dimension extending into the future.

Recent sell-side research from HSBC, Citi and Deutsche Bank has started exploring the implications for the valuation of companies who are reliant on revenues from exploiting fossil fuel reserves. The market for these products is dependent on GHG emissions, and, therefore, constraining emissions has a feedback effect on the fundamentals of demand and price. HSBC estimated that 40-60% of the market capitalisation of European oil majors could be at risk in a low emissions scenario.

The business models of extractives companies are clearly intertwined with a continued market for their products. Greater company transparency around the level of GHG emissions associated with a company's intended strategy would enable investors to understand and challenge the assumptions around future energy markets. The development of integrated reporting offers an opportunity for companies to explain how their reserves are compatible with carbon risk.

At a market level, it is also important to understand the systemic risks of the concentration of potentially unburnable carbon on each stock exchange. Requiring all extractive companies to disclose the emissions potential of their reserves would enable regulators to understand whether markets are becoming more or less carbon intensive.

---

**“For fossil fuel companies, the footprint also includes the carbon embedded in their reserves, which will be released when these are commercialised and combusted. Clearly these reserves are at risk in the transition to a low-carbon economy, which we have estimated at between 40-60 per cent of market capitalisation for European oil, gas and coal companies.”**

*Nick Robins, Head of Climate Change Centre, HSBC<sup>77</sup>*

## C. The roles of carbon footprinting at the company and portfolio levels

There are at least two different levels at which investors can undertake footprint analysis to assess carbon risk exposure: (i) at the individual investee company/individual investment position level, as well as (ii) at the investment portfolio level.

While closely related, these two approaches differ significantly from a cost/benefit perspective. In other words, the insights and information they yield (their benefits), as well as the complexity and effort associated with undertaking them (their costs) differ significantly. The two approaches, therefore, serve different, complementary purposes.

### At the company level

The carbon risk exposure of an investment portfolio can be interpreted as the weighted mean of the carbon risk exposures of the single positions within the portfolio. In the case of equity or corporate debt portfolios, this is the weighted mean of the carbon risk exposures of the investee companies in the portfolio. Each company's carbon risk exposure, in turn, is a function, as described above, of the external factors that each company faces and the company's own carbon footprint (on a relative basis and in a dynamic context).

This means that if an investor aims to assess accurately the carbon risk exposure of a portfolio, the analysis must be conducted separately for each investee company in the portfolio: For each company, the investor must analyse how the company's carbon footprint 'interacts' with the diverse 'external factors' (see above) that the company faces. The reason this analysis often cannot be performed using carbon footprint information at the portfolio level is that when carbon footprint data is aggregated from the company to the portfolio level, critical information that relates to the 'external factors' is lost, resulting in an inaccurate assessment of portfolio carbon risk exposure.

**“At Local Government Super, we regularly monitor the carbon performance of the companies in our portfolios, as well as of our portfolios themselves. This dual approach helps us assess and manage carbon risks, compare our own carbon performance to that of our peers, and clearly communicate with our members on the climate change and greenhouse gas issues associated with their savings.”**

*Peter Lambert, CEO, Local Government Super<sup>78</sup>*

### Five reasons for carbon footprinting investment portfolios

Using company-level carbon footprint information to undertake analysis of carbon risk exposure for each position/constituent (company) in a portfolio, however, can be a lengthy and resource-intensive process. Calculating the portfolio carbon footprint by aggregating company carbon footprints is a fairly straightforward and quick task (see a step-by-step elaboration further below) that can serve five main functions:

- **Client reporting and positioning:** Fund managers and asset owners can supplement traditional financial reporting to clients and beneficiaries with reporting on carbon intensity, one of the most significant environmental metrics. Particularly carbon-efficient investment funds (relative to benchmark) can be positioned and marketed on the basis of this characteristic.
- **Manager monitoring:** Asset owners can use carbon footprinting to hold asset managers accountable for their environmental performance and integration. According to the 2010 Global Investor Survey on Climate Change, 10% of the surveyed asset owners already relied on carbon footprinting analysis to monitor managers' integration of climate change factors into investment management.<sup>79</sup>
- **Efficiency gains over time:** Improving the carbon efficiency of a portfolio can provide a potential investment advantage, helping to reduce regulatory and reputational risks.
- **Risk management:** Carbon footprint analysis at the portfolio level can be used to determine differences in risk exposure between similar investment funds. For instance, situations may occur where the external factors mentioned above remain constant across comparisons<sup>80</sup>, and portfolio footprint variables can yield risk-related insights.
- **Public accountability:** Finally, publication of portfolio carbon performance can be a part of institutional investors' own accountability on climate change, matching increasing corporate disclosure.

The process generally adopted to calculate a portfolio's carbon footprint<sup>81</sup> from the company level to the portfolio level includes, roughly, the following steps:

#### The absolute carbon footprint of the investee company

The first step is the measurement of investee companies' environmental impact in terms of GHG emissions emitted. Many methods of measuring and disclosing this information are available to corporations, with the GHG Protocol being the most commonly adopted by companies.

In GHG accounting terminology, a company's absolute 'carbon footprint' is usually referred to as the 'emissions inventory' of the company and it would be expressed in Amount of emitted GHG / period of time (typically in the form of: tons of CO<sub>2</sub>equivalent / year)

Company emissions inventories can comprise only Scope 1 emissions; Scope 1 and 2 emissions; or full Scope 1 and 2 and 3 emissions.



#### The relative carbon footprint of the investee company

In order to allow for a comparison between the carbon footprints of companies of different size, the companies' absolute carbon footprints must be normalised.

Normalisation can either happen through (i) a variety of 'physical' variables (such as 'number of employees'); (ii) a variety of financial 'flow' variables (such as company revenue, cash flows, earnings, etc.)<sup>82</sup>; or (iii) a variety of financial 'stock' variables (such as balance sheet sum, market capitalisation, equity book value, debt book value, etc.).

The relative carbon footprint of an investee company would be expressed as:

Absolute carbon footprint / normalisation variable (using company revenues per year, this would typically take the form of: tons of CO<sub>2</sub>equivalent / unit of revenue, for the same time horizon)



#### The carbon footprint of the individual 'position' in an investment portfolio

This step addresses the question of which proportion of an investee company's carbon footprint (either relative or absolute) should be apportioned to an investor on the basis of the underlying ownership or debt relationship.

This 'allocation' will typically happen according to the proportion of the company's capital which is 'held' (or provided) by the investor at the particular point in time.

In this area, different methodological approaches are possible (especially when it comes to differentiating between equity and debt) and the investor will have to consider which method best meets its needs. Typically, the carbon footprint of an individual 'position' in an investment portfolio would be expressed as:

Relative carbon footprint of the investee company \* Company capital<sup>83</sup> held by the investor / Total capital<sup>84</sup> of the company (using company revenues per year this would typically take the form of: tons of CO<sub>2</sub>equivalent / unit of company revenue owned by the investor)



#### The portfolio carbon footprint

The portfolio carbon footprint can then be calculated by adding the carbon footprints of the portfolio positions.

If, under point 2, company revenues per year are used as the normalisation variable, this would typically take the form of: tons of CO<sub>2</sub> equivalent / unit of average revenues of the companies in the portfolio.

From an investor's perspective the portfolio carbon footprint relates to the 'indirect' emissions that result from the activities of investee and/or debtor companies. Therefore, according to GHG accounting terminology, these emissions will often, but not exclusively, be categorised under the investor's Scope 3 emissions.

## D. Barriers to a wider adoption of carbon footprinting analysis by investors

There are various obstacles that hamper the wider use of carbon footprinting analysis. Among the most relevant are:

- The lack of carbon pricing at the international level contributes to the perception that GHG emissions are not yet financially material. The arguments presented in this Briefing explain why these perceptions may have to be revised.
- **Quality and availability of data:** A significant barrier is the lack of availability, and shortcomings in the quality, access and comparability of GHG emissions data. Despite the availability of Scope 1 emissions data for carbon-intensive sectors in some jurisdictions (for instance, in the EU), there are still significant gaps in data for less carbon-intensive sectors – across all scopes – in most countries. A related challenge is the lack of external auditing of GHG emissions data,<sup>85</sup> which reduces the reliability of the data and, consequently, its use in financial models. A number of standards and frameworks for reporting emissions have been developed over the last decade (e.g., the GHG Protocol). However, there is still a lack of regulation that enforces the use of these standards.
- **Interpretation of data:** To date, many providers of carbon footprint services only provide GHG emissions data to investors, and the availability of products that also offer analysis and interpretation of data to effectively assess carbon risk exposure appears limited. Investors interviewed for this briefing suggested that data interpretation is increasingly important to investors who wish to understand the carbon risk exposure for each stock. In this respect, it was recognised that the underlying companies have a crucial role to play in explaining to investors how their carbon emissions relate to financial performance.
- **Cost:** The cost associated with hiring a service provider to undertake the portfolio carbon footprint analysis is too burdensome.

## E. Manage risk exposure by reducing the carbon footprint of investments and portfolios

Once an investor has undertaken carbon footprinting analysis and has subsequently assessed the carbon risk exposure of individual investments and/or portfolios, there are several potential ways to reduce carbon risk exposure.<sup>86</sup> Most of them fall into two categories:

- 
- **Quantitative approaches** that reduce carbon risk exposure by reducing carbon footprints at either of the levels described above. These approaches reduce both the regulatory and ‘reputational’ drivers of carbon risk exposure.
  - **Geographic approaches** that shift investment to jurisdictions where regulation of GHG emissions is less advanced or less likely to materialise in the future. These approaches only reduce the regulatory drivers, and may increase the reputational drivers, of carbon risk exposure.
- 

**There are three key quantitative approaches that investors can take to reduce carbon risk exposure:**

- Invest in assets belonging to less carbon-intensive<sup>87</sup> sectors relative to benchmark (asset allocation).
- Select assets with a lower carbon footprint within each sector relative to benchmark (stock/bond selection). An alternative, forward-looking approach consists in selecting companies with particularly sound decarbonisation strategies and ambitious targets even if, momentarily, they may seem relatively carbon-inefficient.
- Engage with carbon-intensive investee companies to encourage carbon efficiency gains over time.

## **Sector allocation**

The carbon footprint of a portfolio can be reduced by underweighting carbon-intensive sectors, such as utilities, relative to the benchmark. Being underweight in carbon-intensive sectors such as utilities or materials may result in reducing the exposure to carbon risk; however, there are some issues to consider when taking this approach.

First, deviating too much from the benchmark sector allocation exposes the portfolio to increased tracking error. Second, by underweighting a certain sector, the investor may reduce the exposure to risk but may also miss out on opportunities that the sector provides in a transition to a low-carbon economy. Many of the opportunities arising from this trend will be captured by innovative, less carbon-intensive companies within carbon-intensive sectors such as utilities or oil & gas.

## **Stock/asset selection and weightings**

The portfolio carbon footprint can be reduced by picking less carbon-intensive stocks (or bonds) *within* each sector. This is the most commonly employed approach, as it reduces the risk and potential opportunity costs associated with deviating from the sector allocation of the benchmark (see **Table 1**). A similar approach consists in not changing the selection of assets per se, but rather in adjusting their individual weightings: the portfolio carbon footprint can be reduced by overweighting particularly carbon-efficient and underweighting particularly carbon-inefficient companies.

These are the most commonly employed approaches, as they achieve to reduce carbon risk exposure while avoiding the risks and potential opportunity costs associated with deviating from the sector allocation of the benchmark.

## **Engagement**

For both actively and passively managed funds, carbon footprint analysis provides the information required for engagement with portfolio companies to reduce emissions. In particular, if a portfolio manager has a strong conviction regarding a certain stock but has identified potential carbon-related risk exposure, the investor can exercise its influence as an owner to engage with the company board to manage the risk over time. Investors can also undertake collaborative engagement activities, which are widely accepted as cost- and time-efficient and effective ways of protecting long-term shareholder value. These collaborative groups tend to tackle systemic issues relating to climate change as opposed to stock-specific issues. Collaborative groups include the CDP, Principles for Responsible Investment, Institutional Investors Group on Climate Change (Europe), Investor Network on Climate Risk (North America), Asia Investor Group on Climate Change (Asia Pacific) and the Investor Group on Climate Change Australia/New Zealand.

## **Passive investment using carbon-tilted indices**

For passive investments, allocation to funds that track carbon-efficient indices allow the carbon footprint to be managed without deviating from the benchmark.

The emergence of carbon-tilted indices within the investment industry allows investors who passively manage their assets to decrease their carbon footprint. Carbon-tilted indices are based on conventional indices but feature a higher allocation to companies that are carbon-efficient relative to industry peers, and a lower allocation to carbon-intensive stocks. Rebalancing stock holdings based on carbon efficiency enables investors to reduce carbon risk exposure while maintaining sector and geographic allocations, diversification and benchmark financial performance. The aim of these strategies is to track the returns of underlying indices with measurably less exposure to carbon risk.

**Table 1** provides an overview of the most important carbon-tilted investment indices, and provides a measure of performance relative to benchmark, including both financial performance and carbon-efficiency performance

TABLE 1

## Products for carbon-efficient investment and their performance

INSTITUTION	NAME OF INDEX	BENCHMARK	INDEX PERFORMANCE RELATIVE TO BENCHMARK	INDEX CARBON FOOTPRINT RELATIVE TO BENCHMARK	ASSOCIATED INVESTMENT PRODUCT(S)	INDEX TILTING METHOD
UBS	Europe Carbon Optimised Index <sup>88</sup>	DJ Stoxx 600 <sup>89</sup>	-0.45% (Annual return in 2011) (total return EUR) <sup>89</sup>	30-40% less than benchmark (expected at index launch, 19.03.08) <sup>90</sup>		Sector-neutral reweighting based on carbon efficiency <sup>90</sup>
BofA Merrill Lynch	BofA Merrill Lynch Carbon Leaders Europe Index	DJ Stoxx 600 <sup>91</sup>	-2.62% (Annual return in 2011) (total return EUR) <sup>92</sup>	516% less than benchmark (at index launch, 01.10.07) <sup>91</sup>		60 stocks with highest ranking based on carbon footprint and P/E ratio in respective sectors <sup>91</sup>
NYSE Euronext	Low Carbon 100 Europe Index	300 largest European companies by market cap <sup>93</sup>	Data unavailable	42% less than benchmark (on average at index launch, 24.10.08) <sup>93</sup>	EasyETF Low Carbon 100 Europe <sup>93</sup>	100 companies with lowest carbon intensities in respective sectors <sup>93</sup>
S&P	US Carbon Efficient Index	S&P 500 <sup>94</sup>	+0.36 (Annual return in 2011) (total return USD) <sup>94</sup>	No specific target	db x-trackers S&P U.S. Carbon Efficient ETF <sup>95</sup>	No more than 375 shares; Negative screen based on carbon footprint and sector weighting <sup>94</sup>
S&P	IFCI Carbon Efficient Index	S&P IFCI Emerging Markets Index <sup>96</sup>	+1.05% (Annual return in 2011) (total return USD) <sup>96</sup>	No specific target		Negative screen based on carbon footprint and sector weighting <sup>96</sup>
S&P/TSE	S&P/TOPIX 150 Carbon Efficient Index	TOPIX 150 <sup>97</sup>	+2.18 (Annual return in 2011) (total return JPY) <sup>97</sup>	No specific target		Negative screen based on carbon footprint and sector weighting <sup>97</sup>
FTSE	Carbon Strategy 350	FTSE UK 350 <sup>98</sup>	+0.1 (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>
FTSE	Carbon Strategy All-Share	FTSE All-Share <sup>98</sup>	0.0% (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>
FTSE	Carbon Strategy Europe	FTSE All-World Developed Europe <sup>98</sup>	0.0% (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>
FTSE	Carbon Strategy Japan	FTSE All-World Developed Japan <sup>98</sup>	0.0% (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>
FTSE	Carbon Strategy Australia 300	FTSE ASFA Australia 300 <sup>98</sup>	+0.2% (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>
FTSE	Carbon Strategy Australia 200	FTSE ASFA Australia 200 <sup>98</sup>	+0.2% (Annual return in 2012) (total return USD) <sup>98</sup>	No specific target		Sector-neutral reweighting based on carbon risk and carbon management <sup>99</sup>

## What's next?

On account of the physical, political, regulatory and social implications of climate change, it is strategically important to investors that they begin systematically gathering information on the GHG emissions associated with their investments and portfolios. This information will be critical for a number of purposes, including enhanced risk management, positioning vis-à-vis clients and the general public, and voluntary and mandatory reporting.

Gathering and processing this information, and making use of it in a meaningful way, is a complex task. Furthermore, accounting and reporting of investor GHG emissions should be undertaken in a standardised and harmonised way that enables procedural efficiencies and comparability of results. Therefore, guidance is needed on how existing GHG accounting frameworks and methods can be extended to and applied by investors and other financial intermediaries.

For this reason, UNEP FI is collaborating with the GHG Protocol to produce internationally accepted guidance specifically for financial intermediaries and investors. The *GHG Protocol Financial Sector Guidance* will be the definitive guide for financial institutions and portfolio investors when measuring, disclosing and managing the GHG emissions associated with investments and financial services. This guidance will provide financial institutions and investors with a consistent framework to effectively measure, analyse and report on GHG emissions in loan and investment portfolios.

For more information on this process, visit:

[www.ghgprotocol.org/feature/financial-sector-guidance-corporate-value-chain-scope-3-accounting-and-reporting](http://www.ghgprotocol.org/feature/financial-sector-guidance-corporate-value-chain-scope-3-accounting-and-reporting)

**“Carbon accounting for investments and loans is in its infancy in the financial services sector. As it may become more important in future, it is essential to look diligently at this complex issue, and to start exploring corresponding approaches and methods today. We will have to evaluate if and how such carbon accounting is implemented, while ensuring that existing corporate carbon reduction efforts are not compromised. As there are still many open questions surrounding this matter, we look forward to supporting UNEP FI and the GHG Protocol in evaluating how a robust carbon accounting framework for financial intermediaries could look like.”**

*Karsten Löffler, Chief Financial Officer, Allianz Climate Solutions<sup>100</sup>*

# How leading investors are already doing it?

## Case studies:

### Case Study 1.

#### ASN Bank, Netherlands

All investments of ASN Bank, through either funds or savings, must adhere to its climate change policy. One of the long-term objectives of this policy is to minimise the bank's overall carbon footprint. In order to assess the effectiveness of the policy, ASN Bank measures the carbon footprint of its equity funds.

##### **1. Assessment of portfolio carbon performance**

ASN Bank currently commissions Trucost to measure the carbon footprint of its three equity funds with a view to reducing it over time.

ASN Bank is revising the methodology used for measuring the carbon footprint of its funds. The revised methodology will measure the absolute reduction of the carbon footprint of the fund, rather than its relative carbon efficiency, and will remove the impact of inflation when calculating the carbon efficiency of the fund.

The bank is also considering measuring the carbon performance of other asset classes such as sovereign and corporate fixed income. This will allow the bank to assess the overall carbon performance of its balanced funds.

##### **2. Disclosure of carbon risk / performance**

ASN Bank discloses the carbon footprint of each of its equity funds in its Annual Report and on its corporate website. Information for the ASN Sustainable Equity Fund is included below.

The ASN Sustainable Equity Fund, managed by SNS Asset Management, invests worldwide in equities of listed companies that meet the sustainability criteria outlined by ASN Bank's policies, including the carbon performance of companies.

The fund overweights companies that are climate friendlier relative to peers and vice versa. This allows for the formulation of long-term goals on the carbon performance of the fund.

TABLE 2

### Financial and carbon performance of ASN funds as compared to benchmark\*

	2012	2011	2010	2009	2008	2007	ASN FUND CARBON PERFORMANCE AS COMPARED TO BENCHMARK* IN 2012	CHANGE IN CARBON EMISSIONS FROM 2011 TO 2012
<b>ASN fund financial performance</b>								
(annual return)	13.9%	-6.9%	17.9%	27.1%	-35.7%	-0.8%		
<b>MSCI AWI financial performance</b>								
(annual return)	15.6%	-4.5%	16.6%	27.1%	-38.8%	-0.6%		
<b>ASN Duurzaam Aandelenfonds carbon performance</b>								
(tCO <sub>2</sub> per million Euros turnover)	122	142	191	213	239	293	-73.7%	-14.1%
<b>MSCI All World Index* carbon performance</b>								
(tCO <sub>2</sub> per million Euros turnover)	464	456	511	515	555	491		1.75%

Notes. Data sourced from the ASN Bank Annual Report 2012.

\* MSCI World in 2012 used as benchmark.

### 3. Management of carbon risk / performance

The ASN Bank climate change policy outlines a series of tools that the bank uses to manage the carbon performance of its funds:

- Screening: Only securities from entities that meet ASN Bank's strict sustainability criteria are included in the investment universe (at the end 2011, there were 303 listed companies that met the sustainability criteria). Research is conducted in-house. The carbon emissions of a company are an additional determinative factor in the construction of the fund. The bank also has started to screen sovereign bonds based on their carbon performance.
- Engagement: ASN Bank engages in dialogue with companies that feature relatively poor carbon performance in order to help them improve.
- Voting: ASN Bank casts its vote at shareholder meetings to favour measures that will improve carbon performance of the companies they own and invest in, as well as in favour of linking remuneration and carbon performance.

# Case Study 2.

## Local Government Superannuation Scheme (LGS), Australia

LGS accepts the scientific advice that the concentration of greenhouse gas emissions in the atmosphere must be kept below 450 parts per million, which equates to a 2° Celsius increase in average global temperatures. Above this level, the impact of climate change is considered dangerous and would likely lead to adverse impacts across LGS's investment portfolios.

As such, LGS believes that it is best to commence positioning and to initiate hedging the portfolio against highly carbon intensive assets, as it believes that it is inevitable that there will be national and global regulatory regimes introduced that will facilitate the move to lower carbon economies. This regulatory impulse has already commenced, and LGS expects it to gain stronger momentum over the medium term. This transition will create investment winners and losers, with subsequent impacts for the LGS investment portfolio

### **1. Assessment of carbon risk / performance (carbon beta)**

In the context of climate change, LGS has focused for now on assessing and managing carbon risk, i.e., the risk that arises from the GHG greenhouse gas emissions associated with the assets in LGS's portfolios. In the listed equity class, LGS assesses carbon risk at both company and portfolio level.

#### **Company level**

At the company level, carbon risk assessment is performed on the basis of two types of information: GHG emissions levels (Scope 2) and intensities ('internal factors'), as well as the policy frameworks to which emissions are exposed today and to which emissions are likely to be exposed to in the future ('external factors').

This carbon risk assessment is complemented by **(i)** an analysis of 'corporate carbon management' that determines how ready the company in question is to reduce its carbon risk exposure in the future, and **(ii)** an assessment of 'strategic profit opportunities' that looks at whether the company will benefit from the shift to low-carbon economies.

LGS believes that, taken together, the three variables (carbon risk, carbon management and strategic profit opportunities) provide a complete assessment of what expanding GHG-focused regulation (and other external factors) will imply for companies, both in terms of risks and opportunities. In other words, they provide an assessment of any company's 'carbon beta'.

#### **Portfolio level**

In a second step, company-level information is aggregated into portfolio-level information and compared with the corresponding scores of the benchmark portfolio. This is done for each of the three variables separately, as well as for the composite variable of 'carbon beta'. In addition, the total volume of GHG emissions associated with the portfolio (in tons of CO<sub>2</sub>e; Scope 1 + Scope 2), as well as the portfolio carbon intensity, are calculated and compared with the benchmark.

For LGS, portfolio-level scores are particularly helpful in assessing how LGS portfolios rate as compared to market benchmarks, and whether there are any 'hot spots' or large exposures to poor carbon-rated companies in high risk sectors.

### **2. Disclosure of carbon risk / performance (carbon beta)**

The information above is used largely for internal purposes and to inform decision-making, but LGS is working towards systematic disclosure on company and portfolio 'carbon beta' in the future.

### 3. Management of carbon risk / performance

- LGS requires from investment managers and consultants to integrate carbon information into decision-making processes. As a result, in June 2011, LGS' international equities portfolio beat the MSCI world excl. Australia both in terms of 'carbon beta' and total GHG emissions and featured a portfolio carbon intensity 16% below that benchmark.
- For a variety of reasons, it is difficult to swiftly and starkly improve portfolio carbon beta through deviations from benchmark, particularly in an Australian context. To compensate for this, LGS employs a hedging strategy that consists in quickly expanding exposure to low-carbon assets through themed portfolios. In only five years, the proportion of low-carbon investments to total invested funds has increased from 0% to 5% for global listed equity and from 0% to 10% for private equity. The difference in growth between each category is mainly due to corresponding differences in liquidity: private equity is less liquid than global listed equity, and, therefore, the hedge against carbon risk has to be greater for the former than for the latter.

In addition, LGS focuses on improving portfolio carbon beta through systematic company engagement and proxy voting on GHG emissions, particularly in the area of local, Australian equities.

## Case Study 3. Quantitative analysis of portfolio carbon performance

### A service of Bank of America Merrill Lynch (BofA ML) (Version of 2011)

BofA ML already offers 'carbon portfolio audits' to managers of listed equity portfolios as a means of assessing portfolio carbon performance relative to benchmark.

The process works as follows:

#### At the company level:

- The GHG emissions of each company in the portfolio are estimated, across different scopes, on the basis of a variety of sources, rather than based on one single source (typically, the median score from the following 4 scores is used: Bloomberg / Carbon Disclosure Project, Trucost, CO2 Benchmark, Inrate).
- In a second step, the proportion of the portfolio is determined for which GHG emissions and carbon intensity information is available at different Scopes (Scope 1, 2 and 3) in order to determine the validity of the 'carbon audit' for the portfolio as a whole. This is done both in terms of number/percentage of holdings in the portfolio, as well as in terms of portfolio market value.
- Carbon intensity figures at the company level are calculated in relation to three key variables: EBIT (earnings before interest and taxes), NTA (net tangible assets), and MV (market value), and across four scopes (Scope 1, 2, as well as Scope 3 downstream, and Scope 3 upstream). This yields 12 carbon intensity figures per company, which are then assessed over a period of time in the recent past (2-3 years). As such, an indication is provided regarding the proportions in the portfolio (both in terms of number of holdings and in terms of share of portfolio market value) for which, over time, carbon efficiency is either **(i)** improving, **(ii)** remaining stable, or **(iii)** deteriorating.
- In parallel to time-series analysis, the carbon intensity figures above are used to conduct sector analysis and to determine the extent to which the stocks in the portfolio out- or underperform relative to peers in the same sectors. To ensure that the sector nomenclature used for this comparison is not biased by an overly broad classification, BofA ML uses this comparison to the third level of the Industry Classification Benchmark (ICB). The ICB contains a four-tier, hierarchical, industry-classification structure. It is a comprehensive system for sector and industry analysis, facilitating the comparison of companies across four levels of classification.

### At the portfolio level:

- In general, one of the main criticisms of carbon portfolio audits is that some portfolios may feature a sector allocation that significantly diverges from the benchmark, which may help to deliver a better carbon footprint. In response to that, the analysis of BofA ML is complemented by further analysis of **(i)** the total performance of the portfolio, in comparison to the benchmark, and **(ii)** the ability of the portfolio manager to select the most carbon-efficient stocks in each sector.
- The company-level carbon intensity variables above are therefore aggregated into corresponding variables at portfolio level, and then compared over time with the respective scores of the benchmark portfolio.
- Based on the set of figures calculated at company and portfolio-levels, and on the subsequent time-series and sector analysis, BofA ML is able to determine the extent to which the portfolio's under- or over-performance is due to either **(i)** stock selection or **(ii)** sector allocation. Only if over-performance is achieved through stock selection can the portfolio be considered more carbon-efficient than its benchmark.

---

### Determining the sector allocation and stock picking effect is done in analogy to purely financial variables:

If:

- WSP – Weight of sector S in portfolio P
- WSB – Weight of sector S in benchmark B
- ISP – Intensity of sector S in portfolio P
- ISB – Intensity of sector S in benchmark B
- CPF – Carbon Portfolio Footprint

We can write:

$$\mathbf{WSP} = \mathbf{WSB} + \Delta\mathbf{WSB}$$

$$\mathbf{ISP} = \mathbf{ISB} + \Delta\mathbf{ISB}$$

We thus know:

$$\mathbf{CPF} = \Sigma (\mathbf{WSP} \times \mathbf{ISP})$$

$$\mathbf{CPF} = (\mathbf{WSB} + \Delta\mathbf{WSB}) \times (\mathbf{ISB} + \Delta\mathbf{ISB})$$

$$\mathbf{CPF} = (\mathbf{WSB} \times \mathbf{ISB}) + (\mathbf{WSB} \times \Delta\mathbf{ISB}) + (\Delta\mathbf{WSB} \times \mathbf{ISB}) + (\Delta\mathbf{WSB} \times \Delta\mathbf{ISB})$$

From this follows:

$$\mathbf{CPF} = \text{Carbon Benchmark Footprint} + \text{Stock-Picking Effect} + \text{Sector Allocation Effect} + \text{Covariance}$$

---

# Case Study 4.

## VicSuper, Australia

VicSuper believes that the impacts of climate change, as well as regulatory responses aimed at curbing GHG emissions, will affect investments in all asset classes and will therefore affect investment returns. As a result, VicSuper decided to understand and attempt to quantify the GHG related risks to which their portfolios and investments are exposed.

There are two major drivers behind VicSuper's initiative:

- Recognition that fossil fuel is a beta risk/systemic issue and understanding the carbon exposure of the fund is crucial to reducing exposure to this beta risk.
- A desire to raise awareness internally.

### 1. Assessment of carbon risk / performance

VicSuper recognises that their contribution to climate change does not end with their direct operations, the greenhouse gas impact of which is far outweighed by that of their investments. VicSuper has engaged Trucost, a UK based research organisation, to measure **(i)** the greenhouse gas emissions, **(ii)** exposures, **(iii)** intensities and **(iv)** disclosure levels for companies in which VicSuper invests within the listed equity sub-asset class. This measurement occurs annually to determine a change over time.

### 2. Disclosure of carbon risk / performance

For the last three years, VicSuper has included a section on their members' Annual Benefit Statement that shows the carbon emissions generated by their account balance. This 'carbon footprint' represents an estimate of the carbon dioxide equivalent emissions generated by the listed equity component of each member's savings in the Scheme. Since last year, the estimation also includes parts of their private equity and unlisted property investments.

Carbon intensity is a measure of GHG emissions expressed as tonnes of carbon dioxide equivalents per million dollars of company turnover (or revenue). VicSuper believe that this is a more valid method than measuring carbon emissions based on a company's market capitalisation (which is the value the share market places on a company), as the value of a company on a share market can fluctuate widely over short periods of time, and is not necessarily reflective of the revenue and carbon-generating operations of the company.

### 3. Management of carbon risk / performance

VicSuper has identified four critical steps to managing the carbon risks and opportunities associated with its investments:

#### Step 1. Measure

VicSuper measure the carbon emissions for the listed equity component of the portfolio in both relative and absolute terms.

#### Step 2. Set Objectives

The objective is to reduce the carbon intensity of VicSuper funds relative to the investment benchmarks for each asset class, and in relation to their own performance year on year.

#### Step 3. Reduce

VicSuper has taken an approach of active ownership. They plan to achieve this objective through the following:

- Investments: Direct investment to address climate change risks and opportunities.
- Research: Contribute to financial services sector climate change research and represent VicSuper and the finance industry on relevant industry groups and project teams.
- Engagement: Engage, collaborate and communicate, as appropriate, with stakeholders on climate change as an investment risk and opportunity to inform, educate and empower them in relation to action on climate change.

#### Step 4. Assess & repeat

VicSuper follow a continuous feedback cycle of questioning their methodology and updating carbon emission measurement estimates.

Each year, VicSuper repeat this process, with the aim to continuously improve. Their progress is reported in the annual VicSuper Sustainability Report.

# Notes and references

- 1** Hansen, J.E., 2012. 'Climate change is here — and worse than we thought.' *The Washington Post*, 3 August 2012. [http://articles.washingtonpost.com/2012-08-03/opinions/35491435\\_1\\_climate-change-climate-model-normal-climate](http://articles.washingtonpost.com/2012-08-03/opinions/35491435_1_climate-change-climate-model-normal-climate) (consulted 22 April 2013).
- 2** In sectors where GHG emissions are already considered material, however, such as in utilities or oil and gas, current and future carbon costs are already used in discounted cash flows and factored into company valuations.
- 3** For instance, in 2012 PricewaterhouseCoopers calculated that in order to have a 50:50 chance of limiting the global mean temperature increase to 2 °C the world now needs to decarbonise by 5.1% every year from 2013 until 2050. This required rate of decarbonisation has not been seen even in a single year since the mid-20th century. Keeping to the 2 °C carbon budget will require unprecedented and sustained reductions over the [next] four decades. In 2011, the global rate of decarbonisation amounted to 0.7%, only a tenth of the level of decarbonisation required.
- 4** Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper, I.G. Watterson, A.J. Weaver and Z.-C. Zhao, 2007. 'Global Climate Projections.' In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, US.
- 5** MunichRe. 2013. Natural catastrophes worldwide 1980-2012. [https://www.munichre.com/app\\_pages/www/@res/pdf/NatCatService/focus\\_analyses/1980\\_2012\\_Paket\\_Welt\\_Fokus\\_Analysen\\_touch\\_en.pdf](https://www.munichre.com/app_pages/www/@res/pdf/NatCatService/focus_analyses/1980_2012_Paket_Welt_Fokus_Analysen_touch_en.pdf) (consulted 22 April 2013).
- 6** Reser, J. P., Pidgeon, N., Spence, A., Bradley, G., Glendon, A. I., & Ellul, M., 2011. Public risk perceptions, understandings, and responses to climate change in Australia and Great Britain: Interim report. <http://www.ncarf.edu.au/publications/public-risk-perceptions-final> (consulted 22 April 2013).
- 7** Yale Environment 360, 2012. 'Increase in Extreme Weather Influencing Opinion on Climate Change.' [http://e360.yale.edu/digest/increase\\_in\\_extreme\\_weather\\_influencing\\_opinion\\_on\\_climate\\_change/3552/](http://e360.yale.edu/digest/increase_in_extreme_weather_influencing_opinion_on_climate_change/3552/) (consulted 22 April 2013).
- 8** Eilperin, J. and P.M. Craighill, 2012. 'Temperatures climbing, weather more unstable, a majority says in poll.' *The Washington Post*, 13 July 2012. [http://articles.washingtonpost.com/2012-07-13/national/35488343\\_1\\_climate-change-tax-increases-greenhouse-gases](http://articles.washingtonpost.com/2012-07-13/national/35488343_1_climate-change-tax-increases-greenhouse-gases) (consulted 22 April 2013).
- 9** Gillis, J., 2012. 'In Poll, Many Link Weather Extremes to Climate Change.' *The New York Times*, 17 April 2012. <http://www.nytimes.com/2012/04/18/science/earth/americans-link-global-warming-to-extreme-weather-poll-says.html> (consulted 22 April 2013).
- 10** Bloomberg, M., 2012. 'A Vote for a President to Lead on Climate Change.' *Bloomberg News*, 1 November 2012. Online. Available at: <http://www.bloomberg.com/news/2012-11-01/a-vote-for-a-president-to-lead-on-climate-change.html> (consulted 22 April 2013).
- 11** Obama, B., 2013. The 2013 State of the Union. <http://www.whitehouse.gov/state-of-the-union-2013> (consulted 22 April 2013).
- 12** PwC, 2012. Too late for two degrees?: Low Carbon Economy Index 2012. [http://www.pwc.com/en\\_GX/gx/low-carbon-economy-index/assets/pwc-low-carbon-economy-index-2012.pdf](http://www.pwc.com/en_GX/gx/low-carbon-economy-index/assets/pwc-low-carbon-economy-index-2012.pdf) (consulted 22 April 2013).
- 13** HM Treasury (UK), 2012. 'Autumn Statement policy decisions.' [http://www.hm-treasury.gov.uk/as2012\\_policy\\_decisions.htm#Carbon\\_Reduction\\_Commitment\\_CRC\\_simplification](http://www.hm-treasury.gov.uk/as2012_policy_decisions.htm#Carbon_Reduction_Commitment_CRC_simplification) (consulted 17 April 2013). GBP 12 (5 December 2012) = USD 18.28, GBP 16 (5 December 2012) = USD 24.38, converted at a rate of 1 GBP = 1.52344 USD on 23 April 2013.
- 14** Ministry of the Environment (Norway), 2012. 'The Government is following up on the Climate Agreement.' <http://www.regjeringen.no/en/dep/md/press-centre/Press-releases/2012/the-government-is-following-up-on-the-cl.html?id=704137> (consulted 17 April 2013). NOK 410 = USD 71.26, converted at a rate of 1 NOK = 0.173806 USD on 17 April 2013.
- 15** International Carbon Action Partnership, 2013. 'ETS Map.' [http://icapcarbonaction.com/index.php?option=com\\_wrapper&view=wrapper&Itemid=147](http://icapcarbonaction.com/index.php?option=com_wrapper&view=wrapper&Itemid=147) (consulted 16 April 2013).
- 16** Ministère du développement durable, environnement, faune et parcs (Québec), 2013. 'Système de plafonnement et d'échange de droits d'émission de gaz à effet de serre (GES) - Foire aux questions' (in French). <http://www.mddefp.gouv.qc.ca/changements/carbone/faq-spede.pdf> (consulted 18 April 2013). CAD 10 = USD 9.75, CAD 40 - 50 = USD 39.01 - 48.77 converted at a rate of 1 CAD = 0.975382 USD on 18 April 2013.
- 17** Sumner, J., L. Bird and H. Smith, 2009. 'Carbon Taxes: A Review of Experience and Policy Design Considerations.' National Renewable Energy Laboratory. <http://www.nrel.gov/docs/fy10osti/47312.pdf> (consulted 16 April 2013). CAD 3.50 = USD 3.41 converted at a rate of 1 CAD = 0.975382 USD on 18 April 2013.
- 18** British Columbia Ministry of Finance. 2012. 'How the Carbon Tax Works.' <http://www.fin.gov.bc.ca/tbs/tp/climate/A4.htm> (consulted 17 April 2013). CAD 30 (1 July 2012) = USD 29.3714 converted at rate of 1 CAD = 0.979053 USD on 16 April 2013.
- 19** Vanderklippe, N., 2013. 'Alberta, industry face wide gap on carbon tax.' *The Globe and Mail*, 9 April 2013. <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-a-resources/alberta-industry-face-wide-gap-on-carbon-tax/article10911280/> (consulted 16 April 2013). CAD 15 = USD 14.6858 converted at rate of 1 CAD = 0.979053 USD on 16 April 2013.
- 20** Bay Area Air Quality Management District, 2013. 'Climate Protection Program.' <http://www.baaqmd.gov/Divisions/Planning-and-Research/Climate-Protection-Program.aspx> (consulted 16 April 2013).
- 21** Point Carbon, 2013. 'Carbon 2013.' <http://www.pointcarbon.com/1.2236309?date=20130325&sdte=1&ref=searchlist> (consulted 16 April 2013).
- 22** Citizens' Information Board (Ireland), 2012. 'Carbon tax.' Online. Available at: [http://www.citizensinformation.ie/en/money\\_and\\_tax/motor\\_carbon\\_other\\_taxes/carbon\\_tax.html](http://www.citizensinformation.ie/en/money_and_tax/motor_carbon_other_taxes/carbon_tax.html) (consulted 16 April 2013). EUR 20 (on liquid fuels) = USD 26.27, EUR 10 (on solid fuels) = USD 13.13, converted at a rate of 1 EUR = 1.313686 USD on 16 April 2013.
- 23** RGGI, 2013. 'Market Monitor Report for Auction 19.' [http://www.rggi.org/docs/Auctions/19/Auction\\_19\\_Market\\_Monitor\\_Report.pdf](http://www.rggi.org/docs/Auctions/19/Auction_19_Market_Monitor_Report.pdf) (consulted 16 April 2013).
- 24** RGGI, 2013. 'CO2 Allowance Auctions – Frequently Asked Questions.' [http://www.rggi.org/docs/Auctions/20/RGGI\\_%20CO2\\_%20Allowance\\_%20Auction\\_%20FAQs\\_Apr\\_08\\_2013.pdf](http://www.rggi.org/docs/Auctions/20/RGGI_%20CO2_%20Allowance_%20Auction_%20FAQs_Apr_08_2013.pdf) (consulted 16 April 2013).
- 25** RGGI, 2013. 'Summary of Model Rule Changes: February 2013.' [http://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Model\\_Rule\\_Summary.pdf](http://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Model_Rule_Summary.pdf) (consulted 23 April 2013).
- 26** Querejazu, D., 2012. 'Carbon Pricing Around the World.' Environmental and Energy Study Institute. <http://www.eesi.org/fact-sheet-carbon-pricing-around-world-17-oct-2012> (consulted 17 April 2013).
- 27** Querejazu, D., 2012. 'Carbon Pricing Around the World.' Environmental and Energy Study Institute. <http://www.eesi.org/fact-sheet-carbon-pricing-around-world-17-oct-2012> (consulted 17 April 2013). DKK 90 = USD 15.85, converted at rate of 1 DKK = 0.176143 USD on 17 April 2013.
- 28** Federal Office of the Environment (Switzerland), 2013. 'Theme tax sur le CO2' (in French). <http://www.bafu.admin.ch/co2-abgabe/index.html?lang=fr> (consulted 17 April 2013). CHF 36 = USD 38.91, converted at rate of 1 CHF = 1.08074 USD on 17 April 2013.
- 29** Ministry of the Environment (Finland), 2012. 'Environmentally related energy taxation in Finland.' <http://www.environment.fi/default.asp?contentid=147208&lan=en> (consulted 17 April 2013). EUR 60 on transport fuel = USD 78.14, EUR 30 on heating fuel = USD 39.43, converted at rate of 1 EUR = 1.31423 USD on 17 April 2013.
- 30** Ministry of the Environment (Sweden), 2012. '20 years of carbon pricing in Sweden.' <http://www.ceps.eu/files/MinistrySweden.pdf> (consulted 17 April 2013). EUR 114 (on households) = USD 149.83, EUR 34 (on industry) = USD 44.69, converted at a rate of 1 EUR = 1.31423 USD on 17 April 2013.
- 31** European Energy Exchange, 2013. 'EU Emissions Allowances – Spot.' <http://www.eex.com/en/Market%20Data/Trading%20Data/Emission%20Rights/EU%20Emission%20Allowances%20%7C%20Spot> (consulted 17 April 2013). EUR 4.67 = USD 6.13, converted at a rate of 1 EUR = 1.31423 USD on 17 April 2013.
- 32** South African Government News Agency, 2013. 'Long-awaited carbon tax to come into effect in 2015.' <http://www.sanews.gov.za/south-africa/long-awaited-carbon-tax-come-effect-2015> (consulted 17 April 2013). ZAR 120 = USD 13.10, converted at a rate of 1 ZAR = 0.109186 USD on 17 April 2013.
- 33** Ministry of Environment (Japan), 2011. 'Japan's Voluntary Emissions Trading Scheme (JVETS)'. <http://www.env.go.jp/en/earth/ets/jvets1105.pdf> (consulted 17 April 2013). JPY 750 = USD 7.68, converted at a rate of 1 JPY = 0.0102324 USD on 17 April 2013.
- 34** Ministry of Environment (Japan), 2012. 'Details on the Carbon Tax (Tax for Climate Change Mitigation)'. [http://www.env.go.jp/en/policy/tax/env-tax/20121001a\\_dct.pdf](http://www.env.go.jp/en/policy/tax/env-tax/20121001a_dct.pdf) (accessed 17 April 2013). JPY 289 = USD 2.96, converted at rate of 1 JPY = 0.0102324 USD on 17 April 2013.
- 35** Nishida, Y. and Y. Hua, 2011. Motivating stakeholders to deliver change: Tokyo's Cap-and-Trade Program. *Building Research & Information* 39(5), pp. 518-533. <http://dx.doi.org/10.1080/09613218.2011.596419>.
- 36** Australian Government, 2013. 'Securing a Clean Energy Future – Appendix A: Carbon pricing mechanism.' <http://www.cleanenergyfuture.gov.au/clean-energy-future/securing-a-clean-energy-future/appendices/> (consulted 17 April 2013). AUD 24.15 (price) = USD 24.94, AUD 20 (ceiling), = USD 20.66, AUD 15 (floor) = USD 15.50, converted at rate of 1 AUD = 1.03286 USD on 17 April 2013.
- 37** Singh, N., 2013. Creating market support for energy efficiency: India's Perform, Achieve and Trade Scheme.' *Climate Development and Knowledge Network*. [http://cdkn.org/wp-content/uploads/2013/01/India-PAT\\_InsideStory.pdf](http://cdkn.org/wp-content/uploads/2013/01/India-PAT_InsideStory.pdf) (consulted 17 April 2013).
- 38** Government of India, 2010. 'Levy of Clean Energy cess.' <http://www.cbec.gov.in/excise/cx-circulars/cx-circulars-10/circ-ccc01-2k10.htm> (consulted 17 April 2013). INR 50 = USD 0.92, converted at a rate of 1 INR = 0.0184417 USD on 17 April 2013.
- 39** Comtrade Carbon, 2013. 'NZUs – Spot.' <https://www.comtrade.co.nz/> (consulted 17 April 2013). NZD 2.12 = USD 1.78, converted at a rate of 1 NZD = 0.844272 USD on 22 April 2013.
- 40** Doan, L., 2013. 'California Carbon Permits Sell Above Expected Clearing Price.' *Bloomberg News*. <http://www.bloomberg.com/news/2013-02-22/california-sells-carbon-allowances-for-13-62-each-in-auction.html> (consulted 16 April 2013). USD 13.72 on 19 February 2013.
- 41** California Air Resources Board, 2012. '2013 Annual Auction Reserve Price Notice.' <http://www.arb.ca.gov/cc/capandtrade/auction/march-2013/2013annreserve> (consulted 16 April 2013). USD 10.71 on 3 December 2012.
- 42** Howell, L. (Ed.), 2013. *Global Risks 2013, Eighth Edition*. World Economic Forum. [http://www3.weforum.org/docs/WEF\\_GlobalRisks\\_Report\\_2013.pdf](http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2013.pdf) (consulted 22 April 2013).
- 43** Howell, L. (Ed.), 2012. *Global Risks 2012, Seventh Edition*. World Economic Forum. [http://www3.weforum.org/docs/WEF\\_GlobalRisks\\_Report\\_2012.pdf](http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2012.pdf) (consulted 22 April 2013).
- 44** UNEP Finance Initiative and World Business Council for Sustainable Development, 2012. *Translating ESG into Sustainable Business Value: Key Insights for Companies and Investors*. <http://www.unepfi.org/fileadmin/documents/translatingESG.pdf> (consulted 22 April 2013).
- 45** Kauffmann, C., C. Tébar Less and D. Teichmann, 2012. *Corporate Greenhouse Gas Emission Reporting: A Stocktaking of Government Schemes*. OECD Working Papers on International Investment, No. 2012/1, OECD Investment Division. <http://www.oecd.org/daf/inv/internationalinvestmentagreements/50549983.pdf> (consulted 22 April 2013).
- 46** Fossil Free, 2013. 'About the Fossil Free Campaign.' <http://gofossilfree.org/about/> (consulted 30 April 2013).
- 47** Global Reporting Initiative, 2013. *Sustainability Disclosure Database*. <http://database.globalreporting.org/> (consulted 22 April 2013).

# Notes and references

- 48** KPMG, 2013. Climate Change and Sustainability Services. <http://www.kpmg.com/global/en/topics/climate-change-sustainability-services/Pages/default.aspx> (consulted 22 April 2013).
- 49** Deloitte, 2013. Deloitte Sustainability. [http://www.deloitte.com/view/en\\_GX/global/services/sustainability-and-climate-change/index.htm](http://www.deloitte.com/view/en_GX/global/services/sustainability-and-climate-change/index.htm) (consulted 22 April 2013).
- 50** Ernst & Young, 2013. Climate Change and Sustainability Services. <http://www.ey.com/US/en/Services/Specialty-Services/Climate-Change-and-Sustainability-Services> (consulted 22 April 2013).
- 51** PwC, 2013. Climate Change and Sustainability. <http://www.pwc.com/gx/en/sustainability/index.jhtml> (22 April 2013).
- 52** Kauffmann, C., C. Tébar Less and D. Teichmann, 2012. Corporate Greenhouse Gas Emission Reporting: A Stocktaking of Government Schemes. OECD Working Papers on International Investment, No. 2012/1, OECD Investment Division. <http://www.oecd.org/daf/inv/internationalinvestmentagreements/50549983.pdf> (consulted 22 April 2013).
- 53** Eurosif, 2013. Eurosif Supports Landmark European Commission Proposal Promoting ESG Investment Disclosure, 30 July 2012. <http://www.eurosif.org/images/stories/30July2012KidDisclosureRelease.pdf> (consulted 22 April 2013).
- 54** Environment Canada, 2013. 'Greenhouse Gas Emissions Reporting Program.' <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&nav=040E378D-1> (consulted 18 April 2013).
- 55** Ministère du développement durable, environnement, faune et parcs (Québec), 2013. 'The Québec Cap and Trade System for Greenhouse Gas Emissions Allowances (in French). <http://www.mddefp.gouv.qc.ca/changements/carbone/Systeme-plafonnement-droits-GES-en.htm> (consulted 18 April 2013).
- 56** California Air Resources Board, 2012. 'Unofficial electronic version of the regulation for the Mandatory Reporting of Greenhouse Gas Emissions.' <http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2012-clean.pdf> (consulted 18 April 2013).
- 57** United States Environmental Protection Agency, 2013. 'Greenhouse Gas Reporting Program – Basic Information.' <http://www.epa.gov/ghgreporting/basic-info/index.html> (consulted 18 April 2013).
- 58** Department for Environment, Food and Rural Affairs (UK), 2012. 'Leading businesses to disclose greenhouse gas emissions.' <https://www.gov.uk/government/news/leading-businesses-to-disclose-greenhouse-gas-emissions> (consulted 18 April 2013).
- 59** Legifrance, 2013. 'Code de l'environnement, Partie législative, Livre II, Titre II, Chapitre IX, Section 4 : Bilan des émissions de gaz à effet de serre et plan climat-énergie territorial' (in French). [http://www.legifrance.gouv.fr/affichCode.do?sessionid=19B94B64AEFC7B80A952B28E76B9651A.rpdjo03v\\_22idSectionTA=LEGISCTA000022494483&cidTexte=LEGITEXTE000006074220&dateTexte=20130418](http://www.legifrance.gouv.fr/affichCode.do?sessionid=19B94B64AEFC7B80A952B28E76B9651A.rpdjo03v_22idSectionTA=LEGISCTA000022494483&cidTexte=LEGITEXTE000006074220&dateTexte=20130418) (accessed 18 April 2013).
- 60** Ministry of Environment and Urbanization (Turkey), 2012. 'Climate Change and Turkey.' [http://iklim.cob.gov.tr/iklim/Files/yay%20C4%20B1nlar/BROSUR\\_ENG.pdf](http://iklim.cob.gov.tr/iklim/Files/yay%20C4%20B1nlar/BROSUR_ENG.pdf) (consulted 23 April 2013).
- 61** Ministry of the Environment (Japan). 'Japan's policies and efforts on GHG inventory, measurement and reporting.' <http://www.gio.nies.go.jp/wgia/wg6/pdf/1-2%20Sci%20kato.pdf> (consulted 23 April 2013).
- 62** Tokyo Metropolitan Government, 2012. 'Tokyo Cap-and-Trade Program for Large Facilities.' [http://www.kankyo.metro.tokyo.jp/en/climate/attachement/Tokyo\\_Cap-and-Trade\\_Program\\_detailed\\_version.pdf](http://www.kankyo.metro.tokyo.jp/en/climate/attachement/Tokyo_Cap-and-Trade_Program_detailed_version.pdf) (consulted 23 April 2013).
- 63** Greenhouse Gas Inventory and Research Center of Korea, 2012. 'What is Greenhouse Gas Target Management?' <http://www.gir.go.kr/eng/og/hm/nc/a/OGHMNCA010.do> (consulted 23 April 2013).
- 64** Clean Energy Regulator (Australia), 2013. 'Steps for reporting corporations – Step 1: Be aware of the reporting thresholds.' <http://www.cleanenergyregulator.gov.au/National-Greenhouse-and-Energy-Reporting/steps-for-reporting-corporations/NGER-reporting-step-1/Pages/default.aspx> (consulted 23 April 2013).
- 65** New Zealand Government, 2013. 'Emissions Trading Scheme – Obligations.' <http://www.climatechange.govt.nz/emissions-trading-scheme/obligations/> (consulted 23 April 2013).
- 66** Freshfields Bruckhaus Deringer, 2005. A Legal Framework for the Integration of Environmental, Social and Governance Issues into Institutional Investment. United Nations Environment Programme Finance Initiative. [http://www.unepfi.org/fileadmin/documents/freshfields\\_legal\\_resp\\_20051123.pdf](http://www.unepfi.org/fileadmin/documents/freshfields_legal_resp_20051123.pdf) (consulted 22 April 2013).
- 67** International Investor Group on Climate Change, 2011. Global Investor Survey on Climate Change: Annual Report on Actions and Progress 2010. [http://www.iigcc.org/\\_data/assets/pdf\\_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011](http://www.iigcc.org/_data/assets/pdf_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011).
- 68** Eccles, R.G., M.P. Krzus and G. Serafeim, 2011. Market Interest in Nonfinancial Information. Harvard Business School Working Paper 12-018. <http://www.hbs.edu/faculty/Publication%20Files/12-018.pdf> (consulted 22 April 2013).
- 69** Kauffmann, C., C. Tébar Less and D. Teichmann, 2012. Corporate Greenhouse Gas Emission Reporting: A Stocktaking of Government Schemes. OECD Working Papers on International Investment, No. 2012/1, OECD Investment Division. <http://www.oecd.org/daf/inv/internationalinvestmentagreements/50549983.pdf> (consulted 22 April 2013).
- 70** This Briefing focuses, within the broader theme of climate change, on the drivers of, and causes for, the phenomenon: GHG emissions. It raises and addresses the question of how the GHG emissions associated with investments and investment portfolios could affect investors in light of i) increasing public prioritization and regulation to cap and reduce GHG emissions, as well as ii) increasing requirements for investor disclosure. This Briefing does not focus on the meteorological and hydrological consequences of climate change and, therefore, on how climate change itself, as a physical phenomenon, will affect economies, investments and portfolios. It has been a deliberate decision by UNEP FI to address these two agendas separately ('carbon risk' versus 'climate risk') as these two issues are fundamentally different from each other and require different conceptual and analytical approaches. The issue of mainstreaming the integration of climate change impact factors is addressed, at UNEP FI, through the project Advancing Adaptation through Climate Information for Financial Institutions (AACIFI).
- 71** International Investor Group on Climate Change, 2011. Global Investor Survey on Climate Change: Annual Report on Actions and Progress 2010. [http://www.iigcc.org/\\_data/assets/pdf\\_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011](http://www.iigcc.org/_data/assets/pdf_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011).
- 72** Personal communication, 2013.
- 73** The Greenhouse Gas Protocol, 2011. Corporate Value Chain (Scope 3) Accounting and Reporting Standard. <http://www.ghgprotocol.org/files/ghgp/public/Corporate%20Value%20Chain%20and%20Scope%203%29%20Accounting%20and%20Reporting%20Standard.pdf> (consulted 7 May 2013).
- 74** The extent to which the GHG emissions associated with investments and investment portfolios will either be Scope 1 or Scope 3 emissions depends, among other variables, on the type of investment: while the GHG emissions associated with debt investments will mostly fall into the Scope 3 category, the categorisation of equity investments will depend largely on the consolidation approach chosen by the investor ('equity share', 'financial control', 'operational control'). More information can be found in the GHG Protocol's Corporate Value Chain (Scope 3) Accounting Standard: <http://www.ghgprotocol.org/standards/scope-3-standard>.
- 76** International Energy Agency, 2012. 'World Energy Outlook 2012.' <http://www.worldenergyoutlook.org/publications/weo-2012/> (consulted 30 April 2013).
- 77** Personal communication, 2013.
- 78** Personal communication, 2013.
- 79** International Investor Group on Climate Change, 2011. Global Investor Survey on Climate Change: Annual Report on Actions and Progress 2010. [http://www.iigcc.org/\\_data/assets/pdf\\_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011](http://www.iigcc.org/_data/assets/pdf_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011).
- 80** For instance, if one were to compare the carbon risk exposure of two investment funds which share the same geographic (or jurisdictional) focus and the same (or a similar) sectoral orientation, one could use footprint analysis at the portfolio level to determine differences in carbon risk exposure. This would avoid having to incur the de-tour of analyzing each company in the portfolio on a case-by-case basis which would save time and effort.
- 81** The carbon footprint of a portfolio (and a benchmark) is the weighted average of carbon footprints of the holdings in the portfolio. This is calculated by summing the investment weight of each holding by the holdings' carbon footprint.
- 82** In the case of financial flow variables, the time horizon of the financial variable has to match the time horizon of the emissions variable (the same year, or the same quarter, or the same month).
- 83** At either book or market values.
- 84** At either book or market values.
- 85** According to the CDP, fewer than half of the Global 500 companies verify their emissions.
- 86** Certain approaches to deal with carbon risk will be limited by the core nature, design and positioning of the fund.
- 87** Here, carbon intensity is defined as tonnes of carbon dioxide equivalent emissions per USD 1 million in revenue.
- 88** The UBS Europe Carbon Optimized Index was retired on 24 September 2012. UBS, personal communication, 2013.
- 89** Calculated on basis of data from: UBS, personal communication, 2013; Stoxx, 2012. 'Stoxx Euro 600 Historical Values EUR Gross Return.' [http://www.stoxx.com/download/historical\\_data/h\\_sxxgr.txt](http://www.stoxx.com/download/historical_data/h_sxxgr.txt) (consulted 25 April 2013).
- 90** UBS, 2008. 'UBS launches Europe Carbon Optimized Index.' [http://www.ubs.com/global/en/about\\_ubs/media/emea/releases/news\\_display\\_media\\_emea.html/en/2008/03/19/ubs\\_launches\\_europe\\_carbon\\_optimized\\_index.html](http://www.ubs.com/global/en/about_ubs/media/emea/releases/news_display_media_emea.html/en/2008/03/19/ubs_launches_europe_carbon_optimized_index.html) (consulted 25 April 2013).
- 91** Merrill Lynch, 2007. 'Launching the ML Carbon Leaders Europe Index.' <http://www.ml.com/media/83701.pdf> (consulted 25 April 2013).
- 92** Calculated on basis of data from: Bank of America Merrill Lynch, personal communication, 2013; Stoxx, 2012. 'Stoxx Euro 600 Historical Values EUR Gross Return.' [http://www.stoxx.com/download/historical\\_data/h\\_sxxgr.txt](http://www.stoxx.com/download/historical_data/h_sxxgr.txt) (consulted 25 April 2013).
- 93** BNP Paribas, 2007. 'NYSE Euronext and EasyETF launch European low-carbon index and ETF managed by BNP Paribas Asset Management, in partnership with AgriSud, GoodPlanet.org and WWF.' <http://www.bnpparibas.ch/en/2008/10/27/nyse-uronext-and-easyetf-launch-european-low-carbon-index-and-etf-managed-by-bnp-paribas-asset-management-in-partnership-with-agrisud-goodplanet-org-and-wwf/> (consulted 25 April 2013).
- 94** Standard and Poor, 2012. 'S&P US Carbon Efficient Index Factsheet.' <http://us.spindices.com/indices/equity/sp-us-carbon-efficient-index> (consulted 25 April 2013).
- 95** Deutsche Bank, 2013. 'S&P U.S. Carbon Efficient UCITS ETF.' [http://www.etf.db.com/UK/ENG/ETF/LU0411076002/B3Z4VB5/SANDP\\_U.S.\\_Carbon\\_Efficient\\_UCITS ETF.html](http://www.etf.db.com/UK/ENG/ETF/LU0411076002/B3Z4VB5/SANDP_U.S._Carbon_Efficient_UCITS ETF.html) (consulted 25 April 2013).
- 96** Standard and Poor, 2012. 'S&P/IFCI Carbon Efficient Index Factsheet.' <http://www.spindices.com/indices/equity/sp-ifici-carbon-efficient-us-dollar> (consulted 25 April 2013).
- 97** Standard and Poor, 2012. 'S&P/TOPIX 150 Carbon Efficient Index Factsheet.' <http://www.spindices.com/indices/equity/sp-topix-150-carbon-efficient-index> (consulted 25 April 2013).
- 98** FTSE, 2012. 'FTSE CDP Carbon Strategy Index Series Factsheet.' [http://www.ftse.com/Indices/FTSE\\_CDP\\_Carbon\\_Strategy\\_Index\\_Series/Downloads/FTCOASX.pdf](http://www.ftse.com/Indices/FTSE_CDP_Carbon_Strategy_Index_Series/Downloads/FTCOASX.pdf) (consulted 25 April 2013).
- 99** FTSE, 2012. 'FTSE CDP Carbon Strategy Index Series Methodology Overview.' [http://www.ftse.com/Indices/FTSE\\_CDP\\_Carbon\\_Strategy\\_Index\\_Series/Downloads/FTSE\\_CDP\\_Carbon\\_Strategy\\_Methodology\\_Overview.pdf](http://www.ftse.com/Indices/FTSE_CDP_Carbon_Strategy_Index_Series/Downloads/FTSE_CDP_Carbon_Strategy_Methodology_Overview.pdf) (consulted 25 April 2013).
- 100** Personal communication, 2013.



## About the UNEP Finance Initiative

The United Nations Environment Programme Finance Initiative (UNEP FI) is a strategic public-private global partnership between the United Nations Environment Programme (UNEP) and the global financial sector. UNEP FI works closely with over 200 financial institutions who are Signatories to the UNEP FI Statements, and a range of partner organizations to develop and promote linkages between sustainability and financial performance. Through peer-to-peer networks, research and training, UNEP FI carries out its mission to identify, promote, and realise the adoption of best environmental and sustainability practice at all levels of financial institution operations.

**This Briefing is a joint project of the UNEP FI Climate Change Advisory Group and the UNEP FI Investment Commission**

### Project Team

#### Nick Burniston

Head of Corporate Responsibility  
Aviva Investors

#### Giorgio Capurri

Environmental Management System Representative  
UniCredit

#### Julie Fox Gorte

Senior Vice President for Sustainable Investing  
PAX World

#### Christopher Greenwald

Head of Sustainability Application and Operations  
Robeco Sustainable Asset Management

#### Natasha Lamb

Vice President, Shareholder Advocacy and Corporate  
Engagement  
Trillium Asset Management

#### Karsten Loeffler

Managing Director  
Allianz Climate Solutions

#### Stephanie Maier

Corporate Responsibility Manager  
Aviva Investors

#### Gianluca Manca

Head of Sustainability Division  
Eurizon Capital, Intesa Sanpaolo Group

#### David Pitt-Watson

Senior Strategic Advisor  
Inflection Point Capital

#### Nick Robins

Head, Climate Change Centre  
HSBC

#### Simone Ruiz

Project Manager  
Allianz Climate Solutions

Copyright © 2013  
United Nations  
Environment Programme  
Finance Initiative

The views expressed  
in this document are  
not necessarily those of  
UNEP or UNEP FI or its  
Signatories nor does UNEP  
FI or its Signatories take any  
responsibility for actions  
as a result of the views or  
opinions expressed in this  
document.

Brochure design  
**Candy Factory**, Genève  
[www.candy-factory.ch](http://www.candy-factory.ch)

**UNEP Finance Initiative**  
International Environment  
House  
15, Chemin des Anémones  
1219 Châtelaine,  
Genève  
Switzerland  
Tel: (41) 22 917 8178  
Fax : (41) 33 796 9240  
[www.unepfi.org](http://www.unepfi.org)

### UNEP FI Secretariat

#### Lead authors

Remco Fischer, Programme Officer, Climate Change  
Jacinto Coello, Programme Officer, Investment Commission

The project team would like to thank Emanuele Fanelli and Pedro Faria of the Carbon Disclosure Project (CDP), and Bill Hartnett from Local Government Superannuation Scheme, Australia for their input, comments and edits to this draft. Additionally, the project team would like to thank Elodie Feller, Daniel Barron, Lucia Pflueger, Maryam Negar Hemmati and Marijn Swinters, from UNEP FI, for their help in completing this briefing.

**DTI/1609/GE**



**UNEP Finance Initiative**  
Changing finance, financing change

[www.unep.org](http://www.unep.org)

United Nations Environment Programme

Tel: (254 20) 7621234  
Fax: (254 20) 7623927  
E-mail: [uneppub@unep.org](mailto:uneppub@unep.org)  
web: [www.unep.org](http://www.unep.org)

