

# STRANDED ASSETS

PROGRAMME



## Summary of Proceedings

### Environment-Related Risks and the Future of Prudential Regulation and Financial Conduct

4<sup>th</sup> Stranded Assets Forum, Waddesdon Manor, 23<sup>rd</sup> October 2015

In Partnership with:



THE ROTHSCHILD FOUNDATION



**Inquiry:** Design of a Sustainable Financial System

**KR** foundation

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## About the Stranded Assets Programme

The Stranded Assets Programme at the University of Oxford's Smith School of Enterprise and the Environment was established in 2012 to understand environment-related risks driving asset stranding in different sectors and systemically. We research how environment-related risks might emerge and strand assets; how different risks might be interrelated; assess their materiality (in terms of scale, impact, timing, and likelihood); identify who will be affected; and what impacted groups can do to pre-emptively manage and monitor risk.

We recognise that the production of high-quality research on environment-related risk factors is a necessary, though insufficient, condition for these factors to be successfully integrated into decision-making. Consequently, we also research the barriers that might prevent integration, whether in financial institutions, companies, governments, or regulators, and develop responses to address them. We also develop the data, analytics, frameworks, and models required to enable integration for these different stakeholders.

The programme is based in a world leading university with a global reach and reputation. We are the only academic institution conducting work in a significant and coordinated way on stranded assets. We work with leading practitioners from across the investment chain (e.g. actuaries, asset owners, asset managers, accountants, investment consultants, lawyers), with firms and their management, and with experts from a wide range of related subject areas (e.g. finance, economics, management, geography, anthropology, climate science, law, area studies) within the University of Oxford and beyond.

We have created the Stranded Assets Research Network, which brings together researchers, research institutions, and practitioners working on these and related issues internationally to share expertise. We have also created the Stranded Assets Forums, which are a series of private workshops to explore the issues involved. The Global Stranded Assets Advisory Council that guides the programme contains many of the key individuals and organisations involved in developing the emergent stranded assets agenda. The council also has a role in helping to informally co-ordinate and share information on stranded assets work internationally.

## Acknowledgements

We would like to thank the participants and speakers, as well as the forum partners The Rothschild Foundation, KR Foundation, and the UNEP Inquiry into the Design of a Sustainable Financial System (the 'UNEP Inquiry'). This was the fourth Stranded Assets Forum organised by the University of Oxford's Smith School of Enterprise and the Environment together with The Rothschild Foundation. It is part of a series that aim to bring together a select number of key people from across the financial system to better understand drivers of stranded assets, their consequences, and how to develop effective responses to the challenges they could generate.

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## Introduction

The University of Oxford's Smith School of Enterprise and the Environment, in partnership with The Rothschild Foundation, the KR Foundation, and the UNEP Inquiry, organised the 4<sup>th</sup> Stranded Assets Forum at Waddesdon Manor, Buckinghamshire, on the 23<sup>rd</sup> October 2015. This forum followed three earlier forums<sup>1</sup>: i) a general investigation of topics connected to stranded assets (March 2014); ii) a more focused event concentrating on divestment by endowments of their financial holdings in the fossil fuel industry (September 2014); and iii) a forum to explore the role that investment consultants play in promoting action by asset owners on matters of environment, climate, and sustainability (March 2015). The 4<sup>th</sup> Stranded Assets Forum examined how environment-related risks, including physical climate change impacts and societal responses to climate change, might materialise in ways that could impact financial stability. It brought together leaders and experts from central banks and research institutions internationally working on macro and micro prudential regulation, as well as financial conduct to see how concerns about environment-related risks might intersect with these regulatory agendas. The scope of the forum was intentionally broad and the objective was to help crystallise a research agenda and pathway to operationalisation.

The forum coincided with a number of highly relevant developments in the treatment of environment-related risks by financial policy makers. On the 29<sup>th</sup> September 2015 Mark Carney gave a major speech on climate change at Lloyd's of London<sup>2</sup> and simultaneously the Bank of England Prudential Regulation Authority (PRA) published a report on climate change impacts and the UK insurance sector<sup>3</sup>. In late September the Financial Stability Board (FSB) also met to discuss climate change in London, proposing the creation of a new Task Force on Climate-related Financial Disclosures<sup>4</sup>. Finally, in early October 2015 the United Nations Environment Programme Inquiry into the Design of Sustainable Financial System ('UNEP Inquiry') also made its final report after an 18 month research and consultation process involving central banks (and a host other financial actors)<sup>5</sup>.

This report provides a distillation of the proceedings and deliberations from this fourth forum. It details key perspectives, discussion points, and issues that emerged during the panel discussion sessions and speakers' remarks. Divergent and minority perspectives are noted where appropriate. The full agenda is listed in Annex A. Annex B contains the list of participants. A suggested reading list was provided to participants in advance of the forum, which appears in Annex C.

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<sup>1</sup> For summaries of the proceedings of the previous forums, please see: <http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/forums.php>

<sup>2</sup> Bank of England (2015). Breaking the Tragedy of the Horizon – climate change and financial stability: a speech given by Mark Carney, Governor of the Bank of England.

<sup>3</sup> Bank of England (2015). The impact of climate change on the UK insurance sector: A Climate Change Adaptation Report by the Prudential Regulation Authority.

<sup>4</sup> Financial Stability Board (2015) FSB proposes creation of disclosure task force on climate-related risks.

<sup>5</sup> UNEP Inquiry (2015). The Financial System We Need: Aligning the Financial System with Sustainable Development.

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# Key Findings

## *Session I: Macroprudential Regulation*

Monetary policy is likely too blunt an instrument to help alleviate climate change risks. Conflicting time horizons, with climate change a long-term risk versus monetary policy being comparatively short-term, means central bankers may not be able to account for climate concerns. Rather than monetary policy, central banks might do best by utilizing a monitoring and engagement strategy, such as analysing risks to critical economic sectors and issuing warnings. Macroprudential regulation should be considered a second-best policy option to help shape climate change outcomes. First best options like implicit or explicit carbon pricing derived through market mechanisms or taxes, would allow governments to more directly mitigate climate change risks. Increased disclosure of climate change related data from companies and financial institutions will be an important tool in managing climate risk, and a standardized format must be found. However, there is currently no consensus on the format of such disclosures. Accounting standards may be one vehicle for deciding these formats.

## *Session II: Microprudential Regulation*

The current asset allocation and pricing models entrenched within the financial industry, which are designed to reduce risk, ironically do the opposite. Both the Capital Asset Pricing Model and Modern Portfolio Theory rely on the presumption of diversifiable risk, which leaves them very exposed to systematic risks, like those posed by climate change. Asset managers would do well to avoid the current obsession of volatility management. The more that current risk and asset allocation models become entrenched in the industry, the more systematic the risk they pose becomes.

The insurance industry can provide an example of how effective regulation could be applied in finance. Following a serious weather calamity, the industry fundamentally changed its approach to risk. New risk models were developed and insurance providers began to collect and demand new data to improve model forecasts. One key aspect of the change was that insurers started to be forward-looking in regards to risk, whereas the current financial industry's perspective, including regulators, is backward-looking.

## *Session III: Norms, Standards, and Conduct*

Data only becomes information when it is presented in a useful way. Therefore, it is important that regulators and investors work closely together to ensure the most appropriate information is available. Norms are uncodified rules of conduct within industries, created by culture, confirmation bias, groupthink, and general inertia of professional practice. Incentives and remuneration are a common part of norms that regulators are concerned with. Ethical norms can change very quickly, but it remains unclear whether this will extend to climate change and sustainability.

Culture is the slow-changing values and fundamental beliefs of a given industry. The culture of the financial industry is at once radical and orthodox, and because of climate change's frequent association with 'the Left' and NGOs, it has often been discounted as immaterial by the sector. However, utilizing the highly networked character of finance may be a more effective way of changing the sector's culture than any external pressure. Professional bodies have an important role to play in this effort. Additionally, the availability of more usable information for business and finance leaders, as well as narratives of success in 'green' investments, could help the industry perspectives.

# Background: Framing the Forum

## *Release of the UNEP Inquiry's final report*

The UNEP Inquiry has examined how to mobilize private and public capital to address sustainability challenges, including: how to overcome mismanagement of environmental risks and externalities; how to finance environmental resilience; how to foster policy innovation and change; and how to align sustainability objectives with wider policy and planning efforts. The full potential of the financial system must be harnessed in order to meet the Sustainable Development Goals of the UN's 2030 Agenda<sup>6</sup>.

The inquiry found evidence of a *quiet revolution* in the adoption of sustainable finance practice, with five emerging practice areas:

- *enhancing market practice* – integration of sustainability risks into market disclosure and risk management
- *upgrading governance architecture* – integration of sustainability into financial decision making of financial regulators and central banks
- *transforming the cultural of finance* – enhancing the awareness of, skill in, and commitment to developing a sustainable finance system among finance professionals
- *enacting finance policy* – development of incentive and liability schemes which contribute to sustainable development
- *utilising the public balance sheet* – incentivising and directly investing in sustainable development, providing certainty to private investors

Over 100 measures were identified, with developing and emerging countries leading the transition. These measures are exemplary of progress towards a financial system fit for sustainable development, which will mobilize private as well as public capital; direct investment away from the depletion of natural capital; price resources and commons appropriately; and overcome short-termism and over-leverage characteristic of today's financial system. These barriers must be overcome to deliver the social benefits of economic development without associated environmental degradation.

## *Release of the Bank of England PRA's report on climate change adaptation*

In September 2015, Bank of England Governor Mark Carney called climate change *the tragedy of the horizon* in an address to Lloyd's of London<sup>7</sup>. He observed that the impacts of climate change occur beyond the horizon of the business and political cycle, as well as the planning horizon of technocratic authorities like central banks. In April 2014, the Bank of England's Prudential Regulatory Authority (PRA) agreed to a request from the UK Department for Environment, Food & Rural Affairs (Defra) to report on climate change adaptation. The PRA's report on climate change adaptation in the UK insurance sector was issued concurrently with Mark Carney's speech<sup>8</sup>.

The PRA has developed a framework of three categories of climate change risk in the insurance sector.

- *Physical Risks* – first-order risk of increased insurance claims caused by a changing climate and extreme weather, either directly (e.g. flood damage) or indirectly (e.g. supply chain disruption).
- *Transitional Risks* – the financial risks arising from the transition to a low-carbon economy and the repricing of carbon-intensive assets.

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<sup>6</sup> See United Nations (2015). Transforming our World: The 2030 Agenda for Sustainable Development.

<sup>7</sup> Bank of England (2015). Breaking the Tragedy of the Horizon – climate change and financial stability: a speech given by Mark Carney, Governor of the Bank of England.

<sup>8</sup> Bank of England (2015). The impact of climate change on the UK insurance sector: A Climate Change Adaptation Report by the Prudential Regulation Authority.



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- *Liability Risks* – The physical and transitional risks of climate change giving rise to new liabilities held by a wide range of economic actors. Liability types include general and public liability, director’s and officer’s liability, and professional indemnity and manifest under their failure to act on climate change risks.
    - *Failure to mitigate climate change*: In the future, the parties who caused climate change may be liable for the economic damages caused by climate change.
    - *Failure to adapt to climate change*: Economic actors are increasingly liable for their failures to anticipate and adapt to the physical risk of climate change. Company officers and fund trustees may also be liable to anticipate and adapt to transitional risks.
    - *Failure to disclose exposure to climate change*: Economic actors with disclosure obligations may be liable if they fail to adequately disclose climate change risks.

All three risks forms have impacts in the multiple channels of monetary policy, macroprudential regulation, and microprudential regulation. The Bank of England is developing a research agenda and seeking further collaboration with industry and international interests.

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# Session I: Macroprudential Regulation

## *Role of Central Banks*

Participants were sceptical of the ability of monetary policy to manage climate change risks. While the role of monetary policy is well established for economic recovery, its role in anticipating and preventing general credit and asset price bubbles is unclear. Monetary policy may be too blunt an instrument to target asset price bubbles and credit availability specific to climate change risks.

Monetary policy planning occurs on a time horizon of 2 to 3 years, whereas climate change impacts take decades to manifest. The near-term economic impacts of climate change may be perpetually dominated by other short-term phenomena, with the economic impact of climate change only visible in counter-factual scenarios featuring decreased long-term growth.

Finally, monetary policy uses interest rates and money supply to control growth and inflation. Interest rates have remained very low since the financial crisis. Unless interest rates recover, central bankers are constrained by the lower boundary of interest rates in setting policy.

What, then, might be the correct role of the central bank in managing climate change risks? The participants suggested that monitoring and engagement activities could be the most crucial contribution of central banks in managing climate change risks. Monitoring activities might include forecasting and long-term horizon scanning, particularly of high-risk industries such as transport and energy. Central banks might issue warnings and raise awareness of these issues while liaising with international counterparts.

## *First-Best versus Second-Best Regulatory Options*

Macroprudential regulation was called a second-best option compared to first-best policy options like implicit or explicit carbon pricing derived through market mechanisms or taxes. Governments should first attempt to manage market failures in the real economy, rather than use macroprudential regulation to manage financial risk up the investment value chain. By doing so, governments can bring about structured mitigation of climate change risks directly rather than via the balance sheets of financial institutions.

## *Perspectives on Disclosure*

Participants shared mixed perspectives on the format, standards, and enforcement of disclosure. Participants considered whether disclosure of climate risks should occur 'top down' or 'bottom up'. Top down disclosure would be mandatory, but participants raised concerns that this might be an unnecessary burden on the organisations responsible for coordinating and enforcing such disclosures. A bottom up approach would be for separate voluntary reporting initiatives in diverse industries to develop and coalesce into wider, inclusive, standardised disclosure practice. The bottom up approach appears to be the one currently preferred by industry and regulators, but has significant disadvantages, not least being slow to develop and non-universal.

Participants disagreed as to whether mandatory disclosure was necessary or even helpful. Some felt that disclosure of climate change risks on a voluntary basis would be sufficient for investors to reward high-performing companies and that pressure in capital markets would ensure the adoption of standardised reporting among all companies with significant risk exposure. Voluntary disclosure has the advantage of allowing investors to endogenously decide on which information is significant to their decision making. Voluntary disclosure may become a cultural norm, which all industry participants adopt without the need for regulatory action.



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Finally, even if effective disclosure regimes are established which allow capital markets to efficiently allocate capital with knowledge of climate change risk, what impact might that have on mitigation scenarios? While climate change risk might be allocated appropriately, disclosure may do little to reduce strategic uncertainty in policy development, or to mitigate systemic non-diversifiable climate change risk.

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## Session II: Microprudential Regulation

### *Inappropriate Asset Allocation Models*

The entrenchment of valuation and pricing models into finance industry norms and regulation can have perverse incentives for of risk. Participants discussed how asset allocation models designed to reduce risk actually exacerbate the systemic risks facing portfolios.

Much of modern asset allocation is based on the presumption of diversifiable risk. Under Modern Portfolio Theory (MPT) investors can maximise their return given a certain risk tolerance by diversifying the riskiness of their assets. Though there are some risks that are systemic and undiversifiable, which could include economy-wide exposure to climate change. The Capital Asset Pricing Model (CAPM) extends from the MPT and allocates assets to efficiently maximise return given a certain risk tolerance, relative to overall market risk. Despite recent challengers to the validity of MPT and the CAPM, they remain dominant in theory and practice.

In practice, the CAPM uses assumptions to simplify the task of allocating assets to minimise risk. First, while the CAPM theoretically minimises risk relative to the global market of assets, this is impracticable. A local market benchmark is used, such as the FTSE 100 or S&P 500, which benchmarks underlying systemic risk to the risk of that local market, rather than true global systemic risk. The assumed mathematical definition of risk in each security is its volatility in price relative to the volatility of the market. If the price of a security increases (decreases) more than the relative increase (decrease) in the market, it is more volatile and more risky. Finally, this risk is assumed to be normally distributed, when in reality many risk profiles follow a fat-tail probability distribution, with a strong central mean but more probable extremes.

Assets allocations are adjusted continuously to minimise volatility for a certain return. Every three to five years asset managers conduct a review which reallocates assets based on a more strategic view of risk, e.g. in regions, industries, and asset classes. Participants suggested that the focus on volatility management rather than strategic allocation reduces the productivity of management efforts, lowering total returns. Three to five years is a sufficiently long time frame that managers would do well to inverse the 80/20% focus on volatility relative to strategic asset allocation.

Additional complications arise in the management of fund accounts as if they are identical in needs, static in time, and that upside risk is equivalent to downside risk. Different strategies are required whether the account owner is seeking to accumulate or de-accumulate assets. The investment process should therefore be an optimisation over time rather than in a single snapshot, and upside risk cannot be treated the same as downside risk.

Participants also questioned the prevailing wisdom that risk (i.e. volatility) must be proportional to return. Evidence was presented that in fact a countervailing strategy of choosing low-volatility securities can produce higher returns in the medium- to long-term. More generally, participants discussed how market theories like the MPT and CAPM are objectively demonstrated only in a pure, efficient, and entirely theoretical market. All markets have some degree of externality and inefficiency.

The danger of these underlying assumptions and models, is that if they become industry norms or regulations, the systematic risk inherent in the assumptions used to design the models becomes entrenched across the industry. Further, decision making of actors in the market becomes procyclical – all the actors respond identically to the same observed information, exacerbating instability.

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## *Lessons from the Insurance Industry*

Participants discussed regulation in the insurance industry as an example of how wider regulation might be enacted in the finance industry.

The global reinsurance industry was facing a state of ruin in the aftermath of Hurricane Andrew in 1992. Following a period of upheaval, the industry underwent a revolution in scientific thinking, capital allocation, and policy deployment to fundamentally change the industry's approach to risk. The reinsurance industry was successfully resilient to hurricane seasons in 2005, with US\$70bn losses, and again in 2011, with US\$121bn losses.

Fundamental to the design of the new reinsurance industry was to ask the right question for policy development. The simple question asked was 'what should be the tolerance level of an insurance contract?'. The industry decided on a tolerance level of 1-in-100 year exposure, with 1-in-200 year resilience. By examining exposure on a 100-year time scale, the industry must be horizon-scanning for new risks likely to develop over the next 100 years. On those risks identified, the industry must be resilient to a 1-in-200 year event. These time frames act respectively as a radar screen and time machine for the industry, trading extremes in impact for time, allowing the insurance industry to capture exposure to risks which occur on timescales beyond the regular business and political planning cycles.

This treatment of risk in the insurance industry required a revolution in the industry's treatment of science and data. New risk models were developed, based on science, and insurance providers began to collect and demand new data to improve model forecasts. Even where scientific evidence was indeterminate, exposure was included so that the model could accurately reflect the extent of known risks and improved in time.

The insurance industry is exposed both to the direct physical impacts of climate change and transition risks – approximately 40% of the industry's claims are for direct weather-related phenomena (e.g. floods and storms). Climate change has a compounding effect on risk in the insurance industry, both aggravating policy liabilities and claims, but also eroding economic growth which drives asset values.

Participants discussed how the lessons of the insurance industry might be adopted more widely by the financial industry. One critical dimension of this approach to risk is that it is forward-looking. Many regulatory approaches to risk, especially for companies and banks, are backward-looking. Such a suggestion might be for banks and companies to report their risk exposure to 1-in-100 year events, and to maintain resilience to 1-in-10 year average losses.

## *Impact of Transparency*

Many asset allocation and risk-minimisation models are based on the Efficient Market Hypothesis (EMH), that is, that the market correctly prices assets based on the available information. There are three forms of the EMH: the strong form EMH which posits that all publicly and privately held information is immediately reflected in asset prices; the semi-strong form EMH which posits that all publicly held information is immediately reflected in asset prices; and the weak-form EMH which posits that all publicly held information is eventually reflected in asset prices.

The emerging International Financial Reporting Standards will make the reporting of EU companies more transparent and will increase the efficiency of EU capital markets. Increased disclosure allows investors to make better decisions about the riskiness of their assets, allocating capital appropriately and minimising risk.

One of the challenges in the promotion of transparency is the discrepancy between the reporting of financial risks and 'non-financial', e.g. ESG risks. Investors are increasingly aware of the impact of these risks on their company holdings, however the reporting of these risks is inconsistent due to their legacy treatment under the 'non-

financial' misnomer. Relevant and universal ESG indicators must be developed and disclosed so that investors can compare their assets on a like-for-like basis, and identify emerging threats.

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## Session III: Standards, Norms, and Conduct

### *Standards*

Standards are codified rules of conduct which regulators use to enforce behaviour. Regulators use a set toolbox of levers to encourage certain behaviours in financial markets.

Typical standards are those enforcing disclosure of information. A distinction is drawn between data and information. A massive array of data exists; it becomes information when it is presented in a useful way. The regulators are not the organisations who use the disclosed information, therefore careful collaboration between the regulators and the investors using the information is required.

An important distinction is drawn between standards and culture. In many cases, a standard is like a metaphorical cage. Individual organisations can squeeze through the bars and non-compliance is always a temptation. Culture behaves as a metaphorical box. Organisations are entirely constrained by culture and are not tempted to deviate. Standards should aspire to change culture, which is discussed further below.

### *Norms*

Norms are informal and uncodified rules of conduct. In the investment industry they are common practices and 'rules of thumb' which are repeated across the industry, and have a large effect on how the industry conducts its business. Norms are created by culture, confirmation bias, groupthink, and general inertia of professional practice.

Common norms include incentive and remuneration design. These are reinforced by the labour and services markets which quickly transfers the norm through the industry. For company executives, such incentives might include performance bonuses for quarterly results, incentivising short-termism. For asset managers, remuneration might be on the basis of fees and index tracking, disincentivising value-adding stewardship activities.

Norms can be difficult to identify. Social movements such as those protesting apartheid and the tobacco industry disrupted a widely held norm that investors were not responsible for the ethical standing of their holdings – that the moral standing of an investor existed at arm's length from the contents of their portfolio. It is unclear however, whether the norm of ethical responsibility extends yet to climate change and sustainability, but strong pressures like the fossil free divestment movement have raised awareness of the issue.

Norms have the potential to change quickly. The adoption of a new business practice often does not spread according to typical uptake curves, but rather as a 'step change' as the dominant majority accept a change in practice simultaneously. Well-respected industry thought-leaders also have potential to impact norms rapidly by lending their credibility to new ideas. Mark Carney's progressive approach to climate change risk may stimulate a changing norm in attitude to climate change risk across the finance industry.

### *Culture*

Culture is the slow-changing fundamental beliefs and values of finance industry practitioners that affect how they do their jobs and respond to information. Culture in risk taking has been cited as a contributor to the 2008 financial crisis<sup>9</sup>. Similar culture challenges exist in building the credibility of climate change risks in the financial industry.

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<sup>9</sup> Institute of International Finance (2008). Final Report on Market Best Practices for Financial Institutions and Financial Products.

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The finance industry is simultaneously orthodox and radical, but has been reluctant to acknowledge the upside risks of climate change in the transition to a low-carbon economy. Climate change's perceived affiliation with 'the Left' has often led to its dismissal as a non-material concern for finance industry leaders. The finance industry is well-networked and peer-to-peer cultural exchange can be more effective than any external pressure. On climate change, the challenge remains to get finance professionals to internalise their ownership of the problem and to apply their creativity to solving it. There is a key role in story-telling of successful enterprises and individuals who made climate change a core part of their missions and had corresponding success in business or investments.

Professional organisations have a strong role to play in influencing industry culture. Professionals adhere to codes and cultures of practice established by their professional organisations, beyond the culture and influence of their own firms. Being respected, third-party groups, professional organisations can direct the culture of industry practitioners and offer an opportunity for engagement on climate change risks.

More usable information for business and finance leaders will help to change perceptions on the materiality and opportunity of climate change risks. The growth of clean/greentech finance products is helping put the subject into the minds of asset managers. To gain acceptance in mainstream finance culture, story-telling of success must accompany the increased availability of information and finance products.

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# Annex A: Agenda

Friday, 23<sup>rd</sup> October 2015

10:30 – 11:00 **Arrival at The Archive at Windmill Hill, Waddesdon Manor**

11:00 – 11:05 **Welcome and Opening Remarks**

**Professor Gordon L. Clark**, Director, Smith School, University of Oxford

**Ben Caldecott**, Director, Stranded Assets Programme, Smith School, University of Oxford

11:05 – 11:25 **Overview of UNEP Inquiry Conclusions**

**Nick Robins**, Co-Director, UNEP Inquiry into the Design of a Sustainable Financial System

11:25 – 11:45 **Bank of England perspectives on environment-related risk**

**Sandra Batten**, Senior Economist, Structural Economic Analysis Division, Bank of England

**Matthew Scott**, Team Leader, Environmental Risks, Prudential Regulation Authority, Bank of England

11:45 – 13:15 **Session I: Macroprudential Regulation**

Chair: **Professor Cameron Hepburn**, Professor of Environmental Economics, Smith School, University of Oxford

Panelists:

**Christopher Allsopp**, Emeritus Fellow of New College and former Member, Court of Directors and MPC, Bank of England

**Grzegorz Peszko**, Lead Economist, Climate Change Group, World Bank

**Andrew Santance**, Senior Economic Adviser, PwC and former Member, MPC, Bank of England

13:15 – 14:15 **Lunch**

14:15 – 15:45 **Session II: Microprudential Regulation**

Chair: **Professor Gordon L. Clark**, Director, Smith School, University of Oxford

Panelists:

**Alan Brown**, former Chief Investment Officer, Schroders and Chairman, CDP

**Rowan Douglas**, Chairman, Willis Research Network

**Jane Stevensen**, Managing Director, Climate Disclosure Standards Board

**Paul Woolley**, Founder, The Paul Woolley Centre for the Study of Capital Market Dysfunctionality, London School of Economics

15:45 – 16:15 **Tea/Coffee**

16:15 – 17:45 **Session III: Norms, standards, and conduct**

Chair: **Nick Robins**, Co-Director, UNEP Inquiry into the Design of a Sustainable Financial System

Panelists:

**Tim Chandler**, Financial Conduct Authority

**Rt Hon. Lord Deben**, Chairman, Committee on Climate Change

**Nick Silver**, Council, Institute and Faculty of Actuaries



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**Sophia Tickell**, Founding Partner, Meteos

17:45 – 18:15 **Closing Remarks**

**Rupert Thorne**, Deputy Secretary General, Financial Stability Board

**Per Bolund**, Minister for Financial Markets and Consumer Affairs, Deputy Minister for Finance, Government of Sweden

19:20 – 21:45 **Dinner**

**Keynote: Professor Cameron Hepburn**, Professor of Environmental Economics, Smith School, University of Oxford and Director, Economics of Sustainability Programme, Institute for New Economic Thinking, Oxford Martin School

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## Annex B: Attendee List

**Christopher Allsopp**, Emeritus Fellow of New College and former Member, Court of Directors and MPC, Bank of England

**Sandra Batten**, Senior Economist, Structural Economic Analysis Division, Bank of England

**Erik Berglof**, Inaugural Director, Institute of Global Affairs, London School of Economics

**Olle Bilinger**, Political Adviser, Ministry of Finance, Government of Sweden

**Per Bolund**, Minister for Financial Markets and Consumer Affairs, Deputy Minister for Finance, Government of Sweden

**Henrik Braconier**, Chief Economist, Swedish Financial Supervisory Authority

**Christine Brogan**, Deputy Director, The Prince's Accounting for Sustainability Project (A4S)

**Alan Brown**, former Chief Investment Officer, Schrodgers and Chairman, CDP

**Rt Hon. Sir Vincent Cable**, former UK Secretary of State for Business, Innovation and Skills

**Ben Caldecott**, Director, Stranded Assets Programme, Smith School, University of Oxford

**James Cameron**, Chairman, Overseas Development Institute

**Mark Campanale**, Founder and Executive Director, Carbon Tracker Initiative

**Tim Chandler**, Technical Specialist, Financial Conduct Authority

**Gordon L. Clark**, Director, Smith School, University of Oxford

**Nicola Doetzer**, Private Finance Adviser, Department of Energy & Climate Change

**Rowan Douglas**, Chairman, Willis Research Network

**Paul Druckman**, CEO, Integrated Reporting

**Alice Garton**, Company and Financial Project Leader, ClientEarth

**Adrian Gahan**, Managing Director, Sancroft International

**Ernest Gnan**, Secretary General SUERF, The European Money and Finance Forum

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**Connie Hedegaard**, Chair, KR Foundation, and former European Commissioner for Climate Action

**Cameron Hepburn**, Professor of Environmental Economics, Smith School, University of Oxford

**Ingrid Holmes**, Associate Director, E3G

**Abyd Karmali**, Managing Director, Climate Finance, Bank of America Merrill Lynch

**Margaret Koval**, Head of Development for Social Sciences, University of Oxford

**Lucas Kruitwagen**, Research Assistant, Stranded Assets Programme, Smith School, University of Oxford

**Rt Hon. Lord Deben**, Chairman, Committee on Climate Change

**Duncan MacDonald-Korth**, Research Associate, Stranded Assets Programme, Smith School, University of Oxford

**Sini Matikainen**, European Systemic Risk Board Secretariat, European Central Bank

**Grzegorz Peszko**, Lead Economist, Climate Change Group, World Bank

**Nick Robins**, Co-Director, UNEP Inquiry into the Design of a Sustainable Financial System

**Matthew Scott**, Team Leader, Environmental Risks, Prudential Regulation Authority, Bank of England

**Andrew Sentence**, Senior Economic Adviser, PwC and former Member, MPC, Bank of England

**Michael Sheren**, Senior Advisor, Prudential Regulation Authority, Bank of England

**Nick Silver**, Council, Institute and Faculty of Actuaries

**Tim Stumhofer**, Senior Program Associate, Sustainable Finance, ClimateWorks

**Sophia Tickell**, Co-Founder & Partner, Meteos Ltd

**Rupert Thorne**, Deputy Secretary General, Financial Stability Board

**Daniel Tulloch**, Research Associate, Stranded Assets Programme, Smith School, University of Oxford

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**Simon Upton**, Director, Environment Directorate, OECD

**Richard Werner**, Professor and Director, Centre for Banking, Finance & Sustainable Development, University of Southampton Business School

**Peter Wheeler**, Executive Vice-President, The Nature Conservancy

**Helene Winch**, Director, Renewable Energy Sector, Low Carbon Foundation

**Natalie WinterFrost**, Chairman, CFA UK and Client Director, Aberdeen Asset Management

**Paul Woolley**, Founder, The Paul Woolley Centre for the Study of Capital Market Dysfunctionality, London School of Economics

**Baroness Worthington**, Director, Sandbag

**Simon Zadek**, Co-Director, UNEP Inquiry into a Sustainable Financial System

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# STRANDED ASSETS

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