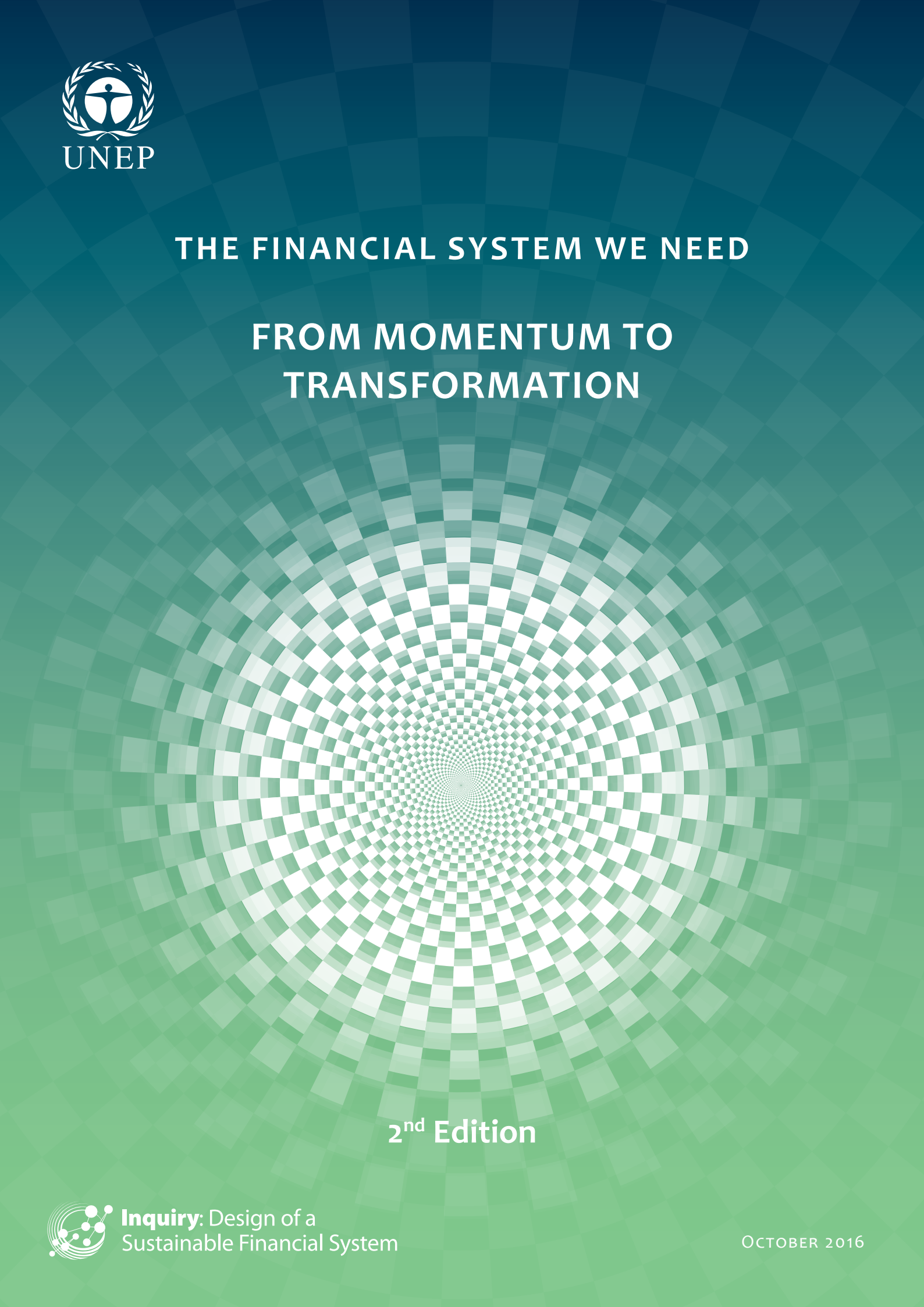
UNEP

THE FINANCIAL SYSTEM WE NEED

FROM MOMENTUM TO TRANSFORMATION



2nd Edition

Inquiry: Design of a Sustainable Financial System

October 2016

The UNEP Inquiry

The Inquiry into the Design of a Sustainable Financial System has been initiated by the United Nations Environment Programme (UNEP) to advance policy options to improve the financial system's effectiveness in mobilizing capital towards a green and inclusive economy—in other words, sustainable development. Established in January 2014, it published the first edition of 'The Financial System We Need' in October 2015. The Inquiry's mandate currently extends to the end of 2017, with work focused on deepening and taking forward its findings.

More information on the Inquiry is available at: *www.unepinquiry.org* and *www.unep.org/inquiry* or from: Ms. Mahenau Agha, Director of Outreach *mahenau.agha@unep.org*.

The Team

Mahenau Agha is the Director of Outreach. ***Nick Robins*** and ***Simon Zadek*** are the Inquiry's co-Directors, and the lead authors of this report.

The Inquiry team includes Saaya Dirlewanger, Maya Forstater, Mark Halle, Iain Henderson, Marc Lopatin, Olivier Lavagne d'Ortigue, Jeremy McDaniels, Nana-Ofori Okyere, Felicity Perry, Shereen Wiseman, and Naurin Nuohan Zhang. The broader team include Agnes Atsiaya, Chad Carpenter, Nozipho January-Bardill, Sandra Rojas, Virginia Sonntag-O'Brien and Kelly Yu.

Acknowledgements

The UNEP Inquiry into the Design of a Sustainable Financial System's work has been made possible due to the commitment and involvement of a wide range of people. The level of research, analysis and engagement achieved are the result of the contribution of time and skills from the numerous partners who make up the broader global Inquiry community. The team would like to acknowledge their appreciation to the following:

Marco Albani, Rafael Noel Del Villar Alrich, Inger Andersen, Sami Andoura, Butch Bacani, Ed Baker, Kathy Bardswick, Alexander Barkawi, Christopher Barrett, Lorenzo Bernasconi, Olle Billinger, Kornelis Blok, Jean Boissinot, Henrik Braconier, Tom Brookes, Edgar van de Brug, Mark Burrows, Maurice Button, Francesco La Camera, Juan-Carlos Castilla-Rubio, Lucianna Castilla-Rubio, Sagarika Chaterjee, Jan Cihlar, Leong Sing Chiong, Martin Cihak, Rita Roy Choudhury, Siobhan Cleary, Kajetan Czyz, Emmanuel Dooc, Colin Le Duc, Stan Dupré, Frank Elderson, Nathan Fabian, Ann Florini, Carsten Frank, Sandra Frimann-Clausen, Roger Gifford, Diletta Giuliani, Yannick Glemarec, Jackson Globus, Rhys Gordon-Jones, Norbert Gorissen, Joris de Groot, Danyelle Guyatt, David Harris, Toby Heaps, Hazel Henderson, Unenbat Jigjid, Dave Lauer, Dave Jones, Christopher Kaminker, Saïd El Khadraoui, Sean Kidney, Naina Lal Kidwai, Caio Koch-Weser, Oskar Krabbe, Mike Kreidler, Rachel Kyte, Deborah Lehr, Cheng Lin, Liu Jialong, Christine Low, Nannan Lundin, Ma Jun, Robert Madelin, Aditi Maheshwari, Geoff Margolis, Will Martindale, Davide Del Maso, Rodomarque Meira, Aloisio Lopes Pereira de Melo, Stacy Middleton, Anthony Miller, Irving Mintzer, Shan Mitra, Andrea Moffat, Amina J. Mohammed, Yannick Monschauer, Nuru Mugambi, Sharmala Naidoo, Timothy Nixon, Patrick Njoroge, Bruno Oberle, Habil O. Olaka, Mohammed Omran, Miriam Ott, Fred Packham, Fatma Pandey, Rodrigo Porto, Murilo Portugal, Atiur Rahman, Mia Horn af Rantzien, Aldo Ravazzi, Martijn Regelink, Teresa Ribera, Enrico Dalla Riva, Jessica Robinson, Mattia Romani, Rathin Roy, Neeraj Sahai, Richard Samans, Oyun Sanjaasuren, Holger Schmid, Dirk Schoenmaker, Guido Schotten, Matthew Scott, Beatriz Stuart Secaf, Edi Setijawan, Aarti Shah, Michael Sheren, Peer Stein, Myriam Vander Stichele, Jakob Thomä, Rens van Tilburg, Wallace Turbeville, Barbara Turley-McIntyre, Lily Vadera, Mario Sergio Vasconselos, Annelise Vendramini, Latha Vishwanath, Maarten Vleeschhouwer, Robert Ward, Steve Waygood, Dirk Wagener, Scott Williams, William Young and Rong Zhang.

UN Environment would like to thank the following for their financial support and strategic partnership:

The governments of Germany, Italy, Switzerland and the United Kingdom of Great Britain and Northern Ireland, the European Commission, and the MAVA Foundation and the Rockefeller Foundation.

We would also like to thank the following partners for their generous support including convening, data and assistance with research: BNEF, FTSE Russell, Generation Investment Management LLP, Paulson Institute, Principles for Responsible Investment, Thomson Reuters and UNEP FI.

A particular note of thanks goes to senior members of UN Environment management who provided guidance to the team since the project was launched. Special thanks goes to Erik Solheim, Executive Director, Achim Steiner, former Executive Director, as well as Michele Candotti, Elliott Harris, Tim Kasten, Pushpam Kumar, Ligia Noronha, Theresa Panuccio, Steven Stone, Ibrahim Thiaw, Eric Usher, Brennan van Dyke and Mette Wilkie.

This second edition of 'The Financial System We Need' has been prepared in association with UNEP Finance Initiative.

UNEP

THE FINANCIAL SYSTEM WE NEED

FROM MOMENTUM TO TRANSFORMATION

2nd Edition

October 2016

Inquiry: Design of a Sustainable Financial System

Contents

LIST OF FIGURES

LIST OF BOXES

From **MOMENTUM** *to* **TRANSFORMATION**

KEY MESSAGES: FROM MOMENTUM TO TRANSFORMATION

1

The global financial system needs reshaping to finance an inclusive, prosperous and environmentally sound future, in other words: to achieve sustainable development.

- The Inquiry's 1st edition of "The Financial Sytem We Need" published in 2015 identified:
  - The need for reforms within the financial system that can correct market and policy failures and deliver sufficient financing for sustainable development, while complementing both real economy actions and public finance measures.
  - A 'quiet revolution' in how such actions across the financial system were starting to respond to this challenge, with notable leadership from developing, as well as some developed, nations.

The Inquiry's first generation of findings have been widely welcomed and reaffirmed through subsequent developments.

2

This momentum has dramatically increased over the past year.

- One year on, these efforts have accelerated, through:
  - *Market Leadership:* Leading financial institutions are recognizing that sustainable development is key to their future success, as exemplified by the green bond market, with US$118 billion now outstanding.
  - *National Action:* Financial policymakers and regulators are acting to drive the reallocation of capital, improve risk management and enhance transparency.
  - *International Cooperation:* In 2016, for the first time, the G20 and the Financial Stability Board are exploring how to develop the financial system to take greater account of environmental factors.

3

Policy, market and broader international drivers are underpinning this momentum.

- Adoption of the Sustainable Development Goals and the Paris Agreement on climate change.
- National development priorities, particularly of developing countries.
- Efforts to correct market and policy failures across the financial system.
- Growing technological disruption to the financial system.
- Rising social expectations of financial system performance.
- Green finance becoming a competiveness factor for businesses and financial centres.

4

Today's momentum remains inadequate to deliver the transformation needed to finance sustainable development.

- Natural capital continues to decline precipitously, alongside growing social inequality and unrest.
- Sustainable financial flows and stocks remain marginal to the deployment of capital, worldwide.
- Financial system remains disconnected from the long-term needs of the real economy.
- Financial stability is increasingly threatened by the effects of today's unsustainable economy.

5

Key steps can align the purpose and impact of the financial system to serve the real economy in transition to sustainable development.

1. Anchor sustainability in national strategies for financial reform and development.
2. Channel technological innovation to finance sustainable development.
3. Realize the triple leverage potential of public finance.
4. Raise awareness and build capabilities across the system.
5. Embed sustainability into common methods, tools and standards across the financial system.

THE FINANCIAL SYSTEM WE NEED:
FROM MOMENTUM TO TRANSFORMATION

The 2016 second edition of 'The Financial System We Need' is organized into three physical parts:

1. *Highlights:* stand-alone policy summary of the key messages, arguments, conclusions and recommendations.

2. *Main report: (a) key messages; (b) highlights of the overall report; followed by the (c) main body of the report comprising:*

    - An in-depth review of recent momentum,
    - An exploration of the significance of financial technology, or 'fintech',
    - The first iteration of a proposed performance framework, and
    - Key conclusions and recommendations.

3. *Working papers:* a series of six technical papers covering each topic of the main report, authored by the UNEP Inquiry and partners, will be released separately.

In addition, we recommend that the second edition be read in conjunction with a number of other recently published pieces, including:

- '*Financing Sustainable Development: Moving from Momentum to Transformation in a Time of Turmoil*', released as a UNEP Inquiry Briefing at the time of the UN General Assembly in September 2016.
- '*G20 Green Finance Synthesis Report*', the first report of the G20 Green Finance Study Group, released on the occasion of the G20 Summit in Hangzhou, China in September 2016, and a set of 14 associated technical papers prepared as inputs to the work of the Study Group made available at the same time.

Finally, many of the 80 working papers published by the UNEP Inquiry since 2014 have been referenced in this second edition of our global report, all of which are freely available online.

Reports and papers can all be accessed at: *www.unepinquiry.org*.

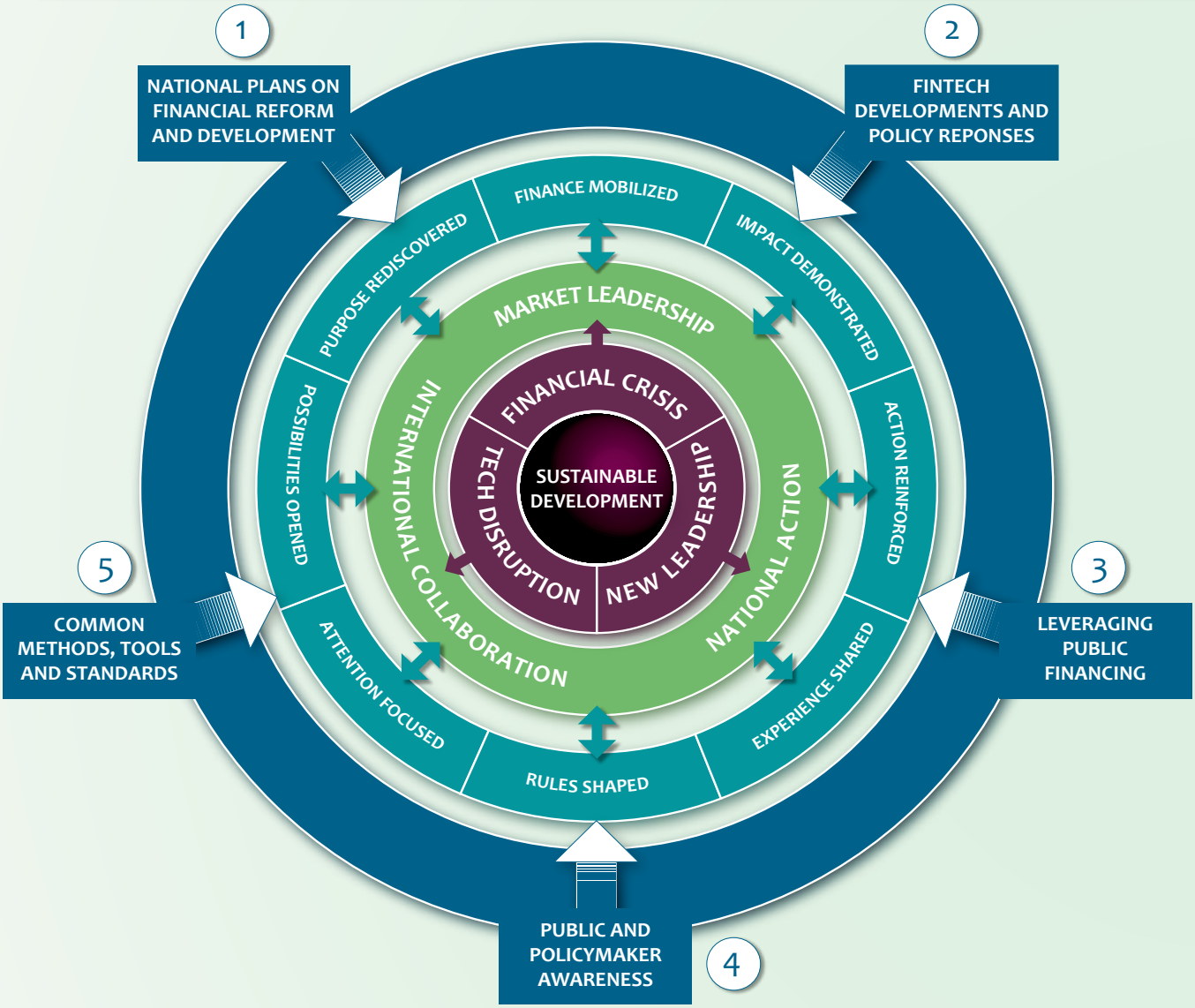
MOMENTUM

Efforts are accelerating to align the financial system with sustainable development.

MARKET LEADERSHIP: Financial institutions and markets are developing innovations such as green bonds, green ratings and stress tests.

NATIONAL ACTION: Policymakers and regulators are introducing measures to promote capital reallocation, improve risk management, enhance reporting and clarify responsibilities of financial institutions.

INTERNATIONAL COOPERATION: Engagement by the G20 and by the Financial Stability Board (FSB) is increasing.



DRIVERS

The global financial system is in turmoil and needs reshaping to finance an inclusive, prosperous and environmentally sound future.

SUSTAINABLE DEVELOPMENT: Trillions of dollars need to be mobilized to meet global goals such as the SDGs and the Paris Agreement.

FINANCIAL CRISIS: Policy action is focused on improving the efficiency, effectiveness and resilience of the financial system.

TECHNOLOGY DISRUPTION: Rapid developments in financial technology are disrupting incumbent models and creating new possibilities.

NEW LEADERSHIP: New sources of influence are becoming important, reflecting the green industrialization and urbanization challenge for developing and emerging economies.

From **MOMENTUM** *to* **TRANSFORMATION**

SYSTEM DYNAMICS

System dynamics are enhancing progress, but momentum remains inadequate to deliver the transformation needed.

IMPACTS DEMONSTRATED: Early evidence of impact strengthens case for action.

PURPOSE REDISCOVERED: Financial rule-makers are reinterpreting their mandates to take account of sustainable development.

ACTION REINFORCED: Market leadership and policy co-evolve.

EXPERIENCE SHARED: National leadership drives international cooperation.

MARKETS SHAPED: Public finance develops new financial products and shapes rules for them to grow.

POSSIBILITIES OPENED: Technological change will reshape the financial system.

ATTENTION FOCUSED: Public expectations of financial system's role in sustainable development are growing.

ALIGNMENT OF THE FINANCIAL SYSTEM

FINANCE MOBILIZED FOR SUSTAINABLE DEVELOPMENT

STEPS FOR TRANSFORMATION

Five areas where key steps can accelerate and deepen shifts in the system.

1. **NATIONAL STRATEGIES:** Embed sustainability into long-term road maps for financial reform.
2. **TECHNOLOGICAL INNOVATION:** Channel fintech developments to ensure that they align finance with sustainable development.
3. **PUBLIC FINANCE:** Leverage public finance not only for direct impacts but to pioneer new markets, rules and practices.
4. **RAISE AWARENESS:** Ensure that policymakers and professionals are fully aware of the imperatives and risks, and raise the quality of public debate.
5. **COMMON METHODS, TOOLS AND STANDARDS:** Develop common approaches to integrating sustainability into definitions, tools and standards.

FROM MOMENTUM TO TRANSFORMATION – Highlights

REVISITING THE QUIET REVOLUTION

A 'quiet revolution' is under way in how the financial system is becoming aligned to sustainable development. This was the key finding of the first, two-year phase of the UNEP Inquiry. The Inquiry set out to identify policy and market actions that could be taken *within* the financial system to complement reforms in the real economy and public finance. Launched at the IMF/World Bank Annual Meetings in Lima, Peru in October 2015, the first edition of the Inquiry's global report, *"The Financial System We Need"*,[1] focused particularly on country leadership in innovating the rules governing the financial system, highlighting that:

- ***Increasing efforts are being made to integrate aspects of sustainable development into financial system reform, development and practice,*** in nations as diverse as China and the UK, Bangladesh and France, and Brazil and Kenya, with notable policy and regulatory leadership coming from some developing, as well as developed countries.
- ***Experience points to an emerging toolbox of measures that can support capital reallocation, better risk pricing and market governance, and practices aligned to sustainable development,*** across a range of priorities from air pollution, clean energy and climate change to financial inclusion, rural development and water.
- ***There is potential to scale and systematize these early innovations, both nationally and internationally,*** to effect a major redeployment of capital to finance sustainable development.

BOX 1: UNEP INQUIRY KNOWLEDGE BASE

Results were underpinned by over 80 published reports and technical papers, prepared together with more than 60 collaborating institutions including banking associations, research institutions, central banks and financial regulators, finance ministries, civil society and international organizations.

Experience was drawn from 15 diverse country-level contexts and engagements,[2] and included policy and technical reviews across banking, bond markets, insurance, institutional investment and stock exchanges, with focused assessments in areas as diverse as human rights, social banking, fiduciary duty and the changing roles of central banks.

In the first edition of Inquiry's global report, an initial set of over 100 innovative measures were mapped, led by central banks, financial regulators, policymakers and standard-setters, stock exchanges and rating agencies.[3]

The Inquiry's knowledge base can be accessed at *www.unepinquiry.org.*

The Inquiry's findings came at an historic moment rich in potential for major change, underpinned by three interlocking developments:

- ***The landmark adoption of the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change,*** both of which recognized that financing was essential for realizing their goals and remained – on current trends – inadequate.[4]

- ***Policy action following the financial crisis of 2008,*** which sought to improve the efficiency, effectiveness and resilience of the financial system in serving the long-term needs of the global economy.

- ***Rapid evolution of the financial system itself,*** resulting from the combined effects of post-crisis macroeconomic environment and reforms, the increasing influence of emerging and developing countries, new social expectations and the disruptive forces of technology across the financial system.

The Inquiry highlighted ***steps that could be taken to encourage and systematize this growing practice***, noting that action within the financial system could most effectively be built: (a) through collaboration efforts between private and public sectors; (b) involving action at both the national and international levels; and (c) complementing classic sustainable development policies, such as public financing and policies directly impacting the real economy. Key options for making this happen included:

- ***National action:*** national compacts and action plans to build sustainable financial systems provide a foundation for making strategic progress. Such roadmaps would most effectively be designed and overseen by coalitions of key institutions, and driven by national circumstances and priorities, including a diagnostic of practice and needs, an assessment of opportunities, a pathway for action and implementation with strong feedback mechanisms to enable learning and improvement.

- ***International cooperation:*** ten priorities for international cooperation were identified, including: developing principles for a sustainable financial system; reaching convergence on disclosure standards; developing sustainability stress testing methods; optimizing fiscal measures in the financial system; incorporating environmental risks in global banking standards; developing a code on investor duties; establishing a green capital markets coalition; introducing guidance for insurance regulators; and, developing a performance framework for a sustainable financial system.

The UNEP Inquiry's first generation of findings have been widely welcomed and reaffirmed through subsequent developments, with many of the proposed next steps reflected in work-in-progress at both multinational and international levels.[5,6]

"India has a huge opportunity to discuss the policy intervention required to drive the flow of sustainable financing and to align the financial system towards a sustainable development agenda. Several goalposts including creating awareness of the financial sector, developing common definitions of green finance indicators, developing green products, measuring progress and framework for assessing financial risks are critical for achieving this."[7]

R. Gandhi, Deputy Governor, Reserve Bank of India

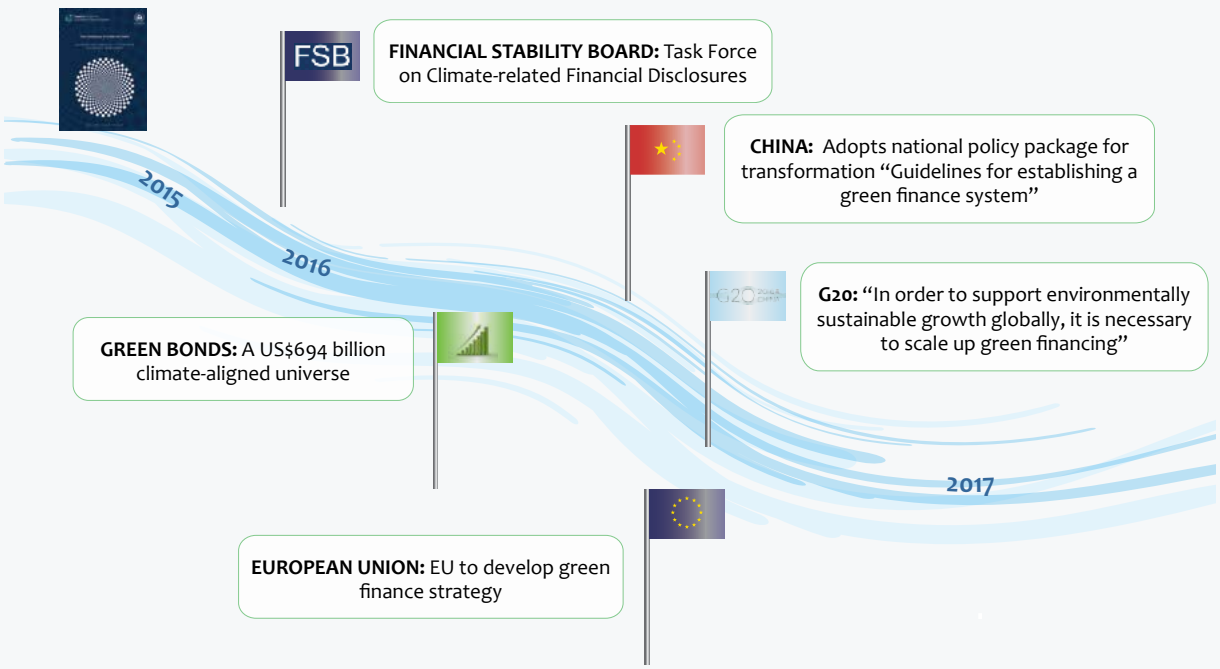
THE GROWING MOMENTUM

The last year has seen an acceleration in the quiet revolution's momentum across the financial system. Historic circumstances, innovation and leadership have combined to incorporate aspects of sustainable development into financial system design and practice. Progress is being made in different places, at multiple levels and involving diverse actors across three, inter-locking pathways of change: market leadership; national action; and international cooperation.

"Meeting the Paris Agreement's goals will require the full mobilization of all stakeholders, including financial sector actors. I fully support efforts to make financial flows consistent with the needed limitation of greenhouse emissions and the financing of climate resilient development."[8]

Michel Sapin, Finance Minister, France

FIGURE 1: HOW THE 'QUIET REVOLUTION' GOT LOUDER



As this momentum has developed, so new dimensions have emerged:

- ***Public debate has advanced.*** Central bank governors, finance ministers and regulators, and finance sector executives are increasingly being asked to explain their contribution to advancing sustainable development. Public interest institutions are playing an increasingly important role in shaping public debate, for example about the risks of 'stranded assets'.[9] Citizens are taking up the opportunities to redeploy their own capital aligned to their values and longer-term interests.
- ***Sustainability is becoming a factor in the competitive development of the world's financial centres,*** with global and regional centres including Hong Kong,[10] Nairobi,[11] London,[12] Paris[13] and Switzerland[14] exploring how best to develop rules, fiscal measures and market leadership to take advantage of new opportunities.
- ***Collaborative networks are multiplying and deepening,*** with a growing trend evident across various jurisdictions to create and institutionalize partnerships, associations and fora for the sharing of best practices, information and experiences.[15] The Inquiry is involved in several of these new initiatives, including the Sustainable Insurance Forum,[16] made up of insurance supervisors and associated with the private sector-focused Principles for Sustainable Insurance,[17] and the Green Infrastructure Investment Coalition.[18]

"Green finance is burgeoning, it has reached a point of spontaneous combustion. But it needs to be aligned. It needs to go beyond the leadership of a few champions."[19]

Nuru Mugambi, Director of Communications and Public Affairs, Kenya Bankers Association

BOX 2: Towards a Sustainable Financial System – Pathways of Change

- **Market Leadership:** financial institutions and markets are responding to client demand, policy signals, environmental stress, and technology developments with a suite of innovations:
  - *Green bonds:* in many ways the 'indicator species' for new ways of raising sustainable finance, green bonds continued to expand and evolve, with China taking a leading role, along with a rise in issuance from US municipalities.[20]
  - *Stock exchanges:* in the past year, 23 new exchanges committed to improve the disclosure of sustainability factors on their markets, from Amman, Casablanca and Dubai to Mexico, Luxembourg and Oslo.[21]
  - *Rating agencies*: six of the world's leading credit rating agencies – S&P Global Ratings, Moody's, Dagong, Scope, RAM Ratings and Liberum – made a public commitment to collaborative action on sustainability in an initiative with institutional investors.[22]
  - *Environmental risk assessment:* experimentation has evolved quickly, with China's ICBC, the world's largest bank, publishing the first 'new generation' environmental stress test, focused on the implications for its loan book of chronic air pollution, as part of China's green finance efforts.[23]
- **National Action:** policymakers and regulators at the national and sub-national levels are taking steps to support and often stimulate this process, introducing measures to promote capital reallocation, improve risk management, enhance reporting, as well as clarify the responsibilities of financial institutions. Our survey of measures identified 217 measures taken in nearly 60 countries by mid-2016, with emerging and developing countries increasing their share from 29% of the total in 2010 to 38% by the end of 2015. Over the past year, notable developments include:
  - *China* has introduced a comprehensive set of guidelines to establish a green financial system, including for banking, capital markets, insurance, local finance and international cooperation.[24]
  - *California* has required insurance companies to report on holdings in high-risk carbon assets.[25]
  - *France's* implementation of new reporting requirements for corporate, as well as more specific reporting from institutional investors, and ongoing work on the assessment of climate-related risks in the banking sector are a key part of its low-carbon transition strategy.[26]
  - *India's* securities regulator has introduced green bond requirements to boost financing, particularly for renewable energy.[27]
  - *Italy* has launched a national dialogue on sustainable finance, exploring options across banking, capital markets, investment and insurance.[28]
  - *Kenya* is building on its global leadership in promoting financial inclusion by developing a plan to mobilize green finance and position itself as a regional hub.[29]
  - *Morocco* is developing green finance roadmaps for banking, capital markets and insurance.
  - *The Netherlands* central bank has assessed the implications of climate change for its financial system.[30]
  - *The Philippines* has developed a public-private disaster insurance pool that will make disaster insurance compulsory for homeowners and SMEs.[31]
  - *The UK* has advanced work on the prudential implications of climate change for the insurance sector.[32]
- **International Cooperation:** most significant in the last year has been the step change in international cooperation around finance and sustainable development. Concerns which are of particular importance to developing countries have continued to grow in visibility, including financial inclusion, foreign direct investment, and the potential for quantum advances to be made through the adoption of financial technology.[33]
  - *G20 and green finance*: China, as part of its G20 Presidency, launched the Green Finance Study Group, co-chaired by the People's Bank of China and the Bank of England, with UN Environment as the secretariat.[34]
  - *Financial Stability Board (FSB) and climate change*: the FSB launched its Task Force on Climate-related Financial Disclosures in December 2015 in response to a G20 request.[35]

Public finance is increasingly understood as having a diverse range of impacts on the deployment of private capital for sustainable development. The Inquiry's primary focus has been on measures to harness private capital within the financial system. But our experience at the country level has shown that it is hard to separate the strategic role of public finance as a lever of change. The use of public finance to 'crowd-in' private finance is now widely accepted as an effective approach to finance some public services and infrastructure. At a time of increased fiscal stringency, it also makes sense to review that the incentives and subsidies flowing through the financial system – for example, tax relief on debt, savings and pensions – are aligned with sustainable development.[36] Public financial institutions can and do support the creation of new markets within the financial system, with the emergence of green bonds being the leading example, pump-primed by development banks (closely followed by sub-sovereigns) issuance. Sustainable development-related criteria could also be applied to the public procurement of financial services or to central bank asset purchase programmes (including so-called 'quantitative easing'). Public financial institutions can also pioneer new sustainability rules and practices, which can then be adopted by the private financial sector.

"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10. Don't let yourself be lulled into inaction."[37]

Bill Gates, Co-Chairman of the Bill and Melinda Gates Foundation

The global financial system is in constant flux, disrupted in part by its changing technological characteristics. Advancing sustainable financing can and should seek to leverage ongoing disruptions to the financial system and the real economy. Financial technology, or 'fintech', is a case in point.[38] Fintech is allowing savers and investors to make more refined choices as to how to allocate their funds, thereby widening opportunities for the incorporation of sustainability factors. Peer-to-peer lending and crowd-sourcing are already opening new funding avenues for employment-generating small and medium-sized enterprises (SMEs). In addition, they increase the prospects for larger-scale financing for sustainable investments to be mobilized directly from domestic savers in developing countries, with major potential cost reductions.

"There is an opportunity for the G20 to create practical green financing models for the developed and the developing world. The good news is there is an abundance of capital globally, but governments need to create the proper conditions to attract this capital. They have an important role to play in setting the policies, regulations, incentives, and in ensuring that they are enforced - (...) Global capital markets are powerful forces. Directed properly, they can alleviate the burden on governments and unlock a sustainable economic future."[39]

Henry (Hank) M. Paulson, Jr., Chair, Paulson Institute

Measuring the performance of the financial system in terms of sustainable development is also becoming a driver of change. Increasingly policymakers, financial institutions and citizens are seeking to assess the contribution of the financial system to sustainable development. To do this, three core performance characteristics need to be evaluated:

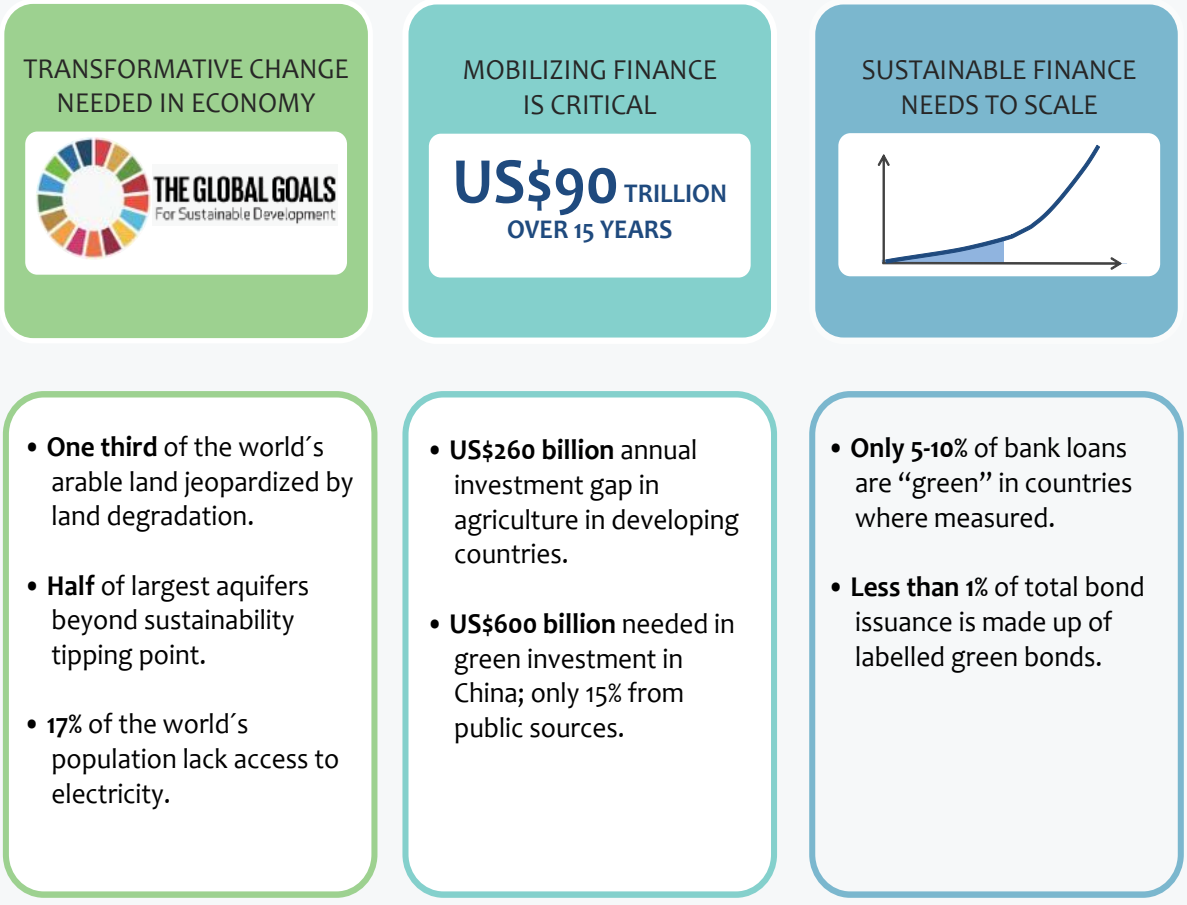
- **Effectiveness** – the degree to which the market prices sustainability factors into financial asset values (sometimes called 'allocative efficiency').
- **Efficiency** – the costs of running the financial system that delivers financial flows aligned with sustainable development.
- **Resilience** – the susceptibility of the financial system to disruptions related to unsustainable development, such as water scarcity, air pollution or climate change, including transition risks.[40]

Our initial work in developing such a framework has drawn on current financial system performance measurement, and has focused on the architecture of rules, the practice of market behaviour, as well as the quantitative stocks and flows of finance towards sustainable assets – and away from assets that degrade natural capital. This has been applied to 20 developing, emerging and developed countries – with key insights emerging on overall system governance, stock exchanges and debt capital markets. Major data gaps remain, which prevent comparative analysis from acting as a driver of improvement.

MOMENTUM IS NOT ENOUGH

Achieving the 2030 Agenda for Sustainable Development and the Paris Agreement requires an unprecedented mobilization of both public and private finance, some US$90 trillion over the next 15 years.[41,42,43] Progress has been made in mobilizing both public and private finance aligned to sustainable development. Current levels of financing for sustainable development, however, remain wholly inadequate. UNCTAD estimates that there are major financing shortfalls across most efforts to address the Sustainable Development Goals, as much as US$2.5 trillion annually for developing countries.[44] The celebration of recent successes should not cloud the fact that we are not yet close to the goal contained within the Paris Agreement of "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".[45] The next five years are crucial to get this capital reallocation under way.

FIGURE 2: THE CHALLENGE IS SCALE AND SPEED



Current efforts to align the financial system with sustainable development are exemplary – but still a work-in-progress. Many innovations are by definition new – and rapid growth is starting from a low base. Most have yet to be fully implemented or institutionalized, and little is known as to which innovations, often in combination, are most effective. With reference to the environment, only 5-10% of bank loans are 'green' as reported in the few countries where any measures are available.[46] Despite the rapid expansion in the green bond market, much less than 1% of total bond issuance is made up of labelled green bonds.[47]

Structural constraints continue to hold back market leadership, including pervasive negative externalities, information asymmetries, misaligned incentives and

Box 3: The Urgent Need to Accelerate Action

- Natural capital has declined in 116 out of 140 countries.[48]
- 6.5 million premature deaths result every year from air pollution linked to the energy system.[49]
- Greenhouse gas emissions add energy to the Earth's system at a rate equivalent to the detonation of four nuclear bombs every second.[50]
- 2015 surpassed 2014 as the hottest year on record due to the combined influence of long-term global warming and an exceptionally strong El Niño event.[51]
- An average of 26.4 million people have been displaced from their homes by natural disasters every year since 2008 – equivalent to one person every second.[52]
- One-third of the world's arable land is jeopardized by land degradation, triggering economic losses of US$6.3 to US$10.6 trillion per year.[53]
- 21 of the world's 37 largest aquifers have passed their sustainability tipping point.[54]

short-termism.[55] Only a minority of countries have taken any action so far to introduce measures to align their financial systems with aspects of sustainable development. None to date have put in place a fully comprehensive approach, and even the most evolved plans, such as in China, are only in their early stages of implementation.

A failure to scale up the current momentum allows for continued investments in an unsustainable development pathway, with associated negative and often irreversible effects such as accelerated climate change. Furthermore, it allows the build-up of systemic risks to financial markets through the perpetuation of mispricing. Finally, it delays the reallocation of finance needed to stimulate the next generation of economic output and incomes in countries across the world.[56]

Despite the positive momentum, we risk slipping backwards if the bulk of financing continues to flow towards unsustainable production and consumption patterns. Without a more rapid, scaled redeployment of financing, we will lock in development trajectories that hinder the realization of the global goals and take us beyond the tipping points for life-supporting climate and wider ecosystems.

"Leadership must come from the private sector, business community and NGOs, not only from the officials. We need a comprehensive and coherent framework supported by political will that enables market forces to move businesses from the traditional to the green economy."[57]

Mohammed Omran, Chair, Egyptian Stock Exchange (EGX)

RENEWING THE PURPOSE OF THE FINANCE SYSTEM

Moving from today's momentum to tomorrow's transformation is not just about doing more of the same. Finance is not consumed for its own sake but exists to serve other purposes. The core purpose of the financial system has always been to serve the real economy – providing a range of core services for households, enterprises and public authorities. Now, the transition to sustainable development is reframing this historic relationship, setting in motion a powerful new dynamic between the real economy and the financial system, focused on delivering inclusive prosperity, poverty elimination and respect for planetary boundaries. Looking across the range of policy and regulatory measures that are driving this dynamic, five priority areas stand out: capital reallocation; risk management; the responsibilities of financial institutions; reporting and disclosure; and national roadmaps for sustainable finance (the '5R's).

Focusing on purpose drives a re-evaluation of the system itself. Progressing to a clean energy future is not, for example, simply a matter of more wind turbines and solar panels, although further technological innovation and large-scale deployment will certainly be needed. A clean energy future will require new market actors, new kinds of market relationships matching supply and demand, different ownership configurations for key parts of the energy system, and a radical overhaul of energy governance at every level.[58]

Similarly for finance, Zhou Xiaochuan, Governor of the People's Bank of China, explains that, "in China, establishing a green finance system has become a national strategy", exactly because of the need to finance pro-

found changes in China's economy over the coming decades.[59] Likewise, Mark Carney, Governor of the Bank of England, has argued that, "achieving the SDGs will require mainstream finance. We need to build a new system – one that delivers sustainable investment flows, based on both resilient market-based, and robust bank-based, finance."[60]

BUILDING ON THE UNDERLYING DYNAMICS OF CHANGE

Shifting from incremental change to transformation can be understood to occur in three stages.[61] First-order changes are 'paradigm maintaining', in that they adjust policy without challenging the existing, underlying assumptions about the way things are. Second-order changes are more significant, where the instrument of a policy is adjusted, but not the overarching policy. Third-order change sees the emergence of new norms, orthodoxies and worldviews.[62]

Moving from lower to higher orders of change often happens through the convergence of seemingly marginal and incremental mainstream developments. Green bonds, for example, reflect the extended application of existing market architecture, but have placed the broader aim of 'greening the bond market' firmly on the agenda, engaging credit rating agencies and regulators. One of the unintended consequences of unconventional monetary policy and the resulting low-interest rates has been a search for yield by institutional investors, which is drawing their attention to green assets. Mainstream investors, insurers and banks embracing 'responsible', 'sustainable' or 'low-carbon' financing are converging in their use of metrics with players previously on the margins such as impact investors[63,64] and social banking pioneers.[65] Broadened interpretations of pension funds' fiduciary responsibilities[66] are looking increasingly like more avant-garde innovations in corporate governance such as the 'B Corporation' legal forms.[67] Innovators within central banks, in highlighting the complex dynamic between climate change and financial stability, are both deepening conventional practice and signalling the need for an alignment of their mandates with longer-term policy goals.[68]

Such dynamics can be particularly powerful in developing countries where financial systems, governance and economies are in such rapid change. Some developing countries have demonstrated international leadership in aligning financial systems with sustainable development. While the degree of visible urgency partly explains this, there are other, underlying reasons that set conditions for more rapid change. Less developed financial systems can allow for more rapid, and at times innovative, changes. Fintech may well enable developing countries to leapfrog some of the traditional steps in developing capital markets, as they have already demonstrated in the pace of adoption of mobile payment systems. The separation of policy and financial system regulatory aims and processes is less accepted and institutionalized in most developing countries, allowing for more integrated planning and action.

STEPS TOWARDS TRANSFORMATION

A new sense of how financial systems are evolving towards sustainability is now emerging. There is a growing interest in the strategic renewal of the underlying purpose of the financial system, re-framing its core role in serving the long-term needs of the real economy – one that must be inclusive and environmentally sustainable. Such interest is far from theoretical. On the contrary, it reflects the combination of perceived need, disappointment and experimentation that has driven today's momentum. This momentum has created a vibrant dynamic that is extending across the financial system as a whole, summarized as having seven dimensions:

1. ***Shifting the financial system can deliver sustainable development outcomes:*** early evidence shows that financial system reform can support sustainable development in the real economy.
2. ***Aligning institutional purpose and mandate:*** financial rule-makers such as central banks and regulators are reinterpreting their mandates to take account of sustainable development.
3. ***Co-evolution of market leadership and policy alongside regulatory innovations:*** market innovation and policy, and regulatory actions emerge not as substitutes, but rather can co-evolve into a mutually reinforcing relationship.
4. ***National leadership drives international cooperation:*** national leadership at this stage is proving to be a powerful driver of – and is arguably a precondition for – action at the international level.
5. ***Public finance and market design:*** direct public financing plays a critical role in delivering sustainable development, as well as in market creation (such as green bonds) and rule-making.

6 ***Technological innovation and sustainable finance:*** the links between fintech and sustainable development highlight the powerful technological forces that will reshape the financial system.

7 ***System performance and public expectations:*** there are growing public expectations that the financial system could play a more constructive role in delivering on sustainable development.

Such emergent dynamics need to be amplified and focused into a transformational force. That more needs to be done is not a matter of optimism or pessimism. It is simply a recognition that there are no guarantees that today's momentum will turn into tomorrow's transformation. In considering the drivers, the nature of the momentum and the system dynamics, the Inquiry would like to highlight five related activity areas that, if effectively taken over the period to 2020, could deliver the needed transformation:

1 ***Anchor sustainability in national strategies for financial reform and development:*** action to develop sustainable financial systems is more coherent and effective where there is a comprehensive, long-term plan or roadmap. Each country is different – and already there is a diversity of approaches, with a mix of policy-led, market-led and public-private initiatives under way.

2 ***Channel technological innovation to finance sustainable development:*** technological opportunities, particularly fintech, need to be leveraged to ensure that they serve to align finance with sustainable development.

3 ***Realize the triple leverage potential of public finance:*** public finance must play a three-fold role in mobilizing private capital for sustainable development – providing financial support through funding and incentives, helping to creating new sustainable finance markets and pioneering new sustainability rules and practices.

4 ***Raise awareness and build capabilities across the system:*** enabling the financial community to effectively implement plans, including taking advantage of new opportunities, ensuring that policymakers and regulators are fully aware of the imperatives and risks, and raising the quality of public debate by ensuring it is better informed and activated as an enabler of change.

5 ***Embed sustainability into common methods, tools and standards:*** a striking evolution in awareness over the past year is the realization by a growing number of standard-setting and oversight bodies of the relevance of key aspects of sustainable development to their core business. There is now an opportunity to realize the latent synergies that exist in evolving a more systematic approach, notably in the development of common approaches to definitions, tools and standards to remove barriers to the expansion of sustainable financial practice.

"I believe that the financial sector as a whole has a generational opportunity to build sustainable capital markets."[69]

Mark Wilson, CEO, Aviva

A MATTER OF CHOICE

Aligning the financial system with sustainable development is ultimately a choice. Progress is being made within existing regulatory mandates by exposing and more effectively managing risk at the project and enterprise level and for the financial system as a whole. Certainly such progress can be extended by applying a 'risk lens' over longer-term horizons and taking account of an ever-broader set of drivers.

Beyond this, however, alignment is a policy decision. In fact, such choices have already been made in broad policy terms. The Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction and the Paris Agreement reaffirm the centrality of sustainable development in underpinning viable and inclusive economic strategies and practices. These policy decisions could now be translated into the mandates of relevant governing institutions within the financial system. This includes those responsible for stewarding the development of the financial system, whose primary task is to maintain orderly and stable – but also vibrant and effective – financial and capital markets. Combined with smart public financing, financial market leadership, and active public debate, the opportunity now exists to drive forward transformational financing for sustainable development.

MAPPING THE MOMENTUM: **KEY MESSAGES**

- *Over the past year, momentum towards a sustainable financial system has deepened, with a specific focus on green finance and climate risk.*

- *Clear pathways are bringing together three critical elements: market leadership by financial institutions; policy and regulatory innovation; and, over time, changes in governance, standards and norms. The precise blend and sequencing of these factors differs according to the issue at hand and country-level financial cultures.*

    - *Market leadership: individual and collective action has accelerated markedly in response to new market opportunities (such as green bonds), growing recognition of material risks and appreciation of rising social expectations.*

    - *Policy and regulatory measures: 2015 was a record year in terms of announcements of new measures taken by financial system policymakers to advance sustainable development, with the pace continuing strongly in the first half of 2016.*

    - *International standards: requiring longer time periods to develop, agree and implement, we see the first signs of how the environmental pillar of sustainable development can be addressed within core international financial standards, identifying a set of latent synergies.*

- *The result of these actions is the beginning of a new powerful dynamic between the financial system, the real economy and progress towards sustainable development:*

    - *first, sustainability challenges in the real economy are driving new demands on the financial system;*

    - *second, actions in the financial system are in turn shaping environmental and social outcomes back in the real economy.*

- *Looking across the range of policy and regulatory measures under way that are driving this dynamic, five priority areas stand out: capital reallocation; risk management; the responsibilities of financial institutions; reporting and disclosure; and national roadmaps for sustainable finance (the '5R's).*

- *Added to this, the role of public financial institutions in both market creation and setting market norms is becoming clearer. The linkages between monetary policy and environmental outcomes are also increasingly a focus of attention.*

1. MAPPING THE MOMENTUM

1.1. 2016 – THE YEAR OF GREEN FINANCE

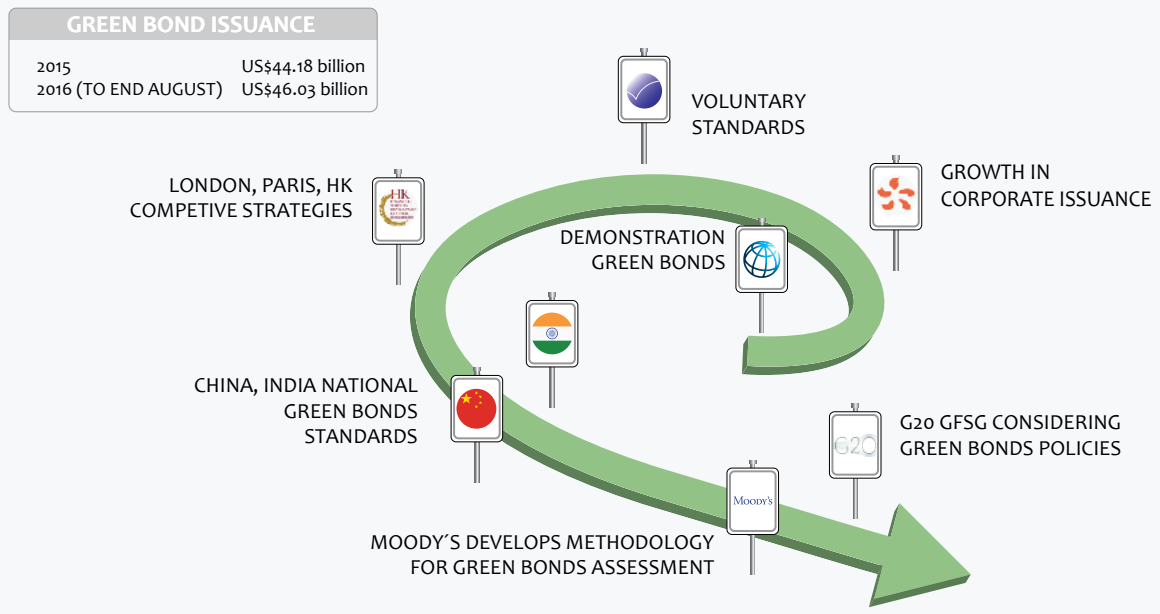
Efforts to build a sustainable financial system have shifted to a new stage over the past year. What were once considered 'niche' applications are now becoming recognized as important – not just for the delivery of sustainable development, but also for the overall health of the financial system. In addition, market practice, policy and regulatory initiatives and public expectations are starting to combine at the national and international levels.

This section highlights some of the key developments over the past year, focusing not only on the 'what', but also on 'how' these actions are blending together to achieve better alignment between the financial system and sustainable development.

One expression of this dynamic is the increasing significance of green finance – robust financial practices that support the regeneration of the environment. Green bonds show how issuers in the real economy, financial institutions, policymakers and standard setters can create new markets (see Figure 3). Green bonds, taken alone, are a means of raising capital by quite conventional methods to use for financing or refinancing green projects, from railways to clean energy, and from green buildings to land remediation.

Yet, green bonds are also part of a broader ecology of change. For example, leading financial centres such as London,[70] Paris[71] and Hong Kong,[72] incentivized by the

FIGURE 3: GREEN BONDS: CO-EVOLUTION OF MARKETS AND POLICY



immediate prospect of capturing a slice of the rapidly growing green bond market, have launched strategic initiatives to become hubs for the growing green finance market as part of their wider plans for growth and competitiveness. Announcing its recommendations in May 2016, Hong Kong's Financial Services Development Council stated, "*if it does not seize this opportunity, others will do so.*" Financial policymakers and regulators have also explored their role in terms of introducing market guidelines, standards and incentives needed to secure a piece of the green bond market. Furthermore, green bonds were one of the topics discussed under China's presidency of the G20 in the Green Finance Study Group (see Box 4).[73]

The current surge of activity builds on many preceding initiatives and market activities. Ethical and social investing goes back many decades. Such innovations set the scene for multiple developments along seemingly unrelated pathways. Ethical screening inspired the Equator Principles, the voluntary guidelines for environmental and social risk analysis in project finance. These in turn triggered leadership in banking regulatory action at the national level, exemplified by the China Banking Regulatory Commission's Green Credit Guidelines.[74] Such leadership has catalysed international cooperation, through UNEP Finance Initiative's work with the banking sector and the IFC-hosted Sustainable Banking Network made up of regulators and associations in developing countries.

Green finance also brings specific concerns and opportunities for developing countries beyond the G20. UN Environment has specifically engaged with practitioners and regulators from Bangladesh, Colombia, Egypt, Honduras, Jordan, Kenya, Mauritius, Mongolia, Morocco,

BOX 4: The G20's Green Finance Study Group – Mobilizing Private Capital

The G20 brings together the world's leading economies to promote strong, sustainable and balanced growth and is a key forum for setting the rules that govern the global financial system. This year, green finance was incorporated for first time into the G20 agenda. As part of China's presidency in 2016, a Green Finance Study Group was established to "develop options on how to enhance the ability of the financial system to mobilize private capital for green investment."[75]

Co-chaired by China and the UK, and with the support of UN Environment as secretariat, the study group gathered experience from G20's member countries, key international institutions as well as observer nations, the private sector and a range of knowledge partners.[76]

To build a platform of common understanding on the opportunities and challenges facing green finance, the study group focused on five research areas: greening the banking system, greening the bond market, greening institutional investment, risk analysis and measuring progress. This process of dialogue and analysis was captured in a summary report welcomed by G20 Finance Ministers and Central Bank Governors, who concluded that "*in order to support environmentally sustainable growth globally, it is necessary to scale up green financing.*"[77] The G20 Leaders have welcomed a set of voluntary options developed by the Green Finance Study Group[78] where particular efforts could be made to:

- provide clear strategic policy signals and frameworks,
- promote voluntary principles for green finance,
- expand learning networks for capacity building,
- support the development of local green bond markets,
- promote collaboration to facilitate cross-border investment in green bonds,
- encourage and facilitate knowledge sharing on environmental and financial risks, and
- improve the measurement of green finance activities and their impacts.[79]

Nigeria, the Philippines, Thailand and Vietnam.[80] From this experience, it is clear that green finance has to be advanced in conjunction with wider finance sector development priorities, such as capital market deepening and extending access to finance for SMEs and households. In addition, international approaches to green finance should reflect the needs of developing countries. Equally, there is a potential for 'leapfrogging' in green finance, learning from the lessons of other innovations such as mobile banking. Indeed, green finance could be a catalyst for wider sector development and the attraction of foreign capital.

"Leadership must come from the private sector, business community and NGOs, not only from the officials. We need a comprehensive and coherent framework supported by political will that enables market forces to move businesses from the traditional to the green economy."[81]

Mohammed Omran, Chairman, Egyptian Stock Exchange (EGX)

Ensuring consistency between the functioning of the financial system and the response to climate change has been another focus area. The Paris climate agreement has catalysed the convergence of previously separated drivers, actors, and financing sources, including international public finance commitments, strategic climate targets, rising public expectations about financial sector performance, and voluntary commitments from the financial community.[82] Connecting the dots, unusually, has been civil society action, notably the well-advocated technical arguments about the risks of stranded assets by the Carbon Tracker Initiative and others.[83] Such connections – combined with climate change's higher policy goals and broader public profile – has stimulated the engagement of national financial policymakers and regulators. These include the Bank of England's prudential review of climate impacts on the insurance sector[84] and France's requirement that institutional investors must disclose their management of climate-related risks and alignment with the global, regional and national low-carbon transition perspectives.[85] Once again, this mix of actions has stimulated international cooperation, notably through the FSB's pivot towards the consideration of environmental challenges.[86]

BOX 5: GREEN BONDS – BUILDING NEW PATHWAYS FOR CAPITAL MOBILIZATION[87]

The rapid growth of green bonds illustrates how public enterprise and market innovation can combine to mobilize capital for sustainable development. Launched almost 10 years ago by leading development finance organizations (such as the EIB, the IFC and the World Bank) working with pioneering investment banks, the green bond market has expanded rapidly on the back of market-based principles and standards, strong investor demand and the introduction of regulatory frameworks in countries such as China and India.[88] Total issuance of bonds with proceeds explicitly ring-fenced for green investment reached US$42.9 billion in 2015 – with a further US$34.6 billion issued in the first half of 2016.[89] Key recent developments include:

- **The rise of emerging economy issuance:** In May 2016, direct issuance of green bonds in emerging and developed countries became equivalent in size for the first time,[90] a trend closely linked to enabling regulatory frameworks launched in China and India. In December 2015, the People's Bank of China (PBoC) published its green bond guidelines, underpinning US$8 billion of issuance from China in the first half of 2016.[91] India's securities regulator then issued its own guidelines in January 2016.[92] In addition, state-owned development banks in Mexico and Costa Rica primed the marketed by issuing their country's first green bonds.
- **The growing use of market principles and standards:** A liquid green bond market relies on the use of common approaches for ensuring trust and accountability. Between 59-66% of green bonds now receive reviews or certifications from external parties, representing good practice in accordance with the voluntary Green Bond Principles.[93] In addition, sector-specific criteria for green bonds, such as for low-carbon transport, renewable energy and low-carbon buildings, were developed by the Climate Bonds Initiative as a way of reducing market friction.
- **The deepening of investor demand:** Investor demand for green investment to fit their strategic asset allocation has become increasingly structured. The new Green Infrastructure Investment Coalition brings together major investors with development banks, international organizations and issuers in key developing countries (such as Brazil, China, India, Kenya and Mexico) to develop a strategic pipeline that can both increase access to capital and drive down the cost of capital.[94]

Yet, at US$118 billion, the total stock of green bonds outstanding is still a tiny fraction of the US$100 trillion in the world's debt capital markets. Strategic action is needed to realize its full potential – and a range of options exist for public sector action:[95]

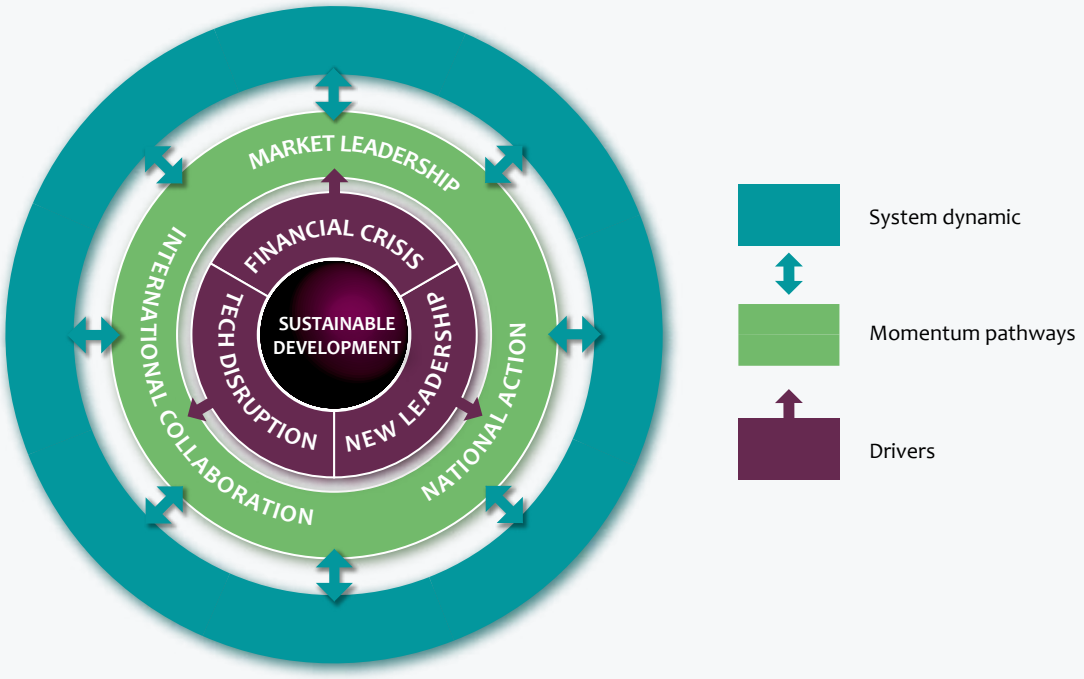
- **Market development:** To date, green bonds have largely developed organically. National green bond development strategies can help to bring together the actors across the system to identify barriers, build capacity, introduce incentives and attract capital. Importantly, the launch of green bond issuance is becoming a useful focal point in a number of countries – such as Kenya, Morocco and Nigeria – around which a comprehensive approach on green finance can cohere. Across markets, adopting common definitions of what is 'green' can help to improve market size, liquidity and efficiency.
- **Extending priorities**: Renewable energy accounts for 27.8% of the use of green bond proceeds, with only 2% raised for agriculture, a core priority for developing countries.[96] In addition to widening the sectoral scope, more could be done to explore other dimensions of sustainable development through principles and standards for positive impact and social impact bonds.[97]

1.2. FROM BUILDING BLOCKS TO PATHWAYS

Today's momentum is underpinned by the dynamic interaction of three building blocks: (a) market leadership including voluntary individual and collective action; (b) policy and regulatory innovations at the national level; and (c) the evolution of the global architecture of financial standards through international cooperation. The 'Year of Green Finance' illustrates how diverse actors and actions can combine to build pathways of system change. Often, such linkages are neither intentional nor expected.

The dynamics of these pathways can differ profoundly between contexts. How these building blocks combine to drive change can vary across countries. In many countries, the momentum in sustainable finance has been a bottom-up development, with citizens and financial institutions creating public pressure, which in turn has driven market innovations – eventually to a stage where policy and regulatory measures have been introduced to clarify market rules and level the playing field. Such bottom-up pathways have been most prominent in developed countries, particularly where citizen action has a historically central role in change processes.

FIGURE 4: BUILDING BLOCKS FOR MOMENTUM



	VOLUNTARY ACTIONS	INNOVATIVE MEASURES	ARCHITECTURAL CHANGE
	Individual and voluntary collective action by market players.	Financial policy and regulatory measures and coordination	Changes to mandates, supervisory structures and standards
NATIONAL	**CHINA:** ICBC publishes first environmental stress test	**FRANCE:** Investor reporting requirements	**NETHERLANDS:** Updated mandate of Central Bank
INTERNATIONAL	**GREEN BONDS:** Market growth	**SUSTAINABLE BANKING NETWORK**	**FSB:** Task Force on Climate-related Financial Disclosures

Illustrative examples

Top-down pathways, on the other hand, tend to start with policy or regulatory action, often with broader national priorities in mind. Such actions have also included a period of managed policy and regulatory experimentation, often directly involving feedback from market actors. China's Green Finance Task Force[98] and subsequent policy developments exemplify this approach, as does the history to date of Indonesia's Sustainable Finance Roadmap.[99]

International connectivity can create productive interactions between these two broad approaches. China's domestic development of a strategy for greening its financial system drew heavily on international experience, often learning from bottom-up experiences that have been translated into a Chinese context.[100] Countries such as the UK have taken inspiration from more policy-led developments elsewhere, such as China's ambitious green bond drive. Such positive synergies between what are often culturally and politically determined differences, of course, cannot be taken for granted.

To helpunderstand the nature of the current momentum, recent developments in each of the three building blocks are considered briefly below.

1.3. MARKET LEADERSHIP[101]

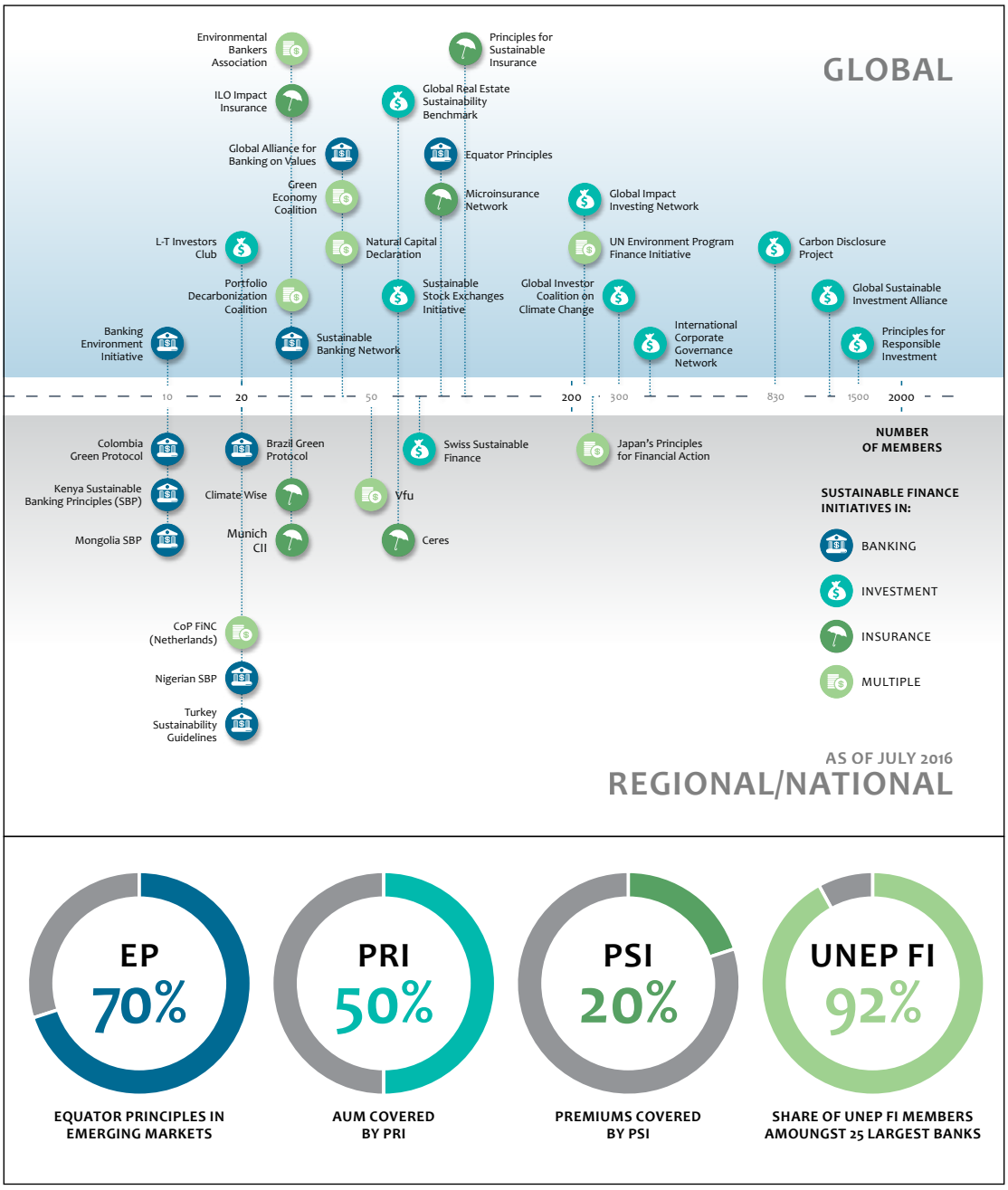
For the financial system to support the transition to sustainable development, the suppliers of financial services across banking, capital markets, investment and insurance will need to reset their business models to match the world's economic, social and environmental imperatives. Increasingly, leading financial institutions are recognizing that sustainable development is key to their future success. Collective action can set new market norms and, in the last decade, an extensive set of national and international initiatives has emerged, illustrated in Figure 5.

Market leadership on sustainable finance plays an important signalling role that goes beyond the direct value chain impacts. Crucially, market leadership sends signals to policymakers and regulators that the needed behavioural and managerial changes are, in principle, feasible. Furthermore, it shows that market actors are prepared to make and foster such changes. In the political economy of sustainable development, such signalling – especially if it originates from mainstream sector leaders – can give policymakers the confidence to address difficult social and environmental issues like climate change. Increasingly, market leadership is also an expression of a new maturity among financial institutions that sustainable development cannot be delivered through voluntary action alone – but often needs changes in prevailing financial system rules. In turn, strong policy signals can create new market expectations across the financial industry. This mutually reinforcing interplay came together not just in the run-up to the Paris Agreement, but also responding to priority environmental issues at the national level. This has resulted in new leadership steps taken by individual financial institutions, the extension of collective initiatives and new blended finance partnerships with the public sector.

- **Banking:** A signal of a growing area of future activity came with the decision by a group of 12 banks, including Société Générale in France, ING in the Netherlands, First Rand in South African and BMCE in Morocco, to develop a 'positive impact' framework to help structure financial products focused on sustainable development. Working together with UNEP FI, the 'positive impact' framework goes beyond just the environmental dimension and was exemplified by the issuance of the first ever 'positive impact' bond by Société Générale in 2015. Another sign of leadership came in March 2016, when the Industrial and Commercial Bank of China published the world's first environmental 'stress test' by a bank. This study explored the implications for its loan book of chronic air pollution and made a definitive connection between environmental factors and credit risk.[102]

- **Capital Markets:** The Sustainable Stock Exchanges (SSE) initiative now partners with 58 stock exchanges across the world, representing over 70% of listed equity markets. As of July 2016, 16 stock markets had provided sustainability disclosure guidance to companies, starting with Johannesburg in 2004. A further 23 stock exchanges – including the Bolsa Mexicana de Valores and seven Nasdaq exchanges in Europe – have publicly committed to provide sustainability guidance by the end of 2016.[103] Beyond disclosure, stock exchanges are also supporting capital reallocation, not just in terms of listing green bonds, but also introducing green equity products.[104]

FIGURE 5: MARKET INITIATIVES AND PARTNERSHIPS ON SUSTAINABLE FINANCE[105]



Source: UNEP FI (2016). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation (forthcoming).

"Sustainable development is an economic necessity. The Sustainable Development Goals both address risks (such as climate change) that threaten our ability to meet our liabilities as pension funds. But they also present the opportunity to build the returns that will pay the pensions for ordinary working people for whom we hold these assets in trust."[106]

Anne Simpson, Investment Director, Sustainability, CalPERS

- **Institutional Investment:** Investors were particularly vocal in their collective contribution to the Paris climate negotiations, with 400 signatories with US$24 trillion of AUM, signing the *Global Investor Statement on Climate Change*, which called for a robust climate agreement and clear market signals on climate policy.[107] Policy engagement has also been backed by action. In June 2016, the Swedish pension fund, AP4, allocated 21.8% (US$3.2 billion as per 1 June 2016) of its global equity portfolio to low-carbon strategies; AP4 aims to decarbonize its entire global equity portfolio by 2020. This step is part of the Portfolio Decarbonization Coalition, bringing together institutions committed to cutting carbon in over US$600 billion in assets.[108] Other investors, such as AXA and the Norwegian Government

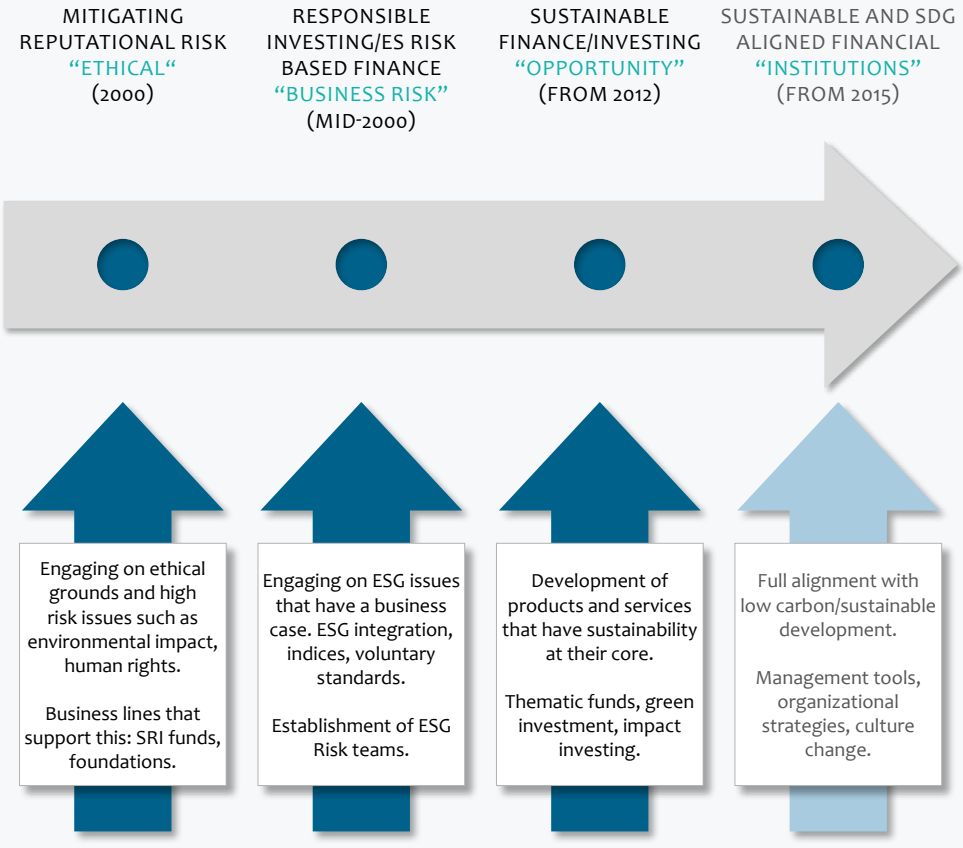
Pension Fund – the world's largest sovereign wealth fund – have introduced strategies to exclude assets with high carbon risks, such as coal.[109]

- **Insurance:** Beyond its role as a long-term investor, insurance is also being harnessed to deliver disaster risk reduction and resilience to climate shocks. Both Munich Re and AXA provided re-insurance to African Risk Capacity, a specialized agency of the African Union that helps countries improve their capacities to plan, prepare and respond to extreme weather events and natural disasters. Based on experience like this, finance ministers from the Vulnerable 20 (V20) group of developing countries have agreed to create a Climate Risk Pooling mechanism drawing on insurance sector expertise.[110] The need is clear: half the population of the V20 lacks access to external pooling mechanisms to manage disaster risks. The insurance sector itself is also developing sustainability principles for underwriting infrastructure projects.

Commitments to sustainable finance have certainly grown – and evolved profoundly – over the past two decades. Figure 6 shows the four key waves in sustainable finance – from an early focus on values and reputational risk, to a shift towards viewing environmental and social factors as a business risk, and on to the more recent recognition of environmental factors as a market opportunity. The fourth wave is now building – in essence, to steer financial institutions so that they are fully aligned with sustainable development and the 2-degree economy.

Measuring this alignment remains difficult given current levels of data and disclosure. One recent survey of leading asset owners identified US$138 billion in low-carbon investments – a very small share of the US$100 trillion in investment assets.[111] Although the banking sector is the largest source of green finance, comparable figures do not exist. In some cases, market incentives still do not provide sufficient risk-adjusted returns for the financial community to allocate capital. The combination of a lack of common definitions and low levels of reporting from financial institutions is

FIGURE 6: THE EVOLUTION OF SUSTAINABLE FINANCE



Source: UNEP FI (2016). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation (forthcoming).

another factor: much greater disclosure is needed not just for green assets, but also for pollution-intensive investments to arrive at the state of net-positive impact across banking, investment and capital markets.

Ultimately, this means that there is still limited information on how close – or how far – financial institutions are from serving sustainable development. Promising product level innovations, such as green bonds, are often not matched by shifts at the institutional level in terms of both governance and financial culture, including key competencies and incentives. Isolated examples of leadership innovation, along with purely procedural efforts at mainstreaming, will not achieve the required changes in underlying behaviour. A more strategic focus on core incentives will be needed.

> *"If we wish to move from 'Do No Harm' to 'Doing Good' in the financial system, then regulation and disclosure alone will not be enough and we will need to do more on positive incentives, especially changes in relative prices in favour of environmentally friendly goods and services."*[112]
>
> **Murilo Portugal,** President, Brazilian Bankers Federation (FEBRABAN)

1.4. POLICY AND REGULATORY MEASURES

Deploying capital at the scale and speed required to achieve sustainable development calls for a number of interlocking policy and regulatory elements:

- first, *policy action is needed in the real economy* to remove market failures such as mispriced pollution and resources. Some progress has been made to internalize externalities into market prices and better match macro-economic and sectoral policies with the need to regenerate natural capital. But serious market failures remain worldwide – and without effective pricing of scarce natural capital, the risk-adjusted returns for sustainable finance will likely be unable to attract sufficient capital.

- second, *the effective deployment of public finance is needed* to provide public goods and stimulate private action. Public finance is essential to deliver collective goods that the market cannot provide – and to stimulate private action through incentives and subsidies. Public finance is important both domestically and internationally to assist the sustainable development transition process in developing countries. In the majority of countries, public finance is scarce – and particular attention is needed to identify cost-effective options with high-leverage impacts.

- third, *action is also needed* ***within*** *the financial system* to remove market and institutional barriers that can prevent the efficient allocation of capital to sustainable development. These can include information asymmetries, misaligned incentives, short-termism, as well as inadequate capabilities and ill-defined responsibilities.

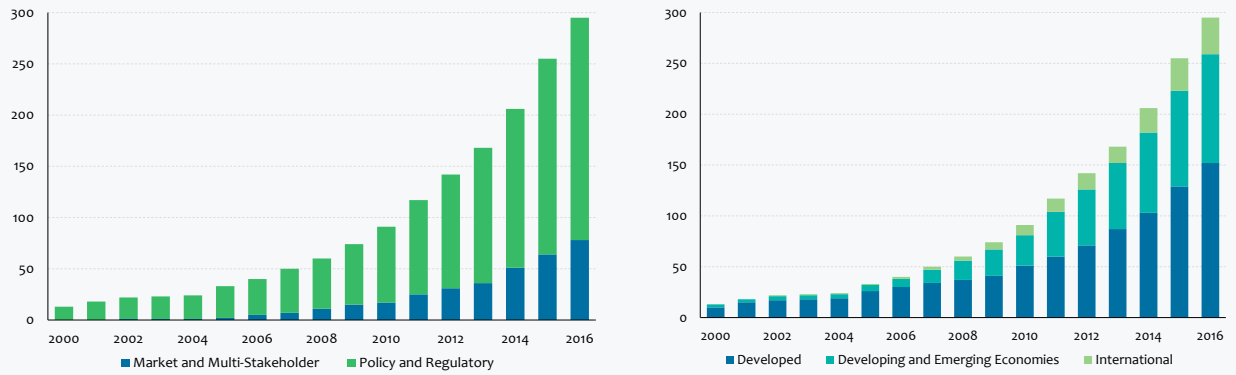
Financial policy and regulatory measures can complement both real economy actions and market

BOX 6: CREDIT RATINGS – WHY INTEGRATION IS ONLY THE START

Credit ratings have a profound influence on the allocation of capital in global bond markets and beyond. In May 2016, six of the world's leading credit rating agencies – S&P Global Ratings, Moody's, Dagong, Scope, RAM Ratings and Liberum – made a public commitment to collaborative action on sustainability in a joint initiative with institutional investors worth US$16 trillion in assets under management.[113] Integrating material environmental, social and governance factors is clearly critical to deliver more accurate risk pricing.

While integration is necessary, there is also a need to understand and mitigate potentially negative market reactions, particularly for developing countries. Environmental shocks could result in downgrades of sovereign bond ratings of vulnerable developing countries. This could bring serious financial and associated economic implications – including a higher cost of capital for government borrowing – unless preventive action is taken to invest in measures to strengthen resilience to threats such as climate change and food price spikes.[114] What could be needed are additional measures to anticipate these shocks, which both mobilize public and private investment in the underlying resilience of vulnerable countries and also ensure that these adaptation measures are rewarded by rating agencies and investors.

FIGURE 7: THE GLOBAL EVOLUTION IN MEASURES FOR SUSTAINABLE FINANCE, 2000-2016



UNEP Inquiry (2016). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development (forthcoming).

leadership. Since its inception, UNEP's Inquiry has been tracking such measures and has developed an extensive repository of their number, function and characteristics. Included are actions by public sector bodies, such as governments, central banks, financial regulators, and public financial institutions that influence the overall architecture of financial system rules.

Our focus has been on actions explicitly taken to address the environmental dimension as part of wider sustainable development efforts. At this stage, a wide net has been cast to include relevant legislation, sectoral and system level regulations, supervisory frameworks, fiscal incentives deployed within the financial system, guidance and guidelines, regulatory assessments, and formally established task forces. Measures are included from all major parts of the financial system, including banking, insurance, investment, debt and equity markets, as well as system-level actions. Most measures are taking place at the national level, but sub-national (i.e. state-level) measures are also considered, alongside regional actions (such as in the EU). International measures – including actions from standard setting bodies, such as the FSB – are collected in a separate category.

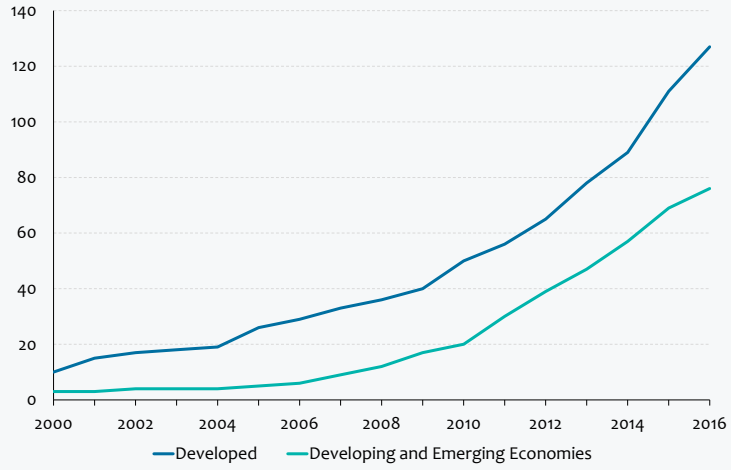
Current momentum is reflected by the steadily rising number of policy and regulatory measures explicitly focused on encouraging sustainable finance. By the end of June 2016, we had identified some 217 policy and regulatory measures covering nearly 60 countries.[115] Most of these are at the national level, with an increasing number of international policy initiatives. Separately, we have identified 78 collective initiatives originating from market institutions (such as financial institutions and stock exchanges), as well as multi-stakeholder initiatives (Figure 7). Policy and regulatory measures comprise 74% of total measures.

A clear acceleration in the number of such measures can be observed, particularly in emerging and developing countries. Some 75% of global measures identified to date were put in place in the period 2009-2016. The single year of greatest growth was 2015, with 49 new measures implemented. So far, 2016 is following a similar trend, with an additional 40 measures being implemented over the first half of the year. Most measures have been taken at national level. There may be some measurement bias due to the greater challenges in collecting data in some developing countries, and the numbers of initiatives per country may be greater in developing countries despite a smaller count being recorded. With that in mind, developed countries[116] are recorded as having adopted the largest number of measures, with a cumulative total of 127 identified as of June 2016. The growth in recorded action within emerging and developing countries[117] has been significant, rising from 29% of the total in 2010 to 38% by the end of 2015 (Figure 8).

Across the different segments of the financial system, developed and developing countries take a strikingly different focus, based on the underlying structure of their financial systems. Developed countries have targeted their efforts on institutional investment, whereas for emerging and developing countries, the banking sector has been the main area of activity, with increasing interest in securities (Figure 9).

From this growing pool of actions, key highlights at the national level from 2015-2016 include:

FIGURE 8: POLICY AND REGULATORY MEASURES BY DEVELOPED AND DEVELOPING COUNTRIES, 2000-2016

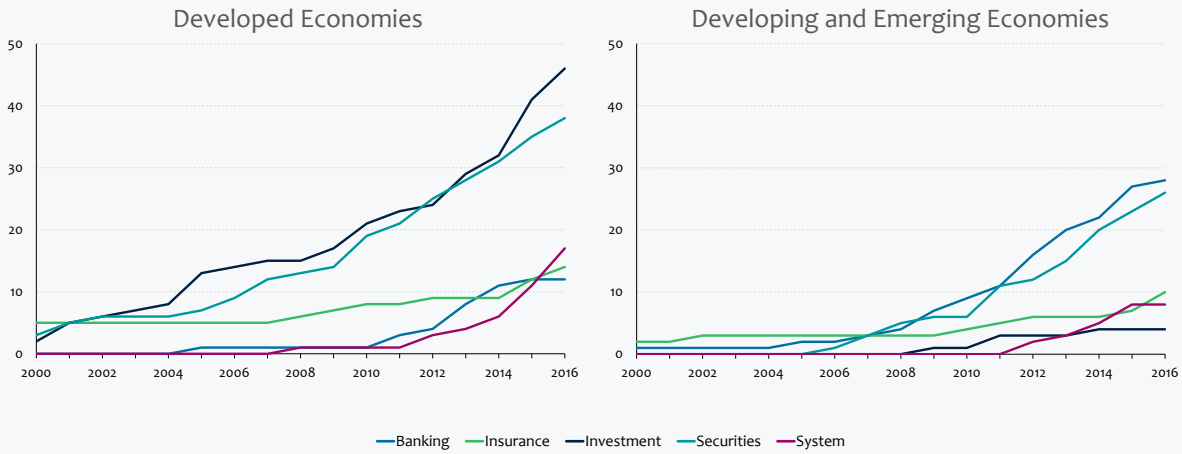


Source: UNEP Inquiry (2016). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development (forthcoming).

- *China:* Introduction of a set of policy guidelines for the establishment of a green financial system by the central bank and six other regulators.
- *France:* Release of implementing measures for new investor reporting requirements and development of its approach to stress testing climate factors in the banking sectors.
- *India:* New green bond disclosure criteria issued by the securities regulator, SEBI.
- *Italy:* Launch of a national dialogue on sustainable finance by the Ministry of the Environment.
- *Morocco:* Development of green finance roadmaps for banking, capital markets and insurance.
- *Philippines:* New catastrophe risk pooling facility introduced for local governments.
- *UK:* Building on its prudential assessment of insurance and climate change, the Bank of England has undertaken further research on the implications for central banking.

Important dynamics are at work between these polcies and measures and market leadership. Policy and regulation can promote good practice and consistent approaches in way that competition alone typically cannot. Most often, real examples of market leadership are needed to demonstrate that practical application is feasible: disclosure and reporting requirements are

FIGURE 9: POLICY AND REGULATORY MEASURES BY ASSET CLASS, 2000-2016



Source: UNEP Inquiry (2016). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development (forthcoming).

BOX 7: CHINA – GREENING THE FINANCIAL SYSTEM – FROM ASSESSMENT TO STRATEGIC ACTION

In August 2016, the State Council adopted a comprehensive set of 'Guidelines for Establishing the Green Financial System'[118] developed by the People's Bank of China along with six other Chinese financial regulators. Back in 2014, the PBC had established a task force, co-convened with UN Environment, to assess how to mobilize the US$600 billion in capital needed each year to invest in green industries. The result was a set of 14 recommendations across four broad themes: information flows, legal frameworks, fiscal incentives and institutional design.[119] A number of specific follow-up actions were taken – for example, to introduce new requirements in the green bond market.

The Guidelines are designed to deliver the country's strategic goal of developing an 'ecological civilization' by incentivizing more private capital to invest in green industries and to control investments in polluting projects. Building a range of existing measures, the guidelines cover 35 specific actions covering banking, securities, public-private partnerships, insurance, emission trading, local finance, risk management and international cooperation.[120]

a case in point. Equally, policy and regulatory actions can act to stimulate innovation in the marketplace – highlighting a need for financial institutions to work through and come forward with effective responses. France's effort to link stress testing in the banking sector and climate-related risk assessment is a case in point. A key bridge between policy actions in different countries is the development of common approaches through international processes.

"There is a growing trend to create and institutionalize partnerships where countries can share knowledge and experience. One example is the mutual exchange forum on inclusive insurance (MEFIN) in Asia. Another is the new sustainable insurance forum at the global level."[121]

Emmanuel Dooc, Insurance Commissioner of the Philippines

1.5. COMMON APPROACHES, NORMS AND STANDARDS[122]

Standards are the third building block of dynamic pathways that drive change in the financial system. Standards are the framing bedrock of the global financial system, involving a number of key components including policy mandates, supervisory structures, specific standards and then translation into national practice, as illustrated in Figure 10. Evolving standards at the international level is a long process. Before new formal standards are released, many steps are taken to understand market practice and potential gaps, as well as the intended and unintended consequences. Standards are often agreed far more quickly in times of broadly acknowledged crisis, as witnessed in the aftermath of the 2008 financial crisis.[123]

The norms, methods, tools and standards that provide a governing framework for the global financial system may impact the pursuit of sustainable development, but this relationship remains largely unacknowledged and underexamined. International norms, methods, tools and standards guide financial institutions directly, such as central banks, regulators and supervisors at the national level. They also enable cross-country assessment of performance to form the basis for plans and actions for continuous improvement. Most of these international approaches are negotiated between nations and adopted at a national level, despite being non-binding.

A common theme, once policymakers and regulators have started to explore the sustainability dimension of their mandates, is to seek to learn lessons from their peers in other countries – and also to develop common approaches to ensure consistency and accelerate the implementation process. The Sustainable Banking Network is one example – bringing together banking regulators and associations from developing countries.[124] A similar initiative for insurance supervisors is also under way – the Sustainable Insurance Forum – growing out of the work of the Principles for Sustainable Insurance with the private sector.[125] But perhaps the most significant step forward in the past year has been the launch of the FSB's Task Force on Climate-related Financial Disclosure (see Box 8).

There are unrealized synergies between financial standards and sustainable development. As the FSB example shows, existing mandates provide a clear

BOX 8: FSB Task Force on Climate-related Financial Disclosures – Building Consistency

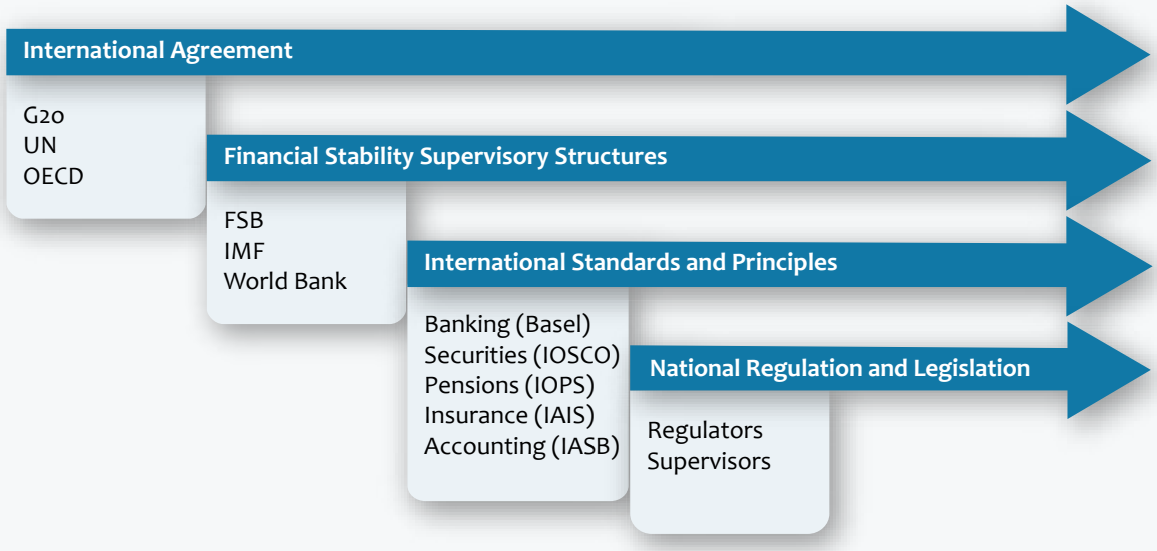
The Task Force marks a new departure for the FSB – its first dedicated focus on the financial implications of an environmental issue. Building on nearly 20 years of climate disclosure and growing mainstream recognition of the importance of improved transparency, the Task Force combines the authority of a leading international financial policy institution with a composition of private sector experts with a mandate to develop "voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders."[126]

Launched in December 2015, the Task Force moved quickly to produce a first report that set out its scope and objectives. This made clear that "enhanced disclosures on climate-related risks that are used by investors, creditors, and underwriters can improve market pricing and transparency and thereby reduce the potential of large, abrupt corrections in asset values that can destabilize financial markets."[127] The Task Force outlined a set of fundamental principles for effective disclosure – that it is relevant, specific, complete, clear, balanced, consistent over time, comparable, reliable and timely. Importantly, the scope of disclosure should include both quantitative and qualitative information, as well as historical and forward-looking statements. The back-loaded nature of many climate impacts means that a focus on future risks is key, and one striking result from the consultation undertaken by the Task Force on its first report was that "96% of respondents see scenario analysis as a key component of disclosure."[128] Over 200 responses were submitted, highlighting a range of technical (e.g. comparability), policy (e.g. inconsistency of standards) and behavioural (e.g. short-termism) barriers to disclosure.

The Task Force is scheduled to deliver its Phase 2 report to the FSB and for public consultation in December 2016. Its recommendations will be voluntary, but could have profound implications for financial and other regulations.

basis for international financial institutions to examine the relevance of new and emerging environmental threats. The International Monetary Fund (IMF), for example, is undertaking work to more fully integrate climate change and energy issues in its surveillance activities. This includes exploring the role of the IMF in strengthening the resilience of small states to natural disasters and climate change.[129] It is also exploring the

FIGURE 10: THE GLOBAL FINANCIAL REGULATION PROCESS



Source: Adapted from Davis, K. (2011). Regulatory Reform Post the Global Financial Crisis: An Overview.

FIGURE 11: INTERNATIONAL FINANCIAL STANDARDS AND SUSTAINABLE DEVELOPMENT

FINANCIAL STABILITY	
Financial Stability Board (FSB)[130]	No formal mention of environmental factors, but the potential systemic risk posed by climate change prompted the new Task Force on Climate-related Financial Disclosure. Expected to report on voluntary disclosure standards in December 2016.
IMF/World Bank - Financial Sector Assessment Program (FSAP)[131]	Financial inclusion is considered as an explicit part of the FSAP process for developing countries; environmental factors emerging on a bottom-up basis but not a formal part of the process.
IMF - Report on Observance of Standards and Codes[132]	The G20/OECD corporate governance standards are one of the 12 recognized areas for assessment within the ROSC assessment.
CORPORATE GOVERNANCE	
G20/OECD Principles of Corporate Governance[133]	References to environmental, human rights and ethical factors, notably in terms of the role of stakeholders, disclosure and responsibilities of the board.
BANKING	
Basel III[134]	Pillar 1 refers to environmental risks that might arise at the transaction level. Potential synergies with Pillar 2 (Supervisory Review) and Pillar 3 (Market Discipline).[135]
BCBS - Corporate Governance Principles[136]	The Principles refer to culture and values including the promotion of responsible and ethical behaviour. But no explicit reference to social and environmental issues.
BCBS - Core Principles for Effective Supervision[137]	BCBS has been active on financial inclusion since 2010. Potential wider synergies with principles on corporate governance, risk management and disclosure/transparency.
SECURITIES	
IOSCO - Principles of Securities Regulation[138]	No formal mention of environmental or social issues. Clear synergies with principles on systemic risk, integrity and ethical behaviour as well as disclosure and certification (e.g. green bonds).
IOSCO - Code of Conduct for Credit Rating Agencies[139]	The focus on improving the quality and integrity of the credit rating process, promoting independence, reducing conflicts of interest and improving transparency and disclosure are all relevant to the integration of sustainable development factors.
INSURANCE	
IAIS – Insurance Core Principles[140]	Major partnership on financial inclusion (Access to Insurance Initiative – A2ii). Clear synergies with sustainable development in corporate culture, assessment of materiality, internal risk management controls and systemic risk.
INVESTMENT	
Investor Duties	In the context of the follow up to COP21, France requested the OECD to launch work on the governance of investments by institutional investors in relation to ESG factors and risks, in particular those associated with climate change. Scheduled to publish in December 2016.
IOPS - Principles for Private Pension Supervision[141]	No formal guidance on environmental and social factors. Clear synergies with principles of integrity, risk management, governance, alignment of interests, disclosure and transparency.
OECD Core Principles of Occupational Pension	Reference is made to the need for good governance and to the G20/OECD High-level Principles of Long-Term Investment Financing.
ACCOUNTING AND FINANCIAL REPORTING	
IASB - International Financial Reporting Standards[142]	Reference to impairment test for intangible assets, such as carbon allowances. Clear synergies with the principles of transparency, accountability and efficiency.
IAASB - International Standards on Auditing[143]	International Federation of Accountants (IFAC) has been active in exploring the role of the accounting profession in delivering the Sustainable Development Goals.

Source: UNEP Inquiry and Corporate Knights (2016). A Review of International Financial Standards as They Relate to Sustainable Development (forthcoming).

possible effects of green finance on macro-economic developments, such as economic growth and financial stability.

With this in mind, the UNEP Inquiry has examined 15 of the major financial standards and supervisory structures. The results suggest that the standards are predominantly focused on the economic pillar of sustainable development – yet with powerful latent synergies with the social and environmental dimensions. Their overarching frameworks offer potentially strong synergies, particularly in terms of risk at the institutional and systemic levels, corporate governance, transparency and disclosure, as well as financial culture. The key findings are presented in Figure 11.

The lack of explicit incorporation of material, social or environmental factors does not prevent national regulators from taking action, but could result in a fragmented response. A lack of standardization across jurisdictions could have the unintended consequence of increasing the costs associated with price discovery. It also increases the risk that the links between fostering sustainable development and enhancing the stability of the financial system might be missed, particularly in relation to systemic issues such as climate change and global inequality.

Financial inclusion offers a useful model for how other sustainable development factors could be embedded within international financial standards. Over the past decade, financial inclusion has moved from outside the world of international standards to becoming politically recognized and increasingly incorporated into key aspects of relevant international standards. G20 finance ministers and central bank governors established the Global Partnership for Financial Inclusion in 2010,[144] followed by the Financial Inclusion Action Plan in 2014. This sets out a number of priorities and actions to facilitate financial inclusion.[145] International financial standards have evolved to reflect this growing commitment, notably in work undertaken by the Basel Committee on Banking Standards and the International Association of Insurance Supervisors, as well as the incorporation of financial inclusion into the Financial Sector Assessment Program. This shift from the margins to increasingly mainstream consideration offers a potential model for other social and environmental aspects of sustainable development.[146]

The adoption of the Sustainable Development Goals provides a strategic opportunity to consider how relevant environmental and social factors can become embedded in financial standards. In the first edition of the Inquiry's report, '*The Financial System We Need*', the UNEP Inquiry proposed a new set of principles for a sustainable financial system that would provide a framework for how sustainable development could be advanced through key international standards. Our subsequent review of standards has confirmed the potential role for a cross-cutting principle that recognizes the wider purpose of financial activity. It also highlighted the potential for further work to explore the implications of sustainable development for key aspects of the standards' landscape, such as systemic risk, governance, disclosure, materiality and culture.

1.6. FINANCIAL SYSTEM REFORM AND THE REAL ECONOMY: A NEW DYNAMIC

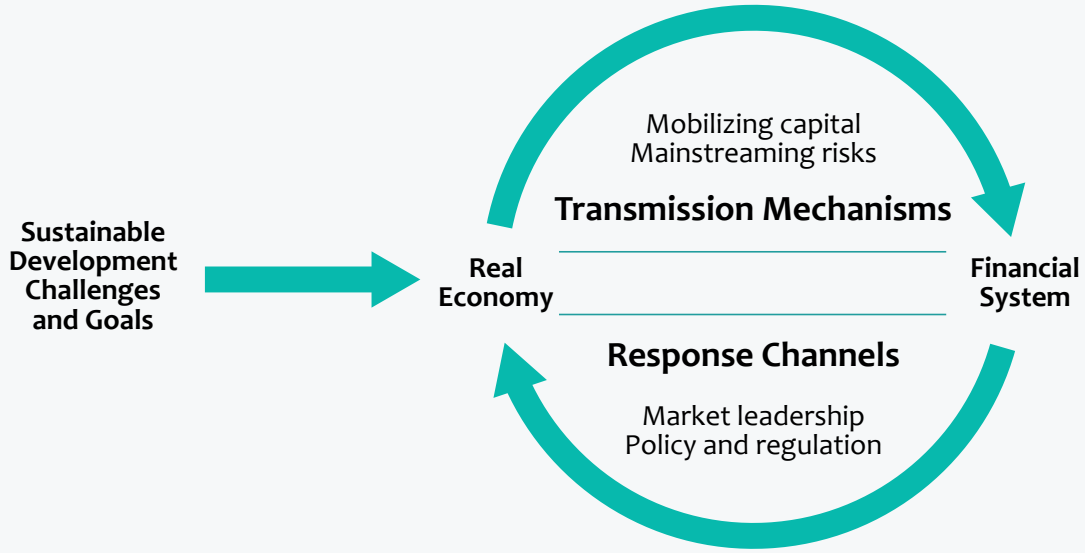
The actions signal the beginning of a new powerful dynamic between the financial system, the real economy and progress towards sustainable development. The core purpose of the financial system is to serve the real economy – providing a range of core services for households, enterprises and public authorities. The transition to sustainable development reframes this historic relationship, inserting new parameters around inclusive prosperity, poverty elimination and respect for planetary boundaries. Simply put, a two-way relationship can be identified (Figure 12):

- first, sustainability challenges in the real economy are driving new demands on the financial system, expressed through a set of transmission mechanisms that call for large-scale capital mobilization, as well as the mainstreaming of social and environmental factors;
- second, actions in the financial system in turn are also shaping environmental and social outcomes in the real economy, through a set of response channels, notably market leadership, along with policy and regulatory measures and international cooperation.

Ideally, these response measures should ensure that the system is as effective, efficient and resilient as possible to deliver the transition to sustainable development.

Set against this growing number of policy and regulatory measures, a key question is: *what measures are most needed to deliver efficiency, effectiveness and resilience in*

FIGURE 12: THE NEW DYNAMIC BETWEEN THE REAL ECONOMY AND THE FINANCIAL SYSTEM



Source: UNEP Inquiry (forthcoming). Financing the Transition: How Financial System Reform Can Serve Sustainable Development.

ways that the financial system can contribute to specific sustainability priorities in the real economy?

To answer this question, we have examined a sub-set of actions in 10 countries that are focused on three interlocking challenges of energy, climate change and land-use. Some of these measures seek to have a direct impact on the real economy – for example, actions to channel capital to sustainable development priorities, such as renewable energy, or reroute capital away from deforestation. Others are more focused on managing the implications of new sustainability risks in the real economy for the financial system; these measures then send important signals back to capital allocation in the real economy.

Looking across the range of policy and regulatory measures being used, five priority areas stand out. Overall, five common themes have emerged from the growing number of policies and measures, cutting across the key sectors of the financial system (the '5R's): capital reallocation; risk management; the responsibilities of financial institutions; reporting and disclosure; and the development of strategic roadmaps. Key examples of the measures being deployed include:

- **Capital Reallocation:** Financing a sustainable economy will require the efficient reallocation of capital. Market dynamics alone may not be enough to mobilize capital for critical priorities at scale or limit flows of capital to unsustainable assets. For example, the European Union is bringing sustainability factors into plans for its Capital Markets Union and is exploring an EU-wide strategic review of sustainable finance.[147]

  In Brazil, starting in 2008, the central bank has introduced requirements limiting landowner access to subsidized rural credit to those who can demonstrate compliance with environmental legislation. From December 2017, financial institutions in Brazil will only be able to provide agricultural credit to landowners whose property is registered in the Rural Environmental Registry (CAR). This builds on a successful measure by the central bank to link rural credit to environmental compliance in the Amazon region. FEBRABAN, the Brazilian Banker's association, is working with the Ministry of Environment to improve the registry using satellite imagery.[148]

"India has a huge opportunity to discuss the policy intervention required to drive the flow of sustainable financing and to align the financial system towards a sustainable development agenda. Several goalposts - including creating awareness of the financial sector, developing common definitions of green finance indicators, developing green products, measuring progress and framework for assessing financial risks - are critical for achieving this."[149]

R. Gandhi, Deputy Governor, Reserve Bank of India

BOX 9: INDIA – FINANCIAL INNOVATIONS TO MOBILIZE CAPITAL FOR SUSTAINABLE ENERGY

India has among the most ambitious renewable energy targets in the world – designed to deliver economic development, energy access and environmental objectives.[150] To complement traditional clean energy policies,[151] India has taken three innovative measures to mobilize private capital:

- **Voluntary financing pledges**: The Ministry of New and Renewable Energy agreed financing pledges with India's banks amounting to 76.5GW of renewable energy.[152]
- **Extending Priority Sector Lending (PSL)**: The Reserve Bank of India has included decentralized renewables within its set of priority sectors for bank lending.[153] Early indications suggest that financing for renewable energy assets under PSL have steadily increased.
- **Introducing Green Bond requirements**: The Securities and Exchange Board of India introduced green bond requirements in January 2016 to help fulfil India's commitment under the Paris Agreement by developing new financing channels that could reduce the cost of capital and establish uniform disclosure thereby facilitating green investment.[154]

Initiatives such as the International Solar Alliance, which India launched in 2015, could also be a mechanism for sharing experience on new ways of raising capital for clean energy.

- **Risk Management:** The degradation of the environment can also generate risks for financial assets and institutions – and potentially for the financial system as a whole. Here the primary focus of financial policy and regulation has been on understanding the scale of these risks and then putting in place measures that strengthen the 'safety and soundness' of financial institutions against these shocks. The linkages to the real economy are therefore *indirect* as a result of changes to risk appetite and risk pricing. In developing and emerging economies such as Bangladesh, Brazil, China and Peru, financial authorities have introduced guidelines and requirements to make the assessment of socio-environmental factors a routine part of financial risk management, particularly in the banking sector. This year, a number of European central banks and regulators in France, the Netherlands, Sweden and the UK have taken steps to evaluate the implications of climate change for their financial systems.[155,156,157,158] Beyond risk assessment lies the critical task of strengthening financial system resilience, a core focus of the Sendai Framework for Disaster Risk Reduction, which specifically highlights the role of financial institutions and financial regulators.[159]
- **Responsibilities of Financial Institutions:** Sustainable development can also have potentially profound implications for the core duties of financial institutions to their clients and other stakeholders.[160] Growing numbers of financial institutions are adopting principles that guide the integration of material environmental and social factors – but market forces alone can be insufficient to ensure sufficient breadth or depth of implementation. Policymakers have supported this process by clarifying how core responsibilities link to sustainability factors, such as the fiduciary duty of pension funds to their beneficiaries. In October 2015, the US Department of Labor became the latest investment regulator to acknowledge that "environmental, social and governance factors may have a direct relationship to the value of an investment" and that when they do "these factors are proper components of the fiduciary's analysis."[161] In another example of the mutual signalling

BOX 10: ASSESSING THE RISKS OF AN ABRUPT CLIMATE SHOCK

The advisory scientific committee of the European Systemic Risk Board published in March 2016 an assessment of carbon risks to the financial system – concluding that a late and abrupt transition could have adverse financial implications.[162] In the short-term, improved disclosure and incorporating climate into stress tests could help. If stress tests find risks to be material, then actions could include building capital buffers, capital surcharges based on carbon intensity and large exposure limits.

between the market and policy, a new statement was launched in June 2016 by leading institutional investors making clear that investors must "take account of environmental, social and governance (ESG) issues and support the stability and resilience of the financial system" – and asking for policy clarity at the national and international levels.[163]

Again, the primary focus here is on relationships within the financial system – between pension funds and their clients - with *indirect linkages* back to the real economy as greater recognition of ESG factors changes capital allocation and stewardship decision-making. In a recent global investor survey, over 65% of respondents agreed that acting on the Sustainable Development Goals was aligned with their fiduciary duties.[164]

"Environmental, social and governance factors may have a direct relationship to the value of an investment" and when they do "these factors are proper components of the fiduciary's analysis."[165]

US Department of Labor, October 2015

- **Reporting and Disclosure:** Enhanced reporting from both non-financial actors and financial institutions is a foundational element for the establishment of sustainable financial systems – enabling consumers to pick the right financial products, investors to make informed choices and regulators to assess the threat to the resilience of the financial system from sustainability-related disruption.[166] Reporting is also the area where the most has been done to develop market-based standards and regulatory frameworks: 38% of the identified measures focus on disclosure. Enhanced reporting can be considered a *bridging* action focused on improving information flows between the real economy and financial system actors. Disclosure is not just needed from corporations in the real economy to the financial system – but also from financial institutions themselves. It is here that particular innovation has been made in the past year. In January 2016, the California Department of Insurance launched its Climate Risk Carbon Initiative (CRCI)[167] setting out mandatory requirements for financial disclosure of insurance companies' investments in fossil fuel enterprises (including coal, oil, gas, and electricity generation). The purpose was to strengthen the prudential oversight of the insurance sector. Further, this action was supplemented by a request to all insurance companies licensed in California to divest their coal assets.[168]

"I do not want to sit by and then discover in the near future that insurance companies' books are filled with stranded assets that have lost their value because of a shift away from the carbon-based economy, jeopardizing their financial stability and ability to meet their obligations, including paying claims to policyholders."[169]

Commissioner Dave Jones, California Department of Insurance

- **Roadmaps:** A growing number of countries have elements of a sustainable financial system in place – but these are often not joined up or focused in a strategic way. Furthermore, action to deliver the Sustainable Development Goals and the Paris Agreement will involve a systemic approach to the financing challenge. For example, Agenda 2030 identifies the need for 'integrated national financing frameworks.'[170] As part of the implementation of the Paris Agreement, the Intended Nationally Determined Contributions (INDCs) submitted in 2015 will need to be translated into more granular 'climate investment plans' or 'green finance strategies'.

BOX 11: FRANCE – REPORTING REQUIREMENTS CAN STIMULATE STRATEGIC THINKING

One of the most ambitious examples of reporting requirements for financial institutions is contained in Article 173 of the French Energy Transition law, which came into effect in 2016. Existing measures for investors to disclose their approach to managing ESG factors were extended to require an explanation of how the physical and transition challenges of climate change are taken into account, and what role they are playing in contributing to energy transition goals. Within the overall reporting framework, investors have considerable flexibility in how they address these issues – in large part to encourage innovation and stimulate strategic thinking. After two annual reporting cycles, a review will be conducted in 2019 to take stock of emerging practices and the usefulness of the reporting for consumers, investors and policymakers.

These roadmaps are perhaps the least developed dimension of the 5R's – but are critical to achieve a *systemic* approach that connects financial practice with real economy needs. Crucially, these cannot be abstract plans – but need to drive actual changes in financial practice. In Indonesia, the country's financial regulator, OJK, launched a Roadmap for Sustainable Finance in 2014, setting out key steps in the banking and capital markets sectors through to 2019.[171] One year later in November 2015, eight of Indonesia's largest banks made new commitments to the financial regulator, OJK, with a focus on building their competencies and developing a framework for environmental and social risks, starting with a pilot programme focused on palm oil.[172] Sweden has also committed to ensuring that the financial sector serves sustainable development through its recent budget bill, a statement of strategic intent that is driving a set of assessments by the financial regulator, actions by Swedish pension funds and the review of the labelling of financial products.

"De Nederlandsche Bank believes it can – and must – contribute to sustainable development. It follows from our legal mandate. And it follows from our mission, which is to contribute to the sustainable prosperity of the Netherlands by safeguarding the financial stability."[173]

Klaas Knot, Governor, DNB

This emerging practice indicates an increasing focus on how financial system reform can support the sustainability transition in the real economy. Whether it is Brazil's focus on rural credit and deforestation, India's efforts to scale-up renewable energy investment or France's new reporting requirements, countries are starting to make explicit links between action in the financial system and the realization of broader national goals for sustainable development and climate change. What began as a series of tactical steps in response to specific environmental problems is starting to become more strategic. Traditionally, sectoral policies to deliver sustainability (for example in agriculture and energy) have largely ignored the need to review financial system rules. These examples point to the complementary role that financial reform can play to deliver effectiveness. The national financing frameworks that are needed to help deliver the Sustainable Development Goals and the Paris Agreement provide an opportunity to develop and launch roadmaps for harnessing the financial system.

Equally, efforts to understand the implications of sustainability challenges from a prudential perspective on the financial system are also gathering pace. So far, the common conclusion of assessments conducted by central banks and regulators has been two-fold: first, that that climate change does not pose an immediate risk to system resilience, but, second, that it is clearly material and requires early action to prevent destabilizing impacts. Improved disclosure is an obvious first response – followed by the development of stress testing and other tools to better understand risks to both business models and portfolios. Forward-looking judgments by supervisors are now becoming possible. In addition, an emerging lesson from many of these examples is the importance of placing specific financial measures within the wider context of a system-wide strategy at the country level through national finance task forces, roadmaps and platforms.

The strategic roles of public finance and monetary policy in the deployment of private capital have also emerged as areas for further exploration. The Inquiry's primary focus has been on measures to harness private capital within the financial system. But our experience at the

BOX 12: The Netherlands – From Risk Assessment to Creating a Platform for Action

Following the financial crisis, the mandate of the Dutch central bank, DNB, was updated to "safeguard financial stability and thus contribute to sustainable prosperity in the Netherlands". As a pension regulator, DNB has explored how pension funds are managing the integration of ESG factors. It has also published an in-depth assessment of the strategic implications of climate change and the energy transition, concluding that it one of the greatest challenges that the economy faces in the long term. More broadly, DNB is acting as a catalyst for discussions on sustainability in the financial sector and has established a new Platform on Sustainable Finance in 2016. These actions formed the basis for the first ever discussion of how to finance the transition to a sustainable economy by EU finance ministers as part of the Netherlands' presidency in the first half of 2016.[174]

BOX 13: How Financial System Reform Could Support Energy Efficiency

Within the energy system, more attention is needed to unlock financing for efficiency improvements. According to the Sustainable Energy for All initiative, US$560 billion a year is needed to double the global rate of energy efficiency improvements – but only US$130 billion is currently being deployed. Awareness of the need to close this gap is growing in the financial system: for example, 115 banks and 40 investors managing close to US$4 trillion of assets have committed to increase their consideration of energy efficiency across their operations.[175] At the G20 level, the Energy Efficiency Finance Task Group has developed the *Voluntary Energy Efficiency Investment Principles* that suggest a supportive policy framework to scale up energy efficiency investments in participating countries.[176]

One option to overcome the lack of data on energy efficiency financing could be to tag loans in the building sector to prevailing energy performance standards: 20 countries now have energy performance standards for buildings (including the EU as one unit). Tagging these loans and then reporting aggregate results would not only give visibility on the flows of energy efficiency finance, but would also provide a sense of the prospective pipeline of asset-backed securities with high energy efficiency standards as well as the data to enable the evaluation of how building performance is linked to credit risk.[177]

country level has shown that it is hard to separate the strategic role of public finance as a lever of change. Equally, the growing application of unconventional monetary policy has raised questions about the linkages with social and environmental outcomes.

Public finance is increasingly understood as having more diverse and complex roles in shaping the broader finance system than its direct spending impacts. The financial crisis has exacerbated fiscal constraints, including pressures on international development assistance. While clearly of concern, such challenges can also generate innovations to ensure that existing flows of public finance are more effectively aligned to sustainable development.

- At a time of increased fiscal stringency, it also makes sense to review the fiscal incentives that flow through the financial system – for example, for savings and pensions - are aligned with sustainable development. A preliminary exploration of these links conducted for the Inquiry has identified a baseline quantum of potential subsidies, but also highlighted considerable data gaps.[178]
- Sustainable development-related criteria are already a rising trend in public procurement,[179,180] but could also be applied to the public procurement of financial services, such as banking, insurance and debt issuance. For example, South Africa has drawn on this instrument in its financial sector charter and code to encourage the sector to do more in empowering the previously disadvantaged, black majority.[181]
- Beyond fiscal measures, the use of public financial institutions to 'crowd-in' private capital is now widely accepted as an effective approach to using scarce resources.[182] The emergence of the green bond market has also revealed the market creation role of public financial institutions through both strategic issuance and purchase programmes.[183]
- A growing number of public financing vehicles, such as pension funds, national security funds, and sovereign wealth funds, are introducing ESG criteria to align investments with sustainable development.[184] This operational rule-setting can also have important spillover effects for private financial institutions. The Equator Principles are a case in point – along with the more recent launch of the Principles for Mainstreaming Climate Action in December 2015 by a coalition of development banks and private institutions.[185]

Central banks are clearly starting to address the prudential dimensions of sustainable development, but the monetary policy linkages are less developed. Work is just beginning to set out the policy and analytical linkages between environmental sustainability and monetary policy.[186] In some cases, the mandates of central banks could enable such exploration. For example, in the case of the European System of Central Banks, the primary goal is to maintain price stability, with a secondary objective of supporting the European Union's economic policies in order to contribute to the EU's objectives, which include sustainable development and environmental protection. In this context, as long

as price stability is not at risk, the ECB could take into account these wider objectives.[187] One area where this could be relevant is the integration of sustainability criteria into refinancing and asset purchase programmes (such as quantitative easing).[188] As part of China's new guidelines for establishing a green financial system, a set of policy incentives have been introduced including linking green finance with the People's Bank of China's re-lending operations.[189]

This dynamic between the financial system, the real economy and sustainable development is at an early stage and in Section 3 we provide the first effort to deliver a framework for understanding performance in terms of efficiency, effectiveness and resilience. In addition, this dynamic needs to be understood in terms of other fundamental changes in the financial system, not least technological disruption through fintech.

HARNESSING FINANCIAL TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT: **KEY MESSAGES**

- *Finance is a system in constant flux – and financial technology (fintech) is now emerging as a powerful driver of disruption with profound implications for sustainable development.*

- *The use of technology in finance is of course not new – but a step change is now expected with the novel application of a number of technologies in combination, notably involving blockchain, the 'internet of things' and artificial intelligence.*

- *UN Environment commissioned an initial landscape review of the potential for fintech to advance sustainable development.*

- *Technological innovation is already offering sustainability solutions across the five core functions of the financial system: moving value; storing value; exchanging value; funding value creation; and managing value at risk.*

- *Fintech offers the prospect of accelerating the integration of the financial and real economy, enhancing opportunities for shaping greater decentralization in the transition to sustainable development.*

- *There is a range of both transitional and more structural unintended consequences, however, with potential downside risks for sustainable development.*

- *Policy interventions can be active on both the fintech supply-side and on the manner in which financial system development is aligned to sustainable development. Some key steps in the fintech for sustainable development innovation journey could include:*

  - *Ensure that fintech is an integral part of financial system development plans and roadmaps focused on financing sustainable development, particularly at the national level, and especially for developing countries.*

  - *Establish a platform of leading fintech companies, working with others to influence the right enabling businesses, policies and standards to effectively connect fintech and sustainable development.*

  - *Incentivize fintech aligned with sustainable development, for example by:*

    - *Supporting venture capital and social impact funds to fund start-ups with specific sustainable development ambitions.*

    - *Creating a challenge fund, similar in nature to the Longitude and X-Prizes, which would seek to create a global community of purpose that can pilot and create replicable solutions over time.*

2. HARNESSING FINANCIAL TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

2.1. ALIGNING TOMORROW'S FINANCIAL SYSTEM – NOT TODAY'S

The financial system is in a constant state of flux. The financial system is woven into almost every human habitat, from the rural village trader to the global investment banker. Its global architecture, diversity of institutions and billions of daily transactions impact those both with and without access to modern financial services. The financial system's share of global income has grown rapidly in recent decades, nearly doubling between 1988 and 2005 to peak at 3.3% of global GDP – before trillions in losses originating in the global financial crisis.[190]

The financial system is unusually dynamic and adaptive. Due to their intangible nature, financial products are more numerous, more diverse and more rapidly created or destroyed than those in the real economy, even in most service sectors. Leveraging global communications infrastructure has allowed the financial system to compress space and time, creating the possibility for nearly immediate capital flows across jurisdictions – but also leading to many problematic issues such as tax avoidance, illicit financial flows, or regulatory arbitrage.[191,192]

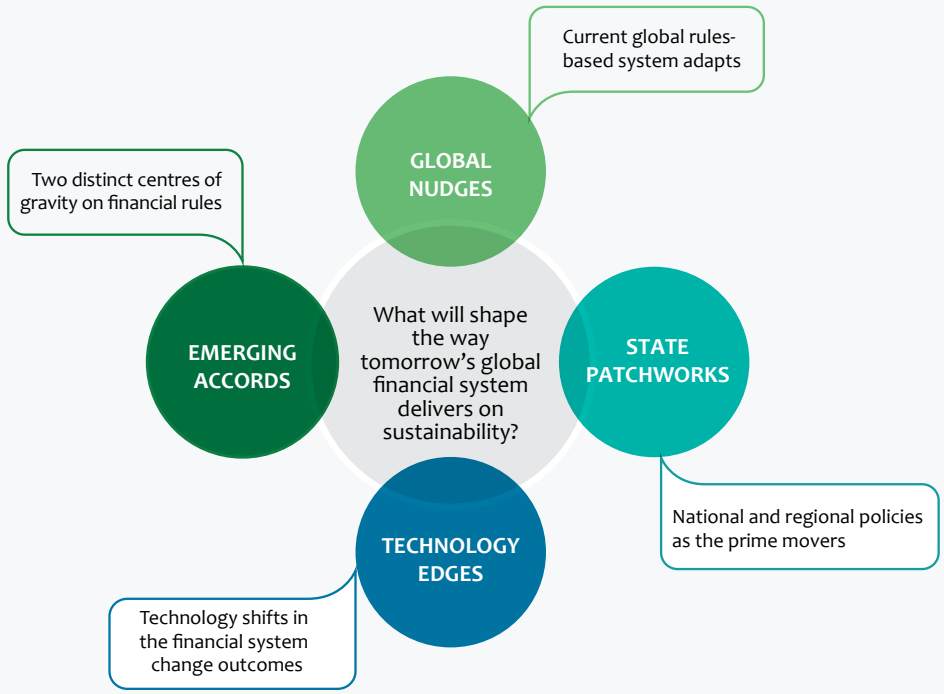
Disruptions to incumbent business models represent an ongoing, endemic risk to all. The sector is mature with massive market actors, but many factors are driving the sector towards major disruption and transformation. Policy and regulatory changes, for example, in the wake of the financial crisis, have diminished the profits of traditional banking after several decades of extraordinary financial success.[193] Unprecedented low interest rates resulting in large part from policy-directed quantitative easing have placed some pension funds and insurance companies at existential risk.

In this dynamic and disruptive context, efforts to align the financial system with sustainable development will require a forward-looking approach. Making predictions about the future path of the financial system is a risky business, given its many likely twists and turns. Failing to take into account possible changes runs the risk of misperceiving opportunities that are in reality on the wane, or missing potential because it is not yet manifest in the mainstream of the financial system. Many of today's sources of momentum have emanated from yesterday's marginal activities, and from hitherto marginal actors.

> *"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10. Don't let yourself be lulled into inaction."*[194]
>
> **Bill Gates,** Co-Chairman of the Bill and Melinda Gates Foundation

Systemically important innovations can also be made in the governance of the financial system itself. How best to align the financial system with sustainable development depends in significant part on how the governance of the system evolves. In the first edition of the Inquiry's

FIGURE 13: TECHNOLOGY IS A DRIVER OF ONE OF THE UNEP INQUIRY'S FOUR SCENARIOS



Source: UNEP Inquiry (2016). Designing for Disruption: The UNEP Inquiry Scenarios.

report, "*The Financial System We Need*", a number of future governance scenarios were developed with OECD support. These mapped the possible contexts under which finance and sustainability needed to be brought together.[195] One of the scenarios, 'Technology Edges' (Figure 13), highlighted the potential for technology-based disruptions to impact the financial system in two related ways – in reshaping market actors and financial services, and in shifting the dynamics between the market and its governance.

Although it is hard to say when, financial technology or 'fintech', in combination with other innovations, will likely change the face of finance and its alignment with sustainable development. The use of fintech is not new, but the novel application of a number of technologies in combination is likely to reconfigure both financial sector business models, as well as the financial policies, regulations and market norms that have shaped modern financial practice. The impact of fintech on sustainable development to date has been an underdeveloped area of research and dialogue, largely framed by firmly held preconceptions.

- Some base their *positive expectations* on extrapolations of today's growing armada of value-led, small-scale, early stage innovations.
- Others base their *pessimism* on concerns about the negative impacts of accelerated commoditization of markets driven by fintech-powered efficiencies.[196]

In short, there has been little serious analysis to date of the core and most important question as to '*the possible scaled effects of fintech on sustainable development*'.

This section lays out the key aspects of the fintech landscape, some key interconnections with sustainable development, the major unintended consequences that need to be addressed, and possible next steps. At this initial early stage, the UNEP Inquiry's initial landscape review of this topic focused on three hypotheses:[197]

- *Game-changer*: that fintech could significantly change the ways in which the financial system could embrace sustainable development.
- *Contingent*: that the technology itself does not imply a fixed answer to the core question, but it will unleash a new generation of impactful, patterned norms.
- *Shaping*: that the nexus between fintech and sustainable development can be shaped by market innovation, collaboration and public-interest measures.

2.2. FINTECH LANDSCAPES

Fintech offers the prospect of a more efficient, accessible and less vulnerable financial system, but brings with it known risks and many unknowns. Fintech covers everything from mobile payment platforms to high-frequency trading, and from crowdfunding and virtual currencies

to blockchain.[198] At its core, fintech reduces market friction by cutting out incumbent intermediaries and often replacing them with lower cost variants, from robo-investors to high-frequency traders, and so ultimately by increasing the speed and lowering the costs of transactions. In combination, fintech innovations are likely to threaten the viability of many of today's financial sector business models. Furthermore, they may undermine the effectiveness of some of the financial policies, regulations and market norms that have shaped modern finance, offering in their stead technology-driven rules embedded through a new generation of code, financial systems and institutions.

Fintech is part of a broader, technology-driven revolution in progress. The world is undergoing a transformation at high speed, driven by the fusion of advanced digital, material and biological innovations.[199] The accelerating confluence of emerging technology breakthroughs covers wide-ranging fields such as artificial intelligence (AI), robotics, the internet of things (IoT), autonomous vehicles, 3D printing, nanotechnology, synthetic biology, DNA editing, biomimicry, advanced materials science, energy storage and distributed computing,[200] to name but a few. This changing technological ecology is likely to rewire every aspect of our global economy and the design and functioning of many core societal functions, from the role and functioning of labour markets to the state.

Fintech is already disrupting the financial sector. Some technological disruption fundamentally erodes value across a whole industry. According to Citi,[201] there has been a 44% loss of share from physical-to-digital business models over a 10-year period of digitalization in music sales, video rentals, travel booking, newspapers, taxis and hotels. Fintech has so far challenged financial incumbents in mobile and internet payments, unsecured P2P lending, and invoice finance, among others. Goldman Sachs has estimated that US$11 billion of annual profit are already at risk from digitalization.[202] Fintech start-ups raised a total of US$19 billion in 2015,[203] concentrated mainly in payments, capital markets, bank credit and personal financial management.

Fintech's scope is potentially very broad. Many of the individual technologies involved are not new, but their combination is driving the overall disruptive potential. This spans at least five core financial sector activities: moving value; storing value; exchanging value; funding and investing in value creation; insuring value and managing risk. Current examples include:

- ***Payments*** are the most immediate 'low-hanging fruit', particularly in developing countries. M-PESA, the iconic P2P mobile money service that was launched in Kenya almost a decade ago, currently has about 25 million customers in 11 countries.[204] ANT Financial Services currently has 450 million users in China, and a further 170 million in India through a joint venture.
- Borrowers and lenders have been 'matched' through online ***P2P platforms*** for around a decade already, but the total amount lent remains small, less than 1% of total loans according to the CITI GPS.[205]
- Fintech has entered the ***investment industry*** to date through the growth of 'robo-advisors', which according to CITI GPS are already managing US$2.6 trillion of the total US$30.4 trillion of the Exchange Traded Fund (ETF) and mutual fund market.

2.3. LINKING FINTECH AND SUSTAINABLE DEVELOPMENT

Fintech's possible impacts – on both the mobilization of capital for critical priorities and the mainstreaming of social and environmental factors throughout the financial system – must be better understood. Fintech is not the outcome of a single or set of institutions with a single set of values or interests. Understanding and shaping it therefore requires one to appreciate its diverse aspects and development pathways. Understanding fintech's possible impacts on sustainable finance requires four analytic steps: (a) restating the sustainable development financing challenge in the fintech context; (b) considering bottom-up examples to understand specific practice and potential; and (c) examining whether there are more general features of the fintech-sustainable finance dynamic. Ultimately, these steps help in addressing the fourth step – the active question of whether there are ways to more consciously impact this dynamic.

(a) Restating the sustainable development financing challenge in the fintech context

The core financing challenge in the context of fintech can be restated as two-fold:

1. **Mobilizing Finance:** capital needs to be mobilized for ***financial inclusion*** of underserved groups (e.g.

low income citizens and small and medium-sized enterprises), raising ***capital for sustainable and resilient infrastructure*** (e.g. energy) and ***financing critical areas of innovation*** (e.g. off-grid energy solutions, smallholder agriculture, sustainable land use, sustainable fisheries).

Barriers to mobilizing finance include poor access to relevant and timely data, weak project pipelines, underdeveloped financial markets in developing countries leading to unfavourable interest rate premiums, unfavourable comparative risk-return ratios stemming from political, exchange-rate and other risks, and the high costs of servicing small amounts of financing and the associated difficulties of scaling finance.

2 **Mainstreaming Sustainability:** sustainability factors are increasingly relevant and material for financial institutions' decision-making. This starts with ensuring ***market integrity*** (e.g. reducing corruption, enabling new common-pool resource markets, efficient markets) and extends to integrating environmental and social factors into risk management (e.g. climate-related risk ratings of biological assets, risk transfer in smallholder agriculture and shared assets). Sustainability also needs to be incorporated into the disclosure responsibilities and reporting (e.g. requiring secure registries of property rights and moveable assets) of market actors to guide their decision-making.

Barriers to mainstreaming sustainability include, for private finance, overall market weaknesses and distortions, including misaligned incentives and illicit financial flows, and inadequate information and capabilities.

(b) Considering bottom-up examples to understand specific practice and potential

A growing number of interesting and potentially scalable cases of fintech-powered financial services are specifically targeted at overcoming one or more of these barriers. Our research has focused on two types of exemplary cases, a number of examples and several notional cases of uses of fintech that could be applied in the pursuit of sustainable financing (see Figure 14). Some examples include:

1 *Payments*: M-KOPA provides affordable solar power to low-income households on a pay-per-use instalment plan. In partnership with mobile money systems such as M-PESA in Kenya and IoT sensors in each solar array, M-KOPA monitors real-time performance and payment status. M-KOPA aims for 1 million homes in Kenya by 2018.[206]

2 *Investing*: Abundance Investment in the UK is a peer-to-peer platform, enabling individuals to make direct investments in renewable energy projects from £5 upwards. So far, it has mobilized over £20 million.[207]

3 *Insuring Risk*: By 2015, over 800,000 farmers in Kenya, Tanzania and Rwanda were insured by ACRE and similar vehicles against a variety of weather risks. Scaling this technology through a combination of the 'internet of things', blockchain and artificial intelligence could help provide risk coverage to an estimated 1.5 billion smallholder farmers in the developing world against increasing weather volatility.[208]

Fintech can open up new ways to make citizens' lifestyles more sustainable. Scaled benefits to deploying fintech can be seen from ambitious actions taken by public and private institutions. UN Women, for example, has led in the UN family in deploying fintech to ensure both equal and greater access for women in developing countries (see Box 14). Ant Financial Services (ANT), a related company of Alibaba, is China's largest fintech company, providing financial products and services, such as payments, loans, insurance and wealth management, to 450 million small businesses and individuals.[209] Financial inclusion is the most immediate contribution an operation like ANT can make to sustainable development, but this is just the beginning of a journey of engaging citizens directly in sustainable development. As one of the most popular mobile apps in China, ANT has been utilizing its platform to enhance the public's literacy about, and active involvement in, environmental protection and green lifestyle, for example:

- Working with over 90 asset management companies to sell their green and sustainable investment products, such as public fund products that are linked with green stock indices (stock indices with a significant share of green enterprises).[210]
- Working with the China Beijing Environmental Exchange in developing carbon accounting for individuals based on transaction data.[211]

(c) Examining whether there are more general features of the fintech-sustainable finance dynamic

Fintech has core features, or DNA, as does financing for sustainable development (Figure 15). Fintech

FIGURE 14: FINTECH FOR SUSTAINABLE DEVELOPMENT INNOVATION PORTFOLIO

PORTFOLIO OF FT4SD CASE STUDIES		GEOGRAPHY	FT4SD CASE STUDY CHARACTERISTICS		SCALING POTENTIAL	
		GEO SCOPE	SD GOALS	SUSTAINABLE FINANCE DRIVER	ADOPTION STAGE	SCALING POTENTIAL
1.1	SME collateral management registry	Global	Jobs and growth	Financial inclusion	Conceptual	++
1.2	Welfare conditional transfer	Developing	Poverty	Financial inclusion	Conceptual	+++
1.3	Remittances/accounts for unbanked	Developing	Poverty	Financial inclusion	Pragmatic followers	+++
1.4	Economic identities for refugees	Developing	Peace	Financial inclusion	Early adopters	+++
1.5	International aid smart contracts	Developing	Poverty	Financial inclusion	Early adopters	++
1.6	Smallholder identity and land registry	Developing	Hunger	Financial inclusion	Early adopters	+++
1.7	Participative democracy 2.0	Global	Jobs and growth	Financial inclusion	Conceptual	++
1.8	Enabling microfinance 2.0	Developing	Poverty	Financial inclusion	Conceptual	++
2.1	Pay as you go resource utilities	Developing	Energy	Capital for infrastructure	Pragmatic followers	+++
2.2	Flexible energy supply and demand	Developed	Energy	Capital for infrastructure	Early adopters	+++
2.3	Renewable energy P2P	Developed	Energy	Capital for infrastructure	Early adopters	++
3.1	Smallholder extension services	Developing	Hunger	Financing innovation	Conceptual	++
3.2	Community distributed generation	Developed	Energy	Financing innovation	Early adopters	+++
3.3	SME asset trade finance	Developed	Jobs and growth	Financing innovation	Conceptual	++
3.4	SME smart assets	Developed	Jobs and growth	Financing innovation	Conceptual	+
4.1	Financial markets early warning system	Global	Partnership	Market integrity	Early adopters	++
4.2	Sustainable fintech regulatory sandbox	Developed	Partnership	Market integrity	Early adopters	+
4.3	Biodiversity conservation exchange	Developing	Land-based	Market integrity	Early adopters	++
5.1	Shared asset insurance	Developed	Consumption	Risk and resilience	Early adopters	++
5.2	Smallholder index insurance 2.0	Developing	Food	Risk and resilience	Conceptual	+++
5.3	Basin water rights management	Global	Water	Risk and resilience	Conceptual	+++
5.4	Agricultural credit risk management	Developing	Land-based	Risk and resilience	Conceptual	++
6.1	Water asset registry and ratings	Global	Water	Performance and disclosure	Conceptual	+++
6.2	Fish supply chain traceability	Global	Ocean-based	Performance and disclosure	Early adopters	++
6.3	Climate monitoring reporting verification	Global	Climate	Performance and disclosure	Conceptual	+++

Source: UNEP Inquiry and Castilla-Rubio, J. C. (2016). Fintech and Sustainable Development: Assessing the Implications (forthcoming).

reduces the costs and increases the speed of financial transactions, and in so doing strips away or replaces many intermediaries, thereby also creating a greater decentralization of financial actors. This leaves savers, the owners of capital and the intended beneficiaries of pensions and insurance policies with more opportunities to make direct financing decisions. In addition, it offers the potential for a radical increase in transparency and possibly of accountability. Blockchain, in addition, offers the potential for dramatic increases in financial inclusion, deepening domestic financial markets, and reducing transaction costs. Furthermore, it offers ways to reduce credit risk by increasing secure information about consumer and investment track records, allowing many individuals and small businesses to access lower cost capital and lending.

Fintech, in combination with other technological innovations, can support the management of real economy environmental effects. Over time, the 'IoT' will enable data to flow from just about any physical asset manufactured, sold or used in the real economy (as a consequence of ever cheaper sensor technology and ubiquitous connectivity). This creates potential for the deployment and use of those physical products to become increasingly accountable and leverageable.[212] Regulators, furthermore, can require increased transparency with regard to measurable sustainable development effects, if only because the cost-related impact on manufacture and distribution are so low. Linking this with fintech, which enables physical flows to be monetarized in real time, will incentivize and enable innovation and greater upstream accountability.

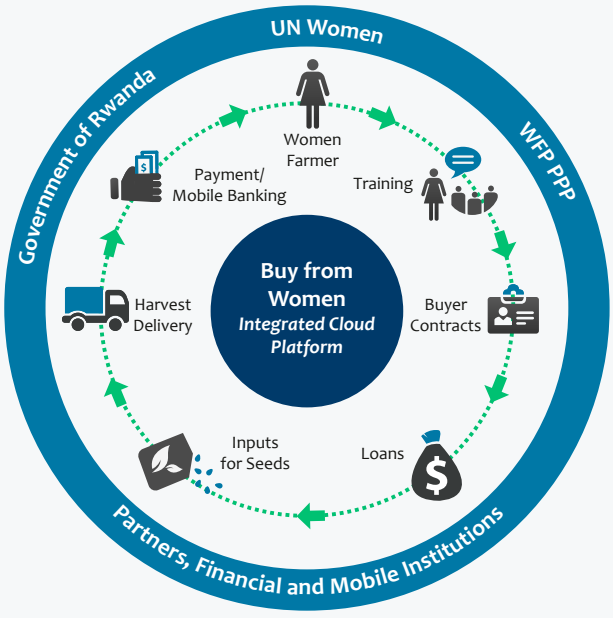
BOX 14: FINTECH FOR GENDER EQUALITY, WOMEN'S EMPOWERMENT AND SUSTAINABLE DEVELOPMENT[213]

Access to long-term affordable financing is one of the key challenges for scaling up gender equality and women's economic empowerment. Worldwide, women-owned formal SMEs have US$260 to US$320 billion in unmet financing needs.[214] Addressing the gender gap in access to finance has the potential to add as much as US$12 trillion in annual 2025 GDP, and boost the resilience of communities and societies to political, socio-economic and climate shocks. For example, access to finance to procure seeds and fertilizers, farm equipment, and storage facilities can increase women farmers' productivity by 20 to 30% in sub-Saharan Africa and accelerate the adoption of climate-smart agriculture.

In order to increase women's access to finance, UN Women leverages innovative technologies, business models and practices to break isolations and generate economies of scale. Notably, UN Women develops digital enterprise platforms that enable women in the developing world to manage all aspects of their business – forecasts, contracts, loans, sales and repayments – with full transparency from their mobile phones.

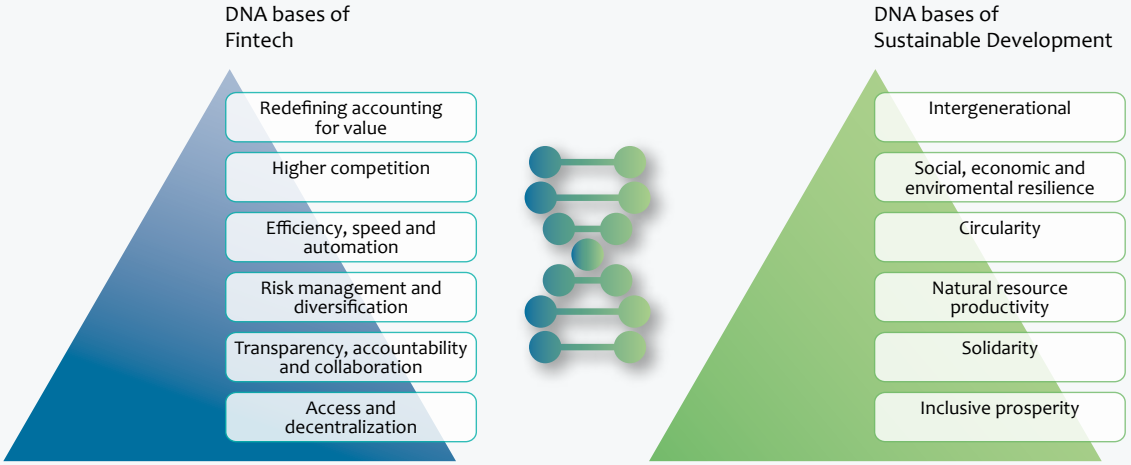
Business data is systematically captured on the platform, available real-time, worldwide. This allows women to build and own a track record, and provides investors with the information they need to lower risk and increase women's access to much-needed finance. This has the potential to cut due diligence and intermediation costs and unlock global social impact investment and crowdfunding for women SMEs in developing countries. A 'portable and immutable' blockchain economic identity linked to the platform can facilitate financial transfers.

The figure below visualizes the digital enterprise platform for climate smart agriculture being prototyped in Rwanda. This climate-smart agriculture (CSA) platform is expected to be extended to a dozen of countries in 2017.



Source: UN Women (2015). Financing: Why it Matters for Women and Girls.

FIGURE 15: THE DOUBLE HELIX DNA OF FINTECH AND SUSTAINABLE DEVELOPMENT

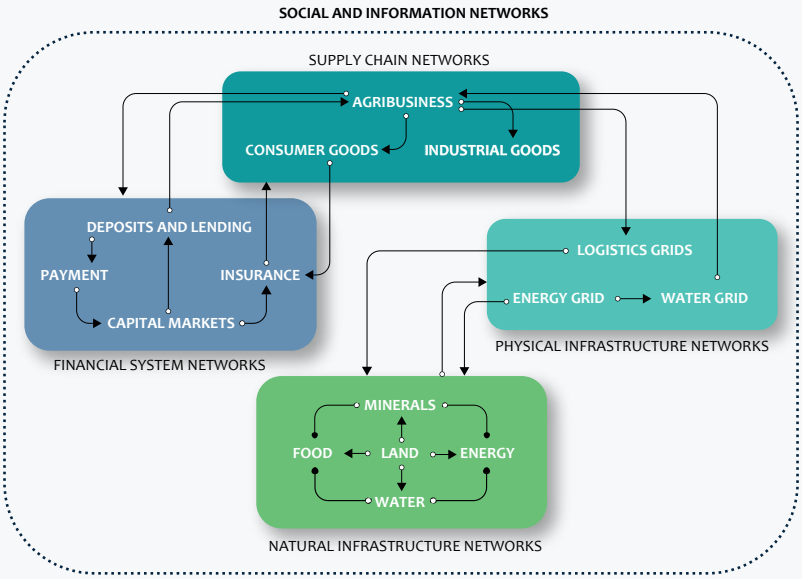


Source: UNEP Inquiry and Castilla-Rubio, J. C. (2016). Fintech and Sustainable Development: Assessing the Implications (forthcoming).

These characteristics clearly address some, although not all, of the barriers to financing for sustainable development, such as lower costs and connecting savers and investors directly with project owners, such as SMEs. Increased transparency and accountability should also strengthen the ability of the wider public and the government to oversee the behaviour of financing individuals and institutions, and notably through blockchain to know the history of use of money involved in specific financial transactions.

Taken alone, such features of fintech would almost certainly increase financial inclusion, and could thereby support other aspects of sustainable development, such as natural resource productivity and depletion rates. To name a few, addressing the gap in access to finance is a pre-condition for climate-smart agriculture, decentralized renewable energy, sustainable settlement, disaster risk management, employment creation, or peace and stability. Such potential should be recognized and acted on, while also acknowledging the limitations and challenges. For example, it may be that fintech embedded in such business models as Uber increases asset utilization rates, in this case cars operating as taxis.[215] However, in such cases there may well be an ambiguous overall environmental impact. For example, Airbnb may on the one hand increase the utilization rates of people's homes, thereby reducing the need to build new hotels, but at the same time increase the level of long-distance tourism because of reduced costs and increased income effects.[216]

FIGURE 16: UNDERSTANDING THE SYSTEM OF SYSTEMS



Source: Space Time Ventures (2016)

Fintech will certainly have broader unintended consequences with possible sustainable development implications. Unintended consequences, indeed, may be greater than the planned, or even the foreseen consequences. Only a few fintech entrepreneurs, for example, set out with the vision that a profitable start-up could have major social or environmental benefits. Similarly, there is little doubt that fintech will have significant, negative employment implications across the financial system, transforming or rendering obsolete many existing businesses and underlying market functions.[217] Less understood, however, is how it will affect the role of central banks, particularly with the emergence of cryptocurrencies alongside money hitherto controlled by state-monopolies.[218] Indeed, some of the deeper unknowns concern how blockchain, in combination with other technology drivers in the real economy, notably artificial intelligence and the IoT, will shape new markets that blur the boundaries between financial services and adjacent, real economy sectors such as retail and telecom, infrastructure delivery, and health and education.

Such consequences need to be better understood and, where possible, managed.

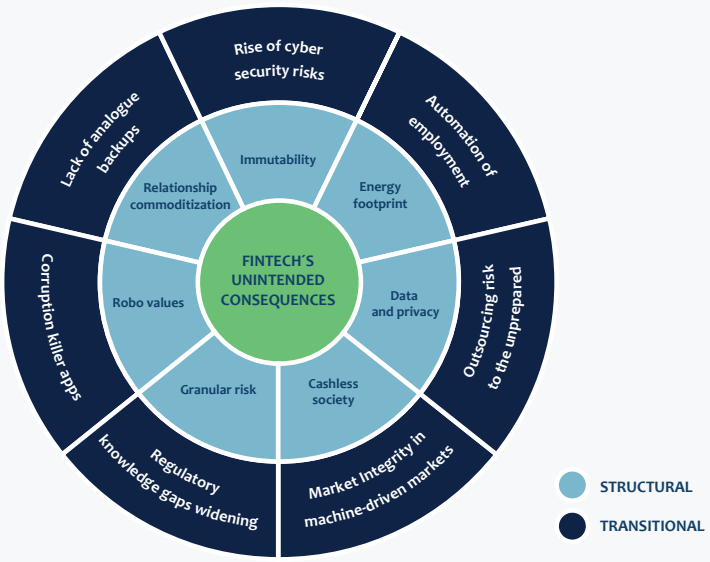
- Positive potential spillovers, for example, might be best handled through incentives and providing greater regulatory space for innovation.
- Negative potential spillovers, on the other hand, might require enhanced supervision, or collaborative efforts among actors to strengthen collective responsibility.

2.4. EMERGING PUBLIC MEASURES FOR ALIGNING FINTECH WITH SUSTAINABLE DEVELOPMENT

Fintech will change the relationship between the financial system, the real economy and the governing role of the state and public institutions. Fintech will accelerate the integration of the financial system and the real economy, enhancing opportunities for greater decentralization in the transition to sustainable development. Fintech will also enhance the role of technologists and market actors in shaping the financial system in practice, highlighting the need for such actors to commit to approaches that enhance sustainable development financing.

Uncertainty and complexity make it hard to know what to do. This fintech-focused research has highlighted the importance of understanding the 'system of systems' relationships between the financial system, natural resources, physical infrastructure, all interlinked by social systems. Earlier work has been based on the simplifying assumption that the financial system can be understood as a distinct, albeit related part of the wider system, particularly its separation from the real economy. Fintech framed more narrowly already presents many uncertainties and unknowns. Figuring out whether and how to intervene becomes more difficult when set against potential unintended consequences. Beyond this, fintech threatens to become overwhelm-

FIGURE 17: FINTECH'S UNINTENDED CONSEQUENCES



Source: UNEP Inquiry and Castilla-Rubio, J. C. (2016). Fintech and Sustainable Development: Assessing the Implications (forthcoming).

ing, especially when taken as part of a broader technological ecology that undermines the concepts and practices that consider the financial and capital markets as a distinct, policy-responsive system.

There is a need to define the policy space that lies between a purely laissez faire approach, and one that seeks to impose linear controls over the emergent new economy. Complicating this challenge is our dual focus on the nexus between fintech and sustainable development, with both topics providing ample scope for policy debate, experimentation and errors. Pursuing a 'wait and see' approach – wherein policy intervention should await a more matured set of markets – has some merit. Yet some of the most knowledgeable, ardent supporters of fintech argue that critical decisions in practice are being made in the short-term, say the next 3-5 years, that will largely embed the modalities of fintech, notably those involving code and associated standards.

Fintech's impact will depend on a number of policy and regulatory innovations that enable scaling and minimize its negative unintended consequences. Some of these interventions are not specific to particular sustainable development considerations, but are good practice in enabling fintech innovations. There is a need, for example, to get the right balance between rules set by law and those evolved through technical code. Bitcoin, for example, has developed its rules without government intervention. But going forward, there will be a need to shape and better manage regulatory interventions in the continued development of blockchain, such as to ensure prudential oversight of possible financial stability effects. Similarly, but not specific to sustainable development, are the advantages of policies that encourage open data and ensure interoperability.

Policies need to be as much about creating an enabling environment as constraining rules and norms. Many people support a 'hands off' approach, particularly where there are distinct public interest outcomes, such as financial inclusion. Safaricom's M-PESA is a well-known success story and deservingly so. It was able to grow quickly because Kenya's banking and telecom regulators initially decided to take a hands-off approach. According to the World Bank '*Digital Dividends*' report, Safaricom maintained a dominant position for seven years through exclusivity agreements locking agents into the system. In 2014, when maturity was reached, Kenya's Competition Authority changed the rules and opened the system.[219]

Policy interventions can be active on both the fintech supply-side and on the manner in which financial system development is aligned to sustainable development. Some key steps in the 'fintech for sustainable development' innovation journey could include:

- Ensuring that fintech is an integral part of financial system development plans and roadmaps focused on financing sustainable development, particularly at the national level, and especially for developing countries.
- Establishing a platform of leading fintech companies, working with others to influence the right enabling businesses, policies and standards to effectively connect fintech and sustainable development. Such a platform should connect with the many emerging incubators and also 'sandboxes' being established in an effort to find the right balance between top-down interventions and bottom-up innovations.
- Incentivizing fintech aligned with sustainable development, for example by:
  - Supporting venture capital and social impact funds to fund start-ups with specific sustainable development ambitions.
  - Creating a challenge fund, similar in nature to the Longitude and X-Prizes, which would seek to create a global community of purpose that can pilot and create replicable solutions over time.

MEASURING PERFORMANCE: **KEY MESSAGES**

Momentum is clearly observable across the financial system. A deeper question is how this is influencing the efficiency, effectiveness or resilience of financial systems in light of sustainable development.

- *There is growing recognition of the importance of measuring performance, but existing data is fragmented, incomplete and does not allow for effective evaluation within or between countries.*

- *UN Environment has developed an early stage framework focused on three performance characteristics: the rules architecture, market behaviour and financial flows.*

- *A set of 21 best-in-class indicators have been identified for the overall system, banking, bond markets, equity markets, institutional investment and insurance, which were then used to compare 20 developing, emerging and developed economies.*

- *From the current phase of the work, a number of initial insights can be drawn:*

    - *A small number of emerging, developing and developed countries are playing a critical leadership role in evolving the frameworks of overall system governance. Emerging economies as a whole appear to be marginally in the vanguard.*

    - *The linkages between the rules architecture, market behaviour and financial flows cannot be made quantitatively at this stage. For example, the quality of sustainability disclosure on stock exchanges is only partly determined by prevailing disclosure rules.*

    - *Measurement of flows of green finance can benefit from examining both absolute amounts and by placing these in country contexts to understand the relative effort being made. For example, among the 20 countries considered, the US and France lead in the absolute dollar value of green bond issuance over the past three years, while it is France and Germany that lead in terms of green bond as a proportion of total bond issuance.*

- *UN Environment will build on these initial findings and further enhance the indicator set and associated analytics to capture a broader spectrum of investment flows, explore measurements focused on resilience as well as fintech developments.*

- *Future iterations also need to extend the range of involved institutions to include key international financial organizations.*

3. MEASURING PERFORMANCE[220]

3.1. THE NEED TO MEASURE PERFORMANCE

There is growing recognition that progress towards aligning the financial system with sustainable development must be measured. The positive momentum means that there are now many initiatives under way. Making sense of the comparative and absolute value of these activities is rapidly becoming a priority. During 2016, several measurement-focused initiatives were launched, including private initiatives,[221,222] country-level initiatives,[223,224,225] and international work such as the G20's Green Finance Study Group[226] and other international organizations.[227] Such initiatives are of critical importance, particularly those focused on building consistent, comprehensive data sets such as the G20-related work taken forward by the World Bank and others.[228]

The UNEP Inquiry also advanced further work during 2016 in exploring how best to establish a consistent basis for specifically measuring progress in aligning the overall financial system with sustainable development outcomes, and to map out how this basis can be improved over time. The objective of this work has been to add value by:

- Providing a map of the financial system dynamics that we need.
- Enabling country, and financial centre, progress to be measured.
- Highlighting areas for market and policy, and regulatory action to improve performance.
- Identifying steps needed to broaden and deepen the performance framework itself.

This section summarizes the emerging framework and presents the initial findings and recommended steps moving forward.[229]

3.2. TAKING STOCK OF CURRENT PRACTICE

The Inquiry in its first phase provided early signals of what might be considered in measuring the alignment of the financial system with sustainable development (see Figure 18). This highlighted the need to measure the workings of the system as a whole, alongside but not restricted to measures of financial flows and stocks, the latter being essentially the outputs of the system. From this perspective, it was proposed to frame any performance measurement with three core system characteristics: efficiency, effectiveness and resilience (see Box 15).

To date, there have been no consistent attempts to capture and analyse data across these key outputs and system characteristics. Some elements are available, including estimates of requirements and information on current flows, such as UNCTAD's widely used estimate that US$5-7 trillion is needed in investments to deliver the Sustainable Development Goals, and some country data such as China's estimate of its green financing needs as US$600 billion annually.[230] Some flow data also exists, such as estimates of global investment in renewables – rising to US$286 billion in 2015.[231] Similarly, some stock data exists, such as China's estimate that about 10% of bank lending in China is classified as 'green',[232] and the estimate of the Brazilian Federation of Banks, FEBRABAN, that 8.8% of corporate lending was allocated to green investment. Data availability is, however, limited to such leadership cases, and even in these cases is based on differing definitions.[233]

FIGURE 18: KEY FEATURES OF A PERFORMANCE FRAMEWORK FOR A SUSTAINABLE FINANCIAL SYSTEM

FEATURE	DESCRIPTION	COMMENT
Requirements	Capital required to finance sustainable development	Covering: (a) deployment of capital to fund incremental assets or activities; (b) elimination of "unsustainable" assets and activities previously funded by capital; and, (c) reserving capital against conditions that could challenge sustainability.
Flows	Flows of finance against such requirements	Providing a common approach for measuring actual flows, building on existing methodologies, accepting that flow analysis does not clarify the effectiveness or efficiency of securing such flows.
Effectiveness	Degree to which markets price sustainability factors into asset values	Core to assessing existence of market failures, although need to distinguish failures associated with real or financial economy market and/or policy weaknesses.
Efficiency	Costs of running the financial system that delivers financial flows against requirements	Includes both transaction-specific and comprehensive financial system costs.
Resilience	Susceptibility of the system to disruptions related to unsustainable development	Covering the direct impact of environmental stress as well as impacts of transitional effects. This is inherently future-oriented and requires (a) analysis over extended time periods and (b) distinguishing higher levels of resilience through externalization and internationalization of sustainability factors.

Source: Adapted from UNEP Inquiry (2015). The Financial System We Need: Aligning the Financial System with Sustainable Development.[234]

"There is an opportunity for the G20 to create practical green financing models for the developed and the developing world. The good news is there is an abundance of capital globally, but governments need to create the proper conditions to attract this capital. They have an important role to play in setting the policies, regulations, incentives, and in ensuring that they are enforced - (...) Global capital markets are powerful forces. Directed properly, they can alleviate the burden on governments and unlock a sustainable economic future."[235]

Henry (Hank) M. Paulson, Jr., Chair, Paulson Institute

Estimates of financial requirements, flows and stocks do not provide a full picture of the efficiency, effectiveness or resilience of the financial system, given the challenges of sustainable development. The connection between efficiency and sustainable development remains unexplored, although the work of Thomas Philippon has pointed to the value of deepening this analytic lens.[236] Equally, there is little data or analysis to help us understand which parts of the financial system are most effective in pricing and managing sustainable development-related risk. Forward-looking information on the resilience to emerging environmental factors such as air pollution, climate change and water stress is equally sparse. For example, the prudential reviews undertaken to assess climate-related risks have been limited in time horizon and constrained by a lack of scenario-based risk modelling by financial enterprises.[237,238,239,240,241]

As a contribution to filling this gap, UN Environment has developed an initial version of a performance framework based around these primary characteristics. Capturing the complex dynamics of sustainable finance will ultimately require extensive modelling of both the real and financial economies, including the public sector and covering nuanced interactions between domestic and international financing considerations and outcomes. Not only is such modelling beyond the scope of the UNEP Inquiry, but also any attempts at this stage would suffer from extreme data shortfalls, high costs and uncertain value. The key dimensions of the performance framework are set out in Box 15.

This work has only been possible through a series of formed partnerships to enable data to be acquired, recast, analysed, interpreted and communicated. Key data sources and partners have included: Bloomberg New Energy Finance, CDP, Corporate Knights, FTSE Russell, the Principles for Responsible Investment, Thomson Reuters and the Sustainable Stock Exchanges Initiative.

Support was also received from the Bank for International Settlements, Bloomberg, the Cleantech Group, the Climate Bonds Initiative, the IMF, SwissRe, UNCTAD, the United Nations Framework Convention on Climate Change and the World Bank. The performance framework is summarized in Box 15.

BOX 15: THE PERFORMANCE FRAMEWORK – IN BRIEF

Our initial approach has a limited scope and covers:

- Green aspects, but only of those for 'finance for sustainable development', although some indicators spill over into broader sustainability considerations;
- Country-based level, as this is the boundary for most policy and regulatory initiatives, recognizing the international nature of private financial flows; and
- Private not public finance, while recognizing the close linkages between them in practice, such as through public subsidies.

The performance framework is made up of four conceptual layers:

- Performance characteristics: efficiency, effectiveness and resilience;
- System pillars: rules architecture, market behaviour and financial flows;
- Segments: overall system, banking, bonds, equities, institutional investors and insurance; and
- Indicators: both 'ideal' and 'proxy' indicators, the latter used depending on data availability.

This framework has been applied to a range of developing, emerging and developed markets, including:

- Developing: Bangladesh, Egypt, India, Indonesia, Kenya, Mongolia, Morocco, Nigeria;
- Emerging: Brazil, China, Colombia, Mexico, Peru, South Africa; and
- Developed: France, Germany, Italy, Singapore, Switzerland, the UK, the US.

In this initial round, a total of 21 proxy indicators have been identified and developed, screened from an initial list of more than 70 choices, and selected through an extensive consultation process and related analysis.

3.3. DEVELOPING THE PERFORMANCE FRAMEWORK

Understanding the performance features of a highly dynamic system is challenging, but possible. Financial system performance cannot be assessed like a plane or football team. Its complex, adaptive nature makes for uncertain relationships between context, interventions, actors and outcomes, all the more so given its massive scale, volume of activities, and transboundary features. The multi-dimensional nature of sustainable development makes this task even harder. In spite of this, well-established frameworks do capture the traditional aspects of system performance, notably the Financial Sector Assessment Program[242] and the World Bank's Global Financial Development Index.[243]

We have also drawn on earlier work supported by the OECD in building scenarios for sustainable financial systems,[244] the 'FAIR' framework set out by the Bank of England's Governor, Mark Carney,[245] and the Citizens' Finance Dashboard developed by a coalition of civil society organizations convened by FinanceWatch.[246] In addition, consideration has been given to specialized analytic perspectives, such as ongoing work on the dynamic relation between financial inclusion and financial system development.[247]

The scope of the performance framework is limited to developments within the financial system itself. Many factors influence the alignment of finance with sustainable development. This includes economic policy, notably the degree to which environmental outcomes are internalized into market prices and value creation, and the deployment of public capital, both through fiscal measures and the use of development finance to leverage private capital. This framework focuses exclusively on action and results within the financial system, while recognizing in practice the existence of important dynamics between these areas.

The proposed framework is grounded in core performance characteristics, which in turn cascade into proxy indicators. The framework is rooted in the three performance characteristics of efficiency, effectiveness and resilience:[248]

- **Effectiveness** – the degree to which the market prices sustainability factors into financial asset values (sometimes called 'allocative efficiency').
- **Efficiency** – the costs of running the financial system that delivers financial flows aligned with sustainable development.
- **Resilience** – the susceptibility of the financial system to disruptions related to unsustainable development, such as water scarcity, air pollution or climate change, including transition risks.[249]

Individual indicators may relate to one or more of these characteristics. Pricing in climate risk, for example, is clearly a matter of effectiveness, but also impacts on system resilience. Improved effectiveness, similarly, would tend to increase financial flows aligned with sustainable development (and reduce flows that are not), thereby increasing measures of efficiency and almost certainly resilience.

The framework rests on three analytical pillars – the architecture of rules, behaviour in markets and the flows of finance. Under architecture, we include all rules, regulations, policies, norms and standards in the financial system that might directly or indirectly enhance sustainable development outcomes. Here we measure whether the 'rules of the game' are aligned with sustainable development needs, drawing on the Inquiry's global database of measures featured in Section 1, supplemented by specific indicators that seek to measure the quality of the governance architecture. Under markets, we identify the behaviours of market actors. Here, we measure how well market players, market makers, and financial services are aligned with sustainable development needs. And under flows we measure allocation of capital to sustainable (and unsustainable activities), both in terms of annual flows and overall stock of assets.

Ideal indicators would exactly capture these characteristics across all these pillars and market segments, but in practice rarely exist due to both conceptual problems and data availability. Proxy indicators have therefore been selected both on the basis of their ability to illuminate performance aspects, and on the practical matter of data availability. Even within a self-imposed 'green finance' limitation, almost 70 potential indicators were screened in depth, from which a total of 21 were selected for use in this cycle. Efforts were made to select proxies that would have relevance across as wide a possible range of countries, and to ensure that we had some measures for each of the selected financial system segments. The current indicator set is illustrated in Figure 19.

3.4. LEARNING THE LESSONS

This initial phase of work provides useful insights into the dynamics surrounding system governance, the links between rules and behaviour, and ways to better understand green financial flows.

Understanding System Governance

The indicator for Financial System Governance and Leadership aimed to measure how sustainable development was being recognized in the overarching mandates of institutions such as finance ministries, central banks and regulators and also how leadership initiatives were interpreting these mandates in light of emerging sustainable development priorities.[250] The results highlight that the linkages are still at an early stage and that a critical leadership role is being played by a small number of emerging, developing and developed countries to evolve the frameworks of overall system governance. From our sample, leadership countries include Brazil, China, France, Kenya and the UK. Emerging economies as a whole appear to be marginally ahead on this indicator, but less advanced in terms of specific sectors, such as institutional investment and insurance.

Linking rules, market behaviour and flows

The linkages between the rules architecture, market behaviour and financial flows cannot be made quantitatively at this stage. This is likely to be the result of multiple factors influencing ultimate behaviour, including those beyond the financial system. It is also unclear whether this is because of a material time lag between new rules, market behaviour and financial flows.

For example, the quality of sustainability disclosure on stock exchanges appears to be only partly determined by prevailing disclosure rules (see Figure 20). Brazil and South Africa lead in terms of the quality of stock exchange rules for sustainability disclosure, while France and the UK lead in terms of the quality of actual reporting. Disclosure rules and practice appear reasonably correlated, although with some notable outliers, including Switzerland, which scores high on practice and low on formal requirements. Other factors such as levels of investor commitment to responsible investment could help to explain these relationships.

FIGURE 19: MEASURING PERFORMANCE: INITIAL SET OF PROXY INDICATORS

ACTORS/ASSET POOLS	ARCHITECTURE	MARKETS	FLOWS	
			STOCKS	FLOWS
SYSTEM LEVEL	• Principles, policy and legal frameworks to align financial system with sustainability • Integration of sustainability into Foreign Direct Investment (FDI) agreements			• Clean energy investment flows • Water and sanitation investment flows • Investment flows to cleantech venture capital
BANKING	• Regulations, codes of conduct and voluntary initiatives regarding banking sustainability, including lender environmental liability	• Banking efficiency		• Real economy lending
DEBT CAPITAL MARKETS				• Issuance of green bonds
EQUITY CAPITAL MARKETS	• Regulatory and self-regulatory commitments to advance sustainability of stock exchanges	• Stock exchange ESG disclosure index • Stock exchange carbon intensity • Stock exchange efficiency	• Levels of low-carbon revenues on stock markets	
INSTITUTIONAL INVESTORS	• Regulations, codes of conduct and voluntary initiatives on ESG in investment	• Consideration of ESG factors in institutional investor decision making	• Environmental and social investments by large investment managers • Portfolio alignment to clean energy and fossil fuels	
INSURANCE	• Regulations, codes of conduct and voluntary initiatives regarding insurance sustainability	• Insurance penetration rate • Insurance density		

Source: UNEP Inquiry and Ecofys (2016). Developing a Performance Framework for a Sustainable Financial System (forthcoming).

Evaluating green finance flows

To date, the rules governing the green bond market have been market-based and voluntary, notably the Green Bond Principles and the Climate Bond Standards; regulatory requirements have emerged relatively recently in China and India. Putting the data on country-by-country issuance is important. Among the 20 countries analysed, Figure 21 shows that the US leads, followed by France, in the absolute dollar value of green bond issuance for the three years to the end of 2015. However, France leads, followed by Germany, in terms of green bonds as a proportion of total bond issuance for the period in question.

A similar contextualization can be applied to understanding the exposure of different stock exchanges to revenues from low-carbon goods and services. Drawing on datasets generated by FTSE Russell, it is possible to calculate the total value of revenues linked to low-carbon goods and services on the world's equity markets.

Figure 22 shows that the US leads in terms of the absolute value of listed low-carbon revenues, but it falls to fourth when normalized as a percentage of free float market capitalization. On this measure, China leads.

More broadly, the indicators show that for institutional investors, not surprisingly, developed countries dominate. This leadership in large part reflects the country distribution of the institutional investor community, although the inclusion of state-run emerging and developing country national social security systems would reveal their lagging behaviour given their considerable size. So far, indicators covering banking and insurance have not offered particular insights, which is certainly more a function of data shortfalls than a reflection of their significance.

3.5. MAKING MEASUREMENT COUNT

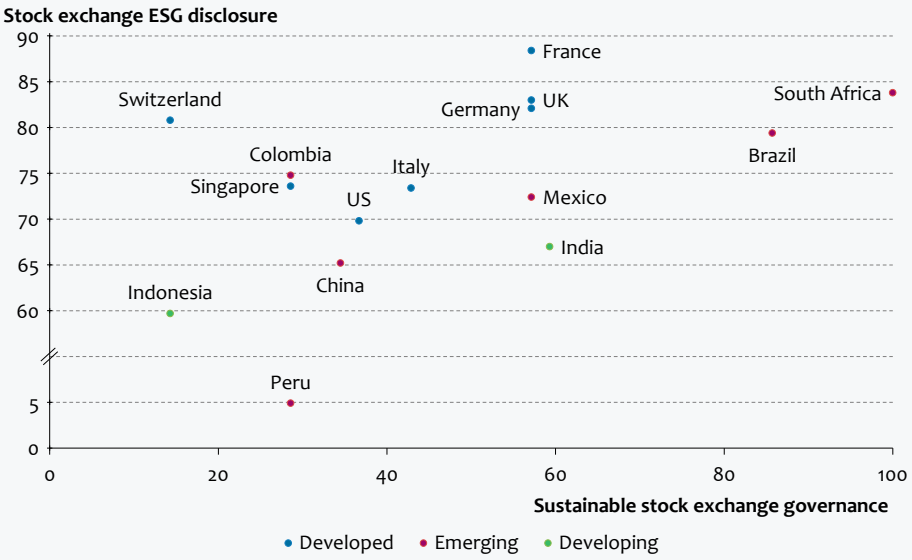
Progress counts at both the national and international levels. Today's global financial system is underpinned by a network of financial centres, which are linked by financial flows, globalized financial enterprises, and international norms, standards and institutions. Actions within these financial centres in large part dictate the direction and pace of change in how the global financial system is configured. Most directly, policies and regulations, but also standards, norms and to a degree culture, operate at a national, or occasionally sub-national or super-national, regional level. Indeed, international action on finance depends significantly on national leadership.

- Brazil and South Africa's leadership has underpinned the subsequent development of the Sustainable Stock Exchange initiative now covering 57 exchanges.[251]
- As part of its COP21 presidency, France developed a broad finance agenda including the development of domestic policies, as well as the encouragement of public and private financial flows consistent with the climate transition.[252]
- Indonesia's innovative sustainable roadmap championed by its financial regulator has resulted in the establishment of an ASEAN-wide sustainable finance forum.[253]
- The Bank of England's leadership in connecting climate risks and financial stability[254] has triggered other central banks to follow suit and resulted in the FSB Task Force on Climate-related Financial Disclosures being established.[255]
- China's systematic assessment of how to advance green finance domestically subsequently led to the G20 under its presidency taking on the topic.[256,257]
- Kenya's breakthrough leadership in advancing financial inclusion through the rapid diffusion of fintech, with Bangladesh and Peru, has inspired the Alliance for Financial Inclusion.[258]

Measuring countries' progress therefore makes sense, and needs to be relevant to policymakers and financial regulators, market makers such as stock exchanges, financial institutions themselves, and the wider public. Policymakers and regulators, primarily with national mandates, need to know if domestic financial systems are aligned with sustainable development.

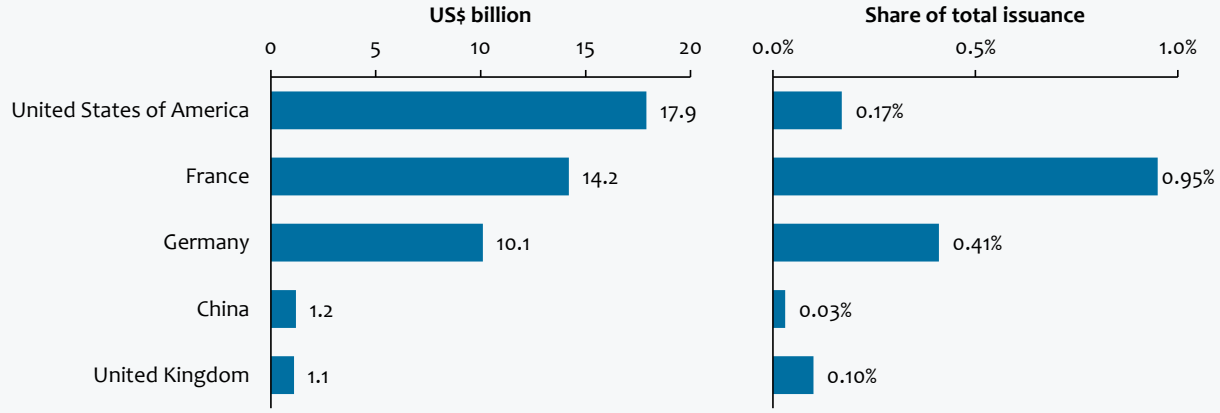
- First and foremost, financial systems need to be developed in ways consistent with countries' sustainable development and climate commitments.
- Second, financial and monetary authorities need to ensure that financial and monetary stability and practices are resilient to challenges posed by unsustainable development, and can evolve in an orderly fashion as sustainable development and climate commitments translate into market signals and developments.

FIGURE 20: STOCK EXCHANGE: COMPARING RULES AND MARKET BEHAVIOUR IN TERMS OF DISCLOSURE



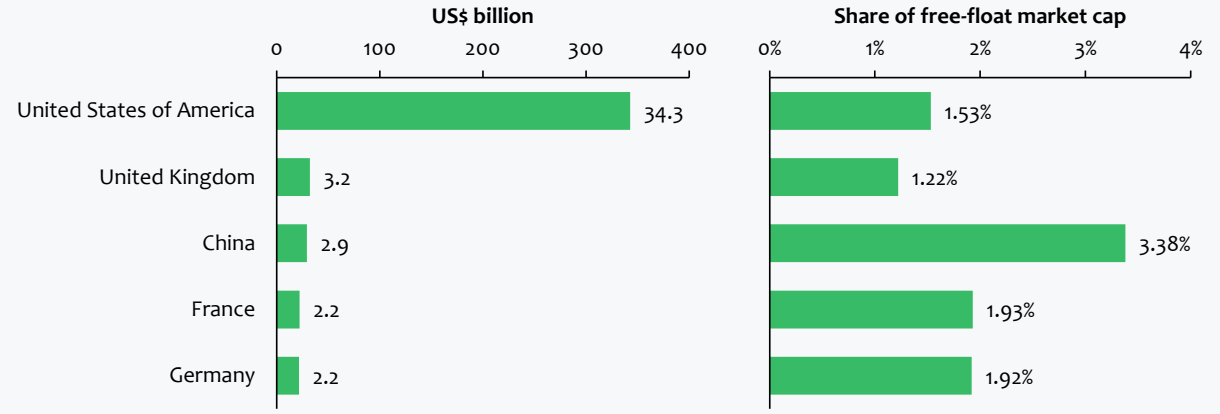
Source: UNEP Inquiry and Ecofys (2016). Developing a Performance Framework for a Sustainable Financial System (forthcoming). Stock exchange ESG disclosure values provided by Corporate Knights. Sustainable stock exchange governance analysed and processed by Ecofys based on Sustainable Stock Exchanges initiative data.

FIGURE 21: GREEN BOND ISSUANCE 2012-2015, ABSOLUTE AND RELATIVE AMONG THE 20 COUNTRIES



Source: UNEP Inquiry and Ecofys (2016). Developing a Performance Framework for a Sustainable Financial System (forthcoming), Based on data from Climate Bonds Initiative and Bloomberg.

FIGURE 22: STOCK EXCHANGE: LOW-CARBON REVENUES, ABSOLUTE AND RELATIVE AMONG THE 20 COUNTRIES



Source: UNEP Inquiry and Ecofys (2016). Developing a Performance Framework for a Sustainable Financial System (forthcoming). Based on data from FTSE Russell Low Carbon Economy data model.

- Third, nations need to be enabled to evolve the competitiveness of their financial centres as growing numbers of capital-seekers and financial institutions are attracted to markets responsive to a new generation of sustainability-aligned businesses and financial products.
- Fourth, financial policymakers and regulators, as well as financial institutions themselves, are increasingly required to account for their handling of social, environmental and economic considerations, requiring demonstrable responses at the national level as well as through international cooperation.

Even with all its inevitable weaknesses at such an early stage, the performance framework can already serve such diverse users:

- Some aspects of financial system reform and development can be benchmarked against comparative international performance.
- Financial institutions and capital-seekers can begin to see which financial centres are taking serious leadership in being configured for a new generation of businesses and financial products.
- The wider public can be better informed and in turn more influential.

That said, there is a long way to go in developing a robust performance framework. The initial results show the importance of, and initial benefit from, this exercise. But they also reveal the need for a more comprehensive effort. Moving to the next level requires some practical steps to be taken, including:

- *Increasing data:* most obvious is the need for improved data and convergent definitions across all segments, and across architecture, market behaviour and financial flows and stocks. While all areas would benefit from data improvements, the most obvious and important gaps are probably in banking, debt capital markets and insurance segments.
- *Broadening the sustainable development lens:* the initial focus on green finance is understandable, but only as an interim step, with the need now clearly to incorporate broader aspects of sustainable development, including underlying, enabling aspects of market integrity, such as illicit financial flows and market structure.
- *Expanding the number of countries:* there is a clear need to extend the number of countries, perhaps embracing existing country groupings such as the G20 and the G7, or ASEAN countries or EU members.
- *Integrating the performance framework:* while the performance framework can play a useful role as a stand-alone methodology, it would be more effective if linked and so fed into to existing national assessment frameworks, such as the Financial System Assessment Program.

Finally, the UNEP Inquiry, in taking forward this work to a second phase and outputs, sees the critical need for a coalition approach that includes key international financial organizations with core statistical analysis and coordinating functions.

4. STEPS TOWARDS TRANSFORMATION

4.1. AMPLIFYING THE MOMENTUM

Today's momentum is to be applauded and encouraged, but needs to be amplified to secure transformation. This is the central message of this year's edition of '*The Financial System We Need*'. The 2030 Agenda for Sustainable Development and the Paris Agreement represent the most ambitious multilateral goals ever set. While moving in the right direction, current levels of financing for sustainable development remain inadequate. We should not allow celebration of the momentum achieved to cloud the challenges we now face.

"Meeting the Paris Agreement's goals will require the full mobilization of all stakeholders, including financial sector actors. I fully support efforts to make financial flows consistent with the needed limitation of greenhouse emissions and the financing of climate resilient development."[259]

Michel Sapin, Finance Minister, France

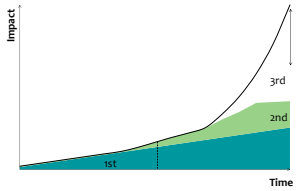
Recognizing the urgent need to move from momentum to transformation is not a matter of optimism or pessimism. The Inquiry highlights the need for, and progress made, in advancing financing for sustainable development. Public finance is essential for realizing the Sustainable Development Goals, and has multiple roles to play – in direct financing, crowding-in private finance, and otherwise shaping financing flows, such as through public procurement and influencing standard-setting. Yet public finance is insufficient. Many of the market and policy innovations intended to drive financing for sustainable development are at an early stage, and despite rapid growth, such changes are starting from a low base. Few countries have made comprehensive progress across their financial systems – and most countries have yet to start. Most actions have yet to be fully implemented or institutionalized, and little is known as to which, often in combination, are most effective.

Failing to amplify the current momentum delays the reallocation of capital away from, and so perpetuates, unsustainable economic development. The continuation of these trends generates powerful feedback loops, undermining human progress and also building up systemic risks that the financial system is, at present, ill-prepared to manage. Such systemic feedback creates more volatility and further undermines the prospects of long-term, sustainable prosperity. In spite of encouraging momentum, then, we risk slipping backwards if the bulk of financing flows continue to be channelled towards unsustainable production and consumption patterns.

4.2. MOVING TO THE NEXT PHASE

Moving from today's momentum to tomorrow's transformation is not just about doing more of the same. Strategies need to evolve as we move from early stage innovation to broader structural change. As we have sought to illustrate with our initial performance framework, a system-wide approach to transforming finance is needed – one that encompasses the

FIGURE 23: MOMENTUM IS NOT ENOUGH

STAGES OF CHANGE	BARRIERS TO ACCELERATION	LEVERAGE POINTS
Current shifts mainly 'first-order' – paradigm maintaining adjustments with some second order policy shifts emerging. **Third-order changes** – deeper changes and disruption are needed. 	**INCUMBENTS** Vested interests in existing valuations and business models. **INCREMENTALISM** Tendency towards slow adjustments, in the face of large and urgent challenge. **UNCERTAINTY** Lack of relative calm to allow a more deliberative approach to long-term considerations.	• National strategies for financial reform and development. • Financial technology development, and policy responses. • Public financial resources and institutions. • Public and political awareness. • Common methods, tools and standards.

architecture of rules, the practice of market behaviour, and the quantitative stocks and flows of finance towards sustainable assets and away from those that degrade natural capital.

Thomas Kuhn described a paradigm shift as being when evidence can be effectively described and dealt with only by affirming the explanations and worldviews that are new or were previously controversial and unacceptable.[260] Paradigm shifts lead to the emergence of new norms, orthodoxies and worldviews. Peter Hall, drawing on Kuhn's work, distinguishes three orders of change.[261]

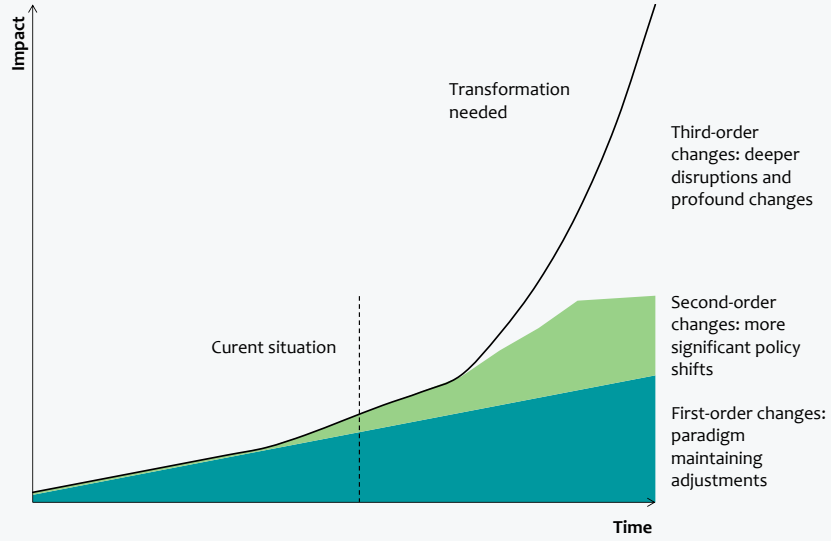
1. First-order changes are 'paradigm maintaining' and involve processes that adjust policy without challenging their existing, underlying assumptions about the way things are.
2. Second-order changes are more significant, where the instrument of a policy is adjusted but not the overarching policy. Both first and second-order changes are characterized by incrementalism.
3. Third-order changes reflect deeper changes to the underlying terms of the discourse and indicate that a paradigm shift is occurring. Third-order change is the paradigm shift described by Kuhn, involving re-appraisal of what have previously been considered certainly true.[262]

"Green finance is burgeoning, it has reached a point of spontaneous combustion. But it needs to be aligned. It needs to go beyond the leadership of a few champions."[263]

Nuru Mugambi, Director of Communications and Public Affairs, Kenya Bankers Association

The transition to sustainable development will require profound changes to the financial system itself. Ambitious goals, and arguably most Sustainable Development Goals and associated targets, will require some degree of system change, often including the 'creative destruction' of existing markets and institutions, and the emergence of new configurations, rules and conventions. Finance is without doubt a case in point. It is not a coincidence that some developing countries have taken leadership in progressing alignment of their domestic financial systems with sustainable development. Such leadership is partly explained by the higher visibility and impact of unsustainable development. Beyond this, or perhaps in part because of this, developing country central banks and financial regulators understand their role as being to align finance with national development priorities, alongside the roles they share with their developed country counterparts of monetary and financial stability and market integrity.[264] As Dr. Atiur Rahman, the previous Governor of the Bangladesh Bank, pointed out, developing countries appreciate more readily the profound connections between central and development banking.[265,266]

FIGURE 24: CHANGE PROCESSES



"Once climate change becomes a defining issue for financial stability, it may already be too late."[267]

Mark Carney, Governor, Bank of England

Now is the need to move towards a deeper change in the financial system. Innovations such as green bonds reflect the extended application of existing market architecture – and in many ways that is their strength, enabling rapid market expansion. Today's momentum is, however, signalling the need and potential to move beyond the current level of innovation to achieve greater scale by addressing the role of sustainable development in broader market norms such as credit ratings. As mainstream investors, insurers and banks increasingly embrace 'responsible', 'sustainable' or 'low-carbon' financing, we see for example the early signs of their convergence with metrics and norms until now only seen in work undertaken by specialist impact investors[268,269] and social banking pioneers'.[270] Notable shifts in the interpretation of, and regulations governing, pension funds' fiduciary responsibilities[271] are looking increasingly like more avant-garde innovations in corporate governance, such as the 'B Corporation' legal forms allowing for financial and non-financial corporate objectives.[272] In highlighting the complex dynamic between climate change and financial stability, innovative central banks are deepening the quality of conventional practice and signalling the need for an alignment of their mandates with longer-term policy goals.[273]

Today's momentum, then, is already exhibiting some of Hall's 'second-level' characteristics – the straddling of at least two different narratives, stretching inherited conventions and providing an early glimpse of an emerging new set of conventions.

4.3. TRANSFORMATIONAL FINANCING IN TIMES OF TURMOIL

Today's economic uncertainty and volatility are often cited as key reasons why more transformational approaches to finance are not possible. Since the global financial crisis, key aspects of the financial system have been in a state of rapid change. Many of these changes are positive – such as the introduction of post-crisis regulation to restore integrity and stability to core financial markets.[274] Others are problematic – such as the apparent break in the long-term trend to increasing cross-border capital flows.[275] Weak underlying growth in industrialized markets continues to deliver historically low interest rates, challenging some of the traditional fundamentals of financial practice, and placing many business models and long-term savers at risk. Technology itself, over recent decades a source of significant value added to incumbents, is now also a source of disruption and change. Fintech is challenging not only today's business models in key financial sectors, but also the very foundations of our modern monetary system, and the basis on which the financial system can be governed in the future.[276, 277]

Moving from momentum to transformation needs to be achieved at a time of turmoil. The direct causes of turmoil may change over time, but turmoil itself looks set to remain a core feature of our global landscape. It is unlikely that we will move into a period of relative calm, allowing for a more deliberative approach to addressing longer-term considerations. So either turmoil has to be circumnavigated to address the Sustainable Development Goals and the ambitions underlying the Paris Agreement, or else this period of recalibration of core features of the financial system needs to be seen as an opportunity for advancing these long-term agendas.

Low interest rates provide a unique historical moment for advancing sustainable development-aligned investment, boosting short-term economic growth and providing greater security for long-term savers. Investment levels remain well below what is needed, and corporate cash-hoarding remains at an all-time high of more than US$5 trillion.[278] Yet many leading experts have pointed out that historically low interest rates in developed countries could provide a rare moment in time for financing capital-intensive long-term investment for sustainable development. International action on this front could deliver a low-cost boost to short-term growth and advance much-needed, low-carbon, resilient and productive infrastructure. Such investments could, furthermore, if delivered through crowded-in private finance, help institutional investors overcome severe revenue and asset valuation shortfalls against future liabilities, and so help in protecting future income streams for ageing populations.

In the wake of the financial crisis, furthermore, central banks and financial regulators are giving greater consideration to broader policy objectives.[279] As well as classical economic objectives such as the US Federal Reserve's employment-related mandate, this increasingly includes related social and environmental goals. Indonesia's financial regulator, for example, introduced a Sustainable Finance Roadmap in the wake of the global financial crisis to strengthen the competitiveness of its financial sector and align it to long-term development priorities.[280] Peru's Superintendency of Banking, Insurance and Private Pension Fund Administrators (Superintendencia de Banca y Seguros) has placed increasing emphasis on ensuring investor oversight over mining-related social and environmental risks, given their potential macroeconomic effects.[281]

4.4. BUILDING ON THE DYNAMICS OF CHANGE

Financing sustainable development is entirely possible, now and into the future. Turning the 'possible' into reality requires that policymakers and market actors work together to connect the dots between what often appear to be, but in reality are not, distinct goals, instruments and dynamic pathways. This second edition of the UNEP Inquiry global report has sought to untangle some of these multi-faceted aspects of the financial system and its impacts on the real economy in an effort to identify what interventions might amplify momentum into transformation. We have distilled seven dimensions of the dynamics of today's financial system to focus on as we formulate practical interventions.

1. ***Impact: shifting the financial system can deliver sustainable development outcomes*** – financial system reform and development is required to deliver sustainable development, alongside complementary developments in the real economy. Practice demonstrates that such changes are possible in shaping specific outcomes, such as clean energy, and can point towards greater financial system stability.
2. ***Purpose: aligning overarching purpose and institutional mandates*** – to effectively pursue the overarching purpose of sustainable development requires an alignment of key mandates of public institutions. Early leadership in such an alignment can be seen from Dhaka to California, but needs to be amplified and embedded institutionally.
3. ***Co-evolution: blending market leadership with policy and regulatory innovations*** – market innovation and policy and regulatory developments are not substitutes, but are necessary co-determinants of the changes needed, building mutual confidence and enabling greater levels of ambition.
4. ***Leadership: national leadership drives international cooperation*** – at this stage, national action is driving cooperation at the international level, often through small alliances of leaders seeking to share experience and develop common approaches to system-wide challenges.
5. ***Public finance: improving productivity for system change*** – the potential of public finance to support system change can be more fully realized, through crowding-in private finance, market creation efforts (such as green bonds) and their impacts on market-wide rules.

6 ***Technology: technological innovation and sustainable finance*** – advancing sustainable development means understanding the disruptive role of technology within the financial system (fintech) and how this can be channelled for improved access, efficiency and protection of natural systems.

7 ***Public choice: public expectations and choice*** – rising expectations of the sustainability performance of the financial system highlights the important role of mechanisms for education, dialogue, participation and accountability to enable informed choice.

Moving from momentum to transformation requires us to design interventions that work with these seven dimensions.

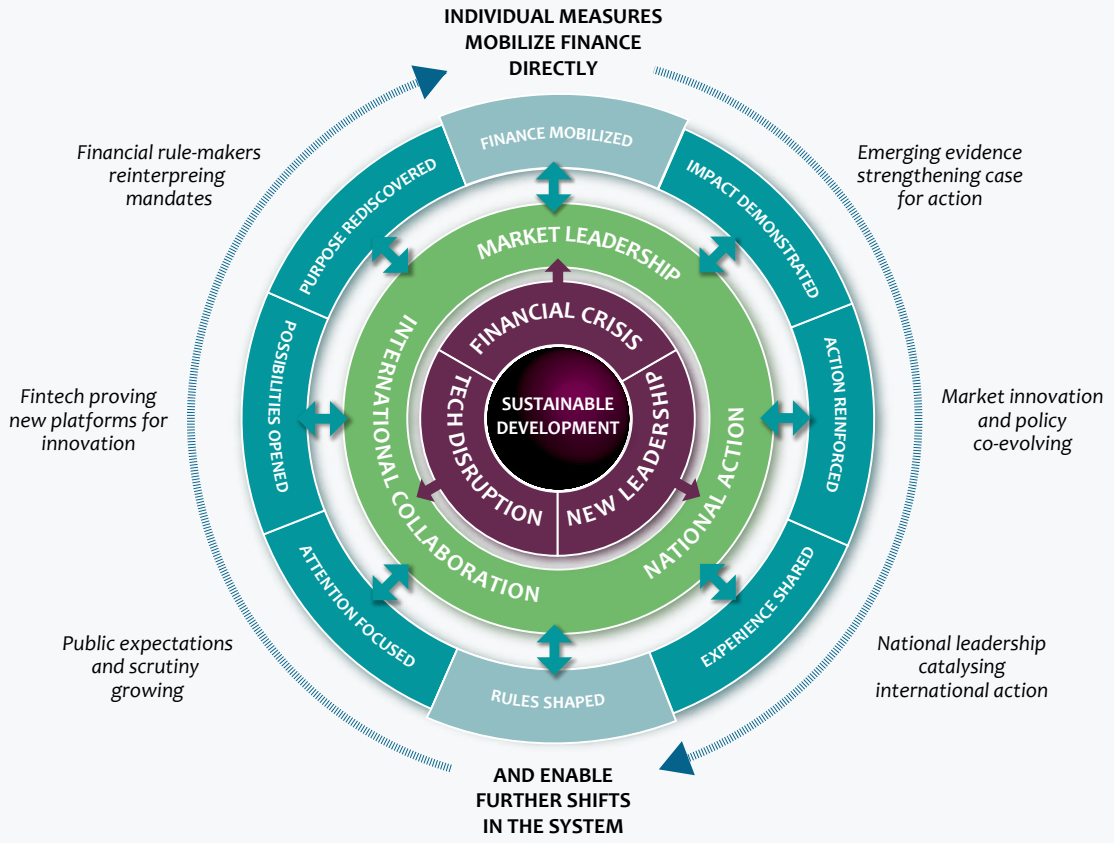
"Implementing the Sustainable Development Goals will not be possible without adequate financing. We have to be creative in mobilizing finance from every possible source and ambitious in exploring how to work together in aligning our global financial system with sustainable development"[282]

Ambassador Peter Thomson, President of the 71st session of the United Nations General Assembly

"I believe that the financial sector as a whole has a generational opportunity to build sustainable capital markets."[283]

Mark Wilson, CEO, Aviva

FIGURE 25: EMERGING SYSTEM DYNAMICS



BOX 16: RENEWING THE PURPOSE OF THE FINANCIAL SYSTEM

Finance is not consumed for its own sake but exists to serve other purposes. Historically, the core purpose of the financial system has been to serve the real economy – providing a range of core services for households, enterprises and public authorities. Now, the transition to sustainable development is reframing this historic relationship, setting in motion a powerful new dynamic between the real economy and the financial system focused on delivering inclusive prosperity, poverty elimination and respect for planetary boundaries. This builds on the post-crisis reform process so that not only the problems of the past are fixed, but also the system is also able to deliver a sustainable future.

4.5. STEPS TO RENEWING THE FINANCIAL SYSTEM

Many of the near-term options set out in our first edition of "The Financial System We Need" are being taken up in practice. Growing numbers of countries are determining what sustainability means for their financial system, and formulating plans for acting on these assessments. Internationally, there has been an up-swell of intergovernmental and private initiatives, each seeking in their own ways to understand emerging innovations and new thinking, and to share lessons and harmonize practice. Just one year on, the sense of potential has become larger – and in the wake of the Sustainable Development Goals and the Paris Agreement, the acknowledged need for a more strategic, long-term response has become greater.

Many bottom-up actions need to be advanced. The world is too complex to secure financing for sustainable development by executing a top-down blueprint, however elaborate or consensual. The wealth of initiatives described in the preceding pages are without doubt the bottom-up driving forces that have brought us, positively, to where we are today. That said, larger-scale initiatives can begin to systematize such innovations into the wider global landscape, embedding the vision and success into institutional forms as appropriate using combined approaches including organizational culture and norms, principles, standards, regulations and policies and wider societal expectations and public choices.

The UNEP Inquiry points to five policy steps that could build on today's momentum in further catalysing and beginning to institutionalize bottom-up innovations to secure the transformation needed in the financial system:

1 ***Anchor Sustainability in National Financial Reform and Development Strategies***

Experience shows that action to develop sustainable financial systems is more coherent and effective where there is a comprehensive, long-term plan or roadmap. Each country is different – and already there is a diversity of approaches, with a mix of policy-led, market-led and public-private initiatives under way. Practice suggests that road maps may include:

- Taking stock of current practices, needs, opportunities and risks through a process of review and dialogue;
- Seeking a convergence of existing national strategies for financial sector development, as well as actions to implement the Sustainable Development Goals and the Paris Agreement;
- Identifying opportunities for financial centre growth and competitiveness through green and sustainable finance;
- Building a coalition of key institutions in the public, private and civic sectors across the country to guide the design and execution of agreed measures, acknowledging and building on existing work;
- Outlining an open pathway for action and implementation, with milestones for review and reinforcement; and,
- Putting in place key metrics and feedback mechanisms to understand performance and enable learning and improvement.

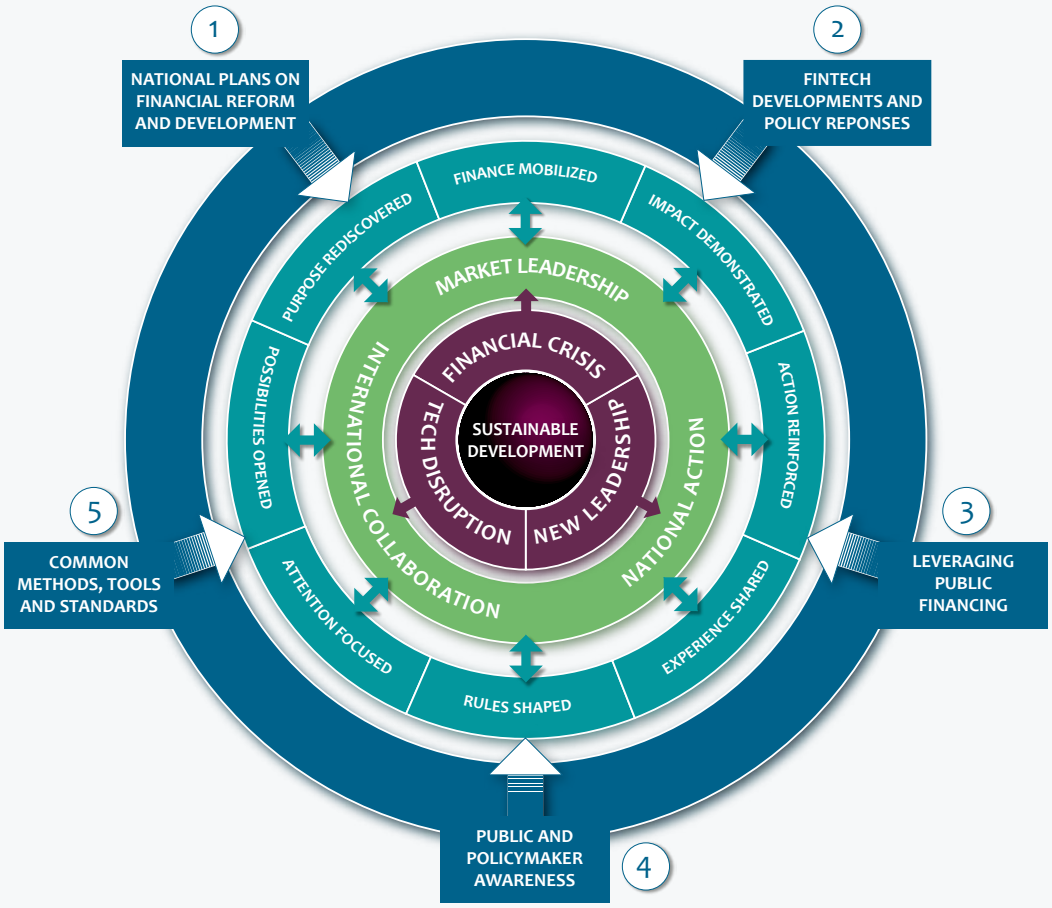
At present, about 10 countries have plans in place or processes under way. By 2020, a stretch goal could be to have 50 national or regional roadmaps, including the major financial centres that are key in shaping the norms of global finance. An international learning network could help to share practice, spur efficiency and raise ambition.

2 ***Channel technological innovation to finance sustainable development***

We have highlighted the key role that technology will play in transforming finance, and so impact its ability to serve the broader needs of sustainable development. Fintech, even at this early stage and as part of an emerging ecology of new technologies, needs to be aligned with sustainable development as it evolves. Options could include:

- Integrate fintech considerations into national strategies seeking to align financial market development with sustainability outcomes, including:
  - Increasing access to sustainable finance for low-income communities as well as micro, small and medium-sized enterprises.
  - Increasing the mobilization of domestic savings for longer-term, sustainability-aligned investments.
- Establishing an international coalition of leading actors in fintech to influence the development of codes, standards and regulations, as well as

FIGURE 26: ACCELERATING SYSTEM DYNAMICS



policy incentives, to better align fintech development with sustainable development.

- Encouraging the integration of sustainable development considerations into fintech challenge funds, incubators and the consideration of early-finance funds.

3 *Realize the triple leverage potential of public finance*

Public finance plays a three-fold role in mobilizing private capital and stimulating market leadership for sustainable development – providing financial support through funding and subsidies, helping to create new sustainable finance markets and pioneering new sustainability rules and practices. The understanding of how development finance institutions can leverage private capital is advancing strongly. However, knowledge of the other areas remains fragmentary. To close this gap, a number of steps could be considered:

- Assessing the implications for sustainable development outcomes of current fiscal incentives provided through the financial system, focusing in particular on possible 'perverse subsidies' and opportunities for enhancing the effectiveness of incentives to meet real economy goals.
- Evaluating the role of public finance in seeding and growing key green and sustainable finance markets, such as landmark issuer (e.g. for green bonds or investment trusts), anchor investor and provision of fiscally neutral tax incentives.
- Identifying the ways in which innovative rules and practices adopted by public finance institutions on sustainable development can be best transferred and adopted by private financial institutions.

4 *Raise awareness and build capabilities across the system*

Raising awareness and building capacity within market and policy institutions will be critical to enable the financial community to take advantage of new opportunities, as well as ensuring that policymakers and regulators are fully engaged in the imperatives and risks associated with such plans, that the public is actively involved as an enabler of change. Steps could include:

- Raising political and policy awareness through key intergovernmental platforms such as the G20 and the G7, as well as the United Nations, and through more specialized finance institutions.
- Building the capabilities of financial professionals, as well as policymakers and regulators, so that sustainability becomes a core part of the skills and behaviours that shape the overall financial culture. Sustainability-focused platforms such as the UNEP Finance Initiative and the Principles for Responsible Investment can play a key role in sharing experience and practice.
- Strengthening public awareness through collaborative approaches to improving financial literacy and education on the linkages with sustainable development, including such programs in the proposed national strategies and plans (see above).

5 ***Embed sustainability into common methods, tools and standards***

A striking evolution in awareness has emerged over the past year, as a growing number of standard setting and oversight bodies have realized the relevance of sustainable development to their core mandate and objectives. Realizing the latent synergies within this evolution toward a more systematic approach calls for:

- Extracting real-time learning from the elaboration and implementation of national strategies for aligning financial system development with sustainable development, ensuring a bottom-up, experience-based basis for evolving common approaches.
- Building out the early stage 'sustainability-aligned financial system' performance framework set out in this report by:
  - Investing in actions to improve the quality and availability of data.
  - Evolving selected metrics to cover the broader sustainable development spectrum including underlying aspects of market integrity.
  - Aligning and perhaps converging such a performance framework with existing international assessment methodologies, such as the FSAP.

The most effective step would be to establish a collaborative approach to such developments, including key international organizations such as the IMF and the World Bank.

Financial standards need to support and reflect a recalibrated alignment of the financial system with sustainable development, especially in regard to standards underlying performance measurement. Such an alignment can be effectively addressed, and a 'one size fits all' approach avoided, through a graduated approach comprising four stages:

- Reviewing unintended sustainable development consequences – positive and negative – of existing standards and processes.
- Developing guidance to explore the relevance of sustainable development factors for key aspects of existing standards and processes (such as materiality, governance, risk and disclosure).
- Incorporating an assessment of the sustainable development implications of new work on financial standards and processes.
- Introducing dedicated efforts to promote specific sustainable development priorities in key standards and processes (such as those already under way for financial inclusion).

Central to these efforts would be the clear request of members of standards organizations, thus linking efforts at the national and international levels, as has been the case for financial inclusion. A target for 2020 might be for at least the first three steps to have been completed across all major financial standards and oversight processes. Particular value could be generated by focusing on developing common approaches to definitions for financial instruments (such as green bonds) and tools (such as sustainability 'stress testing').

"Green finance is one of the very few ideas that, if effectively implemented, can benefit the vast majority of the population in the world, and can help improve the sustainability of the global economy."[284]

Zhou Xiaochuan, Governor, People's Bank of China

4.6. A MATTER OF CHOICE

Aligning the financial system with sustainable development is ultimately a matter of choice. Progress can – and is – being made within existing regulatory mandates, focused on the exposure and more effective management of risk at the project and enterprise level and for the financial system as a whole. Such progress can be extended by applying a 'risk lens' over longer-term horizons and taking account of an ever-broader set of drivers.

Beyond this, however, alignment is a policy decision – a matter of public choice. In fact, such choices have already been made and translated into broad policy terms. The Sustainable Development Goals and the Paris Agreement reaffirm the centrality of sustainable development going forward in underpinning viable and inclusive economic strategies and practices. Needed now is to translate these policy decisions into the mandates of relevant governing institutions. This includes the responsibility for stewarding the development of the financial system, whose task it is to maintain orderly and stable – but also vibrant and effective – financial and capital markets. Combined with smart public financing, financial market leadership, and active public debate, the opportunity now exists to drive forward transformational financing for sustainable development.

ENDNOTES

1. UNEP Inquiry (2015). The Financial System We Need: Aligning the Financial System with Sustainable Development. *http://unepinquiry.org/publication/inquiry-global-report-the-financial-system-we-need/*
2. Over the past couple years, the UNEP Inquiry has engaged with Bangladesh, Brazil, Canada, China, Colombia, France, India, Indonesia, Kenya, Netherlands, South Africa, Switzerland, Uganda, UK and US and other countries
3. UNEP Inquiry (forthcoming). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development.
4. The Sustainable Development Goals built on a number of key policy developments, including the Addis Ababa action agenda on finance for development as well as the Sendai framework for disaster risk reduction. See UN (2016). Transforming Our World: The 2030 Agenda for Sustainable Development. *https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf*
5. Eco-Business (2015). "UNEP unveils new vision for a global financial system". *www.eco-business.com/news/unep-unveils-new-vision-for-a-global-financial-system/*
6. Climate Home (2016). UN: Kenya, Bangladesh, Jordan 'green finance leaders'. *www.climatechangenews.com/2016/07/19/un-kenya-bangladesh-jordan-green-finance-leaders/*
7. UNEP (2016). New Report Shows How India Can Scale up Sustainable Finance, Press Release, 29 April 2016. *http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=27071&ArticleID=36155&l=en*
8. Provided by Ministry of Finance, France
9. Carbon Tracker Initiative (2013). Unburnable Carbon 2013: Wasted Capital And Stranded Assets. *http://carbontracker.live.kiln.digital/Unburnable-Carbon-2-Web-Version.pdf*
10. Hong Kong Financial Services Development Council (2016). Hong Kong as a Regional Green Finance Hub. *http://www.fsdc.org.hk/sites/default/files/Green%20Finance%20Report-English.pdf*
11. Murai, C. and Kirima, W. (2015). Aligning Kenya's Financial System with Inclusive Green Investment. UNEP Inquiry/IFC. *http://unepinquiry.org/wp-content/uploads/2015/11/Aligning_Kenya---s_Financial_System_with_Inclusive_Green_Investment_Full_Report.pdf*
12. City of London (2016). Green Finance – the City of London Corporation. *https://www.cityoflondon.gov.uk/about-the-city/the-lord-mayor/key-events-speeches/Documents/green-finance.pdf*
13. I4CE (2015). France's Financial (Eco)system: Improving the Integration of Sustainability Factors. *http://unepinquiry.org/wp-content/uploads/2016/02/France_Financial_Ecosystem.pdf*
14. Federal Office for the Environment (2015). Design of a Sustainable Financial System: Swiss Team Input into the UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/Design_of_a_Sustainable_Financial_System_Swiss_Team_Input_into_the_UNEP_Inquiry.pdf*
15. For example, the Philippines, together with Indonesia, Mongolia, Nepal, Pakistan, Thailand and Vietnam have formed the Mutual Exchange Forum on Inclusive Insurance, or MEFIN Network, a collegial body of insurance policy makers and regulators in Asia. It was formed in May 16, 2013 in Cebu, Philippines and transformed into a formal network in 2016, with Pakistan as a new member. The Network now serves as a platform of peer-to-peer learning among policy makers and insurance regulators in the region as it develops and implements programs that provide mutual benefit to its members in advancing inclusive insurance solutions.
16. Established by UNEP Inquiry and PRI, the Sustainable Insurance Policy Forum (SIPF) is for insurance regulators and supervisors worldwide.
17. Principles for Sustainable Insurance. *http://www.unepfi.org/psi/*
18. Green Infrastructure Investment Coalition (n.d.). *www.giicoalition.org/*
19. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*
20. Kidney, S. and Sonerud, B. (2015). Scaling up Green Bond Market for Sustainable Development: A strategic guide for the public sector to stimulate private sector market development for green bonds. UNEP Inquiry/CBI. *http://unepinquiry.org/wp-content/uploads/2015/12/GB-Public_Sector_Guide-Final-1A.pdf*
21. Sustainable Stock Exchanges (2016). "Five More Stock Exchanges Join Global Campaign for ESG Disclosure." *http://www.sseinitiative.org/home-slider/five-more-stock-exchanges-join-global-campaign-for-esg-disclosure-2/*. The Sustainable Stock Exchanges Initiative includes over 55 partner exchanges as of August 2016.
22. PRI (2016). Credit Ratings Agencies Embrace More Systematic Consideration Of ESG. *https://www.unpri.org/press-releases/credit-ratings-agencies-embrace-more-systematic-consideration-of-esg*
23. ICBC (2016). Impact of Environmental Factors on Credit Risk of Commercial Banks. *http://www.greenfinance.org.cn/upfile/upfile/filet/ICBC环境压力测试论文_2016-03-19_08-49-24.pdf*
24. People's Bank of China (2016). Guidelines for Establishing a Green Financial System. *http://www.pbc.gov.cn/english/130721/3133045/index.html*

25. California Department of Insurance (2016). California Insurance Commissioner Dave Jones calls for insurance industry divestment from coal. Press Release, 25 January 2016. *http://www.insurance.ca.gov/0400-news/0100-press-releases/2016/statement010-16.cfm*
26. French Treasury (2015). Decree no. 2015-1850. *https://www.legifrance.gouv.fr/eli/decret/2015/12/29/2015-1850/jo/texte*
27. UNEP Inquiry/FICCI/Koan/NIPFP (2016). Delivering a Sustainable Financial System in India. UNEP Inquiry/Federation of Indian Chambers of Commerce and Industry. *http://unepinquiry.org/wp-content/uploads/2016/04/Delivering_a_Sustainable_Financial_System_in_India.pdf*
28. Network Italy (2016). Launch of the "National Dialogue on Sustainable Finance". *http://www.globalcompactnetwork.org/en/news-and-events/news/1198-launch-of-the-national-dialogue-on-sustainable-finance.html*
29. Murai, C. and Kirima, W. (2015). Aligning Kenya's Financial System with Inclusive Green Investment. UNEP Inquiry/IFC. *http://unepinquiry.org/wp-content/uploads/2015/11/Aligning_Kenya---s_Financial_System_with_Inclusive_Green_Investment_Full_Report.pdf*
30. De Nederlandsche Bank (2016). DNBulletin: Time for Transition: Towards a Carbon-neutral Economy. *http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2016/dnb338533.jsp*
31. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*
32. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*
33. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*
34. G20 Green Finance Study Group Document Repository. *http://unepinquiry.org/g20greenfinancerepositoryeng*
35. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Report. *https://www.fsb-tcfd.org/wp-content/uploads/2016/03/Phase_I_Report_v15.pdf*
36. Mintzer, I., Bernatkova, L., Doyle, V., Paroutzoglou, S. and Yavrom, D. (2016). Government Subsidies to the Financial System – A Preliminary Exploration. *http://unepinquiry.org/wp-content/uploads/2016/08/Government_Subsidies_to_the_Global_Financial_System.pdf*
37. Gates, B. (1995). The Road Ahead. Viking Press.
38. UNEP Inquiry and Castilla-Rubio, J. C. (forthcoming). Fintech and Sustainable Development: Assessing the Implications. UNEP Inquiry/Space Time Ventures.
39. UNEP Inquiry/Paulson Institute/Bloomberg Philanthropies/Green Finance Committee (China)/SIFMA (2016). Green Finance – A Growing Imperative. *http://unepinquiry.org/wp-content/uploads/2016/05/Green_Finance_A_Growing_Imperative.pdf*
40. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*
41. New Climate Economy (2014). Better Growth, Better Climate. *http://2014.newclimateeconomy.report/wp-content/uploads/2014/08/NCE_ExecutiveSummary.pdf*
42. International Energy Agency (2015). World Energy Outlook Special Briefing for COP 21. *http://www.iea.org/media/news/WEO_INDC_Paper_Final_WEB.PDF*
43. Brookings (2016). The Importance of Investing in Built-to-last Infrastructure. *https://www.brookings.edu/2016/03/29/the-importance-of-investing-in-built-to-last-infrastructure/*
44. UNCTAD (2014). World Investment Report 2014. *http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf*
45. United Nations Framework Convention on Climate Change (2016). The Paris Agreement, Article 2c. *http://unfccc.int/paris_agreement/items/9485.php*
46. UNEP Inquiry and Ecofys (forthcoming). Developing a Performance Framework for a Sustainable Financial System.
47. UNEP FI (forthcoming). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation.
48. Inquiry estimates based on UNU-IHDP/UNEP (2014). The Inclusive Wealth Report 2014. Cambridge University Press. *http://inclusivewealthindex.org/.*
49. International Energy Agency (2016). World Energy Outlook Special Report on Energy and Air Pollution. *http://www.iea.org/publications/freepublications/publication/weo-2016-special-report-energy-and-air-pollution.html*
50. King, D., Schrag, D., Dadi, Z., Ye, Q. and Ghosh, A. (2015). Climate Change – A Risk Assessment. Cambridge: Centre for Science and Policy. *http://www.csap.cam.ac.uk/media/uploads/files/1/climate-change--a-risk-assessment-v9-spreads.pdf*
51. WMO (2016). WMO Statement on the status of the global climate in 2015. *http://public.wmo.int/en/resources/library/wmo-statement-status-of-global-climate-2015*
52. IDMC (2015). Global Estimates 2015: People displaced by disasters. *http://www.internal-displacement.org/publications/2015/global-estimates-2015-people-displaced-by-disasters/*
53. ELD Initiative (2015). The value of land: Prosperous lands and positive rewards through sustainable land management. *http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/2015_The%20Value%20of%20Land%20-%20ELD%20Initiative%20(2015).pdf*

54. Alexander, R., Ehrlich, P., Barnosky, A., García, A., Pringle, R. and Palmer, T. (2015). Quantifying Renewable Groundwater Stress, World Resources Research, Volume 51, Issue 7, July 2015. *http://advances.sciencemag.org/content/1/5/e1400253*

55. Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydzenka, K. and Yousefi, S.R. (2015). Rethinking Financial Deepening: Stability and Growth in Emerging Markets. SDN 15/08. Washington, D.C.: IMF. *http://www.imf.org/external/pubs/ft/sdn/2015/sdn1508.pdf* The report suggests that very high levels of finance can have negative impacts due to increased frequency of 'booms and busts', a diversion of talent to the financial sector and potential rent extraction.

56. Sachs, J. and Sachs, L. (2015). The Responsible Investor's Guide to Climate Change. Project Syndicate. *https://www.project-syndicate.org/commentary/fossil-fuels-divestment-renewables-by-jeffrey-d-sachs-and-lisa-sachs-2015-01*

57. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

58. Scholtens, B. and Veldhuisa, R. (2015). How Does the Development of the Financial Industry Advance Renewable Energy? A Panel Regression Study of 198 Countries over Three Decades. Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung – Theorie und Politik – Session: Environmental Economics III, No. C13-V2 *http://unepinquiry.org/wp-content/uploads/2016/02/VfS_2015_pid_177.pdf*

59. Zhou, X. (2015). Remarks at World Bank/IMF 2015 Annual Meetings Green Finance Event. Lima, Peru.

60. Carney, M. (2016). The Sustainable Development Goal imperative. Remarks given at United Nations General Assembly, High-Level Thematic Debate on Achieving the Sustainable Development Goals. New York, United States. *http://www.bankofengland.co.uk/publications/Pages/speeches/2016/897.aspx*

61. Hall, P. A. (1993). Policy Paradigms. Social Learning, and the State: The Case of Economic Policymaking in Britain. Comparative Politics, 25(3), 275-296. *https://www.unc.edu/~fbaum/teaching/articles/CompPol-1993-Hall.pdf*

62. Mackintosh, S. (2016). Making The Jump: How Crises Affect Policy Consensus and Can Trigger Paradigm Shift. *http://unepinquiry.org/wp-content/uploads/2016/02/Making_the_Jump.pdf*

63. PRI and UNEP FI (2016). Greening Institutional Investment. *http://unepinquiry.org/wp-content/uploads/2016/09/3_Greening_Institutional_Investment.pdf*

64. OECD (forthcoming). A Quantitative Framework for Analysing Potential Bond Contributions in a Low-Carbon Transition.

65. Vienna Group of Citizens (2015). Values based banking. UNEP Inquiry/Institute for Social Banking/Finance Innovation Lab. *http://unepinquiry.org/wp-content/uploads/2015/04/Values_Based_Banking.pdf*

66. UNEP Inquiry, Principles for Responsible Investment, UN Global Compact and UNEP Finance Initiative (2015). Fiduciary Duty in the 21st Century. *http://unepinquiry.org/wp-content/uploads/2015/09/Fiduciary-duty-21st-century.pdf*

67. Hiller, J. S. (2013). The benefit corporation and corporate social responsibility. Journal of Business Ethics, 118(2), 287-301.

68. De Nederlandsche Bank (2016). DNBulletin: Time for Transition: Towards a Carbon-neutral Economy. *http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2016/dnb338533.jsp*

69. Aviva (2014). A Roadmap for Sustainable Capital Markets. *http://www.aviva.com/media/upload/Aviva-Roadmap-to-Sustainable-Capital-Markets-updated.pdf*

70. City of London (2016). City launches initiative to make London the world leader in Green Finance. Press Release, 14 January 2016. *http://news.cityoflondon.gov.uk/city-launches-initiative-to-make-london-the--world-leader-in-green-finance*

71. Paris Europlace (2016). The Paris Green Financial Center (PGFC) stakeholders announce a new collective commitment to tackle climate change. Press Release, 29 June, 2016. *http://www.paris-europlace.com/en/news/paris-green-financial-center-pgfc-stakeholders-announce-new-collective-commitment-tackle*

72. Hong Kong Financial Services Development Council (2016). Hong Kong as a Regional Green Finance Hub. *http://www.fsdc.org.hk/sites/default/files/Green%20Finance%20Report-English.pdf*

73. Group of Twenty (2016). G20 Green Finance Synthesis Report. *http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf*

74. China Banking Regulatory Commission (2012). Green Credit Guidelines. *http://www.cbrc.gov.cn/EngdocView.do?docID=3CE646AB629B46B9B533B1D8D9FF8C4A*

75. Group of Twenty (2016). Communiqué – G20 Finance Ministers and Central Bank Governors Meeting, 26-27 February 2016, Shanghai. *http://unepinquiry.org/wp-content/uploads/2016/09/Shanghai_Communique_G20_Finance_Ministers_and_Central_Bank_Governors_Meeting_26-27_February_2016.pdf*

76. A process of dialogue was also undertaken to understand the needs, concerns and ambitions of non-G20 developing countries with regard to green finance: see *http://unepinquiry.org/publication/green-finance-for-developing-countries/*

77. Group of Twenty (2016). Communiqué – G20 Finance Ministers and Central Bank Governors Meeting, 23-24 July 2016, Chengdu. *http://unepinquiry.org/wp-content/uploads/2016/09/Chengdu_Communique_G20_Finance_Ministers_and_Central_Bank_Governors_Meeting_23-24_July_2016.pdf*

78. Group of Twenty (2016). Communiqué – G20 Leaders Meeting, 4-5 September 2016, Hangzhou. *http://www.g20.org/English/Dynamic/201609/t20160906_3396.html*

79. Group of Twenty (2016). G20 Green Finance Synthesis Report. *http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf*

80. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

81. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

82. UNEP Inquiry (2016). The Coming Financial Climate. *http://unepinquiry.org/wp-content/uploads/2015/05/Aligning_the_Financial_System_with_Sustainable_Development_4_The_Coming_Financial_Climate.pdf*

83. Carbon Tracker Initiative (2013). Unburnable Carbon 2013: Wasted Capital And Stranded Assets. *http://carbontracker.live.kiln.digital/Unburnable-Carbon-2-Web-Version.pdf*

84. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

85. I4CE (2015). France's Financial (Eco)system: Improving the Integration of Sustainability Factors. *http://unepinquiry.org/wp-content/uploads/2016/02/France_Financial_Ecosystem.pdf*

86. Robins, N. (2016). How Paris Became the Capital of Climate Finance. *http://unepinquiry.org/wp-content/uploads/2016/04/How_Paris_Became_the_Capital_of_Climate_Finance.pdf*

87. UNEP FI (forthcoming). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation.

88. Climate Bonds Initiative (2015). Green Bond Market update. *http://www.climatebonds.net/resources/publications/2015-green-bonds-market-update*

89. Kidney, S. (2016). Mid-Year Green Bond Market Roundup. *http://www.climatebonds.net/2016/08/climate-bonds-mid-year-green-bond-market-roundup*

90. Financial Times (2016). Chinese banks lead 'green' bond boom. *https://next.ft.com/content/9ee1a5f4-20d2-11e6-aa98-db1e01fabc0c*

91. ICMA (2016). New - Official Rules for Chinese Green Bond Market. *http://www.icmagroup.org/News/news-in-brief/new-official-rules-for-chinese-green-bond-market/*

92. Securities and Exchange Board of India (2016). SEBI Board Meeting Press Release, 11 January 2016. *http://www.sebi.gov.in/sebiweb/home/detail/32793/yes/PR-SEBI-Board-Meeting*

93. Kidney, S. (2016). Mid-Year Green Bond Market Roundup. *http://www.climatebonds.net/2016/08/climate-bonds-mid-year-green-bond-market-roundup*

94. Green Infrastructure Investment Coalition (n.d.). *www.giicoalition.org/*

95. Kidney, S. and Sonerud, B. (2015). Scaling up Green Bond Market for Sustainable Development: A strategic guide for the public sector to stimulate private sector market development for green bonds. UNEP Inquiry/CBI. *http://unepinquiry.org/wp-content/uploads/2015/12/GB-Public_Sector_Guide-Final-1A.pdf*

96. Climate Bonds Initiative (2016). Bonds and Climate Change: The State of the Market in 2016. *https://www.climatebonds.net/files/files/HSBC-2016-Brasil-English-A4.pdf*

97. Société Générale (2016). Success of the first positive impact bond issuance contributing to the financing of a low-carbon economy. Press Release, 20 November 2015. *https://www.societegenerale.com/en/content/societe-generale-success-first-positive-impact-bond-issuance-contributing-financing-low-0*

98. China Green Finance Taskforce (2015). Establishing China's Green Financial System. UNEP Inquiry/People's Bank of China. *http://unepinquiry.org/wp-content/uploads/2015/12/Establishing_Chinas_Green_Financial_System_Final_Report.pdf*

99. OJK (2014). Roadmap for Sustainable Finance in Indonesia. *http://www.ojk.go.id/Files/box/keuangan-berkelanjutan/roadmap-keuangan-berkelanjutan.pdf*

100. China Green Finance Taskforce (2015). Establishing China's Green Financial System. UNEP Inquiry/People's Bank of China. *http://unepinquiry.org/wp-content/uploads/2015/12/Establishing_Chinas_Green_Financial_System_Final_Report.pdf*

101. This section draws on UNEP FI (forthcoming). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation.

102. ICBC (2016). Impact of Environmental Factors on Credit Risk of Commercial Banks. *http://www.greenfinance.org.cn/upfile/upfile/filet/ICBC环境压力测试论文_2016-03-19_08-49-24.pdf*. This report gives an overview of the first study involving environmental stress testing by a bank. See also: Natural Capital Declaration (2016). Leading Financial Institutions to Test Lending Portfolios for Environmental Risk. *http://www.naturalcapitaldeclaration.org/2016/05/leading-financial-institutions-to-test-lending-portfolios-for-environmental-risk/*

103. Sustainable Stock Exchanges Initiative (2016). SSE campaign to close the ESG guidance gap. *http://www.sseinitiative.org/engagement/esg-guidance/*

104. Sustainable Stock Exchanges Initiative (2016). Green Finance Policy Brief. *http://www.sseinitiative.org/wp-content/uploads/2016/07/Green-Finance-Policy-Brief.pdf*

105. EP = Project finance portfolio covered by Equator Principles in emerging market; PRI = Asset Under Management (AUM) covered by PRI members compared to the total AUM of the investment market (source: Signatory base AUM hits $59 trillion); Total premiums issued by PSI compared to the world premiums issued. UNEP FI (2015). Insurers Managing $14 Trillion Commit to Backing Sustainable Development *http://www.unepfi.org/opsi/wp-content/uploads/2015/06/insurance2030_pressrelease.pdf*; UNEP FI = UNEP FI membership compared against Forbes "The World's Biggest Public Companies "Major Banks" category sorted by asset values; Total assets of UNEP FI members compared to the total assets of the finance industry. Available: *http://www.equator-principles.com/*

106. UNEP Inquiry sourced, New York City, August 2016.

107. *http://investorsonclimatechange.org/statement*

108. AP4 (2016).AP4 announces today a continued action in decarbonizing its Equity Portfolio. Press Release, 15 June 2016. *http://www.ap4.se/en/2016/6/ap4-announces-today-a-continued-action-in-decarbonizing-its-equity-portfolio*. See also: Portfolio Decarbonization Coalition (2015). *http://www.unepfi.org/fileadmin/documents/PortfolioDecarbonizationCoalition.pdf*

109. Regjeringen (2016). The Management of the Government Pension Fund in 2015. Report to the Storting (white paper). *https://www.regjeringen.no/contentassets/1ee9d1e693f14463b61f1ca85120c7c0/chapter1_report_no23_2015-2016.pdf*

110. Climate Vulnerable Forum (2016). V20 Ministerial Communiqué, 14 April 2016. *http://www.thecvf.org/v20-ministerial-communique/*

111. Asset Owners Disclosure Project (2016). AODP 2016 Global Climate 500 Index. *http://aodproject.net/global-climate-500-index/*. See also: OECD (2016). Annual Survey of Large Pension Funds and Public Pension Reserve Funds. *http://www.oecd.org/finance/survey-large-pension-funds.htm*

112. UNEP Inquiry sourced, New York City, August 2016.

113. PRI (2016). Credit Ratings Agencies Embrace More Systematic Consideration Of ESG. *https://www.unpri.org/press-releases/credit-ratings-agencies-embrace-more-systematic-consideration-of-esg*

114. S&P (2014). Climate Change Is A Global Mega-Trend For Sovereign Risk. *https://www.globalcreditportal.com/ratingsdirect/renderArticle.do?articleId=1318252&SctArtId=236925&from=CM&nsl_code=LIME&sourceObjectId=8606813&sourceRevId=1&fee_ind=N&exp_date=20240514-20:34:43* See also: UNEP (2014). Environmental Risk in Sovereign Credit Ratings. *http://www.unepfi.org/fileadmin/documents/ERISC_Phase2.pdf*

115. This section draws on UNEP Inquiry (2016). Financing the Transition: How financial System Reform Can Serve Sustainable Development (forthcoming) and UNEP Inquiry (2016). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development (forthcoming).

116. Countries are classified according to World Bank income classification. Here, "developed countries" correspond to high-income countries. For more information, see: *https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries*

117. "Developing and emerging economies" correspond to low, lower middle and upper middle income countries. For more information, see: *https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries*

118. Ma, J. and Zadek, S. (2016). The G20 Embraces Green Finance. *https://www.project-syndicate.org/commentary/g20-embraces-green-finance-by-ma-jun-and-simon-zadek-2016-09*

119. China Green Finance Taskforce (2015). Establishing China's Green Financial System. UNEP Inquiry/People's Bank of China. *http://unepinquiry.org/wp-content/uploads/2015/12/Establishing_Chinas_Green_Financial_System_Final_Report.pdf*

120. People's Bank of China (2016). Guidelines for Establishing a Green Financial System. *http://www.pbc.gov.cn/english/130721/3133045/index.html*

121. UNEP Inquiry sourced, personal correspondence, August 2016.

122. This section draws on UNEP Inquiry and Corporate Knights (2016). A Review of International Financial Standards as They Relate to Sustainable Development (forthcoming).

123. Mackintosh, S. (2016). Making The Jump: How Crises Affect Policy Consensus and Can Trigger Paradigm Shift. *http://unepinquiry.org/wp-content/uploads/2016/02/Making_the_Jump.pdf*

124. Sustainable Banking Network (n.d.). *http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Partnerships/Sustainable+Banking+Network/*

125. UNEP and Swiss Re co-hosted a Roundtable on "Insurance 2030: Policies and partnerships for sustainable development": *http://www.unepfi.org/psi/insurance-2030-roundtable/. See also:* Bacani, B., McDaniels, J. and Robins, N. (2015). Insurance 2030: Harnessing Insurance for Sustainable Development. UNEP Inquiry/PSI. *http://unepinquiry.org/wp-content/uploads/2015/06/Insurance_2030.pdf*

126. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures. *https://www.fsb-tcfd.org*

127. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Report. *https://www.fsb-tcfd.org/wp-content/uploads/2016/03/Phase_I_Report_v15.pdf*

128. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Public Consultation. *https://www.fsb-tcfd.org/wp-content/uploads/2016/07/FSB-TCFD-Phase-I-Public-Consultation.pdf*

129. Kim, J. (2016). Statement by the Managing Director on the IMF Work Program, 8 June 2016. *http://www.imf.org/external/np/pp/eng/2016/060816.pdf*

130. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures. *https://www.fsb-tcfd.org*

131. IMF (n.d.). Financial Sector Assessment Program (FSAP). *https://www.imf.org/external/np/fsap/fssa.aspx*

132. IMF (n.d.) Reports on the Observance of Standards and Codes (ROSCs). *https://www.imf.org/external/NP/rosc/rosc.aspx*

133. OECD (2015). G20/OECD Principles of Corporate Governance. *http://dx.doi.org/10.1787/9789264236882-en*

134. BIS (n.d.). Basel III: international regulatory framework for banks. *http://www.bis.org/bcbs/basel3.htm*

135. UNEP FI and CISL (2015). Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III? *http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf*

136. BIS (2015). Corporate governance principles for banks. *http://www.bis.org/bcbs/publ/d328.htm*

137. BIS (2012). Core principles for effective banking supervision. *http://www.bis.org/publ/bcbs230.htm*

138. IOSCO (n.d.). IOSCO Objectives and Principles of Securities Regulation and the IOSCO Assessment Methodology. *https://www.iosco.org/about/?subsection=display_committee&cmtid=19&subSection1=principles*

139. IOSCO (2004). Code of Conduct Fundamentals for Credit Rating Agencies. *http://www.iosco.org/library/pubdocs/pdf/IOSCOPD180.pdf*

140. IAIS (n.d.). Insurance Core Principles. *http://www.iaisweb.org/page/supervisory-material/insurance-core-principles*

141. IOPS (n.d.). Principles and Guidelines. *http://www.iopsweb.org/principlesandguidelines/*

142. IFRS (n.d.). About us. *http://www.ifrs.org/About-us/IASB/Pages/Home.aspx*

143. IAASB (n.d.). *https://www.iaasb.org/*

144. The Global Partnership for Financial Inclusion (GPFI) is an inclusive platform for all G20 countries, interested non-G20 countries and relevant stakeholders to carry forward work on financial inclusion, including implementation of the G20 Financial Inclusion Action Plan, endorsed at the G20 Summit in Seoul on 10 December 2010 in Seoul.

145. Global Partnership for Financial Inclusion (2014). G20 Financial Inclusion Action Plan. *http://gpfi.org/sites/default/files/documents/2014_g20_financial_inclusion_action_plan.pdf*

146. Global Partnership for Financial Inclusion (2016). Global Standard-Setting Bodies and Financial Inclusion: The Evolving Landscape. *http://www.gpfi.org/publications/global-standard-setting-bodies-and-financial-inclusion-evolving-landscape*

147. UNEP Inquiry/2 Degrees Investing Initiative (2016). Building a Sustainable Financial System in the European Union: the Five 'R's of Market and Policy Innovation for the Green Transition. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2016/04/Building_a_Sustainable_Financial_System_in_the_European_Union.pdf*. See also *http://europa.eu/rapid/press-release_SPEECH-16-2428_en.htm*

148. Brazilian Vegetable Oil Industries Association (2016). Brazil: Private properties have preserved more native vegetation than Conservation Units, says the Minister of the Environment. *http://www.abiove.org.br/site/_FILES/English/02052016-103811-02_05_2016_info_147_car-ministra_izabella_-_english.pdf*

149. UNEP (2016). New Report Shows How India Can Scale up Sustainable Finance, Press Release, 29 April 2016. *http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=27071&ArticleID=36155&l=en*

150. In 2014, Indian Prime Minister Narendra Modi announced a new target of implementing 175 gigawatts (GW) of renewable energy generation capacity by 2022, 100GW of which will be solar power.

151. Government of India, Ministry of New and Renewable Energy (2016). Year Wise target to achieve 100,000 MW Grid Connected Solar Power by 2021-22. *http://mnre.gov.in/file-manager/UserFiles/OM-year-wise-cumulative-target-for-100000MW-grid-connected-SP-project.pdf*

152. RE-Invest (2015). Green Energy Commitments. http://re-invest.in/about-re-investment/green-energy-commitments/

153. RBI (2015). Priority Sector Lending – Targets and Classification. *https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=9688&Mode=0*

154. SEBI (2016). Disclosure Requirements for Issuance and Listing of Green Bonds. http://www.sebi.gov.in/cms/sebi_data/boardmeeting/1453349548574-a.pdf

155. French Treasury (2015). Decree no. 2015-1850. *https://www.legifrance.gouv.fr/eli/decret/2015/12/29/2015-1850/jo/texte*

156. De Nederlandsche Bank (2016). DNBulletin: Time for Transition: Towards a Carbon-neutral Economy. *http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2016/dnb338533.jsp*

157. Bowen, A., and Dietz, S. (2016). The Effects of Climate Change on Financial Stability, with Particular Reference to Sweden. *http://www.fi.se/upload/43_Utredningar/20_Rapporter/2016/climat-change-financial-stability-sweden.pdf*

158. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

159. UN (2015). Sendai Framework for Disaster Risk Reduction. *http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf*

160. UNEP FI (forthcoming). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation.

161. US Department of Labor (2015). Interpretive Bulletin Relating to the Fiduciary Standard under ERISA in Considering Economically Targeted Investments. 29 CFR Part 2509 RIN 1210-AB73. *https://s3.amazonaws.com/public-inspection.federalregister.gov/2015-27146.pdf*

162. European Systemic Risk Board (2016). Too Late, Too Sudden: Transition to a Low-Carbon Economy and Systemic Risk. Reports of the Advisory Scientific Committee, No 6. February 2016. *https://www.esrb.europa.eu/pub/pdf/asc/Reports_ASC_6_1602.pdf*

163. Fiduciary Duty in the 21st Century Investor Statement (2016). *http://www.fiduciaryduty21.org/investor-statement.html*

164. Responses to a survey from investment managers and asset owners across the globe, with US$5.9 trillion in assets under management, and interviews with 12 other stakeholders. Research conducted for a forthcoming 2016 PRI and ShareAction publication, *Transforming our World through Investment*.

165. US Department of Labor (2015). Interpretive Bulletin Relating to the Fiduciary Standard under ERISA in Considering Economically Targeted Investments. 29 CFR Part 2509 RIN 1210-AB73. *https://s3.amazonaws.com/public-inspection.federalregister.gov/2015-27146.pdf*

166. See SDG12.6

167. California Department of Insurance (2016). Climate Risk Carbon Initiative. *http://www.insurance.ca.gov/0250-insurers/0300-insurers/0100-applications/ci/*

168. California Department of Insurance (2016). Climate Risk Carbon Initiative FAQs. *http://www.insurance.ca.gov/0250-insurers/0300-insurers/0100-applications/ci/upload/Climate-Risk-Carbon-Initiative-Questions-4.pdf*

169. California Department of Insurance (2016). California Insurance Commissioner Dave Jones calls for insurance industry divestment from coal. Press Release, 25 January 2016. *http://www.insurance.ca.gov/0400-news/0100-press-releases/2016/statement010-16.cfm*

170. UN (2016). Transforming Our World: The 2030 Agenda for Sustainable Development (paragraph 63). *https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf*

171. OJK (2014). Roadmap for Sustainable Finance in Indonesia. *http://www.ojk.go.id/Files/box/keuangan-berkelanjutan/roadmap-keuangan-berkelanjutan.pdf*

172. OJK and WWF (2015). Indonesia First Movers on Sustainable Banking. Press Release, November 2015. *http://awsassets.wwf.or.id/downloads/sustainable_banking_pilot_project_ojk_wwf_id_english_231115_1.pdf*

173. Knot, K. (2015). Speech at Sustainable Finance Seminar, De Nederlandsche Bank, 27 November 2015. *http://www.dnb.nl/binaries/KK_tcm46-334439.pdf?201512021*

174. Rijksoverheid (2016). Annex 12 Informal ECOFIN meeting on 22 April agenda item Sustainable finance. April 2016. *https://www.rijksoverheid.nl/documenten/kamerstukken/2016/04/20/bijlage-12-informal-ecofin-meeting-on-22-april-agenda-item-sustainable-finance*

175. Energy Efficiency Finance Task Group (2015). Voluntary Energy Efficiency Investment Principles for G20 participating countries. *http://www.unepfi.org/fileadmin/energyefficiency/EnergyEfficiencyInvestmentPrinciples.pdf; http://www.unepfi.org/fileadmin/documents/EnergyEfficiencyFinanceStatement.pdf*

176. IPEEC (n.d.). Energy Efficiency Finance Task Group (EEFTG). *http://www.ipeec.org/cms/21-energy-efficiency-finance-task-group-eeftg-.html*

177. See Robins, N. and Sweatman, P. (forthcoming). How to grow the energy efficiency finance market through green tagging. See also *https://hypoblog.org/2016/07/01/the-future-development-of-eu-mortgage-and-covered-bond-markets-and-implications-of-the-energy-efficiency-debate/*

178. Mintzer, I., Bernatkova, L., Doyle, V., Paroutzoglou, S. and Yavrom, D. (2016). Government Subsidies to the Financial System – A Preliminary Exploration. *http://unepinquiry.org/wp-content/uploads/2016/08/Government_Subsidies_to_the_Global_Financial_System.pdf*

179. IISD (2015). How Green Public Procurement Contributes to Sustainable Development in China. *http://www.iisd.org/library/how-green-public-procurement-contributes-sustainable-development-china*

180. UNEP (2013). Sustainable Public Procurement: A Global Review. *http://www.unep.org/resourceefficiency/Portals/24147/SPP_Full_Report_Dec2013_v2%20NEW%20(2).pdf*

181. Naidoo, S. and A. Goldstuck (2015). The Experience of Governance Innovations in South Africa. UNEP Inquiry/Global Green Growth Institute. *http://unepinquiry.org/wp-content/uploads/2016/06/The_Experience_of_Governance_Innovations_in_South_Africa.pdf*

182. OECD (2014). Public Financial Institutions and the Low-carbon Transition. *http://www.oecd-ilibrary.org/environment-and-sustainable-development/public-financial-institutions-and-the-low-carbon-transition_5jxt3rhpgn9t-en*

183. Climate Bonds Initiative (2016). Bonds and Climate Change: The State of the Market in 2016. *https://www.climatebonds.net/files/files/HSBC-2016-Brasil-English-A4.pdf*

184. UNEP Inquiry, Principles for Responsible Investment, UN Global Compact and UNEP Finance Initiative (2015). Fiduciary Duty in the 21st Century. *http://unepinquiry.org/wp-content/uploads/2015/09/Fiduciary-duty-21st-century.pdf*

185. Mainstreaming Climate Action within Financial Institutions (2015). Five Voluntary Principles. *http://www.worldbank.org/content/dam/Worldbank/document/Climate/5Principles.pdf*

186. Barkawi, A. and Monnin, P. (2015). Monetary Policy and Sustainability – the Case of Bangladesh. UNEP Inquiry Working Paper/CEP. *http://unepinquiry.org/wp-content/uploads/2015/04/Monetary_Policy_and_Sustainability_The_Case_of_Bangladesh.pdf*

187. UNEP Inquiry/2 Degrees Investing Initiative (2016). Building a Sustainable Financial System in the European Union: the Five 'R's of Market and Policy Innovation for the Green Transition. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2016/04/Building_a_Sustainable_Financial_System_in_the_European_Union.pdf*

188. Volz, U. (forthcoming). The Role of Central Banks in Enhancing Green Finance. See also Barkawi, A. (2016). Central Banking and the Transition to a Low-Carbon Economy: the Role of Monetary Policy. *https://www.youtube.com/watch?v=5NKZI8MC2Jk*

189. People's Bank of China (2016). Guidelines for Establishing a Green Financial System. *http://www.pbc.gov.cn/english/130721/3133045/index.html*

190. Lauer, D. (2012). Capitalism Fail: Financial Services on the Brink. *http://www.huffingtonpost.com/dave-lauer/financial-services-industry_b_1605193.html*

191. OECD (2014). Illicit Financial Flows from Developing Countries: Measuring OECD Responses. *https://www.oecd.org/corruption/Illicit_Financial_Flows_from_Developing_Countries.pdf*

192. Finance Watch (n.d.). Campaign: Change finance. *http://www.finance-watch.org/hot-topics/campaign-change-finance*

193. Thimann, C. and Zadek, S. (2015). New Rules for New Horizons: Report of the High Level Symposium on Reshaping Finance for Sustainability. UNEP Inquiry/AXA. *http://unepinquiry.org/wp-content/uploads/2015/04/New_Rules_for_New_Horizons.pdf*

194. Gates, B. (1995). The Road Ahead. Viking Press.

195. UNEP Inquiry (2016). Designing for Disruption: The UNEP Inquiry Scenarios. *http://unepinquiry.org/wp-content/uploads/2016/05/Designing_for_Disruption.pdf*

196. Lewis, M. and Baker, D. (2014). Flash boys. Allen Lane.

197. UNEP Inquiry and Castilla-Rubio, J. C. (forthcoming). Fintech and Sustainable Development: Assessing the Implications. UNEP Inquiry/Space Time Ventures.

198. UNEP Inquiry and Castilla-Rubio, J. C. (forthcoming). Fintech and Sustainable Development: Assessing the Implications. UNEP Inquiry/Space Time Ventures.

199. Schwab, K. (2016). The fourth industrial revolution. World Economic Forum.

200. Allen, M. (1999). Do-it-yourself climate prediction. Nature.

201. Citi GPS: Global Perspectives & Solutions (2016). Technology at Work v2.0. Oxford Martin School/Citi. *http://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf*

202. Nash, R. M. and Beardsley, E. (). The Future of finance Part : The rise of shadow bank. Goldman Sachs; Schneider, J. and Prasad Borra, S.K. (2015). The Future of Finance Part 2: Redefining the Way We Pay in the Next Decade. Goldman Sachs; Terry, H. P., Schwartz, D., Sun T. (2015). The Future of Finance Part 3: The Socialization of Finance. Goldman Sachs.

203. Citi GPS: Global Perspectives & Solutions (2016). Technology at Work v2.0. Oxford Martin School/Citi. *http://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf*

204. Vodafone (2016). Vodafone M-Pesa reaches 25 million customers milestone.

205. Citi GPS: Global Perspectives & Solutions (2016). Technology at Work v2.0. Oxford Martin School/Citi. *http://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf*

206. Financial Times (2016). Lightbulb moment for M-Kopa. *http://www.ft.com/cms/s/2/ccfaa1ba-d0f1-11e5-831d-09f7778e7377.html#axzz4IP6y9kMv*

207. Abundance Investments (n.d.). *https://www.abundanceinvestment.com*

208. ACRE (n.d.). *http://acre.com/about-us*

209. WSJ (2016). 5 Things to Know About China's Ant Financial. *http://blogs.wsj.com/briefly/2016/04/26/5-things-to-know-about-chinas-ant-financial/*

210. *http://weekly.caixin.com/2016-08-12/100977009.html*

211. *http://www.cbeex.com.cn/article/xxfw/zx/bsdt/201608/20160800059270.shtml*

212. Thanks in particular for these insights to Niall Murphy, CEO and founder of Evrythng: https://evrythng.com/

213. UN Women (2015). Financing: Why it matters for women and girls. *http://www.unwomen.org/en/news/in-focus/financing-for-gender-equality*

214. IFC (2013). How Movable Collateral Gets Credit Moving. *http://www.ifc.org/wps/wcm/connect/7b0e2e804782fbfa9644f7299ede9589/How%2Bmovable%2Bcollateral%2Bgets%2Bcredit%2Bmoving.pdf?MOD=AJPERES*

215. Fraiberger, S. P. and Sundararajan, A. (2015). Peer-to-peer rental markets in the sharing economy. NYU Stern School of Business Research Paper.

216. Zervas, G., Proserpio, D. and Byers, J. (2016). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. Boston U. School of Management Research Paper, (2013-16).

217. Financial Times (2016). Growth of fintech forecast to spur almost 2m banking job cuts. *http://www.ft.com/cms/s/0/e00f8884-f65c-11e5-96db-fc683b5e52db.html#axzz4JIrgQ8kS*

218. Bank of England (2016). Staff Working Paper No. 605: The macroeconomics of central bank issued digital currencies. *http://www.bankofengland.co.uk/research/Pages/workingpapers/2016/swp605.aspx*

219. World Bank (2016). Digital Dividends – World Development Report. *http://www.worldbank.org/en/publication/wdr2016*

220. This section draws on UNEP Inquiry and Ecofys (forthcoming). Developing a Performance Framework for a Sustainable Financial System.

221. Degrees Investing Initiative (2016). Developing Sustainable Energy Investment (SEI) Metrics, Benchmarks, and Assessment Tools for the Financial Sector.

222. Corporate Knights (2016). Measuring Sustainability Disclosure.

223. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

224. I4CE (2016). Landscape of Climate Finance in France. *http://www.i4ce.org/go_project/landscape-climate-finance-france/*

225. CPI (2012). German Landscape of Climate Finance. *http://climatepolicyinitiative.org/publication/german-landscape-of-climate-finance/*

226. World Bank Group (2016). Outline Framework for Measuring Progress on Green Finance. *http://unepinquiry.org/wp-content/uploads/2016/09/5_Outline_Framework_for_Measuring_Progress_on_Green_Finance.pdf*

227. OECD (2016). Measuring Distance to the SDGs Targets: a pilot assessment of where OECD countries stand. *http://www.oecd.org/std/OECD-Measuring-Distance-to-the%20SDGs-Target-Pilot-Study-web.pdf*

228. For example, the World Bank G20 Financial Inclusion Indicators: *http://databank.worldbank.org/data/reports.aspx?source=g20-basic-set-of-financial-inclusion-indicators*

229. UNEP Inquiry and Ecofys (forthcoming). Developing a Performance Framework for a Sustainable Financial System.

230. UNEP Inquiry/Paulson Institute/Bloomberg Philanthropies/Green Finance Committee (China)/SIFMA (2016). Green Finance – A Growing Imperative. *http://unepinquiry.org/wp-content/uploads/2016/05/Green_Finance_A_Growing_Imperative.pdf*

231. Frankfurt School-UNEP Centre/BNEF (2016). Global Trends in Renewable Energy Investment 2016, *http://www.fs-unep-centre.org*

232. China Banking Regulatory Commission (2012). Green Credit Guidelines. *http://www.cbrc.gov.cn/EngdocView.do?docID=3CE646AB629B46B9B533B1D8D9FF8C4A*

233. Bloomberg New Energy Finance (2016). Clean Energy Defies Fossil Fuel Price Crash To Attract Record $329bn Global Investment In 2015. *http://about.bnef.com/press-releases/clean-energy-defies-fossil-fuel-price-crash-to-attract-record-329bn-global-investment-in-2015/*

234. The matrix is based on Figure 12: An Integrated Performance Framework for a Sustainable Financial System on page 54.

235. UNEP Inquiry/Paulson Institute/Bloomberg Philanthropies/Green Finance Committee (China)/SIFMA (2016). Green Finance – A Growing Imperative. *http://unepinquiry.org/wp-content/uploads/2016/05/Green_Finance_A_Growing_Imperative.pdf*

236. Philippon, T. (2015). Has the US Finance Industry Become Less Efficient? On The Theory And Measurement Of Financial Intermediation. The American Economic Review, 105(4), 1408-1438.

237. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

238. ESRB (2014). EBA/SSM Stress Test: The Macroeconomic Adverse Scenario. *https://www.esrb.europa.eu/pub/pdf/other/140430_Adverse-scenario_2014-EBA-stress-test.pdf?c66cb2a5ee3dbfd8fddf53ad78827bcf*

239. Van Den End, J. W., Hoeberichts, M. and Tabbae, M. (2006). Modelling Scenario Analysis and Macro Stress-testing. De Nederlandsche Bank.

240. Voysey, A. and Andreeva, N. (2016). Environmental Risk Analysis by Financial Institutions. *http://unepinquiry.org/wp-content/uploads/2016/09/2_Environmental_Risk_Analysis_by_Financial_Institutions.pdf*

241. ICBC (2016). Impact of Environmental Factors on Credit Risk of Commercial Banks. *http://www.greenfinance.org.cn/upfile/upfile/filet/ICBC环境压力测试论文_2016-03-19_08-49-24.pdf*

242. The Financial Sector Assessment Program (FSAP), established in 1999, is a comprehensive and in-depth analysis of a country's financial sector. FSAP assessments are the joint responsibility of the IMF and World Bank in developing economies and emerging markets and of the IMF alone in advanced economies. *https://www.imf.org/external/np/exr/facts/fsap.htm*

243. The Global Financial Development Database is an extensive dataset of financial system characteristics for 206 economies. *http://data.worldbank.org/data-catalog/global-financial-development*

244. UNEP Inquiry (2016). Designing for Disruption: The UNEP Inquiry Scenarios. *http://unepinquiry.org/wp-content/uploads/2016/05/Designing_for_Disruption.pdf*

245. Carney, M. (2016). The Sustainable Development Goal imperative. Remarks given at United Nations General Assembly, High-Level Thematic Debate on Achieving the Sustainable Development Goals. New York, United States. *http://www.bankofengland.co.uk/publications/Pages/speeches/2016/897.aspx*

246. Finance Watch (2015). A Coalition of Civil Society Groups Led by Finance Watch Launches a New Tool to Measure the Financial System's Impact on Society. *http://www.finance-watch.org/press/press-releases/1177-launch-citizens-dashboard-of-finance*

247. GPFI (2015). GPFI Report to the Leaders: G20 Summit, Antalya, 2015. *http://www.gpfi.org/sites/default/files/documents/GPFI-Progress-Report2015.pdf*

248. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

249. Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

250. Corporate Knights (2016). Spotlight on the 2016 Global 100. *http://www.corporateknights.com/magazines/2016-global-100-issue/spotlight-on-the-2016-global-100-14533333/*

251. Sustainable Stock Exchanges Initiative (2015). List of Partner Exchanges. *http://www.sseinitiative.org/sse-partner-exchanges/list-of-partner-exchanges/*

252. Robins, N. (2016). How Paris Became the Capital of Climate Finance. *http://unepinquiry.org/wp-content/uploads/2016/04/How_Paris_Became_the_Capital_of_Climate_Finance.pdf*

253. OJK (2014). Roadmap for Sustainable Finance in Indonesia. *http://www.ojk.go.id/Files/box/keuangan-berkelanjutan/roadmap-keuangan-berkelanjutan.pdf*

254. Bank of England (2016). Central Banking, Climate Change and Environmental Sustainability. *http://www.bankofengland.co.uk/research/Pages/conferences/1116.aspx*

255. Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Report. *https://www.fsb-tcfd.org/wp-content/uploads/2016/03/Phase_I_Report_v15.pdf*

256. Forstater, M. and Zhang, N. (2016). Measuring Progress: Definitions and Concepts Background Note. *http://unepinquiry.org/wp-content/uploads/2016/09/1_Definitions_and_Concepts.pdf*

257. World Bank Group (2016). Outline Framework for Measuring Progress on Green Finance. *http://unepinquiry.org/wp-content/uploads/2016/09/5_Outline_Framework_for_Measuring_Progress_on_Green_Finance.pdf*

258. Alliance for Financial Inclusion (2016). AFI Members Travel to Nairobi for Digital Financial Services (DFS) Training. *http://www.afi-global.org/news/2016/7/28/afi-members-travel-nairobi-digital-financial-services-dfs-training*

259. Provided by Ministry of Finance, France

260. Kuhn, T. S. (2012). The Structure of Scientific Revolutions. University Of Chicago Press.

261. Hall, P. A. (1993). Policy Paradigms. Social Learning, and the State: The Case of Economic Policymaking in Britain. Comparative Politics, 25(3), 275-296. *https://www.unc.edu/~fbaum/teaching/articles/CompPol-1993-Hall.pdf*

262. Mackintosh, S. (2016). Making The Jump: How Crises Affect Policy Consensus and Can Trigger Paradigm Shift. *http://unepinquiry.org/wp-content/uploads/2016/02/Making_the_Jump.pdf*

263. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

264. Thimann, C. and Zadek, S. (2015). New Rules for New Horizons: Report of the High Level Symposium on Reshaping Finance for Sustainability. UNEP Inquiry/AXA. *http://unepinquiry.org/wp-content/uploads/2015/04/New_Rules_for_New_Horizons.pdf*

265. UNEP Inquiry, Bangladesh Bank and IISD (2016). Designing a Sustainable Financial System in Bangladesh. *http://unepinquiry.org/wp-content/uploads/2015/04/Designing_a_Sustainable_Financial_System_in_Bangladesh_Summary_Briefing.pdf*

266. Rahman, A. (2014). Inclusive finance and sustainable development. Bangladesh Institute of Bank Management.

267. Carney, M. (2015). Breaking the Tragedy of the Horizons – Climate Change and Financial Stability, Speech at Lloyds of London, September 2015. *http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech844.pdf*

268. PRI and UNEP FI (2016). Greening Institutional Investment. *http://unepinquiry.org/wp-content/uploads/2016/09/3_Greening_Institutional_Investment.pdf*

269. OECD (forthcoming). A Quantitative Framework for Analysing Potential Bond Contributions in a Low-Carbon Transition.

270. Vienna Group of Citizens (2015). Values based banking. UNEP Inquiry/Institute for Social Banking/Finance Innovation Lab. *http://unepinquiry.org/wp-content/uploads/2015/04/Values_Based_Banking.pdf*

271. UNEP Inquiry, Principles for Responsible Investment, UN Global Compact and UNEP Finance Initiative (2015). Fiduciary Duty in the 21st Century. *http://unepinquiry.org/wp-content/uploads/2015/09/Fiduciary-duty-21st-century.pdf*

272. Hiller, J. S. (2013). The benefit corporation and corporate social responsibility. Journal of Business Ethics, 118(2), 287-301.

273. De Nederlandsche Bank (2016). DNBulletin: Time for Transition: Towards a Carbon-neutral Economy. *http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2016/dnb338533.jsp*

274. Thimann, C. and Zadek, S. (2015). New Rules for New Horizons: Report of the High Level Symposium on Reshaping Finance for Sustainability. UNEP Inquiry/AXA. *http://unepinquiry.org/wp-content/uploads/2015/04/New_Rules_for_New_Horizons.pdf*

275. UNCTAD (2015). World Investment Report 2015. *http://unctad.org/en/PublicationsLibrary/wir2015_en.pdf*

276. Tapscott, D. and Tapscott, A. (2016). Blockchain Revolution: How the Technology behind Bitcoin is Changing Money, Business, and the World. Penguin.

277. Henderson, H. (2016). Fintech: Good and Bad News for Sustainable Finance (forthcoming).

278. Johnston, D. (2012). Idle corporate cash piles up. Reuters. *http://blogs.reuters.com/david-cay-johnston/2012/07/16/idle-corporate-cash-piles-up/*

279. Group of 30 (2015). Fundamentals of Central Banking: Lessons from the Crisis.

280. OJK (2014). Roadmap for Sustainable Finance in Indonesia. *http://www.ojk.go.id/Files/box/keuangan-berkelanjutan/roadmap-keuangan-berkelanjutan.pdf*

281. UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

282. UNEP (2016). Incoming President of UN General Assembly Puts Financing for Sustainable Development Center Stage. *http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=27081&ArticleID=36247&l=en*

283. Aviva (2014). A Roadmap for Sustainable Capital Markets. *http://www.aviva.com/media/upload/Aviva-Roadmap-to-Sustainable-Capital-Markets-updated.pdf*

284. UNEP Inquiry/Paulson Institute/Bloomberg Philanthropies/Green Finance Committee (China)/SIFMA (2016). Green Finance – A Growing Imperative. *http://unepinquiry.org/wp-content/uploads/2016/05/Green_Finance_A_Growing_Imperative.pdf*

APPENDIX I: ABBREVIATIONS

AI	Artificial Intelligence
AML	Anti-Money Laundering Law
ASEAN	Association of Southeast Asian Nations
Basel III	Third Basel Accord
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CAR	Rural Environmental Registry
CRCI	Climate Risk Carbon Initiative
DNB	De Nederlandsche Bank
EIB	European Investment Bank
ESG	Environmental, social and corporate governance
ETF	Exchange-Traded Fund
EU	European Union
FDI	Foreign direct investment
FEBRABAN	Federação Brasileira de Bancos
Fintech	Financial technology
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FTSE	Financial Times Stock Exchange
G20	Group of Twenty
G7	Group of Seven
GDP	Gross domestic product
GW	Gigawatt
IAASB	International Auditing and Assurance Standards Board
IAIS	International Association of Insurance Supervisors
IASB	International Accounting Standards Board
ICBC	Industrial and Commercial Bank of China

IFAC	International Federation of Accountants
IFC	International Finance Corporation
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
IOPS	International Organisation of Pension Supervisors
IOSCO	International Organization of Securities Commissions
IoT	Internet of things
KYC	Know Your Customer laws
MW	Megawatt
OECD	Organisation for Economic Co-operation and Development
OJK	Otoritas Jasa Keuangan - Financial Services Authority (Indonesia)
P2P	Peer-to-peer
PSL	Priority Sector Lending
ROSC	IMF Reports on the Observance of Standards and Codes
S&P	Standard & Poor's
SDGs	Sustainable Development Goals
SEBI	Securities and Exchange Board of India
SME	Small and medium-sized enterprises
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNEP Inquiry	United Nations Environment Programme Inquiry into the Design of a Sustainable Financial System
V20	Vulnerable Twenty Group

APPENDIX II: PARTNERS

We would like to thank the following institutions that have supported the work of the UNEP Inquiry in developing this report in 2016: 2° Investing Initiative; ABN AMRO Bank; Avanzi; AVIVA; Banco Central do Brasil; Banco de Mexico; Banco do Brasil; Bank for International Settlements; Bank of England; California Department of Insurance; Central Bank of Kenya; City Financial; City of London Corporation; Climate Bonds Initiative; Collaborare Advisory; College of Europe; Corporate Knights; Council on Economic Policies; Credit Suisse; De Nederlandsche Bank; Department for International Development (UK); Ecofys; Egyptian Exchange; École polytechnique fédérale de Lausanne; Erasmus University Rotterdam; European Bank for Reconstruction and Development; European Climate Foundation; European Commission; European Political Strategy Centre; Federação Brasileira de Bancos; Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Germany); Federal Ministry of Finance (Germany); Federal Office for the Environment (Switzerland); Federation of Indian Chambers of Commerce and Industry; Foreign Commonwealth Office (UK); French Treasury; FTSE Russell; Fundação Getúlio Vargas (FGV); Generation Investment Management; Government of Mongolia; Government of Nigeria; Green Finance Committee of the China Society for Finance and Banking; Green Infrastructure Investment Coalition; HM Treasury (UK); Institut du Développement Durable et des Relations Internationales; International Finance Corporation; International Institute for Sustainable Development; International Monetary Fund; Indian Institute for Public Policy and Finance; International Union for Conservation of Nature; Jackson Globus; Johns Hopkins University; Kenyan Bankers Association; MAVA Foundation; Ministry of Environment, Land and Sea (Italy); Ministry of Finance (Brazil); Ministry of Finance (Sweden); Monetary Authority of Singapore; Mongolian Bankers Association; New Climate Economy; Organisation for Economic Co-operation and Development; Otoritas Jasa Keuangan; Paulson Institute; People's Bank of China; Philippines Insurance Commission; Planetary Skin Institute; Principles for Responsible Investment; PwC; Reserve Bank of India; Rockefeller Foundation; SE4ALL; SEI Stockholm; Singapore Management University; SNS Center for Business and Policy Studies; SOMO; The Cooperators; Thomson Reuters; UN Women; United Nations Conference on Trade and Development; UNEP FI; University of Chicago Harris School of Public Policy; Uppsala University; Utrecht University; Washington State Office of the Insurance Commissioner; World Economic Forum; World Energy Council; World Federation of Exchanges and World Resources Institute.

APPENDIX III: INQUIRY FULL LIST OF REPORTS AND PAPERS

INQUIRY REPORTS

UNEP Inquiry (2015). The Financial System We Need: Aligning the Financial System with Sustainable Development. October 2015. Geneva: UNEP. Available in Arabic, Chinese, English, French, Portuguese, Russian and Spanish at *http://unepinquiry.org/publication/inquiry-global-report-the-financial-system-we-need/*

UNEP Inquiry (2014). Invitation. Update Report 1: January 2014. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2014/06/Aligning_the_Financial_System_with_Sustainable_Development_1_An_Invitation.pdf*

UNEP Inquiry (2014). Insight from Practice. Update Report 2: October 2014. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2014/10/Aligning_the_Financial_System_with_Sustainable_Development_2_Insights_from_Practice.pdf*

UNEP Inquiry (2015). Pathways to Scale. Update Report 3: January 2015. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2015/04/Aligning_the_Financial_System_with_Sustainable_Development_3_Pathways_to_Scale.pdf*

UNEP Inquiry (2015). The Coming Financial Climate. Update Report 4: April 2015. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2015/05/Aligning_the_Financial_System_with_Sustainable_Development_4_The_Coming_Financial_Climate.pdf*

UNEP Inquiry (2015). Aligning Africa's Financial System with Sustainable Development. March 2015. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2015/04/Aligning_Africas_Financial_System_with_Sustainable_Development.pdf*

UNEP Inquiry (2015). Aligning the Financial Systems in the Asia Pacific Region to Sustainable Development. April 2015. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2015/04/Aligning_the_Financial_Systems_in_the_Asia_Pacific_Region_to_Sustainable_Development.pdf*

UNEP Inquiry (2016). Green Finance for Developing Countries: Needs, Concerns and Innovations. May 2016. Geneva: UNEP. *http://unepinquiry.org/wp-content/uploads/2016/08/Green_Finance_for_Developing_Countries.pdf*

COUNTRY-FOCUSED PAPERS

Bangladesh: Barkawi, A. and Monnin, P. (2015). Monetary Policy and Sustainability – the Case of Bangladesh. UNEP Inquiry Working Paper/CEP. *http://unepinquiry.org/wp-content/uploads/2015/04/Monetary_Policy_and_Sustainability_The_Case_of_Bangladesh.pdf*

Bangladesh: UNEP Inquiry, Bangladesh Bank and IISD (2015). Designing a Sustainable Financial System in Bangladesh. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/Designing_a_Sustainable_Financial_System_in_Bangladesh_Summary_Briefing.pdf*

Brazil: Center for Sustainability Studies at Getulio Vargas Foundation (GVces/FGV-EAESP) (2015). The Brazilian Financial System and the Green Economy: Alignment with Sustainable Development. UNEP Inquiry/Center for Sustainability Studies at Getulio Vargas Foundation. *http://unepinquiry.org/wp-content/uploads/2015/10/brazilianfinancialsystemgreeneconomy_febraban-gvces_april2015.pdf*

China: China Green Finance Taskforce (2015). Establishing China's Green Financial System. UNEP Inquiry/People's Bank of China. *http://unepinquiry.org/wp-content/uploads/2015/12/Establishing_Chinas_Green_Financial_System_Final_Report.pdf*. Also see sub-papers:

- Background Paper A: Theoretical Framework Of Green Finance. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Background_Paper_A_Theoretical_Framework.pdf*
- Background Paper B: International Experience Of Green Finance. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Background_Paper_B_International_Experience.pdf*
- Detailed Recommendation 1: Create A Green Banking System. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_1_Green_Banking_System.pdf*
- Detailed Recommendation 2: Develop Green Funds. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_2_Green_Funds.pdf*
- Detailed Recommendation 3: Green The Development Banks. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_3_Green_the_Development_Banks.pdf*
- Detailed Recommendation 4: Strengthen Discounted Green Loans. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_4_Discounted_Green_Loans.pdf*

- Detailed Recommendation 5: Promote The Issuance Of Green Bonds. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_5_Green_Bonds.pdf*
- Detailed Recommendation 6: Create A Green IPO Channel. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_6_Green_IPO.pdf*
- Detailed Recommendation 7: Promote Development Of Emissions Trading Markets. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_7_Emissions_Trading.pdf*
- Detailed Recommendation 8: Establish A Green Rating System. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_8_Green_Rating.pdf*
- Detailed Recommendation 9: Create A Green Stock Index. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_9_Stock_Index.pdf*
- Detailed Recommendation 10: Develop Environmental Cost Analysis. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_10_Environmental_Cost_Analysis.pdf*
- Detailed Recommendation 11: Create Green Investor Networks. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_11_Green_Investor_Networks.pdf*
- Detailed Recommendation 12: Create A Compulsory Green Insurance System. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_12_Compulsory_Green_Insurance.pdf*
- Detailed Recommendation 13: Establish The Legal Liability Of Financial Institutions. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_13_Lender_Liability.pdf*
- Detailed Recommendation 14: Make Environmental Information Disclosure Mandatory. *http://unepinquiry.org/wp-content/uploads/2015/04/ECGFS_Detailed_Recommendation_14_Mandatory_Disclosure.pdf*

China: Zhang, C., Zadek, S., Chen, N. and Halle, M. (2015). Greening China's Financial System: Synthesis Report. Development Research Centre/ IISD. *https://www.iisd.org/sites/default/files/publications/greening-chinas-financial-system.pdf*. Also see Chinese expert sub-papers:

- Zhuo, X. and Zhang, L. (2015). A Framework for Green Finance. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-1.pdf*
- Zheng, Z. (2015). Demand for Green Finance. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-2.pdf*
- Zhong, M. and Lan, H. (2015). Environmental and Industrial Policy Environment for the Development of Green Finance in China (2015). In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-3.pdf*
- Tian, H., Chen, N., Zhang, L. and Wang, G. (2015). Lessons from Development of Green Finance in China. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-4.pdf*
- Wang, G. (2015). Problems and Difficulties in the Development of China's Green Financial System. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-5.pdf*

Colombia: UNEP Inquiry/IFC (2015). Aligning Colombia's Financial System with Sustainable Development. UNEP Inquiry/IFC. *http://unepinquiry.org/wp-content/uploads/2015/10/Aligning_Colombias_Financial_System_with_Sustainable_Development.pdf*

European Union: UNEP Inquiry/2 Degrees Investing Initiative (2016). Building a Sustainable Financial System in the European Union: the Five 'R's of Market and Policy Innovation for the Green Transition. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2016/04/Building_a_Sustainable_Financial_System_in_the_European_Union.pdf*

France: I4CE (2015). France's Financial (Eco)system: Improving the Integration of Sustainability Factors. UNEP Inquiry Working Paper. *http://unepinquiry.org/wp-content/uploads/2016/02/France_Financial_Ecosystem.pdf*

India: UNEP Inquiry/FICCI/Koan/NIPFP (2016). Delivering a Sustainable Financial System in India: Final Report. UNEP Inquiry/Federation of Indian Chambers of Commerce and Industry. *http://unepinquiry.org/wp-content/uploads/2016/04/Delivering_a_Sustainable_Financial_System_in_India.pdf*

Indonesia: Volz, U. and Zadek, S. (2015). Towards a Sustainable Financial System in Indonesia. UNEP Inquiry/IFC/ASrIA. *http://unepinquiry.org/wp-content/uploads/2015/04/Towards_a_Sustainable_Financial_System_in_Indonesia.pdf*

Kenya: Murai, C. and Kirima, W. (2015). Aligning Kenya's Financial System with Inclusive Green Investment. UNEP Inquiry/IFC. *http://unepinquiry.org/wp-content/uploads/2015/11/Aligning_Kenya---s_Financial_System_with_Inclusive_Green_Investment_Full_Report.pdf*

Netherlands: van Tilburg, R. (2015). Design of a Sustainable Financial System: Input from the Netherlands to the UNEP Inquiry. UNEP Inquiry/Sustainable Finance Lab – Utrecht. *http://unepinquiry.org/wp-content/uploads/2015/10/Design_of_a_Sustainable_Financial_System_Netherlands_Input_to_the_UNEP_Inquiry.pdf*

South Africa: Naidoo, S. and A. Goldstuck (2015). The Experience of Governance Innovations in South Africa. UNEP Inquiry/ Global Green Growth Institute. *http://unepinquiry.org/wp-content/uploads/2016/06/The_Experience_of_Governance_Innovations_in_South_Africa.pdf*

South Africa: Naidoo, S. and Goldstuck, A. (2015). Experience and Lessons from South Africa: An Initial Review. UNEP Inquiry/ Global Green Growth Institute. *http://unepinquiry.org/wp-content/uploads/2016/06/Experience_and_Lessons_from_South_Africa.pdf*

Switzerland: Federal Office for the Environment (2015). Design of a Sustainable Financial System: Swiss Team Input into the UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/Design_of_a_Sustainable_Financial_System_Swiss_Team_Input_into_the_UNEP_Inquiry.pdf*

United Kingdom: Bourdon, J., McDaniels, J. and Robins, N. (2015). The United Kingdom: Global Hub, Local Dynamics. UNEP Inquiry Working Paper. *http://unepinquiry.org/wp-content/uploads/2015/10/UK_Global_Hub_Local_Dynamics.pdf*

United States: Krosinsky, C. (2016). The State of Sustainable Finance in the United States. UNEP Inquiry Working Paper. *http://unepinquiry.org/wp-content/uploads/2016/02/The_State_of_Sustainable_Finance_in_the_US.pdf*

United States: Turbeville, W. (forthcoming). Aligning the Financial System with Sustainable Development in the United States. UNEP Inquiry Working Paper. DEMOS/UNEP Inquiry.

THEMATIC PAPERS

ASrIA/IFC/UNEP Inquiry (2015). Exploring Financial Policy and Regulatory Barriers to Private Climate Finance in South-East Asia. ASrIA. *http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Exploring-Exploring_Financial_Policy_and_Regulatory_Barriers_to_Private_Climate_Finance_in_South_East_Asia_ASRIA.pdf*

Bacani, B., McDaniels, J. and Robins, N. (2015). Insurance 2030: Harnessing Insurance for Sustainable Development. UNEP Inquiry Working Paper. UNEP Inquiry/PSI. *http://unepinquiry.org/wp-content/uploads/2015/06/Insurance_2030.pdf*

Bacani, B. (2015). A systemic view of the insurance industry, regulation and sustainable development: International developments and policy proposals for China. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-9.pdf*

Caldecott, B. and Robins, N. (2015). Greening China's Financial Markets: The Risks and Opportunities of Stranded Assets. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-6.pdf*

Caldecott, B. and McDaniels, J. (2014). Financial Dynamics of the Environment: Risks, Impacts, and Barriers to Resilience. UNEP Inquiry Working Paper. UNEP Inquiry/Smith School, Oxford University. *http://unepinquiry.org/wp-content/uploads/2015/04/Financial_Dynamics_of_the_Environment_Risks_Impacts_and_Barriers_to_Resilience.pdf*

Chenet, H. (2015). Financial Risk and the Transition to a Low-Carbon Economy: Towards a Carbon Stress Testing Framework. UNEP Inquiry Working Paper. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2015/10/2dii_risk_transition_low-carbon_workingpaper_jul2015.pdf*

Clarke, T. and M. Boersma (2016). Sustainable Finance? A Critical Analysis of the Regulation, Policies, Strategies Implementation and Reporting on Sustainability in International Finance. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/02/Sustainable_Finance.pdf*

Cleary, S. (2015). Stock Exchanges and Sustainability. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/12/Stock_Exchanges_and_Sustainability.pdf*

Dupré, S. and Thomä, J. (2015). Alignment of Investment Strategies with Climate Scenarios: Perspectives for Financial Institutions. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-11.pdf*

Egler, H.P. and Frazao, R. (2016). Sustainable Infrastructure and Finance: How to Contribute to a Sustainable Future. UNEP Inquiry Working Paper. UNEP Inquiry/ Global Infrastructure Basel Foundation. *http://unepinquiry.org/wp-content/uploads/2016/06/Sustainable_Infrastructure_and_Finance.pdf*

Forstater, M. and Zhang, N. (2016). Measuring Progress: Definitions and Concepts Background Note. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/09/1_Definitions_and_Concepts.pdf*

Glemarec, Y., Bardoux, P. and Roy, T. (2015). The Role of Policy-Driven Institutions in Developing National Financial Systems for Long-Term Growth. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/The_Role_of_Policy-Driven_Institutions_in_Developing_National_Financial_Systems_for_Long-Term_Growth.pdf*

Greenham, T., McCann, D. and Ryan-Collins, J. (2014). Financial System Impact of Disruptive Innovation. UNEP Inquiry Working Paper. UNEP Inquiry/new economics foundation. *http://unepinquiry.org/wp-content/uploads/2014/09/Financial_System_Impact_of_Disruptive_Innovation.pdf*

Hawkins, P. (2015). Design Options for a Sustainable Financial Sector: Lessons from Inclusive Banking Experiments. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/Design_Options_for_a_Sustainable_Financial_Sector.pdf*

Henderson, H. (2015). Perspectives on Reforming Electronic Markets and Trading. UNEP Inquiry Working Paper. UNEP Inquiry/Ethical Markets Media. *http://unepinquiry.org/wp-content/uploads/2015/12/Perspectives_on_Reforming_Electronic_Markets_and_Trading.pdf*

Jackson, T. and Victor, P. (2015). Towards a Stock-Flow Consistent Ecological Macroeconomics. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/04/Towards_a_Stock-Flow_Consistent_Ecological_Macroeconomics.pdf*

Kapoor, S. (2015). Internalising Climate Mitigation for Financial Policymakers. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-8.pdf*

Kidney, S. and Sonerud, B. (2015). Scaling up Green Bond Market for Sustainable Development: A strategic guide for the public sector to stimulate private sector market development for green bonds. UNEP Inquiry Working Paper. UNEP Inquiry/CBI. *http://unepinquiry.org/wp-content/uploads/2015/12/GB-Public_Sector_Guide-Final-1A.pdf*

Kidney, S., Oliver, P. and Sonerud, B. (2015). Greening China's Bond Market: Facilitating green investment and improving transparency and stability in financial markets. In Greening China's Financial System (Zhang, Zadek, Chen and Halle (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-10.pdf*

Kreibiehl, S. and Patel, S. (2014). Delivering the Green Economy through Financial Policy. UNEP Inquiry Working Paper. UNEP Inquiry/Frankfurt School of Finance and Management. *http://unepinquiry.org/wp-content/uploads/2014/05/141017_UNEP-Inquiry-Green-Economy-through-Financial-Policy-3.pdf*

Krosinsky, C. (2015). The Value of Everything. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/12/The_Value_of_Everything.pdf*

Lake, R. and Robins, N. (2015). Financial Reform, Institutional Investors and Sustainable Development. UNEP Inquiry Working Paper. UNEP Inquiry/CalPERS/Rob Lake Advisors Ltd. *http://unepinquiry.org/wp-content/uploads/2015/04/Financial_Reform_Institutional_Investors_and_Sustainable_Development.pdf*

Mackintosh, S. (2016). Making the Jump: How Crises Affect Policy Consensus and Can Trigger Paradigm Shift. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/02/Making_the_Jump.pdf*

McDaniels, J. and Robins, N. (forthcoming). Aligning Financial Cultures to Sustainable Development. UNEP Inquiry Working Paper. UNEP Inquiry.

Mintzer, I., Bernatkova, L., Doyle, V., Paroutzoglou, S. and Yavrom, D. (2016). Government Subsidies to the Financial System – A Preliminary Exploration. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/08/Government_Subsidies_to_the_Global_Financial_System.pdf*

Monnin, P. and Barkawi, A. (2015). Monetary Policy and Green Finance – Exploring the Links. In Greening China's Financial System (Zhang, Zadek, Chen and Halle. (Eds)). DRC/IISD with UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/greening-chinas-financial-system-chapter-7.pdf*

PRI/UNEP FI/UNGC/UNEP Inquiry (2015). Fiduciary Duty in the 21st Century. UNEP FI. *http://unepinquiry.org/wp-content/uploads/2015/09/Fiduciary-duty-21st-century.pdf*

PRI/UNEP FI/UNGC/UNEP Inquiry (2014). Policy Frameworks for Long-Term Responsible Investment: The Case for Investor Engagement in Public Policy. *http://unepinquiry.org/wp-content/uploads/2015/10/PRI_Case-for-Investor-Engagement.pdf*

Robins, N. (2016). How Paris Became the Capital of Climate Finance. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/04/How_Paris_Became_the_Capital_of_Climate_Finance.pdf*

Robins, N. and McDaniels, J. (2016). Greening the Banking System: Taking Stock of G20 Green Banking Market Practice. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/09/9_Greening_the_Banking_System.pdf*

Sampaio, R.S., Diniz, E., Maristrello Porto, A.J. and Martins Lopes, L.D. (2016). Lenders and Investors Environmental Liability: How Much is Too Much? UNEP Inquiry Working Paper. UNEP Inquiry/FGV. *http://unepinquiry.org/wp-content/uploads/2016/04/Lenders_and_Investors_Environmental_Liability.pdf*

Sandberg, J. (2015). Towards a Theory of Sustainable Finance. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/Towards_a_Theory_of_Sustainable_Finance.pdf*

Thimann, C. and Zadek, S. (2015). New Rules for New Horizons: Report of the High Level Symposium on Reshaping Finance for Sustainability. UNEP Inquiry/AXA. *http://unepinquiry.org/wp-content/uploads/2015/04/New_Rules_for_New_Horizons.pdf*

Thomä, J., Strauss, D., Lutz, V. and Kulle, A.C. (2015). Green SMEs and Access to Finance: the Role of Banking Diversity. UNEP Inquiry Working Paper. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2015/10/2ii_banking_diversity_v0.pdf*

Thomä, J., Dupré, S., Hasan, F. and Robins, N. (2015). Equity Markets, Benchmark Indices, and the Transition to a Low-Carbon Economy. UNEP Inquiry Working Paper. UNEP Inquiry/2 Degrees Investing Initiative. *http://unepinquiry.org/wp-content/uploads/2016/05/Equity_markets_benchmark_indices_and_the_transition_to_a_low-carbon_economy.pdf*

Turbeville, W. (forthcoming). Towards a Performance Framework for a Sustainable Financial System. UNEP Inquiry Working Paper. DEMOS/UNEP Inquiry.

UNEP FI/Cambridge Institute for Sustainability Leadership/UNEP Inquiry (2015). Banking and Sustainability: Time for Convergence – A Policy Briefing on the links between Financial Stability and Environmental Sustainability. *http://unepinquiry.org/wp-content/uploads/2015/10/BankingSustainability_TimeForConvergence.pdf*

UNEP Inquiry (2016). Designing for Disruption: The UNEP Inquiry Scenarios. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/05/Designing_for_Disruption.pdf*

UNEP Inquiry (forthcoming). Financing the Transition: How Financial System Reform Can Serve Sustainable Development. UNEP Inquiry.

UNEP Inquiry (forthcoming). Measure to Measure: The Global Progress of Measures to Align Financial Systems with Sustainable Development. UNEP Inquiry.

UNEP Inquiry and Castilla-Rubio, J. C. (forthcoming). Fintech and Sustainable Development: Assessing the Implications. UNEP Inquiry/Space Time Ventures.

UNEP Inquiry and Corporate Knights (forthcoming). A Review of International Financial Standards as They Relate to Sustainable Development. UNEP Inquiry.

UNEP Inquiry and Ecofys (forthcoming). Developing a Performance Framework for a Sustainable Financial System. UNEP Inquiry.

UNEP Inquiry/Paulson Institute/Bloomberg Philanthropies/Green Finance Committee (China)/SIFMA (2016). Green Finance – A Growing Imperative. *http://unepinquiry.org/wp-content/uploads/2016/05/Green_Finance_A_Growing_Imperative.pdf*

van Liebergen, B. (2015). Creating a Sustainable Financial System: A Role for Finance Ministries. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/10/Creating_a_Sustainable_Financial_System.pdf*

Vienna Group of Citizens (2015). Values based banking. UNEP Inquiry Working Paper. UNEP Inquiry/Institute for Social Banking/Finance Innovation Lab. *http://unepinquiry.org/wp-content/uploads/2015/04/Values_Based_Banking.pdf*

Volz, U. (forthcoming). The Role of Central Banks in Enhancing Green Finance. UNEP Inquiry Working Paper. UNEP Inquiry.

Volz, U. (2015). Effects of Financial System Size and Structure on the Real Economy: What Do We Know and What Do We Not Know? UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2015/11/Effects_of_Financial_System_Size_and_Structure_on_the_Real_Economy.pdf*

Wachenfeld. M., Aizawa, M. and Dowell-Jones, M. (2015). Human Rights and Sustainable Finance: Exploring the Relationship. UNEP Inquiry Working Paper. UNEP Inquiry/Institute for Human Rights and Business. *http://unepinquiry.org/wp-content/uploads/2015/10/Human_Rights_and_Sustainable_Finance.pdf*

Weber, O. and Acheta, E. (2016). The Equator Principles: Do They Make Banks More Sustainable? UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/02/The_Equator_Principles_Do_They_Make_Banks_More_Sustainable.pdf*

Zadek, S. and Robins, N. (2015). Imagining a Sustainable Financial System. UNEP Inquiry Working Paper. UNEP Inquiry. *http://unepinquiry.org/wp-content/uploads/2016/02/Imagining_a_Sustainable_Financial_System.pdf*

APPENDIX III: EXTENDED BIBLIOGRAPHY

2 Degrees Investing Initiative (2016). Developing Sustainable Energy Investment (SEI) Metrics, Benchmarks, and Assessment Tools for the Financial Sector.

Alexander, R., Ehrlich, P., Barnosky, A., García, A., Pringle, R. and Palmer, T. (2015). Quantifying Renewable Groundwater Stress, World Resources Research, Volume 51, Issue 7, July 2015. *http://advances.sciencemag.org/content/1/5/e1400253*

Allen, M. (1999). Do-it-yourself climate prediction. Nature.

Asset Owners Disclosure Project (2016). AODP 2016 Global Climate 500 Index. http://aodproject.net/global-climate-500-index/. See also: OECD (2016). Annual Survey of Large Pension Funds and Public Pension Reserve Funds. *http://www.oecd.org/finance/survey-large-pension-funds.htm*

Aviva (2014). A Roadmap for Sustainable Capital Markets. *http://www.aviva.com/media/upload/Aviva-Roadmap-to-Sustainable-Capital-Markets-updated.pdf*

Bank of England (2015). The Impact of Climate Change on the UK Insurance Sector. *http://www.bankofengland.co.uk/pra/Documents/supervision/activities/pradefra0915.pdf*

Bank of England (2016). Central Banking, Climate Change and Environmental Sustainability. *http://www.bankofengland.co.uk/research/Pages/conferences/1116.aspx*

Bank of England (2016). Staff Working Paper No. 605: The macroeconomics of central bank issued digital currencies. *http://www.bankofengland.co.uk/research/Pages/workingpapers/2016/swp605.aspx*

BIS (2012). Core principles for effective banking supervision. *http://www.bis.org/publ/bcbs230.htm*

BIS (2015). Corporate governance principles for banks. *http://www.bis.org/bcbs/publ/d328.htm*

Bowen, A., and Dietz, S. (2016). The Effects of Climate Change on Financial Stability, with Particular Reference to Sweden. *http://www.fi.se/upload/43_Utredningar/20_Rapporter/2016/climat-change-financial-stability-sweden.pdf*

Brookings (2016). The Importance of Investing in Built-to-last Infrastructure. *https://www.brookings.edu/2016/03/29/the-importance-of-investing-in-built-to-last-infrastructure/*

Carbon Tracker Initiative (2013). Unburnable Carbon 2013: Wasted Capital And Stranded Assets. *http://carbontracker.live.kiln.digital/Unburnable-Carbon-2-Web-Version.pdf*

Carney, M. (2015). Breaking the Tragedy of the Horizons – Climate Change and Financial Stability, Speech at Lloyds of London, September 2015. *http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech844.pdf*

Carney, M. (2016). The Sustainable Development Goal imperative. Remarks given at United Nations General Assembly, High-Level Thematic Debate on Achieving the Sustainable Development Goals. New York, United States. *http://www.bankofengland.co.uk/publications/Pages/speeches/2016/897.aspx*

China Banking Regulatory Commission (2012). Green Credit Guidelines. *http://www.cbrc.gov.cn/EngdocView.do?docID=3CE646AB629B46B9B533B1D8D9FF8C4A*

Citi GPS: Global Perspectives & Solutions (2016). Technology at Work v2.0. Oxford Martin School/Citi. *http://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf*

City of London (2016). Green Finance – the City of London Corporation. *https://www.cityoflondon.gov.uk/about-the-city/the-lord-mayor/key-events-speeches/Documents/green-finance.pdf*

Climate Bonds Initiative (2015). Green Bond Market update. *http://www.climatebonds.net/resources/publications/2015-green-bonds-market-update*

Climate Bonds Initiative (2016). Bonds and Climate Change: The State of the Market in 2016. *https://www.climatebonds.net/files/files/HSBC-2016-Brasil-English-A4.pdf*

Climate Vulnerable Forum (2016). V20 Ministerial Communiqué, 14 April 2016. *http://www.thecvf.org/v20-ministerial-communique/*

Corporate Knights (2016). Measuring Sustainability Disclosure.

Corporate Knights (2016). Spotlight on the 2016 Global 100. *http://www.corporateknights.com/magazines/2016-global-100-issue/spotlight-on-the-2016-global-100-14533333/*

CPI (2012). German Landscape of Climate Finance. *http://climatepolicyinitiative.org/publication/german-landscape-of-climate-finance/*

De Nederlandsche Bank (2016). DNBulletin: Time for Transition: Towards a Carbon-neutral Economy. *http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2016/dnb338533.jsp*

ELD Initiative (2015). The value of land: Prosperous lands and positive rewards through sustainable land management. *http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/2015_The%20Value%20of%20Land%20-%20ELD%20Initiative%20(2015).pdf*

Energy Efficiency Finance Task Group (2015). Voluntary Energy Efficiency Investment Principles for G20 participating countries. *http://www.unepfi.org/fileadmin/energyefficiency/EnergyEfficiencyInvestmentPrinciples.pdf*

ESRB (2014). EBA/SSM Stress Test: The Macroeconomic Adverse Scenario. https://www.esrb.europa.eu/pub/pdf/other/140430_Adv erse-scenario_2014-EBA-stress-test.pdf?c66cb2a5ee3dbfd8fddf53ad78827bcf

European Systemic Risk Board (2016). Too Late, Too Sudden: Transition to a Low-Carbon Economy and Systemic Risk. Reports of the Advisory Scientific Committee, No 6. February 2016. *https://www.esrb.europa.eu/pub/pdf/asc/Reports_ASC_6_1602.pdf*

Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Public Consultation. *https://www.fsb-tcfd.org/wp-content/uploads/2016/07/FSB-TCFD-Phase-I-Public-Consultation.pdf*

Financial Stability Board (2015). Task Force on Climate-related Financial Disclosures Phase One Report. *https://www.fsb-tcfd.org/wp-content/uploads/2016/03/Phase_I_Report_v15.pdf*

Fraiberger, S. P. and Sundararajan, A. (2015). Peer-to-peer rental markets in the sharing economy. NYU Stern School of Business Research Paper.

Frankfurt School-UNEP Centre/BNEF (2016). Global Trends in Renewable Energy Investment 2016, *http://www.fs-unep-centre.org*

French Treasury (2015). Decree no. 2015-1850. *https://www.legifrance.gouv.fr/eli/decret/2015/12/29/2015-1850/jo/texte*

Gates, B. (1995). The Road Ahead. Viking Press.

Global Partnership for Financial Inclusion (2014). G20 Financial Inclusion Action Plan. *http://gpfi.org/sites/default/files/documents/2014_g20_financial_inclusion_action_plan.pdf*

Global Partnership for Financial Inclusion (2016). Global Standard-Setting Bodies and Financial Inclusion: The Evolving Landscape. *http://www.gpfi.org/publications/global-standard-setting-bodies-and-financial-inclusion-evolving-landscape*

GPFI (2015). GPFI Report to the Leaders: G20 Summit, Antalya, 2015. *http://www.gpfi.org/sites/default/files/documents/GPFI-Progress-Report2015.pdf*

Group of 30 (2015). Fundamentals of Central Banking: Lessons from the Crisis.

Group of Twenty (2016). G20 Green Finance Synthesis Report. *http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf*

Hall, P. A. (1993). Policy Paradigms. Social Learning, and the State: The Case of Economic Policymaking in Britain. Comparative Politics, 25(3), 275-296. *https://www.unc.edu/~fbaum/teaching/articles/CompPol-1993-Hall.pdf*

Henderson, H. (2016). Fintech: Good and Bad News for Sustainable Finance (forthcoming).

Hiller, J. S. (2013). The benefit corporation and corporate social responsibility. Journal of Business Ethics, 118(2), 287-301.

Hong Kong Financial Services Development Council (2016). Hong Kong as a Regional Green Finance Hub. *http://www.fsdc.org.hk/sites/default/files/Green%20Finance%20Report-English.pdf*

I4CE (2016). Landscape of Climate Finance in France. *http://www.i4ce.org/go_project/landscape-climate-finance-france/*

ICBC (2016). Impact of Environmental Factors on Credit Risk of Commercial Banks. *http://www.greenfinance.org.cn/upfile/upfile/filet/ICBC环境压力测试论文_2016-03-19_08-49-24.pdf*

IDMC (2015). Global Estimates 2015: People displaced by disasters. *http://www.internal-displacement.org/publications/2015/global-estimates-2015-people-displaced-by-disasters/*

IFC (2013). How Movable Collateral Gets Credit Moving. *http://www.ifc.org/wps/wcm/connect/7b0e2e804782fbfa9644f7299ede9589/How%2Bmovable%2Bcollateral%2Bgets%2Bcredit%2Bmoving.pdf?MOD=AJPERES*

IISD (2015). How Green Public Procurement Contributes to Sustainable Development in China. *http://www.iisd.org/library/how-green-public-procurement-contributes-sustainable-development-china*

UNU-IHDP/UNEP (2014). The Inclusive Wealth Report 2014. Cambridge University Press. *http://inclusivewealthindex.org/*

International Energy Agency (2015). World Energy Outlook Special Briefing for COP 21. *http://www.iea.org/media/news/WEO_INDC_Paper_Final_WEB.PDF*

International Energy Agency (2016). World Energy Outlook Special Report on Energy and Air Pollution. *http://www.iea.org/publications/freepublications/publication/weo-2016-special-report-energy-and-air-pollution.html*

IOSCO (2004). Code of Conduct Fundamentals for Credit Rating Agencies. *http://www.iosco.org/library/pubdocs/pdf/IOSCOPD180.pdf*

Johnston, D. (2012). Idle corporate cash piles up. Reuters. *http://blogs.reuters.com/david-cay-johnston/2012/07/16/idle-corporate-cash-piles-up/*

Kidney, S. (2016). Mid-Year Green Bond Market Roundup. *http://www.climatebonds.net/2016/08/climate-bonds-mid-year-green-bond-market-roundup*

Kidney, S. and Sonerud, B. (2015). Scaling up Green Bond Market for Sustainable Development: A strategic guide for the public sector to stimulate private sector market development for green bonds. UNEP Inquiry/CBI. *http://unepinquiry.org/wp-content/uploads/2015/12/GB-Public_Sector_Guide-Final-1A.pdf*

Kim, J. (2016). Statement by the Managing Director on the IMF Work Program, 8 June 2016. *http://www.imf.org/external/np/pp/eng/2016/060816.pdf*

King, D., Schrag, D., Dadi, Z., Ye, Q. and Ghosh, A. (2015). Climate Change – A Risk Assessment. Cambridge: Centre for Science and Policy. *http://www.csap.cam.ac.uk/media/uploads/files/1/climate-change--a-risk-assessment-v9-spreads.pdf*

Knot, K. (2015). Speech at Sustainable Finance Seminar, De Nederlandsche Bank, 27 November 2015. *http://www.dnb.nl/binaries/KK_tcm46-334439.pdf?2015120218*

Kuhn, T. S. (2012). The Structure of Scientific Revolutions. University Of Chicago Press.

Lauer, D. (2012). Capitalism Fail: Financial Services on the Brink. *http://www.huffingtonpost.com/dave-lauer/financial-services-industry_b_1605193.html*

Lewis, M. and Baker, D. (2014). Flash boys. Allen Lane.

Ma, J. and Zadek, S. (2016). The G20 Embraces Green Finance. *https://www.project-syndicate.org/commentary/g20-embraces-green-finance-by-ma-jun-and-simon-zadek-2016-09*

Mainstreaming Climate Action within Financial Institutions (2015). Five Voluntary Principles. *http://www.worldbank.org/content/dam/Worldbank/document/Climate/5Principles.pdf*

Nash, R. M. and Beardsley, E. (2015). The Future of finance Part 1 : The rise of shadow bank. Goldman Sachs.

New Climate Economy (2014). Better Growth, Better Climate. *http://2014.newclimateeconomy.report/wp-content/uploads/2014/08/NCE_ExecutiveSummary.pdf*

OECD (2014). Illicit Financial Flows from Developing Countries: Measuring OECD Responses. *https://www.oecd.org/corruption/Illicit_Financial_Flows_from_Developing_Countries.pdf*

OECD (2014). Public Financial Institutions and the Low-carbon Transition. *http://www.oecd-ilibrary.org/environment-and-sustainable-development/public-financial-institutions-and-the-low-carbon-transition_5jxt3rhpgn9t-en*

OECD (2015). G20/OECD Principles of Corporate Governance. *http://dx.doi.org/10.1787/9789264236882-en*

OECD (2016). Measuring Distance to the SDGs Targets: a pilot assessment of where OECD countries stand. *http://www.oecd.org/std/OECD-Measuring-Distance-to-the%20SDGs-Target-Pilot-Study-web.pdf*

OECD (forthcoming). A Quantitative Framework for Analysing Potential Bond Contributions in a Low-Carbon Transition.

OJK (2014). Roadmap for Sustainable Finance in Indonesia. http://www.ojk.go.id/Files/box/keuangan-berkelanjutan/roadmap-keuangan-berkelanjutan.pdf

OJK and WWF (2015). Indonesia First Movers on Sustainable Banking. Press Release, November 2015. *http://awsassets.wwf.or.id/downloads/sustainable_banking_pilot_project_ojk_wwf_id_english_231115_1.pdf*

People's Bank of China (2016). Guidelines for Establishing a Green Financial System. *http://www.pbc.gov.cn/english/130721/3133045/index.html*

Philippon, T. (2015). Has the US Finance Industry Become Less Efficient? On The Theory And Measurement Of Financial Intermediation. The American Economic Review, 105(4), 1408-1438.

PRI (2016). Credit Ratings Agencies Embrace More Systematic Consideration Of ESG. *https://www.unpri.org/press-releases/credit-ratings-agencies-embrace-more-systematic-consideration-of-esg*

PRI and UNEP FI (2016). Greening Institutional Investment. *http://unepinquiry.org/wp-content/uploads/2016/09/3_Greening_Institutional_Investment.pdf*

Rahman, A. (2014). Inclusive finance and sustainable development. Bangladesh Institute of Bank Management.

RBI (2015). Priority Sector Lending – Targets and Classification. *https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=9688&Mode=0*

Regjeringen (2016). The Management of the Government Pension Fund in 2015. Report to the Storting (white paper). *https://www.regjeringen.no/contentassets/1ee9d1e693f14463b61f1ca85120c7c0/chapter1_report_n023_2015-2016.pdf*

Rijksoverheid (2016). Annex 12 Informal ECOFIN meeting on 22 April agenda item Sustainable finance. April 2016. *https://www.rijksoverheid.nl/documenten/kamerstukken/2016/04/20/bijlage-12-informal-ecofin-meeting-on-22-april-agenda-item-sustainable-finance*

S&P (2014). Climate Change Is A Global Mega-Trend For Sovereign Risk. *https://www.globalcreditportal.com/ratingsdirect/renderArticle.do?articleId=1318252&SctArtId=236925&from=CM&nsl_code=LIME&sourceObjectId=8606813&sourceRevId=1&fee_ind=N&exp_date=20240514-20:34:43*

Sachs, J. and Sachs, L. (2015). The Responsible Investor's Guide to Climate Change. Project Syndicate. *https://www.project-syndicate.org/commentary/fossil-fuels-divestment-renewables-by-jeffrey-d-sachs-and-lisa-sachs-2015-01*

Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydzenka, K. and Yousefi, S.R. (2015). Rethinking Financial Deepening: Stability and Growth in Emerging Markets. SDN 15/08. Washington, D.C.: IMF. *http://www.imf.org/external/pubs/ft/sdn/2015/sdn1508.pdf*

Schneider, J. and Prasad Borra, S.K. (2015). The Future of Finance Part 2: Redefining the Way We Pay in the Next Decade. Goldman Sachs.

Scholtens, B. and Veldhuisa, R. (2015). How Does the Development of the Financial Industry Advance Renewable Energy? A Panel Regression Study of 198 Countries over Three Decades. Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung – Theorie und Politik – Session: Environmental Economics III, No. C13-V2 *http://unepinquiry.org/wp-content/uploads/2016/02/VfS_2015_pid_177.pdf*

Schwab, K. (2016). The fourth industrial revolution. World Economic Forum.

Sustainable Stock Exchanges Initiative (2016). Green Finance Policy Brief. *http://www.sseinitiative.org/wp-content/uploads/2016/07/Green-Finance-Policy-Brief.pdf*

Tapscott, D. and Tapscott, A. (2016). Blockchain Revolution: How the Technology behind Bitcoin is Changing Money, Business, and the World. Penguin.

Terry, H. P., Schwartz, D., Sun T. (2015). The Future of Finance Part 3: The Socialization of Finance. Goldman Sachs.

UN (2015). Sendai Framework for Disaster Risk Reduction. *http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf*

UN (2016). Transforming Our World: The 2030 Agenda for Sustainable Development (paragraph 63). *https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf*

UN Women (2015). Financing: Why it matters for women and girls. *http://www.unwomen.org/en/news/in-focus/financing-for-gender-equality*

UNCTAD (2014). World Investment Report 2014. *http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf*

UNCTAD (2015). World Investment Report 2015. *http://unctad.org/en/PublicationsLibrary/wir2015_en.pdf*

UNEP (2013). Sustainable Public Procurement: A Global Review. *http://www.unep.org/resourceefficiency/Portals/24147/SPP_Full_Report_Dec2013_v2%20NEW%20(2).pdf*

UNEP (2014). Environmental Risk in Sovereign Credit Ratings. *http://www.unepfi.org/fileadmin/documents/ERISC_Phase2.pdf*

UNEP FI (forthcoming). A Changing Sustainable Finance Landscape: From Leadership Actions to Market Transformation.

UNEP FI and CISL (2015). Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III? *http://www.unepfi.org/fileadmin/documents/StabilitySustainability.pdf*

United Nations Framework Convention on Climate Change (2016). The Paris Agreement. *http://unfccc.int/paris_agreement/items/9485.php*

US Department of Labor (2015). Interpretive Bulletin Relating to the Fiduciary Standard under ERISA in Considering Economically Targeted Investments. 29 CFR Part 2509 RIN 1210-AB73. *https://s3.amazonaws.com/public-inspection.federalregister.gov/2015-27146.pdf*

Van Den End, J. W., Hoeberichts, M. and Tabbae, M. (2006). Modelling Scenario Analysis and Macro Stress-testing. De Nederlandsche Bank.

Voysey, A. and Andreeva, N. (2016). Environmental Risk Analysis by Financial Institutions. *http://unepinquiry.org/wp-content/uploads/2016/09/2_Environmental_Risk_Analysis_by_Financial_Institutions.pdf*

WMO (2016). WMO Statement on the status of the global climate in 2015. *http://public.wmo.int/en/resources/library/wmo-statement-status-of-global-climate-2015*

World Bank (2016). Digital Dividends – World Development Report. *http://www.worldbank.org/en/publication/wdr2016*

World Bank Group (2016). Outline Framework for Measuring Progress on Green Finance. *http://unepinquiry.org/wp-content/uploads/2016/09/5_Outline_Framework_for_Measuring_Progress_on_Green_Finance.pdf*

Zervas, G., Proserpio, D. and Byers, J. (2016). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. Boston U. School of Management Research Paper, (2013-16).

Zhou, X. (2015). Remarks at World Bank/IMF 2015 Annual Meetings Green Finance Event. Lima, Peru.

Inquiry: Design of a Sustainable Financial System

International Environment House
Chemin des Anémones 11-13
Geneva
Switzerland
Tel.: +41 (0) 229178995
Email: inquiry@unep.org - Twitter: @FinInquiry
Website: *www.unep.org/inquiry/*
Inquiry Live: *www.unepinquiry.org*