



Mobilizing Public and Private Funds for Inclusive Green Growth Investment in Developing Countries

A Stocktaking Report Prepared for
the G20 Development Working Group

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Executive Summary

In the Los Cabos Communique, the G20 announced a commitment to “maintaining a focus on inclusive green growth [IGG] as part of our G20 agenda” and went on to “encourage further exploration of effective mechanisms to mobilize public and private funds for inclusive green growth investment in developing countries, including through the public-private Dialogue Platform on Inclusive Green Investments [DPIGI]...” As background for this decision, IFC undertook an extensive literature review and compiled a structured bibliography of relevant reports and research subsequently produced as a public document, *Private Investment in Green Growth and Climate-Related Activities*. This report substantially expands on this earlier work as a contribution to the further development of the Dialogue Platform, and responds to the following additional requests:

- Map ongoing efforts to track finance flows for IGG and undertake a meta-analysis to identify gaps in terms of sectors, geographies, technologies underserved by private finance.
- Build a repository of lessons learned across sectors to help identify best practices on structuring investments; addressing barriers; and ensuring a supportive policy and enabling environment.
- Elaborate findings on innovative mechanisms to leverage private finance and how to scale them up, including initiatives to engage institutional investors to identify

best practices to inform approaches to be adopted by the DPIGI.

Distill key lessons learned and policy implications as the basis for strategies for attracting investment outside the G20 countries, consistent with making green growth more “inclusive”.

Key Findings and Recommendations:

- The absence of an agreed definition in discussing “inclusive green growth,” which incorporates a wide range of sectors with very diverse characteristics and challenges, is a major challenge to identifying, evaluating, and learning from existing IGG investments.
- More than 160 publications and documents related to IGG were reviewed and summarized as the basis for financial mapping and lessons learned. What emerges is that there is no one-size-fits-all policy prescription suitable for all parts of the globe. Recurring themes include the need for effective policies to create investment-grade environments or to compensate for market failures and the importance of predictability and policy-certainty for investors. Clean energy policies are the largest source of experience with mandates and regulations the most important drivers.
- From the large set of documents reviewed, only a subset of 16 included

substantial data on finance flows appropriate for mapping. Most reports do not track flows under the rubric of IGG and much of the data included is under the mantle of climate finance as an indicator for IGG flows. Finance for mitigation investments was about \$350 billion in 2010/2011, with the bulk of this funded by the private sector for renewable energy projects. Data for energy efficiency and adaptation to climate change is less readily available and not always consistently defined and reported. The lack of comprehensive data and knowledge poses a challenge to decision making and appropriate policy development.

- A highlight of all the reports is that the dominant source of funding for green investments globally is domestic/local finance in all regions, with the private sector accounting for the lion's share of total investments. While collectively managing more than \$75 trillion, OECD institutional investors represent only a minute portion of these overall direct investment flows.
- Numerous initiatives related to green investment and the IGG agenda were identified as sources of lessons learned and insight into the potential role of the DPIGI. Seven case studies including five new works were examined ranging from promoting new technologies and business models to improving information generation and availability. An overriding conclusion is that while financing is almost always a necessary element for success, poor policies, inadequately proven technologies or business models, or lack of consumer acceptance may be primary barriers. Financing will not be an effective solution unless and until these other barriers are addressed.
- Development banks are an important source of experience with respect to

opportunities and barriers to scaling up investment. A review of IFC financing shows each dollar it invested was leveraged around four times from private investors. Not surprisingly, greater leverage is achieved with well-established technologies. In newer areas, or with less well understood business models, active "selling" of the climate component can help spur investment, and concessional finance can often nudge investment into promising but as yet commercially unproven areas.

- Institutional investors are a diverse, highly differentiated group subject to very different regulatory and management environments. They rely on a chain of service providers, fund trustees, advisors, asset managers, policy makers and regulators to make investment decisions. As a result, introducing new asset classes or investment themes takes time to embed in the decision making process. Many such funds have yet to think about sustainability and development considerations in their investment strategies and identify numerous barriers to doing so including perceived lack of investment opportunities, policy uncertainties; developing country risks; lack of track record; liquidity concerns; and short time horizons.
- Within the universe of large institutional investors, those based in the OECD have decidedly more barriers to investing into IGGI including regulatory response to recent losses and the fiscal crisis as reflected in Basel III and Solvency II. In contrast, pension fund assets in non-OECD countries have been growing over the last few years, and while fiduciary duty remains the overriding objective, developing country pension funds are more likely to consider the broader socio-economic context in which they operate. One example is a new policy now under implementation in South Africa.

- An analysis of 48 existing initiatives with a green focus found very few have evolved to a stage where they can be described as leaders already allocating capital and providing a conduit for asset flows—a relatively narrow subset of investors is likely to take the lead on innovative new initiatives. Identifying and encouraging this group of potential leaders within the investment community will be an important objective of the DPIGI.
- While very inadequate, substantial green investment is currently taking place within existing policy frameworks and without special incentives. These activities

provide a baseline for short-term opportunities for scale-up. Through sharing evidence about where and under what conditions “going green” is profitable the DPIGI could aim to change the investor mindset from the perception that the business case for green investment is still uncertain to green investment as the fundamental path to preserve long-term economic growth. Through a DPIGI, governments can call for policy and regulatory change to increase investor support for industry initiatives, and to facilitate the efficient deployment of capital for green investments.

Overview

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The G20 countries have increasingly recognized the importance of green growth in recent years, and many countries are demonstrating strong leadership through effective and progressive policies. The focus has so far been on creating new economic opportunities while solving environmental and resource scarcity challenges. However, governments do not act alone—the private sector is a natural partner, providing new technologies, business models and investment opportunities across a variety of sectors to help scale-up transformation. Since the 2008 Pittsburgh G20 Summit, in order to foster these partnerships and leadership by the private sector there has been a surge in related intergovernmental, non-governmental and private sector platforms, to actively promote government policies and public-private partnerships to deliver greater investment in resource-efficient, low-carbon infrastructure and services. Recognizing gaps in the discussion on financing green growth in low income countries, the G20 Los Cabos Communique in 2012 enhanced the focus on inclusive green growth through, inter alia, the creation of a Dialogue Platform on Inclusive Green Investments (DPIGI) as part of the Development Working Group (DWG) program.

As the largest development finance institution dedicated to private sector development, with a strong emphasis on sustainability, International Finance Corporation (IFC) was commissioned to undertake an extensive literature review as a stocktaking exercise on existing mechanisms to mobilize private capital

for inclusive green growth (IGG) investments in developing countries, as preparation for Los Cabos. Following the completion of that work, IFC was asked to expand the stocktaking exercise and provide insights on how the DPIGI could engage new stakeholders such as institutional investors in support of IGG investments. This report presents the findings of this work for review by the DWG. The full report follows this overview. In addition, a series of supporting documents and materials, most of them specifically created or commissioned in support of this work, will be made available as part of the final report produced for consideration at the G20 meeting in St. Petersburg in 2013.

An initial challenge has been the absence of an agreed definition of IGG. IGG can incorporate a wide range of sectors with very diverse investment characteristics and challenges, as well as a wide range of countries at differing levels of development. The importance of green growth for development is being increasingly documented as reflected in several recent reports including *Inclusive Green Growth: The Pathway to Development* (World Bank, 2012), and *Putting Green Growth at the Heart of Development* (OECD, 2013). The working definition used in this paper is intentionally broad and encompasses investments that support economic growth in a clean, resilient and sustainable manner; the inclusive component is focused on base of pyramid (BOP) and low-income countries or such subsets of population within other developing countries. The literature review and supporting research are presented in a manner intended to

allow the reader to pursue those issues associated with IGG of most interest, while also addressing the specific objectives associated with the potential role and form of the DPIGI.

This overview starts with the high-level findings of the expanded literature review. In order to help readers navigate the vast amounts of information reviewed, a software tool has been developed that allows searches by theme, geography, sector, instrument, and other interests. The overview then provides a mapping of financial flows relevant to IGG based on existing information and identifies gaps in our knowledge along sectoral and geographical lines. We next review several case studies of initiatives that offer insights into the larger context of existing efforts to promote IGG, and provide a baseline for possible discussion of strategies for scaling up investment through the DPIGI. These include examples based on new technologies, new business models, and the provision of better information, all with particular reference to inclusive green growth. The penultimate section addresses two aspects of financing: leverage in the context of development bank activity and the lack of institutional finance directed to green growth. Finally, a concluding section outlines issues that may warrant further exploration and discussion by the DPIGI.

Literature Review: What Do We Know?

The updated bibliography of publications relevant to IGG and finance encompasses more than 160 sources, each reviewed for key messages and relevance to the particular interests of the DPIGI. A detailed analysis of these reports including their main findings and a checklist of key features will be included in the supporting documents to be provided with the final report.

It is difficult to summarize the findings of such a large body of material in a few

paragraphs. What emerges from the review is that much is being published in the area of green growth and climate finance, but little of it is based on original research; rather, most of it draws on existing work or “received wisdom.” Lacking consistent definition, review of this literature is also problematic as terms are not used consistently, and data cannot be easily compared across sources. Many reports provide qualitative and/or illustrative discussion of barriers to investment, and provide policy prescriptions. The most interesting elements of the reports from a DPIGI standpoint may well be specific case studies, describing successes (or failures) on the ground.

Nonetheless, most reports reiterate certain common themes. Most reports talk about the need for effective policies—either to create investment-grade environments, or to compensate for market failures; some provide qualitative and/or illustrative discussion of barriers to investment, and provide policy prescriptions. Successful examples of climate-related investment indicate that mandates and regulations have been the most important drivers. Predictability and policy-certainty are also often mentioned. Several reports mention the removal of subsidies, notably on fossil fuels, and the institution of carbon pricing. Many reports also talk about the judicious use of public funding, provided in the form of dynamic subsidies, as a means to leverage private investment. Certainly the review reinforces the recommendations for future work for the DPIGI that are identified in this report.

In order to render this large trove of information more accessible and user-friendly, and to help overcome confusion with respect to terms and the scope of analysis, a sophisticated knowledge management software was used that will allow readers multiple access points to filter the information, thereby increasing the likelihood of being able to narrow the investigation to the sector, geography, technology, or other information being sought. (Examples are

provided in the main report.) Searches will be possible using a topical database organized along relevant categories, key themes, keywords, and questions likely to be of interest to different users. As the DPIGI develops, such a tool could provide intelligent and immediate access to vast amounts of relevant information. A publicly accessible version of this tool will be provided with the final report.

Mapping of Finance Flows: Where are the Gaps?

It is evident that financing of green investment has been growing, with financing levels of about US\$ 350 billion in 2010/2011—the bulk of it private sector funding for renewable energy projects. Global financial flows for adaptation are considerably lower, at US\$12–16 billion, with a significant portion based on North-South flows and primarily from public sources. The dominant source of funding for green investment is domestic or local finance in all regions, and the private sector accounts for the lion's share of total investments. Institutional investors represent a minute portion of these flows.

In order to establish a baseline for assessing financial flows currently being directed toward inclusive green investments, the data available in the literature reviewed were mapped to analyze the reported allocations of finance to green investments in a systematic way. The primary objective of the exercise was to identify private sector investment gaps in sectors, geographies, and technologies with regard to IGG globally. Only 16 publications out of the more than 160 analyzed included substantial data on finance flows appropriate for mapping; however, most reports do not track flows under the rubric of IGG, and much of the data available is under the mantle of climate finance.

Only a handful of publications identify, collect, and report primary sources of data; the

remaining reports include analyses of different subsets of the data and report them in different formats. As a result, any errors, omissions, and inconsistencies in the primary sources are replicated and compounded across other publications. For example, relative to large scale renewable energy projects, the data sources for energy efficiency and adaptation are much less well developed because the relevant investments are often not clearly labeled, and therefore may be embedded in larger financing, and/or are usually not publicly reported. Data on smaller-scale financial flows for IGG to developing countries are especially limited, often inconsistent, and with major gaps. Furthermore, the absence of consistent definitions makes it all the more difficult to disaggregate flows to developing countries and to specific sectors. This constraint, noted in all the reports mapping green finance, makes it particularly challenging to assess private sector contributions to adaptation and other non-mitigation-related investments.

Two areas of financing—the role of development banks and institutional investors—are examined in greater detail, and discussed later in this summary.

Selected Case Studies: What Do They Tell us?

Numerous initiatives related to green investment and the IGG agenda were identified as possible sources for insight into the potential role of the DPIGI. Consistent with the broad scope and diverse strategic approaches to promoting IGG, seven case studies were examined to expand on the insights from the literature, most commissioned for this report—ranging from promoting new technologies and business models to improving information generation and availability. An overriding conclusion is that while financing is almost always a necessary element for success, it is often not the primary barrier to

greater IGG investment. Indeed, the absence of financing is often an indicator of other deficiencies in the enabling environment, such as poor policies, inadequately proven technologies or business models, or lack of consumer awareness and acceptance. The case studies also illustrate the importance of local factors and market considerations; the barriers to clean cookstoves and solar lanterns in one country region may differ from those in a neighboring jurisdiction, which can make replication and scaling up even successful models complicated, resource intensive, and time-consuming. Short summaries of these case studies follow.

This report draws heavily on experiences within the IFC and WBG reflecting the authors' greater access to documents and sources produced by these institutions. While information was sought from other IFIs, the most up to date and well documented material was also often not readily available. A sampling of some of the publicly available literature documenting the experience of other international financial institutions follows and shows that they too have a plethora of IGG-related financial initiatives now underway (See Box 2). The further development of the DPIGI offers an opportunity to engage these institutions and to draw on their experience.

Promoting IGG through New Technologies

One of the most promising strategies for advancing IGG objectives is through new technologies of particular benefit to BOP and lower income populations. In selling to poor populations, financing initial equipment cost is often a critical barrier, even if the new technology replaces a more expensive and intermittent service, as with improved cookstoves that reduce fuel costs, or solar lanterns that replace kerosene lamps.

Clean Cookstoves

Approximately three billion people in South Asia and Sub-Saharan Africa rely on solid

fuels (coal and traditional biomass) for cooking. In order to improve energy access, direct health benefits and reduced indoor air pollution, numerous initiatives have emphasized the provision of efficient cookstoves and clean fuels to poor households. However, despite many projects led by the World Bank and others over the past 20 years, large-scale adoption has yet to materialize due to a variety of context-specific barriers on both the consumer and producer/distributor sides. Financing the working capital needs of producers and distributors is often one challenge, while lack of information, awareness, and cultural barriers dominate for consumers.

Solar Lanterns:

About 600 million people in Africa have no access to electricity, and rely on increasingly expensive, hazardous, and polluting fuel-based sources of energy for their lighting needs. The World Bank Group and other MDBs are working with a new generation of off-grid lighting products or systems that generally comprise an electricity source (most commonly, a solar panel); a modern rechargeable battery; and an LED lamp or lantern. These projects incorporate several types of support: product testing (particularly important, as poor quality products undermine consumer confidence and “poison the market”); market intelligence; access to finance; business development support; and collaboration with governments to identify and address policy barriers.

Developing New Business Models

Another strategy for advancing IGG objectives is through new business models that can address some of the constraints and risk perceptions associated with BOP and lower income populations. Here, too, financing is a critical requirement—but enabling policies, capacity building, and public-private partnerships and dialogue are equally important. Often, such endeavors involve adapting a successful business

model from one context to another, be it from developed country to developing country, or one market segment to another.

Clean Water Services

Access to clean water is one of the most important needs of the poor. However, traditional provision models often fail due to infrastructure degradation resulting from the absence of technical capacity and cost-recovery mechanisms required for long-term sustainability of operations. Many innovative ideas are being explored, but the solutions will require time and care to evaluate and, if successful, to replicate elsewhere. One new business model for off-grid, distributed services, being implemented in rural Kenya by IFC with the Safe Water Network, includes reduced grid infrastructure requirements to substantially lower costs; initial financing for testing and evaluating business models; market testing of services to determine ability and willingness to pay; collaboration with relevant government agencies and NGOs; and engagement with local banks to help meet requirements for commercial lending.

Energy Efficiency

Energy efficiency (EE) investments can be profitable and contribute to green growth in multiple ways, including reduced pollution and resource requirements, as well climate change mitigation. Yet, even when the economic viability is proven, there are barriers to more widespread adoption, particularly in developing countries. The private sector-focused multilateral development banks (MDBs), notably the European Bank for Reconstruction and Development (EBRD), through its Sustainable Energy Initiative and IFC, through its Sustainable Energy Financing program, have made EE into a business line. They package technical assistance and capacity building together with financial support, generally in the form of

credit lines and/or guarantee facilities. This approach has repeatedly proven successful and low-risk and continues to be replicated and scaled up.

For the most part, however, commercial EE lending does not address the needs of the very poor or BOP segments, as they are outside the commercial banking system. Micro-credit programs or targeted publicly-supported programs (as for solar lanterns and cookstoves) have generally stepped in to fill the breach. This may be changing with the advent of cellular phone-based banking, which dramatically reduces transaction costs and barriers for banking in rural areas and for smaller accounts.

Insurance Products and Services

Intrinsic to the concept of IGG is the mitigation of and adaptation to otherwise unavoidable natural disasters. The availability of insurance substantially reduces the near- and long-term economic impacts of natural disasters, while reducing the burden on individuals, as well as on in-country and foreign governmental aid. Insurance is at an earlier stage of evolution in developing countries, with growth rates routinely outstripping GDP growth. There is much potential for further developing this market in multiple ways, including:

- Extending the availability of insurance to manage risks in the developing world.
- Working to promote resilience and adaptation to changing weather and climate extremes through innovative insurance products and services that support green growth.
- Investing in and financing green growth and adaptation projects. Insurers could bring large amounts of new funds to bear on inclusive green growth projects, and have already made a strong start in devoting resources to green projects in the industrialized world.

Providing Better Information

Often, lack of information and awareness hinders the development of products and services adapted to local conditions and needs. Making information more widely available can enable investments, sometimes very cost effectively.

Weather Observation and Early Warning Systems

Reliable, on-time weather information and forecasting are vital to economic activity and disaster preparedness, and early warning systems can avoid the need for more expensive disaster recovery. Lessons from early efforts to promote new weather technologies show that while financing is a critical element, mechanisms to ensure sustainable revenues, systems maintenance, and responsive business and humanitarian applications are also necessary, as are the full support and buy-in of national weather agencies deploying these technologies. Furthermore, attempts to meet developing country needs through technologies commonly used in developed countries usually result in unsustainable networks that perform poorly. An emerging set of lower-cost, highly reliable technologies, building on cellular networks (rapidly growing in most developing countries) has the potential to overcome many of the traditional barriers to weather observation.

Country Risk Indicators

Country-based indicators that help inform investors about the barriers and opportunities for investment are compiled and reported in many forms, e.g., the Global Green Economy Index, published by Yale University, and the Doing Business Report produced by the World Bank Group. These concepts are increasingly being applied to various elements of green growth; e.g., a recent index produced by the Inter-American Development Bank focuses on the climate for renewable energy investment in Latin America. Initial exploratory

work was commissioned for this report to develop and test metrics that will help private investors evaluate climate risks pertinent to specific sectors (e.g., coastal infrastructure) in specific countries.

An IFC study with a port client in Colombia illustrates the potential benefits of this approach. With donor support, the client was given detailed information on potential risks of sea level rise and other probable climatic changes relevant to the financial performance of the port. With this information, the client decided to spend over US\$25 million to make improvements that will enhance the climate resilience of the port—an investment triggered entirely by a small expenditure on making information and awareness available to the company.

Financing Green Growth: How Do We Unlock Private Investment?

The above sections have highlighted a number of interesting initiatives that speak to IGG. The mapping exercise indicates that while the financing of green growth has been increasing, it is nowhere close to the projected need of up to \$275 billion annually in incremental investment in developing countries to 2030 to meet the additional costs associated with stabilizing global temperatures at 2°C (World Development Report 2010). Furthermore, very little is explicitly directed to IGG and BOP initiatives. Strategies to increase financial flows toward green growth recognize the important role that the private sector must play, and the need to find ways to achieve greater “value for money” so that limited public dollars can leverage significant multiple investments from other investors, although leverage is not always an indicator for impact.

Financing by multilateral and national development banks for climate related investments has been steadily growing, as the

institutions make addressing climate change an explicit element of their strategy. They also provide an interesting platform through which to study leverage, particularly as it relates to the private sector. Yet, development bank financing remains a small portion of overall financing needs, and is constrained by the capital base of the institutions. At the same time, institutional investors control many trillions of dollars in assets—a very small portion of which reaches green investment (and an even smaller amount going to developing countries). Unlocking even a small share of these flows could provide a significant boost to the availability of investment resources.

Understanding Leverage: IFC's Experience

Development banks—whether global, regional or national, or multilateral, bilateral, or domestic—can play a significant role in financing green investment and IGG, and in leveraging significant resources from the private sector to do so. This report highlights in depth analysis of leveraging achieved through IFC's climate finance experience, for which detailed information is available for the period 2005–2013. These findings can just as easily be applied to other private sector-focused development banks, as they follow similar funding models. Detailed data on these other banks' activities were not available to permit a comparison, and the report therefore confines itself to reporting on IFC's experience

Just as there are no standard definitions of climate finance, green investment, or IGG, there is no universally accepted definition of leverage. Furthermore, leverage is only one part of the story, and is not always an indicator of development impact. Most discussions of leverage refer to the ratio of total funding to public funding, although this can be further nuanced by specific reference to private funding, or to climate finance.

An IFC analysis of its climate portfolio reviewed different sectors—renewable energy,

energy efficiency, and other climate-related activity, further disaggregated by project type (such as power generation, industrial energy efficiency, and financing through intermediaries, to name a few). The results reveal that one dollar of IFC financing—itsself raised in capital markets based on significant leveraging of shareholder capital—was leveraged around four times from other investors (essentially private, given its mandate) across the 563 projects examined. Not surprisingly, greater leverage is achieved with well-established technologies. In newer areas, or with less well understood business models, active “selling” of the climate component can help spur investment, and concessional finance can often nudge investment into promising but as yet commercially unproven areas. In all cases, climate-related investment needs a conducive underlying investment environment.

Even though the volume of financing may be small relative to the global need, development banks often play a very important role in demonstrating the viability of investments, thereby opening up markets and paving the way for others to follow.

Institutional Investors: The Challenges and The Opportunities

Institutional investors are a diverse, highly differentiated group, and include public and private pension funds, insurance companies, and sovereign wealth funds—all subject to very different regulatory and management environments. The complexity of the investment system means that institutional investors rely on a chain of service providers. Fund trustees, advisors, asset managers, policy makers and regulators all play important roles in the investment decision. As a result, introducing new asset classes or investment themes takes time to embed in the decision making process.

The governing principle for investment decisions by pension funds is fiduciary duty: acting

in the long-term best interests of the beneficiaries. National and international regulations (such as Basel III and Solvency II) drive investors to act conservatively and seek relatively large, low-risk, liquid, long-term investments that deliver steady, preferably inflation-adjusted income streams that are matched to their liabilities. Portfolios are traditionally built around two main asset classes: bonds and equities.

Investors frame green investing primarily through the broader environment, social, and governance (ESG) lens, focused primarily on protecting their reputation rather than with an explicit sustainability objective. Even though studies have shown that incorporating ESG in the investment process can enhance returns and/or reduce risk, many investors have yet to think about how best to integrate sustainability into investment strategies. Furthermore, investors are cautious of repeating bad experiences; the collapse of solar photovoltaic and wind turbine manufacturers, driven by price declines and retroactive policy changes that include reversal of clean energy subsidies in parts of Europe, has damaged investor confidence.

In-depth interviews with investors undertaken for this report reveal the following main barriers to scaling up green investments:

- Lack of an economic business case: perceived lack of investment opportunities, policy reversals.
- Policy uncertainties: lack of meaningful action on climate.
- Developing country risks: poor governance and inadequate investment processes.
- Lack of track record.
- Liquidity concerns: green infrastructure investments can tie up capital.
- Investment time horizons: financial performance assessed on short-term results.

These barriers appear to apply more acutely to financing originating from OECD-

based investors. However, pension fund assets in non-OECD countries have been growing over the last few years, and while fiduciary duty remains the overriding objective, developing country pension funds are more likely to consider the broader socio-economic context in which they operate. Furthermore, in most developing countries, the majority of retirement assets are linked to social security systems, and managed by government-controlled agencies. National pension plans can be leaders in infrastructure investment. South Africa provides a very interesting case study of how regulatory changes are beginning to raise awareness and drive investment choices; the Pension Funds Act now requires investors to explicitly consider ESG issues in their investment decisions. One advantage of emerging markets is that the pension fund industry is usually at an earlier stage in its evolution, and less set in its ways—thus, more open to new ideas. Sovereign Wealth Funds based in emerging markets are another potential source of IGG financing, particularly with respect to green infrastructure.

A gap analysis was undertaken to gauge the progress of existing green investment related initiatives including industry groups and investment initiatives e.g. Green Growth Action Alliance, toward addressing some of the challenges mentioned above. Forty-eight existing initiatives with a green investment feature were mapped according to four criteria assessing their progress toward influencing the investment process, public policy, direct investment, and industry mindset. These initiatives were further divided into four categories based on their primary type of activity: Movers—those that directly allocate capital and provide a conduit for asset flows; Influencers—those that seek to influence others in the finance system to behave in particular ways; Thinkers—those that provide thought leadership and research; and Tools—those that provide systems support via ratings systems, credit worthiness, and systems to measure risk/return, and were rated by

their assessed progress. Figure 1 is a visual representation of the findings.

As the figure illustrates, most initiatives to date can be categorized as Influencers and Thinkers; very few initiatives have entered into the space where they can be described as Movers engaged in allocating capital and providing a conduit for asset flows. Moreover, it is a relatively narrow subset of investors that is likely to take the lead on the initiatives reviewed. Identifying and encouraging this group of potential leaders within the investment community will therefore be an important objective of the DPIGI. In addition some investors were interviewed and their observations and recommendations relevant to their green investment activity include:

- The need to change the narrative: rather than wait for an ideal investment framework, investors should set out their expectations of the policy community and help make it happen.
- Governments need to price externalities, provide first loss support, and create proper legal frameworks related to governance and policy measures.
- Multilaterals can play an increased role in establishing precedents for investing and opening up markets.

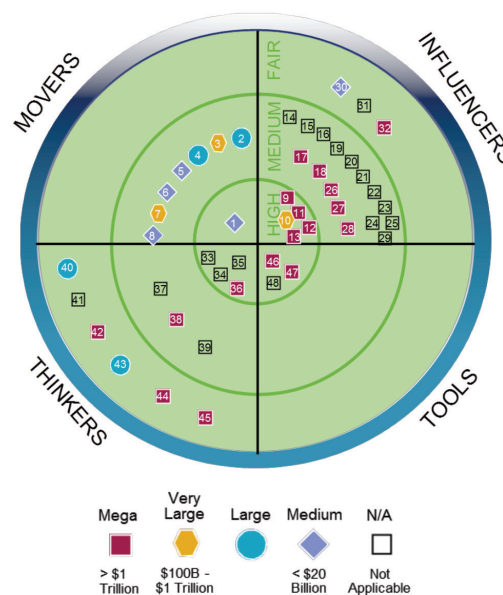
Toward an Agenda for the DPIGI

Issues for possible exploration by the DPIGI are identified throughout the main report, including in each case study. Several areas of general relevance for further exploration and discussion by the DPIGI include:

Exploring Initiatives Most Likely to Address BOP and IGG Issues:

The case studies discussed in the report—new technologies, new business models, and information provision—all have precedents in

FIGURE 1: Investor Initiatives Mapping by Primary Role and Objectives



Source: Mercer, Internal Analysis Produced for IFC (2013)

developed countries but relevance for the developing world, and in particular, the least developed countries.

Scaling Up Existing Activity:

While very inadequate, substantial green investment is currently taking place within existing policy frameworks and without special incentives. This is the case for many development bank activities focused on SMEs and BOP needs, and investments in well-established green technologies through private financing. These activities provide a baseline for short-term opportunities to scale-up.

Tapping the Institutional Investor Community:

The DPIGI has the opportunity to fundamentally change the investor mindset from the perception “green investment loses money” to green investment is seen as the fundamental path to preserving long-term economic growth.

An objective of the DPIGI could be to help identify, validate, and communicate the risks of failing to take into account climate change, food security, and other objectives of inclusive green growth. Through a DPIGI, governments can call for policy and regulatory change; to increase investor support for industry initiatives; and to facilitate the efficient deployment of capital for green investments.

Shifting the Metrics of Financial Return to a Broader Concept of Development Dividends:

As traditionally defined, financial returns omit many broader and longer-term development considerations. An issue for the DPIGI to explore is how the two can be combined to the benefit of all, based on emerging initiatives such as that in South Africa.

In the Los Cabos Communique, the G20 announced a commitment to “maintaining a focus on inclusive green growth [IGG] as part of our G20 agenda” (Par. 70). The Communique went on to “encourage further exploration of effective mechanisms to mobilize public and private funds for inclusive green growth investment in developing countries, including through the public-private Dialogue Platform on Inclusive Green Investments.[DPIGI] . . .” (Par. 72) As background for this decision, at the request of the Development Working Group (DWG), an informal group of co-facilitators asked the International Finance Corporation (IFC) to assist with a preliminary stock taking exercise, drawing lessons from existing initiatives on identifying and overcoming barriers to private investment. In response to this request, IFC undertook an extensive literature review and compiled a structured bibliography of relevant reports and research summarizing the contents and relevance to the G20 DPIGI for each one. This work was subsequently produced as a public document, “*Private Investment in Green Growth and Climate-Related Activities*,” available online at the IFC website.¹

Following receipt of IFC’s report, the DWG produced a Progress Report proposing: expanding the stocktaking exercise through a multi-stakeholder dialogue involving in particular the IOs, interested development financial institutions (DFIs), countries, private sector,

and relevant initiatives as an initial step to establishing the public-private DPIGI. The DWG were asked to report back on progress by the end of 2012.

This program of work was discussed at the September 2012 Bali meeting of the DWG and subsequently formalized in Terms of Reference. Key elements were:

- Map ongoing efforts to track finance flows for IGG and undertake a meta-analysis to identify gaps in terms of sectors, geographies, technologies that remain underserved by private finance.
- Update and revise the scope of the annotated bibliography and issues note prepared for Phase 1.
- Build repository of success stories and less successful approaches across sectors that can help identify best practices and lessons learned on structuring investments; addressing barriers; and ensuring a supportive policy and enabling environment.
- Elaborate findings on innovative mechanisms to leverage private finance and how to scale them up.
- Review initiatives to engage institutional investors to identify best practices to inform approaches to be adopted by the DPIGI.

¹ www.ifc.org/Report-GreenGrowth

- Distill key lessons learned and policy implications that could form the basis for successful strategies for attracting investment outside the G20 member countries, consistent with the desire for green growth to be more “inclusive.”

This report addresses each of the proposed elements in some detail. A continuing challenge in undertaking this work has been the absence of an agreed definition in discussing “inclusive green growth,” which incorporates a wide range of sectors with very

diverse investment characteristics and challenges. The working definition used in this paper is intentionally broad and encompasses investments that support economic growth in a clean, resilient, and sustainable manner. These investments can include those that contribute to both climate mitigation and or adaptation as well as those in efficient resource utilization, particularly water. The inclusive component is focused on base of pyramid (BOP) and low-income countries in particular, and such subsets of populations within other developing countries and emerging economies.

Literature Review: What Do We Know?



Literature Review

IFC published its first inclusive green growth (IGG) bibliography in 2012,² profiling approximately 50 green growth sources. The field has continued to grow, and for this paper more than 160 publications with substantial information on green growth and finance were reviewed (see list in Appendix III).³ The review process captured the key messages from each of the publications and some additional information on a consistent basis according to a checklist. The checklist is intended to identify and summarize pertinent details of the report such as geographic focus; case studies; sectors and technologies that are considered; overall framing theme of the report, e.g., sustainable development or climate change; external endorsement of the analysis; determination of original research; indications on roles for donors; and information relevant to the DPIGI. Each of the reviews has been tagged according to the main themes it covers, allowing for readers to identify all relevant publications covering the same issues. The objective of this exercise was both to inform this paper with the latest thinking and to create an easily accessible systematic compendium of all the most recent and relevant literature.

The reports cover a range of green growth related issues. Some contain estimates of financing flows, but these are mostly focused on clean energy or climate-related investment, and preponderantly on mitigation. Very

few reports explicitly address *inclusive* green growth, which is perhaps not surprising given the lack of accepted definitions of what constitutes IGG. Indeed, one recurring theme across the vast majority of reports was the difficulty in tracking and assessing green growth activity, given the lack of common definitions and satisfactory data capture mechanisms.

Most reports contain descriptions of barriers to green growth investment, ranging from broad enabling environment issues to more sector- and geography-specific discussions; they also provide policy prescriptions designed to address such barriers. Several discuss financing—through the private sector, public-private partnerships, banks, bilateral and multilateral financing institutions, and institutional investors. Some provide toolkits and guidance on instruments and financial options available. A number of reports have a specific focus, such as new technologies, forestry, pension funds or banks; many contain case studies of specific initiatives and experience.

What emerges from this review is that there is no silver bullet: a one-size-fits-all policy prescription sure to succeed in all parts of the

² Available at www.ifc.org/Report-GreenGrowth

³ The reports point to the vast amount of research that is taking place in the area of green growth, and while the review cast a wide net to capture most new scholarship in the area, it does not claim to be exhaustive.

globe is simply not possible. But there are some recurring themes and recommendations. Most reports talk about the need for effective policies—either to create investment-grade environments, or to compensate for market failures. Successful examples of climate-related investment indicate that mandates and regulations have been the most important drivers. Predictability and policy-certainty are also often mentioned.

Several reports mention the removal of subsidies, notably on fossil fuels, and the institution of carbon pricing. Many reports also talk about the role of the public sector in risk mitigation, and the judicious use of public funding, provided in the form of dynamic subsidies, as a means to leverage private investment. The role of bilateral financing institutions and multilateral development banks in financing green growth is also a focus in some reports.

Numerous reports contain case studies that speak to the different elements of the agenda; examples of what has worked in particular settings or in specific areas could be an interesting springboard on which to base further DPIGI exploration.

Software Tool for Navigating the IGG Literature

Instead of just updating our previous bibliography, we decided to pursue an alternative approach to helping people access and navigate the IGG literature, and thus better support any future G20 IGG dialogue process. A public software platform developed to allow compiling and organizing extensive data sets, the Brain Software (www.thebrain.com), was chosen as the basis for an IGG knowledge management system. This software offers an excellent means of organizing information in a way that facilitates access to a large body of information, allows patterns and linkages to be seen and followed, and allows the flagging and

assessment of important lessons and recommendations from the literature.⁴

The development of a publically available IGG knowledge management system using this software was commissioned⁵ for use at all levels, from researchers to decision makers. The IGG Brain is in an advanced prototype form, and work is continuing to explore different ways of organizing the information to optimize access and learning, and ultimately result in a more productive IGG dialogue. Through creating smart interconnections between the data, the real value of this system is allowing the user multiple access points and filtering for the information, thereby increasing the likelihood of being able to find the information being sought.

In addition to the documents themselves, a wide variety of relevant tables, figures, case studies, and key paragraphs have been extracted from the text of the individual publications and linked to other relevant, thematic information, allowing for a more holistic overview.⁶ Supplementary to using the Brain's search function to look for a specific document or identifying documents through key IGG "themes," with the most relevant documents linked by theme, this substantive body of information can be accessed through several other means.⁷

⁴ Additional information regarding Brain software, including tutorials and sample Brains, can be accessed through www.thebrain.com.

⁵ Dr. Mark Trexler (www.climatographer.com) has more than 25 years of experience in climate change and related topics, and has been utilizing Brain software in his own work for more than five years.

⁶ Each document is assigned a unique identifying number, and all of the materials extracted from a document have been labeled with the identifying number for easy tracking of where information and insights are being drawn from. Approximately 2,000 "thoughts" have been extracted from the documents included in IGG Brain.

⁷ Please see Appendix IV for a full description of this tool with detailed examples.

Mapping of Finance Flows: Where are the Gaps?

Objective

Undertaking the literature review highlighted the importance of establishing a baseline for assessing the finance flows currently being directed toward green investments. Green growth incorporates a wide range of sectors with very diverse investment characteristics and challenges; energy efficiency investments are often smaller and require aggregation, while adaptation-related investments are especially difficult because they typically pay off in loss avoidance and lack direct profit opportunities. Using the data in the literature, a finance mapping exercise was undertaken to analyze the reported allocations of finance to green investments in a systematic way from the various sources of information.

Methodology

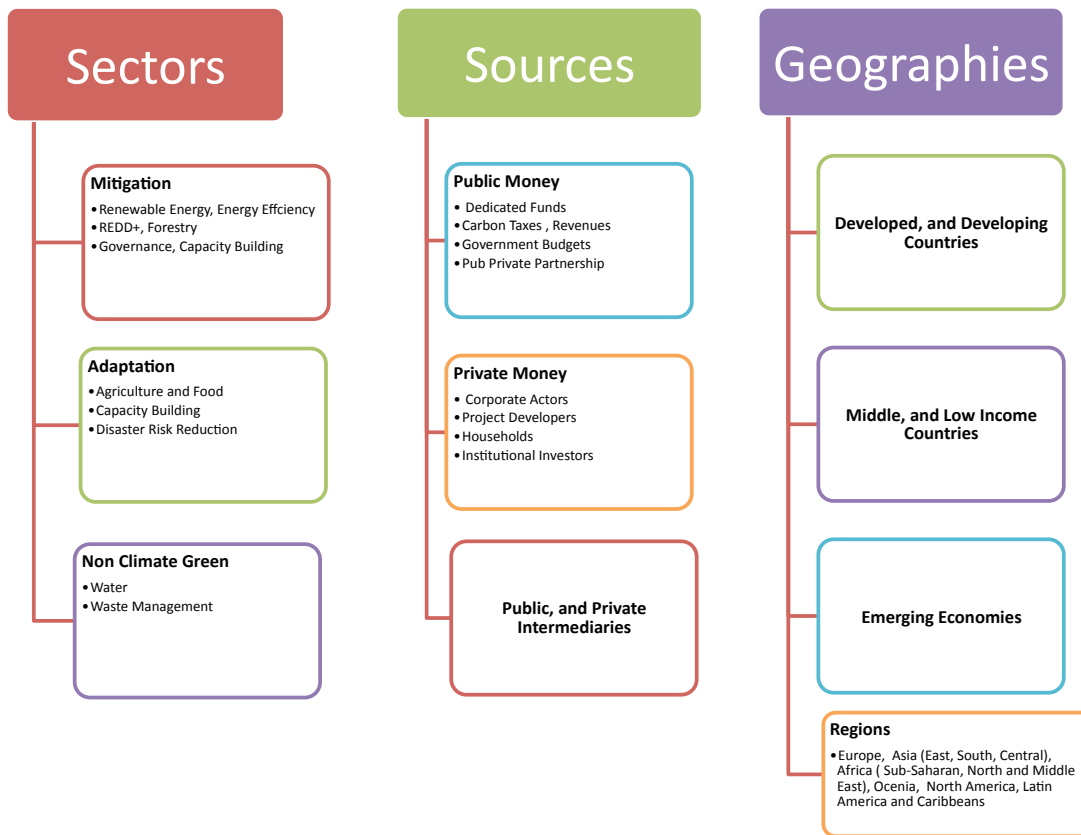
The primary objective of the exercise was to identify the private sector investment gaps in the sectors, geographies, and technologies in the context of IGG. By disaggregating the data available in a consistent and comprehensive way, it was hoped that clear patterns and gaps would emerge both in terms of the volumes and the data availability for the different sectors and geographies. Out of a total of 160 publications, only 16 included substantial data on finance flows appropriate for mapping. (See list in Appendix V.) This report did not attempt to collect and report primary sources

of data, but rather to systematically reflect numbers that are being published in the current literature. A further challenge is that most reports do not track flows under the rubric of IGG, and as such, much of the data included here is under the mantle of climate finance as an indicator for IGG flows or sector-specific interventions implicitly contributing to IGG.

Given the complexities and consistency constraints, the financial data in the 16 reports were captured in as much detail as possible under three groups based on the terms used in the reports as relevant—sectors, geographies, and sources—and then further codified in three categories: historical investments, projected investments, and annual allocations. This classification was chosen to identify the past, existing, and future financial flows scenarios for IGG-related investments, and to accommodate the significant variations in terms of the way the data are reported.

All the cumulative and disaggregated figures reported were recalculated and cross checked for their accuracy and consistency. In some cases where crucial details were missing, the original sources of data were tracked down in order to verify consistency. It is interesting to note that there are only a handful of publications that have collected and reported primary sources of data; the remaining reports include analysis based on different parts of these data sets and present this information in different formats. Most of the reports included some minor to major mathematical errors in the financial

FIGURE 2: Categories Used to Map IGG Finance Data



Source: Compiled by IFC to categorize IGG finance data across multiple publications.

data they were reporting. However, none of these discrepancies were significant enough to make any report completely irrelevant or misleading in terms of its ultimate conclusions.

All the data were captured under the following categories⁸ where appropriate:

Findings

It is evident that financing for green investments has been growing. Most reports highlight that finance for mitigation investments was approximately US\$350 billion in 2010/2011,⁹ with the bulk of this being funded by the private sector for renewable energy projects (see Figure 3 and Table 2). While renewable energy data are relatively well reported, there is a little

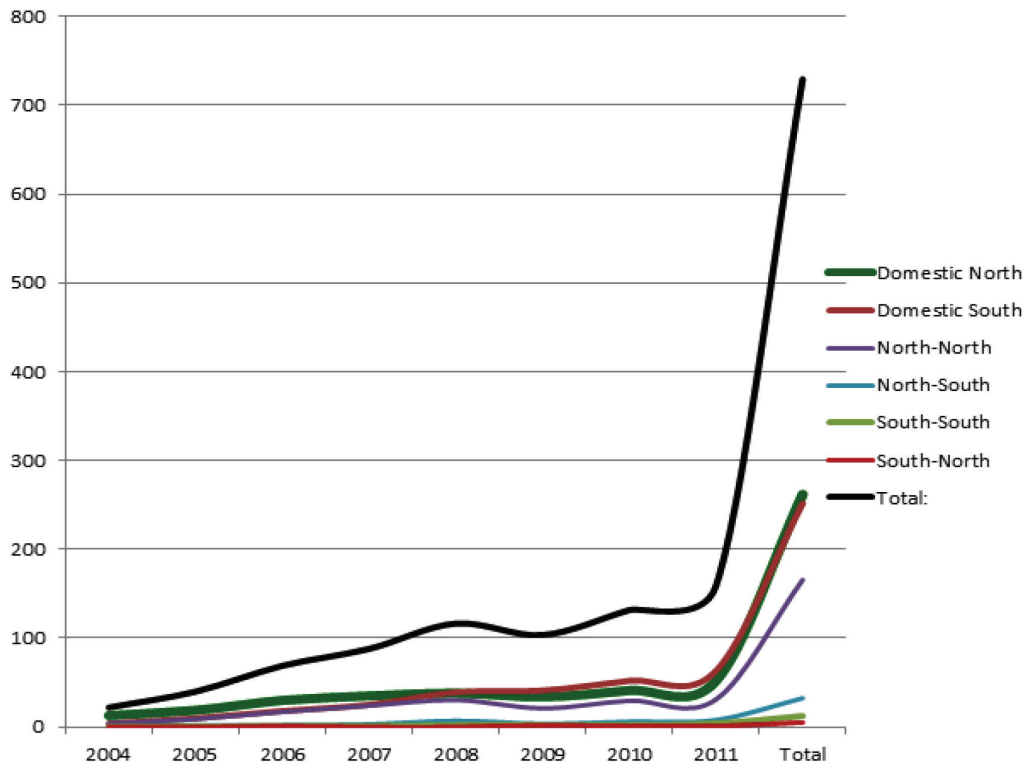
information on energy and resource efficiency investments.

This exercise also revealed that data on financial flows for IGG to developing countries, even when reported as climate finance, are limited, often inconsistent, and with major gaps, resulting in serious implications for decision making. There are a limited number of credible

⁸ UNCSD has also produced a useful overview of the flow of funds for climate finance/green growth, categorizing the numbers by “sources, channels, instruments and users”.

⁹ The figures are indicative estimates of annual flows for the latest year available 2010 or 2011. They do not represent the annual expenditure between 2010 and 2011 (Source Climate Policy Initiative (CPI) – Landscape of Climate Finance 2012).

FIGURE 3: Categories Used to Map IGG Finance Data



Source: World Economic Forum, Green Investment Report: The Ways and Means to Unlock Private Finance for Green Growth, A Report to the Green Growth Action Alliance (2013).

primary sources of information assessing finance flows (four in particular) that are consistently repackaged or modestly supplemented to support the analysis presented in most other publications. As a result, any errors, omissions, and inconsistencies in the primary sources are then replicated and compounded across all other publications.¹⁰

Moreover, there is an absence of consistent definitions, making it all the more difficult to disaggregate flows to developing countries and specific sectors. This was a major constraint noted in all the reports mapping green finance. The lack of agreed definitions on what constitutes a green or inclusive green investment, and therefore the relevant sectors to be included, renders the tracking process subjective and inconsistent across different publications. This

¹⁰ For example, the 2013, Green Investment Report by the Green Growth Action Alliance (G2A2) cites the total figure for adaptation finance as US\$14 billion. As indicated in the report, the source of this figure was the CPI Landscape of Climate Finance 2012 report. However, the CPI report includes a range for adaptation finance from USD12.3 to 15.7. The USAID Asia ‘Fast out of the Gate: How Developing Asian Countries can Prepare to Access International Green Growth Financing’ 2013 report uses the figures in the G2A2 report, but again does not refer anywhere in the report that this is the adjusted figure based on an average of the range. Moreover, the CPI report clearly mentions that the figures collected are “indicative estimates of annual flows for the latest year available, 2010 or 2011.” Similar disclaimers were not used in the other reports referencing this data, which would have been useful to maintain the consistency and accuracy of the data that was used.

TABLE 1: Geographic Allocation of Green Growth Finance

Destination of Investments Regions/ Countries	Total Annual average investments All figures in US\$ billion
Developed Countries (2010/2011)	193
Developing Countries (2010/2011)	172
OECD (2011)	103
Non-OECD (2011)	150
Europe (2004–2011)	58.72
Latin America and Caribbean (2004–2011)	5.3
Asia (2009–2012)	40
East Asia	NA
Africa (2010/2011)	1–1.33
Sub-Saharan Africa (2011)	1.09
Middle East and North Africa (2004–2011)	2.9
Central Asia	NA
Oceania (2004–2011)	11.99
Brazil (2004–2011)	6.31
India (2004–2011)	5.50
China (2004–2011)	23.86
South Africa (2010)	0.5

Sources: CPI: The Landscape of Climate Finance 2012, UNEP: Bilateral Finance Institutions and Climate Change, A mapping of 2011 Climate Finance Flows to Developing Countries, USAID ASIA Fast Out of The Gate: How Developing Countries Can Prepare to Access International Green Growth Financing, vol 1, April 2013; WBG (coordinator)IMF, OECD, RDBs: Mobilizing Climate Finance; BNEF: Global trends in renewable energy investment 2012; IEA Global Gaps in Clean Energy RD&D: Update and Recommendations for International Collaboration 2010.

Note: All figures represent the annual amounts for the year(s) indicated next to the Region/Country in the same row.

^a The figures are indicative estimates of annual flows for the latest year available 2010 or 2011. They do not represent the annual expenditure between 2010 and 2011.

^b Same as above.

constraint made it particularly challenging to assess private sector contributions to adaptation and other non-mitigation-related investments. It is quite likely that many such private investments are bundled under generic climate mitigation investments even though they are contributing to adaptation or other green growth-related sectors. Data availability and documentation are very different across relevant sectors with the most detailed and credible information associated with renewable energy, energy efficiency data being a little more sporadic, and information on adaptation and related sectors being the

most limited. See the summary of summary of sector specific climate finance in Table 2.

Global financial flows for adaptation are significantly lower at approximately US\$12–16 billion annually. A significant portion of this funding is based on North-South flows, primarily from public financial sources. Unlike mitigation finance, public sector adaptation interventions have not been able to catalyze private sector investments. This figure could be under-reported when the data and definitional constraints mentioned above are taken into account, including the lack of reporting on domestic investments in low-income countries.

All the reports consistently highlight that the dominant source of funding for green investments globally is domestic/ local finance in all regions, with the private sector accounting for the lion's share of total investments. Institutional investors represent only a minute portion of these overall investment flows. It is difficult to identify what proportion of this investment is focused on addressing the inclusive dimension of green growth, but it is likely to be a very small fraction, as emerging markets already represent a small subset of their investments, with green growth a smaller subset within that.

There is a small North-to-South and an even smaller South-to-North financing pattern for green investments, primarily in the clean energy sector. Private finance already accounts for the majority of current flows, but as noted, this is not consistent across all sectors or geographies, with renewable energy and infrastructure investments dominating the flows. However, the lack of consistent and comprehensive data on financial investments poses a major challenge to identifying exact sources, gaps, and opportunities. Most reports include numbers only for developed and middle-income countries. Investments in low-income countries are not captured in the main, thereby posing a challenge to forming a complete overview of global IGG investments. This is likely to be both because the data are not being captured in a systematic way,

TABLE 2: Summary of Sector-Specific Climate Finance
(All the totals are in bold; the highlighted cells contain verifiable financial figures; NA = Not Available)

Sources/Sectors	Total	Public Money					Private Money					
	Annual Invest. (US\$ billion)	Dedicated Climate Funds	Nat. Fin. Institutions	Gov. Budgets	Intl. Fin. Institutions	Total Pub. Sector	Corporate Actors	Institutional Investors	Project Developers	Households	Pvt. Fin Intermediaries	Total Pvt. Sector
Adaptation												
Total (2010/2011) ¹	14	NA	5.2	2.7	6	13.9	NA	NA	NA	NA	NA	NA
Agriculture and Forestry (2011)	5.1	NA	3.78	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Preservation, Supply and Sanitation (2011)	3.22	NA	3.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capacity Building and Technical Assistance (2011)	1.40	NA	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Disaster Risk Reduction (2011)	1.40	NA	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mitigation												
Total (2010/2011)	350	1.1–1.5	37.5	14.9–18.2	26.9	82.0	74.9	0.6	122.2	32.3	37.95	267.9
Energy Efficiency (2011)	23.68	NA	NA	NA	23.68	NA	NA	NA	NA	NA	NA	NA
Infrastructure (2011)	74.4	NA	NA	NA	NA	NA	NA	74.4	NA	NA	NA	74.4
Renewable Energy (2004–2011)	141.4	NA	NA	3.1	NA	NA	NA	NA	138.3	NA	NA	138.3
Lcet (2009–2010)	23	NA	NA	23.54	NA	23	NA	NA	NA	NA	NA	NA
Redd+ (2010–2012)	1.3	NA	NA	NA	1.3	NA	NA	NA	NA	NA	NA	NA
Other												
Total (2010/2011)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water (2010)	270²	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Management (2011)	0.52	NA	0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sources: CPI: The Landscape of Climate Finance 2012, Green Investment Report: The Ways and Means to Unlock Private Finance for Green Growth (G2A2); UNEP: Bilateral Finance Institutions and Climate Change, A Mapping of 2011 Climate Finance Flows to Developing Countries; McKinsey Global Institute Resource Revolution: Meeting the World's Energy, Materials, Food, and Water Needs (); USAID ASIA Fast Out of The Gate: How Developing Countries Can Prepare to Access International Green Growth Financing, vol 1, April 2013; IEA: Global Gaps in Clean Energy RD&D: Update and Recommendations for International Collaboration 2010.

Notes: The sum total of each sub sector listed above does not add up to the 'TOTAL' financial figures of the major sectors' (Adaptation, Mitigation and Others). Most of the sector specific annual figures are provided in isolation by various reports and they do not indicate a linear relationship with the global average investment figures under the Mitigation, Adaptation and Other categories.

^a The figures are indicative estimates of annual flows for the latest year available 2010 or 2011. They do not represent the annual expenditure between 2010 and 2011.

^b The source of this investment is unclear. Given that in general most capital investments in the water sector are publically financed, it is likely that this figure represents primarily funds from government budgets.

and the information may be difficult to verify. This problem is again exacerbated by the lack of consistent definitions in this field.

Similarly, only one report out of the 16 reviewed provided information on investments in research, development, and demonstration of Low Carbon Emission Technologies (LCET). Looking at the current growth of renewable energy markets, RD&D in clean technologies has been a key driver for this sector with multiplier benefits, and even so, the information

on investments in green growth technologies is under-reported.

The upshot is that a lack of comprehensive data and knowledge poses a challenge to decision making and appropriate policy development to support new IGG investments in low-income countries. A recommendation for the G20 would be to support greater consistency in tracking and reporting of investments, based on clear definitions, in order to establish more clearly where public funds are most needed.

6

Selected Case Studies: What Do They Tell Us?

Numerous initiatives related to green investment and the IGG agenda were identified as possible sources for insight into the potential role of the DPIGI. Consistent with the broad scope and diverse strategic approaches to promoting IGG, seven case studies were examined to build on the insights from the literature, most commissioned for this report. These cases were selected to illustrate the wide range of responses to the challenge of promoting IGG and the correspondingly diverse issues associated with finance as a central or supporting element and include the following:

Promoting IGG through New Technologies

This topic is addressed based on two initiatives of importance to the quality of life for the rural poor, promotion of modern cookstoves and solar lanterns. The importance of this objective has recently been recognized and elevated on the development agenda with the adoption of the UN's Sustainable Energy for All initiative that aims to make sustainable energy universally available by 2030.¹¹ Clean energy for cooking and lighting are fundamental steps toward poverty alleviation with a multitude of benefits including improved health, educational opportunities, and income generating opportunities. The case studies¹² highlight the complex factors which influence the

successful introduction of new consumer products, even when technically proven and economically attractive. While consumer and business financing are often inadequate, other factors including lack of information and cultural barriers can be of greater import—particularly when dealing with practices as personal and ingrained as cooking. Lighting initiatives appear to be progressing much more rapidly and successfully than cookstove projects, arguably because of these non-financial factors.

Promoting IGG through New Business Models

Another lesson from development programs is that sometimes the absence of a successful “business model”—the successful organization of a business to sell a product or service and generate sufficient revenue to be sustainable—can be a critical issue even

¹¹ A UN led initiative, with more details available at (www.sustainableenergyforall.org).

¹² The discussion draws on two primary sources, a paper by Koffi Ekouvi, a World Bank cookstove expert, reviewing World Bank experience of promoting improved cookstove technologies, and extensive documentation available at the website of a World Bank Group led international initiative to promote solar lanterns, Lighting Africa.

when consumer demand exists, technologies are proven, and financing is available.¹³ The three case studies selected draw on very different sectors and experiences. The first is an effort to provide clean water for poor rural Kenyans through a partnership with an NGO, Safe Water Network, that included innovative features such as market testing of services to determine ability and willingness to pay, and participation from local banks to provide financing for small business participation. This sector shares some challenges similar to those faced by cookstove initiatives insofar as consumers can be surprisingly reluctant to pay even small amounts for “improved” services.

In contrast, the other two examples illustrate commercial business models which work but require innovation to reach smaller businesses and the poor. One is a strategy used by a growing number of development banks which provide some combination of training, credit lines, and risk reduction to engage local commercial banks in financing clean energy efforts by their clients. These projects can bring about a large volume of lending for a relatively small amount of donor support but have to date largely excluded smaller businesses and the poor outside the banking system. Another example is insurance products: while often identified as a commercial approach to reducing the climate vulnerability of developing countries, the challenge has also been to devise products suitable for poor countries and persons.

Influencing Markets through Provision of Information

The preceding examples indicate that provision of information is an important factor in program success; solar lanterns are a very new product and making rural consumers aware of

their performance and value is a major challenge. Another case study similarly combines opportunities to use new technologies with a focus on provision of information, in this case weather observation and early warning of extreme weather. An emerging set of lower-cost, highly reliable technologies, building on cellular networks (rapidly growing in most developing countries) has the potential to overcome many of the traditional barriers to weather observation and early warning systems. However, as new and very different technologies, they face institutional inertia from public agencies accustomed to established ways of doing things.

A very different example of an information based approach is the evaluation and publication of climate risk indicators by country as a potential source of guidance for private investment. The thinking behind this approach is that making investors more aware of risks and opportunities can both encourage investment and better public policy by governments interested in improving their rankings, a concept embodied in the annual *Doing Business*¹⁴ reports published by the World Bank Group. IFC has already had some success bringing about private action to reduce climate vulnerability by working with business clients to help them identify and implement risk reduction measures.

These three themes illustrated by the case studies highlight some of the diverse issues

¹³ “The essence of a business model is that it defines the manner by which the business enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit: it thus reflects management’s hypothesis about what customers want, how they want it, and how an enterprise can organize to best meet those needs, get paid for doing so, and make a profit” D. Tece, “Business Models, Business Strategy and Innovation” Long-Range Planning, Vol 43, 172–194 (2010)

¹⁴ See www.doingbusiness.org

and challenges involved in promoting inclusive green growth that may constrain or amplify the impact of financing. While discussed as distinct influences, in practice they should be seen as joint factors which must be understood and addressed simultaneously to achieve success. For example, while promoting solar lanterns requires overcoming many of the barriers to new technologies, a major challenge has been to create business models consistent with large-scale distribution to dispersed rural households and information programs to assure buyers of product quality and value for money.¹⁵

Short summaries¹⁶ of these case studies and their implications for possible focus by the DPIGI follow.

Short summaries of these case studies follow.

This report draws heavily on experiences within the IFC and WBG reflecting the authors' greater access to documents and sources produced by these institutions. While information

was sought from other IFIs, the most up to date and well documented material was also often not readily available. A sampling of some of the publicly available literature documenting the experience of other international financial institutions follows and shows that they too have a plethora of IGG-related financial initiatives now underway (See Box 2). The further development of the DPIGI offers an opportunity to engage these institutions and to draw on their experience.

¹⁵ For a useful discussion of how these issues come together in an African context, see Proctor, "Solar Energy: African Economies' Secret Weapon," *Fortune/CNN Money*, June 25, 2013 (on-line: <http://management.fortune.cnn.com/2013/06/25/africa-solar/>).

¹⁶ Full versions of each of the case studies will be produced and made available at the website of the IFC Climate Business Department (www.ifc.org/climatebusiness).

Promoting IGG through New Technologies

One of the most promising strategies for advancing inclusive green growth objectives is through new technologies of particular benefit to BOP and lower-income populations. Financing is typically a critical requirement at multiple stages of new technology development, including product design and early market introduction. In selling to poor populations, financing initial costs is often a critical barrier if the new item has a one-time capital cost, even if the new technology replaces a more expensive and intermittent service, as is true with improved cookstoves, which reduce fuel costs, and solar lanterns, which replace kerosene lamps.

Clean Cookstoves

The nexus of improved energy access, direct health benefits and reduced indoor air pollution can be achieved in part through expanding access to clean cookstoves and fuels.¹⁷ This is of particular significance to approximately three billion people, mainly in South Asia and Sub-Saharan Africa, who still rely on solid fuels (traditional biomass¹⁸ and coal) for cooking and heating (UNDP and WHO 2009; IEA 2012). Under business as usual, it is projected that 2.5 billion people will still depend on these fuels for cooking and heating in 2030, with the bulk of use being in Sub-Saharan Africa, where the number of people without clean cooking facilities will increase by about 20 percent (IEA

2012). There is growing momentum to shift this trajectory through the launch of initiatives such as the public-private Global Alliance on Clean Cookstoves (GACC)¹⁹ and the UN Sustainable Energy For All that have both emphasized the provision of efficient cookstoves and clean fuels to poor households. World Bank cookstove projects over the last 20 years included 19 projects in Sub-Saharan Africa costing US\$1.2 billion. (Ekouevi, 2013) The World Bank is currently operating five programs that are either global or regional in focus; each is associated with a different business model to improve access to clean cookstoves and fuel in an effort to scale up.

Barriers to Scaling Up

Large-scale adoption and sustained use of clean cookstoves is not materializing due to a variety of context specific barriers both on the consumer and producer/distributor sides. While financing in terms of a lack of investment and working capital appear to be constraints for

¹⁷ Moreover, rapid urbanization in many developing countries, alongside inefficient production of charcoal and use of wood-fuels might be threatening forest cover in the neighboring catchment areas (Arnold et al 2003).

¹⁸ Wood, charcoal, crop residues, and animal dung

¹⁹ Led by the United Nations Foundation to help 100 million households adopt clean and efficient stoves and fuels by 2020 (www.cleancookstoves.org).

producers, lack of information, awareness, and cultural barriers dominate for consumers and should not be underestimated. Table 3 identifies specific barriers and potential solutions funded by the public and private sectors. For example, in the case of Bangladesh, possible solutions could include publically funded awareness raising campaigns, along with broader female empowerment initiatives, which could be complemented by privately funded demonstrations using early adopters. In order to be sustainable and ensure impact any interventions therefore need to be designed following an assessment of the local, context-specific barriers and must be developed in line with government strategies in consultation with local communities and women.

Drivers for Scaling Up

Addressing these challenges requires a multi-pronged approach across four key drivers that have been identified through reviewing successful programs: awareness raising; markets and preferences; technologies and standards; and innovative financing. Both the public and private sectors have a role to play in each case.

- **Awareness raising:** Households need to be informed about the risks of using inefficient cookstoves, and the direct and indirect benefits of switching to cleaner alternatives. Programs that have assumed spontaneous adoption have failed.
- **Markets and preferences:** Solutions need to be targeted to specific market segments, taking into account consumer preferences/habits and barriers such as availability and affordability to ensure appropriate technology choices and design of business and financing models e.g., flexible repayment terms and micro-finance options.
- **Technologies and standards:** The uptake of clean cookstoves and clean fuels needs to happen in tandem to ensure efficiency

and intended outcomes. As such, the targeted consumers need to be offered a suite of options that address their more pressing concerns around durability and safety. Experience has shown that public funding is necessary at the early stages of program development and evolution, particularly in countries with less developed business environments.²⁰

- **Innovative financing:** Experience has shown that subsidized programs cease operations once public/donor funding is removed; hence, market-based solutions are key to sustainability. Social enterprises and the use of carbon finance are increasingly being deployed across the value chain of activities to support scaling up.

NGOs and companies are developing innovative business models that provide cooking appliances to the poor in an affordable way, although this process can entail lower expected returns on investment than fully commercial ventures. Grameen Shakti in Bangladesh is a successful example by providing soft credit for consumers, adaptive technologies to lower costs and maximize income generation, and consumer-friendly after sales service, including buy-back options.

Ultimately, a successful business model will need to address producer, distributor, and consumer financing and work in tandem with the public sector to address non-financial barriers, in particular cultural barriers. This can be achieved through a smart blend of public and private financing, and cooperation among government, the private sector, and qualified

²⁰ The commercialized Anagi stove in Sri Lanka, which has reached over three million households, benefited from donor funds in product development and testing over two decades (Rai and McDonald, 2009).

TABLE 3: Challenges with Scaling-up Clean Cookstoves

	Barrier	Description	Public Financing Solutions	Private Financing Solutions
Consumer Barriers	Lack of information on adverse health consequences of inefficient use of solid fuels	Households lack information on negative health outcomes of solid fuels; therefore, demand for clean cookstoves does not exist.	<ul style="list-style-type: none"> ■ Awareness campaigns ■ Media coverage ■ Demonstrations, workshops ■ Sponsoring of events ■ Social marketing 	<ul style="list-style-type: none"> ■ Product-specific advertising ■ Sponsorship of events to target potential customers
	Poor access to clean cooking solutions	Clean cookstoves are not available in many rural, peri-urban and urban areas due to limited distribution networks and relatively small-scale production facilities.	<ul style="list-style-type: none"> ■ Policy, legal, and regulatory reforms ■ Partnerships with private operators to develop clean cooking initiatives 	<ul style="list-style-type: none"> ■ Investment in production facilities and in distribution networks ■ Expansion of existing distribution networks
	Liquidity constraints to affording clean cooking solutions	Affordability of cookstoves is an issue for the poor. Price competitiveness and availability of fuels are other barriers preventing the transition to cleaner fuels. Cleaner fuels like LPG are affordable only if available to middle/upper income households.	<ul style="list-style-type: none"> ■ Guarantees to micro-lenders ■ Partner with private operators to buy down costs using smart subsidies 	<ul style="list-style-type: none"> ■ Flexible repayment terms ■ Micro-finance ■ Integrate carbon finance to lower product costs
	Cultural resistance to clean cooking solutions	Adoption of new cooking solutions is behavioral change from the prevailing. Often, women rely on their husbands to make the purchase. There may be resistance even if the wife is convinced about its benefits.	<ul style="list-style-type: none"> ■ Awareness raising ■ Campaigns to promote empowerment of women 	<ul style="list-style-type: none"> ■ Demonstrations using early adopters
Producer/ Distributor Barriers	Lack of investment capital	Access to investment capital to start up a business is difficult for small- and medium-scale entrepreneurs working on clean cooking solutions. They usually operate in difficult business environments with a low profit margin activity.	<ul style="list-style-type: none"> ■ Subsidize loans ■ Guarantee credit ■ Advisory services to develop business plans ■ Facilitation of commercial loans ■ Reform tax/ duty regimes for energy technologies 	<ul style="list-style-type: none"> ■ Social impact equity investment ■ Debt investment ■ Integrate carbon finance in business plans
	Lack of working capital	There is an absence of capital to run business operations, including staffing and inventory management. Even with carbon finance, working capital is needed to bridge the gap to carbon revenues.	<ul style="list-style-type: none"> ■ Facilitation of access to commercial loans 	<ul style="list-style-type: none"> ■ Develop SME products ■ Micro-credit

Source: Compiled by Authors from information in Ekouvei, K., (2013), *Scaling Up Clean Cooking Solutions: The Context, Status, Barriers and Key Drivers*.

NGOs to support clean cooking interventions. Early grants and low-cost financing provided through organizations that can provide both finance and quality assurance for products can encourage the development of businesses, either at a community or individual level, to retail the stoves to reach the base of pyramid.

Solar Lanterns

About 600 million people in Africa (60 percent of the population) have no access to

electricity. This number is expected to rise faster than new grid connections and increase to about 700 million by 2030. These people, most of whom are in rural areas, rely on increasingly expensive, hazardous, and polluting fuel-based sources of energy for lighting and cooking. Fuel-based lighting is generally of low quality, impeding learning and economic productivity. In the past decade, a variety of technologies have emerged that offer the potential for clean, modern lighting based on low-power light emitting diodes (LEDs) and solar energy.

BOX 1: WHAT ARE MODERN OFF-GRID LIGHTING PRODUCTS?

The Lighting Africa program works with off-grid lighting products or systems that are stand-alone and rechargeable, and can be installed, assembled, and used easily without requiring assistance from a technician. These products are affordable, typically costing less than US\$100, with some retailing at US\$10 or less.



The Niwa Multi 300

© Niwa – Next Energy Products Ltd.

During the day, the solar panel is placed directly in the sun to generate electricity that recharges the battery. At night, the electricity is available to power the lamp. Products that meet Lighting Africa Performance Targets guarantee users at least four hours of good, consistent lighting each night after a sunny day of recharging.

Source: www.lightingafrica.org.

A key feature of the Lighting Africa program is the recognition that supporting the distribution of new lighting technologies in mostly rural markets requires several types of support:

- Quality assurance through product testing and promotion (as poor quality products could undermine consumer acceptance and “poison the market”);
- Market intelligence as individual companies might be reluctant to incur the cost of evaluating diverse, dispersed local markets;
- Access to finance as low-income consumers require help with the initial cost of devices;
- Business development support; and

- Collaboration with governments to identify and address policy barriers.

Financing was thus only one of several required elements for market development. The end result has been highly successful; almost seven million people in Africa now have qualified products with steady market growth (120 percent in 2012) in 20 countries. The model is also now being replicated in other parts of the world, including India.

IFC’s Sustainable Energy Financing (SEF) program model applies in the off-grid lighting sector. However, the risks for financial institutions (FIs) to provide debt financing for a nascent industry where the oldest companies are 6 years old, and few have matured to profitability, are profoundly greater than energy efficiency investments with proven technology procured from and installed by 80 year old established firms. The risk of a market where consumers themselves are not credit worthy further compounds the challenge, along with the initial small size of all companies and transactions in an immature market.

While innovators in off-grid lighting, efficient cookstoves, vended water, small piped water systems and microgrids are emerging on the scene with pilots for delivering basic energy, water, and sanitation services to the underserved through innovative business models—they will not scale without access to finance, and specifically commercial debt against which to leverage their equity investors’ capital. For example, with sales of Lighting Africa-certified solar lanterns increasing by more than 100% per year—>400% for some manufacturers—working capital and trade finance are essential to allow distributors and manufacturers to finance the next order (substantially larger than the prior order) with 4–6 month lead times between paying for product orders and the resulting sales revenues. Without such debt available, market growth and profitability

is constrained not by technology or demand, but rather by debt availability.²¹

The donor role as a source of seed capital and support for early innovators is therefore more important than ever in these frontier sectors, and the potential impact from a developmental as well as a climate change perspective are immense. However, the wrong intervention including poorly designed subsidies can worsen the problem. Doing so will inevitably lead to donors picking winners on behalf of the market, impeding innovation and undercutting the competition that is the driver of more and

better products and inevitably lower prices. The design of good donor support is consequently a promising issue for analysis and focus by the DPIGI.

²¹ An informative video focusing on a Kenyan small business based on renting out solar lanterns for the same cost a family would spend on kerosene is available on-line: http://www.youtube.com/watch?feature=player_embedded&v=zziEb15Gtk



Developing New Business Models

Clean Water Services

One of the most important needs of the poor is for clean water. In declaring 2013 the International Year of Water Cooperation, the UN emphasized some of the many reasons why provision of clean water is essential to poverty eradication:²²

- 85 percent of the world population lives in the driest half of the planet. 783 million people do not have access to clean water, and almost 2.5 billion do not have access to adequate sanitation.
- Six to eight million people die annually from the consequences of disasters and water-related diseases.
- Water availability is decreasing in many regions and already an issue.
- Water for irrigation is closely related to food production and security: ~70 percent of global freshwater withdrawals (more in some fast-growing economies).
- The developmental importance of clean water is reflected in significant bilateral and multilateral programs addressed to this need, estimated at close to US\$3 billion per year in Sub-Saharan Africa alone.²³ As with other ongoing service needs, infrastructure is often put in place only to degrade or fail rapidly due to the absence of the technical capacity and cost recovery mechanisms required for long-term sustainability of operations.

One innovative effort to address this need is based on testing new business models for off-grid, distributed services in rural communities, an approach potentially applicable across the developing world.²⁴ Key features of this concept include:

- Reduced grid infrastructure requirements, which can substantially lower costs;
- Initial financial support for testing and evaluating business models over sufficient time periods to allow for meaningful evaluation;

²² Ootsma, "Water cooperation is key to poverty eradication, gender equality and environmental sustainability," (UNDP blog, March 12, 2013), <http://www.undp.org/content/rwanda/en/home/ourperspective/ourperspectivearticles/2013/03/22/water-cooperation-is-key-to-poverty-eradication-gender-equality-and-environmental-sustainability.html>

²³ IFC and Safe Water Network, "The Decentralized Water Market: Assessing and Overcoming the Hurdles to Scale in Kenya (SAWA Market Brief Issue No. 3, Jan 2013). The Kenya project draws on international experience including similar efforts in Ghana and India.

²⁴ The relevance of low-cost, distributed service models has already been discussed in the context of weather observation and early warning systems. Another application is in provision of clean energy as illustrated by the solar lighting example. Such opportunities are one focus of the Sustainable Energy For All initiative. www.sustainableenergyforall.org.

- Market testing of services to determine ability and willingness to pay prices necessary to fund private investment;
- Collaboration with relevant government agencies and NGOs on setting “fair” prices and avoiding conflicts with ongoing initiatives; and
- Engagement with local banks to determine what will be necessary to meet their needs if funding is to be obtained from commercial sources.

This current IFC initiative, in cooperation with the Safe Water Network, focuses on rural Kenya.²⁵ The experience to date illustrates some of the complex, local, and multi-layered challenges in applying these principles. The first and most critical barrier has been an unwillingness to pay for these services even at very low prices, and even when below prices previously paid for untreated water.

As noted, commercial financing is also a key requirement for sustainability and the focus of the Kenya initiative. Urban water service providers are a logical starting point as they have the scale and revenue generation to be most creditworthy. “Shadow” credit ratings for these entities have been developed to identify those most creditworthy. An output-based aid program is being tested to partially subsidize expansion projects for community water systems; the subsidy reduces the overall financing cost and provides some comfort to the lender in evaluating the overall risks of the project.

The Kenya program illustrates some of the many challenges, including financing, in providing clean water services to the poor. Many innovative ideas are being explored, but the solutions will require time and care to evaluate and, if successful, to replicate elsewhere. A combination of commercial financing, new technologies, supportive governments, and innovative business models will most likely be necessary.

Energy Efficiency

Investor interest in energy efficiency (EE)—the use of technology that requires less energy to perform the same function in the provision of products and services²⁶ has increased generally in many developing countries due to rising energy prices, opportunities arising from new technologies, and supportive government policies.²⁷ Such investments have also become increasingly attractive to institutional investors.²⁸ For example, a recent report by the nonprofit research organization CERES²⁹ finds that institutional investors are finding EE opportunities an attractive way to mitigate climate-related risks in their portfolios, leading to investments in EE improvements and in companies that develop EE products and services. However, to reach adequate scale, EE projects will need to be bundled into products that meet investor criteria, so that a secondary market for such securities can be created.

Although focused on the U.S., the CERES report contains generally applicable lessons: policymakers need to pursue policies at the utility level (to align incentives with EE), at the standards and regulations level (to drive demand for EE), and at the broader financial market level (to encourage innovative financing mechanisms).

²⁵ IFC/SAWA Market Brief

²⁶ http://www.eia.gov/energyexplained/index.cfm?page=about_energy_efficiency.

²⁷ Both China and India have adopted aggressive energy efficiency policies in recent years IEA 2013.

²⁸ See discussion of increased interest from the asset management side of insurance companies in the insurance case study *infra*.

²⁹ CERES 2013, Power Factor: Institutional Investors’ Policy Priorities Can Bring Energy Efficiency to Scale. <http://www.ceres.org/resources/reports/power-factor-institutional-investors2019-policy-priorities-can-bring-energy-efficiency-to-scale/view>.

Yet, even where the economic viability of such investments is proven, there are barriers to more widespread adoption—often more so in developing countries. The key impediments to EE investments are several, intertwined market failures. In addition to weak policy environments to encourage low-carbon and green growth, the situation is further exacerbated by a lack of awareness on the part of end-users and financiers, problems of high transaction costs, perceived high risks that may drive up the discount rates associated with projects, and difficulties in structuring workable contracts for preparing, financing, and implementing EE investments. Such investments thus require market development that addresses the constraints to designing, packaging, and financing EE projects.³⁰

Private sector focused MDBs like IFC and EBRD have made EE into a business line. In addition to incorporating EE into direct lending activities, they work through FIs to extend credit lines and other facilities in support of EE and renewable energy (RE) lending. Such programs often include significant technical assistance to address some of these barriers. An initial barrier specific to EE lending is usually the absence of traditional hardware or other forms of security; the credit risk is defined by the opportunity for reduced costs, and the lender may perceive a greater risk in the absence of local experience to validate the saving potential. Thus risk guarantees alone are insufficient; tailored technical assistance and training are also required. The on-lending model is particularly well-suited to reaching smaller companies and end-users, because it avoids the large transaction costs typically associated with direct MDB financing, and because it can be deployed to the local FI's existing client base.

IFC's SEF program is implemented by IFC's Advisory Services to address key barriers to FI lending to clean and resource-efficient projects, as well as renewable energy investments

in emerging markets. As of June 2012, IFC has provided SEF Advisory Services to 47 FIs.

The EBRD addresses EE and climate change through its Sustainable Energy Initiative (SEI). The SEI was launched in 2006 with the aim of scaling up sustainable energy investments, improving the business environment for sustainable investments and removing key barriers to market development. Between 2006 and 2012, the EBRD SEI invested €11 billion in 602 sustainable energy projects (RE and EE) in 33 countries across the region.³¹

EBRD combines investments with technical assistance and policy dialogue to finance sustainable energy projects. Technical assistance is available for activities ranging from market analysis and energy audits to training and awareness-raising. As part of its policy dialogue activities, the SEI works with governments to support institutional and regulatory frameworks that incentivize sustainable energy investments while addressing market or regulatory barriers.

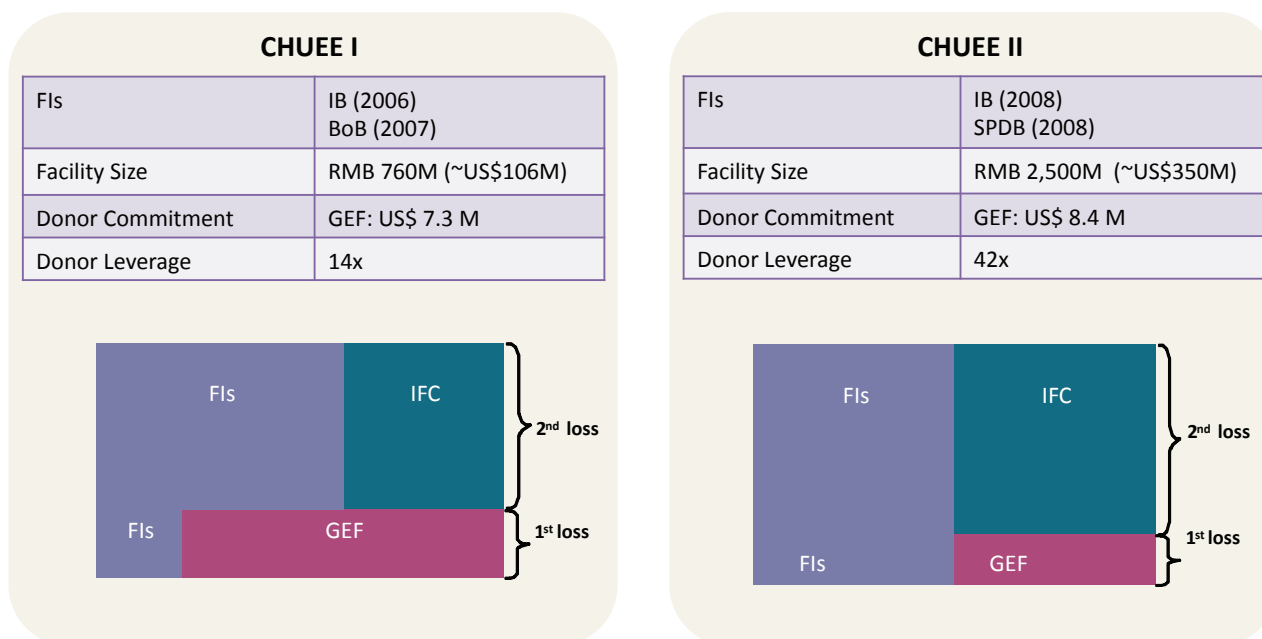
Through specialized financing facilities, the EBRD extends credit lines to local FIs to develop sustainable energy financing as a permanent field of business. Local financial institutions on-lend the funds to their clients, including small and medium-sized businesses, and corporate and residential borrowers. Financing has supported diverse projects in virtually all sectors, ranging from agribusiness food processing and manufacturing, to industry, construction and services. Examples include the overhaul of district heating systems in western Siberia and Ukraine, replacing inefficient energy sources

³⁰ World Bank Internal Evaluation Group (IEG) 2010. Assessing the Impact of IFC's China Utility-based Energy Efficiency Program: Energy Efficiency Finance.

³¹ Financing Sustainable Energy: EBRD Action and Results - <http://www.ebrd.com/downloads/research/brochures/sei.pdf>.

FIGURE 4: Structuring Support for Clean Energy in China

The CHUEE Program: Improving Access to Credit



Source: IFC Presentation (2011).

with biomass from forestry waste, and the up-grading of buses in Bulgaria, to run on cleaner fuel.³² Since 2006, to date, EBRD has provided 22 financing facilities with close to €2.6 billion.³³

One of the primary concerns in the evolution of the clean energy financing programs has been the tension between climate change objectives, which imply a focus on large emitters such as heavy industries, and more inclusive market segments such as small businesses and low-income households. A review of China Utility-based Energy Efficiency Program (CHUEE) and other clean energy finance projects by the World Bank Internal Evaluation Group concluded that SMEs should be the increasing focus of lending as larger, better financed customers were less in need of support.³⁴ While the opportunities and barriers vary by country, several clean energy finance

programs have explicitly focused on the SME segment. There is some evidence that SME financing remains more challenging due to the higher transaction costs and greater need for providing clients with technical support.

There is also some evidence that as banks become more knowledgeable and experienced in the technical requirements and

³² SEI Municipal and infrastructure EE, updated May 2010, available at <http://www.ebrd.com/pages/sector/energyefficiency/sei/municipal.shtml>.

³³ Sustainable Energy Financing Facilities, updated April 2013, available at <http://www.ebrd.com/pages/sector/energyefficiency/sei/financing.shtml>.

³⁴ World Bank Internal Evaluation Group (IEG), Assessing the Impact of IFC's China Utility-Based Energy Efficiency Finance Program (2010).

BOX 2: INCLUSIVE GREEN GROWTH INITIATIVES ACROSS THE MULTILATERAL DEVELOPMENT BANKS (MDBS)

IADB: The Inter-American Development Bank (IADB) finances EE initiatives in the Latin America and Caribbean region through its project lending (loan) portfolio operations. IADB has initiated EE work in specific sectors—such as biofuels and water utilities—to reduce operating costs through investments in more efficient technology¹. Some recent examples include the IADB EE project in the Dominican Republic (DR)^a currently under preparation, which aims in part to create a demand for EE products and services in order to support a market for such products. Another IADB project in Colombia,^b also under preparation with resources from the Clean Technology Fund, plans to offer a credit line to SMEs to finance EE and co-generation projects.

Much of IADB's EE work focuses on the infrastructure sectors via direct lending to governments for public sector EE initiatives with a combination of private sector support. Recently, however, IADB established a US\$50 million Energy Efficiency Finance Facility (EEFF) which will offer small-scale loans to private clients including some technical assistance to help overcome financial barriers and reduce costs to companies investing in EE and small-scale RE projects in the region.^c

AfDB: The African Development Bank (AfDB) addresses EE and sustainable energy in Africa through its Sustainable Energy Fund for Africa (SEFA).^d SEFA is a bilateral trust fund administered by AfDB and funded by the Government of Denmark. SEFA supports sustainable private-sector led EE and small and medium clean energy projects through advisory services, grants for technical assistance and capacitybuilding, as well as investment capital. Its investments include seed/growth capital to SMEs to off-set preparation costs and crowd-in additional investment to unlock and expand the SME market.

ADB: The Asian Development Bank (ADB) recognizes scaling-up EE improvements as a highly costeffective alternative to increasing energy availability to address rapidly rising energy demand, projected to rise from 34% of global demand in 2010 to as much as 56% in 2035.^e ADB's EE efforts for EE are part of the multi-pronged Clean Energy Program (CEP). ADB has well over 100 EE projects across the region with the majority being DS-EE projects (over 50 projects) that are currently under implementation. ADB's demand side investments in EE equaled US\$721 million (along with US\$252 million for supply side investments), or 41% of total CEP investments with the remaining 59% majority in RE initiatives.^f An interesting example of the emerging possibilities in the building sector is highlighted through the ADB EE Multi-Project Financing Program in China which utilizes a Partial Risk Guarantee Facility set up through ADB to facilitate greater financing of building EE projects through a number of commercial banks working with ESCOs. A goal is to encourage local commercial banks to lend to building developers and operators in order to access financing for EE improvements.

Another way ADB aims to promote EE improvements is by setting minimum energy performance standards and labeling programs for appliances. Similarly, in encouraging construction of EE buildings, ADB can provide capacity building to government bodies to enhance the skills base to create mechanisms for verification and enhancement of EE building codes.^g

Although most of ADB's EE interventions are at commercial scale, one sector of greater relevance to low income populations is brick manufacturing. ADB is financing a Brick Kiln Efficiency Improvement Project in Bangladesh which aims to transform the brick sector while also providing sustainable growth potential for brick manufacturers, an industry which employs many poor households. The project will promote advanced brick kiln pilots to demonstrate their operational and commercial viabilities in Bangladesh. The combined efforts will help build more energy-efficient brick manufacturing capacities, a concept potentially replicable in other parts of the region including China, India and Nepal.^h

^a IADB-Topics-Energy-EE, <http://www.iadb.org/en/topics/energy/energy-efficiency,2654.html>.

^b IADB-DR, <http://www.iadb.org/en/projects/project-description-title,1303.html?id=DR-L1034>.

^c IADB-Colombia, <http://www.iadb.org/en/projects/project-description-title,1303.html?id=CO-L1124>.

^d IADB-EE Finance Facility, <http://www.iadb.org/en/news/news-releases/2013-04-12/energy-efficiencyfacility,10412.html>.

^e Sustainable Energy Fund for Africa, <http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/sustainableenergy-fund-for-africa/>.

^f ADB-Accelerating DS-EE investments, June 2013 <http://www.adb.org/news/adb-aims-accelerate-demand-sideenergy-efficiency-investments>.

^g ADB-Same Energy More Power report, Figure 4, 2012 <http://www.adb.org/sites/default/files/pub/2013/sameenergy-more-power.pdf>.

^h World Bank-ESMAP Report – Clean Technologies in the Brick Sector, 2009 <https://openknowledge.worldbank.org/bitstream/handle/10986/2797/601550ESW0P1110e-00201100Color0FINAL.pdf>.

administration of clean energy loans in general, they become more willing to offer the product to a wider range of customers, including SMEs. This has particularly been IFC's experience in China. Replication has occurred in several forms, as over time local FIs found that loss rates were low; they offered larger amounts, offered loans to additional client categories or for additional types of EE/RE investments, and even expanded into other countries within their regions. The MDBs also found they were able to mainstream such products and offer better terms as they too found that the risks were lower than initially perceived.

For the most part, commercial EE lending does not address the needs of the very poor or BOP populations as they are outside the commercial banking system. This has consequently been the focus of micro-credit programs, often operated by civil society organizations, or targeted publicly supported programs as in the case of some examples discussed in the context of the solar lantern case study. However, there is some sense this may be changing with the advent of cellular phone-based banking, which dramatically reduces the transaction costs and barriers for banking in rural areas and much smaller accounts.³⁵ An interesting example of the emerging possibilities is illustrated by a presentation made in March 2013 at the Asian Development Bank (ADB) by the Bank of the Philippines (BoP), not coincidentally a participant in the IFC clean energy financing program.³⁶ It described a pilot program offering consumer financing for small, energy-efficient appliances, a growing market in rural areas. Financing is available for an approved list of products and vendors, and financing can be obtained entirely via cellular phone.

Insurance Products and Services

Intrinsic to the concept of inclusive green growth is limiting damages due to natural disas-

ters, including those stemming from global climate change.

If environmental degradation and risks associated with increasing extreme weather events escalate in the developing world, a crisis of insurance availability and affordability could ensue, in turn hampering growth. The availability of insurance substantially reduces the near- and long-term economic impacts of natural disasters, while reducing the burden on individuals and on in-country and foreign governmental aid.

Insurance is at an earlier stage of evolution in the developing world and takes a different form there. As the incidence of weather-related catastrophes has tripled in the past three decades, the underdevelopment of insurance markets renders a high proportion of losses uninsured, and thus a rising stake in new loss-resilient infrastructure. In many developing countries, insurance has been historically dominated by public entities. Liberalization allowing commercial entrants has taken place in many cases, beginning in China in 1992 and in India in 1999.

Insurers can materially engage in green growth in several ways: by helping spread the costs of everyday as well as catastrophic losses (their core business) that so often represent a setback to development efforts; accurately

³⁵ See e.g., "Is it a Phone, Is it a Bank?" *The Economist*, March 30, 2013 (<http://www.economist.com/news/finance-and-economics/21574520-safaricom-widens-its-banking-services-payments-savings-and-loans-it>). There are also opportunities for creating markets for solar energy technologies to power cellular phone service to rural areas; solar charging stations can also become small businesses supporting local lighting, cell phones, and other low power devices off the grid. IFC is supporting such an approach in an advisory project recently initiated in Papua New Guinea.

³⁶ US AID, ADB, CDKN, Workshop Report: Preparing for Scaled-up Climate Financing: New Business Opportunities for Green Growth, April 2-4, 2013.

evaluating and communicating risks to inform public and private decision making; offering innovative risk management products and services; providing influential input to the public policy processes; and directly investing some of their substantial assets (more than US\$20 trillion under management) in inclusive green growth projects and providing risk management tools for other investors.³⁷

Disaster risk financing compensates for losses but does nothing by itself to physically shield populations and assets from natural hazards. A number of recent innovative disaster risk financing tools have forged more explicit links between disaster risk financing and disaster risk management. These instruments make access to financing contingent upon engagement in disaster risk management activities. The World Bank, for example, established a contingent credit facility in 2008 with an eligibility requirement of implementation of national disaster risk management strategy; the Inter-American Development Bank (IADB) has since followed suit with a similar facility.

The World Bank Development Policy Loan (DPL) with Catastrophe Deferred Drawdown Option is available to IBRD eligible member countries. Eligibility is contingent upon the implementation of a national disaster risk management program that is monitored by the World Bank. Financial terms are those regularly applied to IBRD loans. Drawdown of funds is contingent upon the occurrence of a natural disaster that results in the declaration of a state of emergency by a Head of State. Another example is the IADB's Contingent Credit Facility for Natural Disaster Emergencies, a US\$600 million Facility that provides contingent loans ranging up to US\$100 million or 1 percent of a country's gross domestic product, whichever is less. Countries are required to have an adequate integrated disaster risk management program to be eligible. Drawdown of funds is contingent upon the occurrence of a natural disaster of a type and intensity determined by Facility guidelines. All

IADB member countries are eligible to receive this loan. Financial terms are those regularly applied to IADB operations. (World Bank, 2011)

As a regulated industry subject to government review of terms, conditions, and rates, insurance can also be viewed as combining public and private characteristics. Governments have a wide range of involvement in the insurance sector beyond the most obvious oversight of rate increases from mandating coverage (e.g., as a condition for publicly financed mortgages in the U.S.); imposing conditions for coverage (e.g., raising homeowners insurance rates after floods in coastal areas); capping or regulating liability (e.g., capping liability for damages from nuclear power plant operation); to creating and underwriting insurance products otherwise not adequately available in the market (e.g., crop insurance for farmers; micro-insurance for poor farmers). Thus while for many purposes the insurance sector can be appropriately seen as a private business, there is considerable government involvement and at least the potential for greater collaboration in support of inclusive green growth-related investment.³⁸

³⁷ In 2012, insurance represented seven percent of the global economy, manifesting as US\$4.6 trillion in premium revenues, US\$22 trillion in assets under management, and a large multinational workforce. Almost all revenue growth in the insurance sector today is centered in the developing world, where demand is far from saturated; just over US\$700 billion in annual premiums already come from emerging market. Moreover, insurance can help offset the high proportion of GDP otherwise lost due to natural disasters in the developing world. Most long-run economic costs of natural disasters occur where insurance is not widely used. (Mills, 2013).

³⁸ There are signs that some insurance regulators in developing countries are also showing interest in these issues. For example, a conference organized by the Comisión Nacional de Seguros y Fianzas this November in Mexico City includes a session on the role of the insurance sector in responding to climate change.

BOX 3: INSURANCE PROGRAMS AS MECHANISMS FOR DISASTER RELIEF

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) was set up in 2007 to provide catastrophic coverage for the island states of the Caribbean. Donor countries were encouraged to provide capital to establish the CCRIF and thereby instill some discipline to the ex-ante relief program. The coverage was for relief funds that could be paid out immediately after a catastrophe, but were not intended to provide a substitute for long-term relief. Caribbean states choosing to engage had to pay a participation fee, which formed part of the capital of the CCRIF, together with an annual premium. As of 2011, the CCRIF had paid out seven claims totaling about US\$32 million, two for earthquake (a surprise) and five for wind losses. Famously, the CCRIF was one of the first payers of monies (in the amount of US\$7.7 million) immediately after the 2010 Haiti earthquake.

Donor support for the CCRIF was very important to its establishment and included US\$67million for a special fund to help establish the Facility in its early years. Donor funds are helping to defray expenses and claims for running the fund while CCRIF builds up its own capital. The initial period of support is five years but can be extended. In its first years, the donor fund has reimbursed the CCRIF for its operating expenses, its reinsurance premiums, and its claims. In short, the donors are in the first loss position.

Source: World Bank, Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions (2011).

Policy and regulatory environments clearly shape insurers' ability to engage in business generally, and green growth in particular. Regulators are often in the position of approving new insurance products and services. The "Solvency II" regulations (anticipated to go into force 1 January 2014) will likely call for greater capital reserves than at present for riskier and/or unlisted investments. Regulated rates are also a concern. As previously noted, if insurers perceive that rates inadequately reflect risks, they will shy away from markets. This is of course a material concern under climate change, given that insurance rate-setting is often based on historic losses as opposed to projections of future losses.

Countries with limited or ineffective insurance coverage typically suffer much longer and lasting economic consequences from the impact of extreme events. Managing approximately a quarter of total catastrophe losses globally, their engagement varies widely by region. The insured fraction of total losses is 44 percent in North America, 29 percent in Europe, 9 percent in South America, 8 percent in Asia, and even less in Africa. Insurers' exposure, however, is rising everywhere.

The Contribution of Insurance Products to Green Growth

Insurance can contribute to green growth in several ways, including:

- The insurance industry provides a highly valuable role in spreading the costs of natural disasters, a service essential for effective disaster response and recovery.
- Insurance provides products for disaster response and recovery. See Box 3, Insurance Programs as Mechanisms for Disaster Relief.
- Insurers can be investors in green growth. In the past decade, 25 insurers have collectively made US\$40 billion in finance and direct investments relevant to climate and environmental concerns, spanning venture capital, private equity, public equity, and credit. Of the total, US\$23 billion was directed to climate change mitigation.
- Insurance companies are sources of risk management, technical knowledge, and advice. Within the insurance industry, a few companies focus primarily on providing their clients with technical support on how to manage their

risks.³⁹ This can include information related to designing building to withstand high winds and other extreme weather events, as well as risks specific to manufacturing processes, such as minimizing fire risks in warehouses.

Accurately Evaluating and Communicating the Risks of Extreme Weather Events

A prerequisite for insurance is the informed evaluation of risks, without which delineation of coverage and premium setting isn't possible. Due to its many uncertainties, climate change presents many challenges to the meaningful quantitative and financial estimation of risk, but the insurance industry has perhaps the greatest incentive to develop and apply the latest scientific methods.⁴⁰

The role of the insurance industry in public discussion of climate change, especially with respect to policy choices, has been increasing but remains somewhat limited relative to the economic stakes. A recent *New York Times* article citing a prominent industry official characterized what the American insurance industry was doing to combat global warming as “nothing much.”⁴¹ In assessing why this might be the case, the article cited the underlying assumption of risk by the federal government (especially for flood insurance) and the ability to raise premiums and drop coverage to adjust to higher risks. In contrast, a detailed survey of insurance companies found a pattern of increasing activities globally, ranging from information and awareness campaigns to innovative risk management and insurance products to investments in greenhouse gas mitigation.⁴² There are also recent insurance industry reports warning governments that the consequences of climate change may be so serious as to “threaten the insurability of catastrophe risk”, and noting the need within the industry to shift from historic to predictive risk assessment methods.⁴³

Strategies for Increased Collaboration and Issues for Greater Public-Private Dialogue

As the preceding discussion suggests, there are several potential roles for insurance products and the insurance industry that could contribute to enhanced resilience to natural disasters and the risks of climate change. These include:

- a. ***Extending the availability of insurance to manage risks in the developing world.*** While some climate-specific insurance products have been introduced in developing countries, the weakness

³⁹ One example is FM Global, www.fmglobal.com.

⁴⁰ The actuarial profession has an essential role to play in interpreting the results of the currently available loss models, and to collaborate with the climate and loss modelling community to develop the models for the future. Actuaries are accountable for assisting markets and governments to find the technical solutions to manage the dynamic effects of an increasingly unpredictable global climate. This responsibility falls equally on the shoulders of modelling, pricing and product development actuaries.

⁴¹ Porter, “For insurers, no doubts on climate change,” *NYT*, May 14, 2013. Consequently, despite losses due to Sandy and record drought, USUSU.S. property and casualty insurance was more profitable in 2012 than in 2011.

⁴² E. Mills, 2013. As of third quarter 2012, 378 insurance entities based in 51 countries had collectively initiated 1,148 activities related to managing the risks of human-induced climate change. These activities have emerged largely in the past decade, with the earliest dating to 1973. Most major insurers and all major reinsurers and insurance brokers have engaged to varying degrees, collectively representing \$2 trillion (44%) percent) of industry revenues and 2.5 million employees.

⁴³ Geneva Association, *Warming of the Oceans and Implications for the (Re)Insurance Industry* (2013) (https://www.genevaassociation.org/media/616661/GA2013-Warming_of_the_Oceans.pdf).

of insurance markets in general in these countries, especially low-income countries, is a significant barrier to more specialized disaster insurance products.

- b. **Working to promote resilience and adaptation to changing weather and climate extremes.** While insurers have begun to reactively adapt to rising weather-related losses by adjusting insurance prices, contract terms, and availability, a few have sought to help customers proactively improve their physical and economic resilience to a changing climate.
- c. **Introducing innovative products and services that support green growth.** Many insurers in the industrialized world offer “green” insurance products that incentivize their customers to adopt energy-efficient and renewable energy products and services (e.g., lower premiums for energy efficient housing or vehicles), or fill coverage gaps that otherwise stand as barriers to development and infrastructure investment (e.g., coverage for offshore wind energy infrastructure).
- d. **Engaging in public policy and land use planning processes.** For centuries, insurers have influenced public policy on issues ranging from land use planning in flood zones to automobile safety, frequently striking agreements on the pricing of risk and the establishment of public risk management activities.
- e. **Investing in and financing green growth and adaptation projects.** Insurers could bring large amounts of new funds to bear on inclusive green growth projects, and have already made a strong start in devoting resources to green projects in the industrialized world.

9 Providing Better Information

Often, the lack of information and awareness hinders the development of products and services adapted to local conditions and responsive to local needs. One area where timely information is crucial is weather data and early warning of extreme weather events. Market information can encourage investment in better technologies and services.

Weather Observation and Early Warning Systems

Reliable, real-time, locally relevant weather information and forecasting is a vital contributor to economic activity and disaster preparedness, and a high return investment from a societal perspective. Early warning systems can avoid the need for much more expensive disaster recovery and sometimes avoid the need for much more costly infrastructure improvements.⁴⁴ Good weather information is also essential or highly valuable for many commercial activities. Farmers, including small farmers, live by the weather—when and what to plant, when to harvest, when to irrigate; so do many larger businesses, including utilities (planning for temperature related variation in demand and hydropower supply), aviation, and ports/shipping companies. Yet the reality as summarized in a recent assessment commissioned for this report is that:

Attempts to meet the weather observing needs of developing countries by deploying technologies commonly used in developed countries usually result in networks that perform poorly and quickly prove to be unsustainable. (Snow, 2013)

This situation is typically even worse in the poorest, least developed countries, where the budgetary support, human capacity, and supporting infrastructure are weakest. World Bank assessments have concluded that despite investment of many millions of dollars in support for traditional weather systems in low-income countries, few if any have been able to maintain effective operation, much less become commercially sustainable.

An emerging set of lower cost, highly reliable technologies has the potential to overcome many of the traditional barriers to weather observation. Such technologies can also link effectively to early warning of natural disasters through cellular phone service and public communication systems, a major step toward making some of the poorest and

⁴⁴ S. Hallegatte, “Early Warning Weather Systems Have Very Real Benefits”, (World Bank Blog posted July 23, 2012), <http://blogs.worldbank.org/developmenttalk/early-warning-weather-systems-have-very-real-benefits>.

most vulnerable populations less at risk from extreme weather events. While no one technology or service can effectively replace conventional weather observing technology for all purposes, a combination of approaches offers the potential for meeting most needs as well as (and in some cases better than) current systems at much lower cost and with supporting requirements much better suited to the circumstances of poor countries. The new approaches build on the rapidly growing, extensive cellular telephone network increasingly available even in rural areas as a foundation allowing for a combination of some or all of the following elements:

- The use of cell phone towers as sites for weather observing stations⁴⁵ and company staff to install and maintain necessary equipment.
- Deployment of a new generation of low-cost, durable sensing systems appropriate to local conditions that require minimal maintenance and calibration, and can provide automated information via the cellular phone networks.
- Developing public-private partnerships between weather agencies and telecommunication companies to plan, implement, and operate the network.
- Developing business models based on the value of weather information, which help cover the costs of system operation and maintenance.

The system described can provide most of the basic requirements for weather ob-

servation. Emerging technologies offer additional benefits and in some instances, surpass the quality of established approaches. For example, technology for detecting lightning in clouds has been shown to be highly effective in locating thunderstorms and predicting the

BOX 4: WEATHER OBSERVING SYSTEM

Two examples of a small, self-contained weather observing system: the Lufft WS401 Weather Station. This multi-sensor device comes in a variety of configurations. Each system shown here measures barometric pressure, temperature, and relative humidity. However, the top one also measures rainfalls via a tipping bucket gauge; the one on the bottom measures solar radiation together with wind speed and direction. The device consumes little power; most configurations have no moving parts. All sensors within the unit are calibrated at the Lufft factory.



Images from www.lufftusa.com/tools/categoryitems.cfm?caid=517.

⁴⁵ There is an ongoing technical debate about the appropriateness of cell phone tower siting for weather observation purposes. As reviewed by Snow (2013), the empirical evidence shows that this is not likely to be a source of large errors or bias.

onset of heavy rainfall and severe weather, allowing earlier public warnings and with greater geographic accuracy than possible from conventional systems.⁴⁶ Warnings can be provided through automated systems and by radio and cellular phone services.

Some efforts to improve weather and early warning systems utilizing new technologies have been supported by international initiatives. One notable failure was the Weather Information for All initiative (WIFA), launched with great fanfare in 2008 by Kofi Annan and the Global Humanitarian Forum. The project aimed to use the mobile telecommunications network spreading rapidly across Africa to improve both the continent's weather observing network and the availability of weather information through mobile short message services. Only the first of three planned phases of the WIFA program was completed before the Forum ceased all activities in 2010 due to lack of funds. All the weather stations installed are reportedly no longer operational. (Snow, 2013)

The failure of this program, despite the expected economic and social benefits and relatively low investment required, points to several challenges. First, financing was clearly inadequate for the level of ambition proposed. Second, there was never a business plan consistent with the need for sustainable revenue and system maintenance; public-private partnerships for business and humanitarian applications were not pursued. Third, the hardware selection was based too much on minimizing costs and did not adequately consider the local conditions; new innovative and more appropriate technologies were also not fully considered. Fourth, the full support and "buy-in" of national weather agencies was not achieved.

These concepts are being tested again in 10 projects approved by the Global Environment Facility using resources from the Least Developed Countries Fund, and are expected to begin implementation later this year.⁴⁷

Country Risk Indicators

In recent years one approach of interest to increasing investment has been the development of country-based indicators that help measure and inform investors about the barriers and opportunities for investment in different countries. Such indicators are now compiled and reported in many forms by many sources. For example, the Global Green Economy Index published by Yale University "evaluates the efforts of countries to create environmentally sustainable economies, focusing on efforts to invest in clean energy technology, sustainable forms of tourism, and improved domestic environmental quality."⁴⁸ In contrast, the *Doing Business Project* launched by the World Bank and IFC in 2002 more narrowly provides objective measures of business regulations and their enforcement, further looks at domestic small and medium-sized companies, and measures the regulations applying to them through their life cycle.⁴⁹ Through the publication of

⁴⁶ Experience in the U.S. shows that lightning detection allows for warnings up to 30 minutes earlier, time that can be crucial for effective disaster mitigation—especially in poor countries where disaster response programs are not as fully developed. Snow, 2013. For more detailed description of cloud lightning detection and its potential contribution to storm warnings see <http://www.earthnetworks.com/OurNetworks/LightningNetwork.aspx>.

⁴⁷ UNDP GEF, "Climate Information and Early Warning Systems in Africa Supported by UNDP GEF" (<http://ews-undp.blogspot.com/2012/09/strengthening-climate-information-and.html#!/2012/09/strengthening-climate-information-and.html>).

⁴⁸ <http://epi.yale.edu/indicators/indicator-case-studies/reports/global-green-economy-index-o>.

⁴⁹ A benefit of rankings is also their appeal for media purposes and consequent relevance for governments. See materials available at www.doingbusiness.org

objective performance metrics, the *Doing Business* publication of rankings “encourages countries to compete toward more efficient regulation; offers measurable benchmarks for reform; and serves as a resource for academics, journalists, private sector researchers and others interested in the business climate of each country.”⁵⁰

The concept of indices and country rankings is increasingly being applied to various elements of green growth. For example, The Pew Charitable Trusts, in partnership with Bloomberg New Energy Finance, publishes a review of clean energy investment rankings. The Inter-American Development Bank recently released profiles on 26 countries in Latin America and the Caribbean, reviewing 30 indicators related to the investment climate for low-carbon investments.⁵¹ As a contribution to the G20 project, IFC commissioned Deloitte to explore the potential application of the index and ranking approach to the indicators of most relevance to private actions to reduce countries’ vulnerability to weather extremes and climate change as a way to incentivize inclusive green growth. These actions, largely but not exclusively in the domain of the public sector, have the potential to protect the assets, and social and environmental structures from the impacts of climate change, unlock the demand for adaptation products and services, and essentially prepare the socio-economic structures to incorporate climate change concerns in planning, operation, and investments. The initiatives that have the potential to address the observed barriers are classified in five general categories: Data and Information, Institutional Arrangements, Policy Frameworks, Economic Incentives, and Technology and Human Capital (see Figure 5).

Based on observed best practices and on conclusions of IFC’s previous work, each category is populated with a list of initiatives that have the potential to achieve the objective of enabling climate change adaptation (see

Table 4). Significant criterion in prioritizing initiatives was ease of implementation in each country independent of a country’s level of economic development, cost effectiveness, and cost/benefit ratio potential, as well as the feedback from private sector companies that were surveyed for the purpose. This initial work was exploratory and intended to outline the concept sufficiently to allow for review and discussion with potentially interested private parties and governments. An application of the rankings to one country illustrating how the results could be presented is presented below. See Table 5.

The potential impact of an information based approach also draws on experience from IFC’s series of business case studies done to help understand the feasibility of analyzing the financial risks of climate change across different sectors and regions in the context of IFC clients (www.ifc.org/climaterisk). One such study on investment planning and operation of ports,⁵² (see Box 5) cost approximately US\$200,000, yet informed and enabled multi-million dollar private sector adaptation investments, which in turn will protect several hundreds of millions of dollars of port infrastructure used for moving one percent of Colombia’s international trade (2008).

The leverage ratio of the cost of removing the informational barrier to the private sector investment was on the order of 100. If a similar type of information was produced for all infrastructure facilities and incorporated in relevant regulation, it could be expected that the ratio would be considerably higher.

⁵⁰ See, e.g., “UK slips down global green investment rankings,” *The Guardian*, March 29, 2011.

⁵¹ <http://climatescope.fomin.org/>

⁵² The Muelles el Bosque climate risk study was financed by the Trust Fund for Environmentally and Socially Sustainable Development (TFESSD) and IFC.

TABLE 4: Indicators Relevant to Private Investment in Measures to Enhance Climate Resilience

Indicator	Description
Data and information	
1. Climate and hydrological projections	National climate (e.g. temperature, precipitation, humidity, solar radiation/cloud cover and wind) and/or hydrological (e.g. soil moisture, groundwater, runoff, evaporation, flood/drought) projections based on calibration and validation of climate and hydrological models
2. Direct and indirect impacts	National data/information about climate change direct and indirect impacts relevant to the private sector and elaborated for specific sectoral and geographic needs
3. Adaptation measures, costs and benefits	National data/information about climate change adaptation measures, and associated costs and benefits, elaborated for specific sectoral and geographic needs
4. Community vulnerability, risk and adaptation	National/local data/information about community vulnerability and risk from climate change and/or adaptation priorities
Institutional arrangements	
5. Institutions and forums	1. Coordinating national bodies and forums with a role in facilitating climate change adaptation in the private sector
Policies	
6. Building standards and/or codes	2. Building standards and/or codes incorporating climate change impact and adaptation considerations
7. Public infrastructure	Public and key infrastructure having factored climate change impacts and adaptation into design, operations and/or decommissioning
8. Local zoning rules	Local zoning rules incorporating climate change impact and adaptation considerations for new and/or existing infrastructure/buildings in areas vulnerable to climate change (e.g. floodplains, coastal zones, glaciers)
9. Permitting and impact assessments	National/local permitting (e.g. land use and/or construction permits) and/or environmental/social impact assessment rules incorporating climate change impact and adaptation considerations into developments
10. Investor relations and/or stakeholder management	Incorporation of climate change impact and adaptation considerations in instruments and practices for investor relations and stakeholder management (e.g. disclosure in security filings, bond prospectuses, stakeholder consultation, community resettlement and compensation)
Economic incentives	
11. Government incentives	Government incentives promoting climate change adaptation in the private sector
12. Finance	Public and/or private finance instruments (e.g. loans, equity, guarantees) for climate change adaptation, including planning, implementation, purchase of equipment and material, and innovation/R&D in the private sector
13. Full-cost accounting for water and energy	Cost accounting and pricing practices in water and energy utilities, which reflect the 'true' lifecycle costs of the impacts of more extreme weather and climate change on water and energy management and services, and which incentivizes increased efficiency, reduced consumption and improved resilience
14. Environmental trading markets	Markets to trade environmental entitlements or allocations (e.g. over water, soil and/or biodiversity resources) under pressure from climate change
Communication, technology and knowledge	
15. Information and communication technologies	Availability and market penetration of information and communication technologies (e.g. internet and mobile cellular)
16. Technology and knowledge	Access to and use of technology and knowledge useful to understand, assess and respond to climate change risks and opportunities

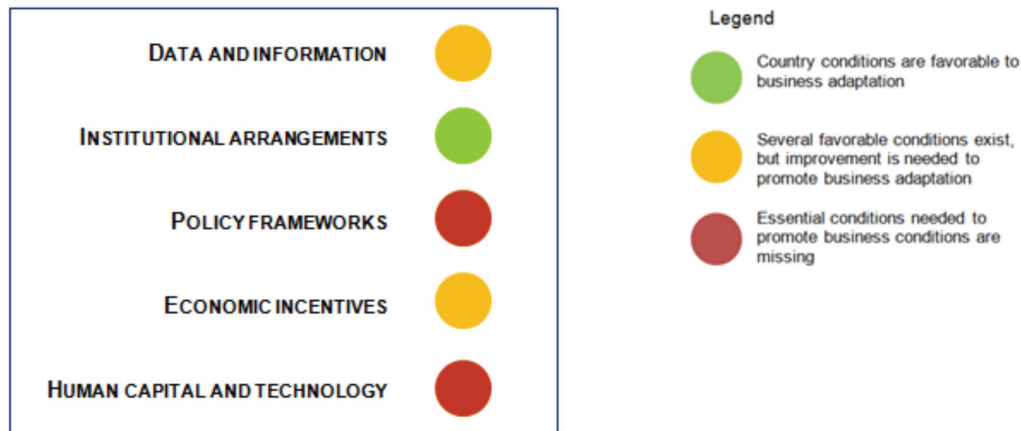
Source: IFC, (2013), Enabling Environment for Private Sector Adaptation: an Index Assessment Framework.

TABLE 5: Indicator: Climate and Hydrological Projections

Description	Measures	Costs	Benefits	Business case summary
National climate (e.g. temperature, precipitation, humidity, solar radiation/cloud cover and wind) and/or hydrological (e.g. soil moisture, groundwater, runoff, evaporation, flood/drought) projections based on calibration and validation of climate and hydrological models	<ul style="list-style-type: none"> Free access to data/information from a national or international body (e.g. government department, public agency, research center, donor organization) Data available electronically Data available in both raw format as well as maps or graphs (e.g. cumulative frequency distributions) Downscaled projections Data available on primary (e.g. average, maximum and minimum temperature and precipitation) and derived (e.g. growing season length, hot/cold days, flood/drought indicators, soil moisture) hydro-climate variables 	<ul style="list-style-type: none"> Installation, operation and maintenance of hydro- meteorological observation network Climate modeling capability Research costs Data/ information diffusion 	<ul style="list-style-type: none"> Avoided loss and damage from climate-related hazards Avoided business interruption Better mid- to long-term planning and/or pricing decisions enhancing profitability Increased revenue opportunities (e.g. new insurance products) 	<ul style="list-style-type: none"> The costs of producing climate and hydrological projections are likely outweighed by potential avoided costs and increased revenue opportunities—the World Bank estimates that hydrometeorological investments in Russia and Central Asia have benefit-to-cost ratios between 5 to 1 and 53 to 1

Source: IFC, (2013), Enabling Environment for Private Sector Adaptation: an Index Assessment Framework.

FIGURE 5: Snap-shot of Indicators to Determine Favorable Conditions for Business Adaptation in a Low-income Country



BOX 5: INVESTMENT PLANNING AND OPERATION OF PORTS: A CLIMATE RISK ANALYTICAL STUDY

In 2011, IFC and the port of Muelles el Bosque (Cartagena, Colombia), in collaboration with numerous public and private sector partners, elaborated a climate risk study for the port and quantitatively assessed financial, environmental, and social impacts that are projected to result from the changing climate.

The study analyzed projected changes in sea level rise, storm surge height, precipitation, temperature, and wind patterns, and direct and indirect effects of these on port assets, operations inside and outside of the port, surrounding environment and communities, and the trade of the goods transported through the port.

Where applicable, the effects of impacts were incorporated into the company’s financial model, using the company’s usual discount rate, allowing further assessment of cost-effective adaptation options.

Based on the conclusions of the study, the company announced plans for US\$30 million adaptation investments in two of the ports it operates, of which US\$12 million have already been invested.

10

Financing Green Growth: How Do We Unlock Private Investment?

The above sections have highlighted a number of interesting initiatives that speak to IGG. The mapping exercise indicates that while the financing of green growth has been increasing, it is nowhere close to the scale that will be required to stabilize global temperatures. Furthermore, very little is explicitly directed to IGG and BOP initiatives. Strategies to increase financial flows toward green growth recognize the important role that the private sector must play, and the need to find ways to achieve bigger “bang for buck” so that limited public dollars can leverage significant multiple investments from other investors.

Financing by multilateral and national development banks for climate related investments has been steadily growing, as the institutions make addressing climate change an explicit element of their strategy. They also provide an interesting platform through which to study leverage, particularly as it relates to the private sector. Yet, development bank financing remains a small portion of overall financing needs, and is constrained by the capital base of the institutions. At the same time, institutional investors control many trillions of dollars in assets—a very small portion of which reaches green investment (and an even smaller amount going to developing countries). Unlocking even a small share of these flows could provide a significant boost to the availability of investment resources.

Understanding Leverage: IFC’s Experience

Development banks—whether global, regional or national, or multilateral, bilateral, or domestic—can play a significant role in financing green investment and IGG, and in leveraging significant resources from the private sector to do so. This report highlights in depth analysis of leveraging achieved through IFC’s climate finance experience, for which detailed information is available for the period 2005–2013. These findings can just as easily be applied to other private sector-focused development banks, as they follow similar funding models. Detailed data on these other banks’ activities were not available to permit a comparison, and the report therefore confines itself to reporting on IFC’s experience.

The results reveal that one dollar of IFC financing—itsself raised in capital markets based on significant leveraging of shareholder capital—was leveraged over four times from other investors (essentially private, given its mandate) across the projects examined. Not surprisingly, greater leverage is achieved with well-established technologies. In newer areas, or with less well understood business models, active “selling” of the climate component is necessary, and concessional finance can often nudge investment into promising but as yet commercially unproven areas. In all cases, climate-related investment needs a conducive underlying investment environment.

IFC's Climate-Related Portfolio

An analysis of IFC's climate portfolio reviewed different sectors—renewable energy, energy efficiency, and other climate-related activity, further disaggregated by project type (such as power generation, industrial energy efficiency, and financing through intermediaries, to name a few). The review encompassing 563 projects undertaken over the 2005–2013 period,⁵³ provides interesting insights on trends in the nature of the activities that have been financed, as well as the leverage and mobilization achieved. Starting from a relatively modest level in 2005, when IFC began tracking its climate-related activities (21 projects amounting to IFC investment of US\$211.7 million, or four percent of IFC's own account commitments), IFC's activities have grown in volume as well as in the breadth of sectors involved to reach 14 percent of total own account⁵⁴ commitments in 2013.

The definitions and typology that IFC uses for climate-related investment and advisory projects are contained in a document entitled *IFC Definitions and Metrics for Climate-Related Activity*.⁵⁵ Sometimes, an entire project can be considered climate-related; for others, climate-related activities will be a small component of a broader project. IFC isolates the climate component of the project for tracking and reporting purposes, determines the share of climate-related activities within a given project, and then calculates the IFC “climate claim” based on a pro-rata share of the financing provided.⁵⁶

IFC uses three broad categories to define climate-related investment:

- **Mitigation:** implies either reduction in emissions of GHGs into the atmosphere or absorption of GHGs from the atmosphere. Mitigation is further categorized as direct, wherein the GHG reductions are attributable to changes in the client's operations as a result of investment or advice; or indirect, where activity by an

IFC client results in GHG reductions by a third party. Activities that qualify as direct mitigation include renewable energy (RE) generation; energy efficiency (EE); agriculture, forestry and land use; waste management; transport; and other mitigation such as replacements of heating and cooling systems with reduced global warming potential refrigerants, or carbon transactions. Indirect mitigation includes component manufacture, financial intermediary (FI) transactions and advisory services (AS) market-level activities. In order to be classified as mitigation, the activity must be able to demonstrate emissions reductions against a business-as-usual baseline, according to detailed methodologies that IFC has defined for this purpose.

- **Adaptation:** implies reduction in the vulnerability of human or natural systems to the impacts of climate change and climate variability related risks by maintaining or increasing adaptive capacity and resilience.
- **Special Climate:** includes activities that contribute to mitigation, but for which no approved GHG reduction calculation methodology exists.

In the period under review, there was just one project that could be classified as “adaptation.” This is largely due to the fact that there

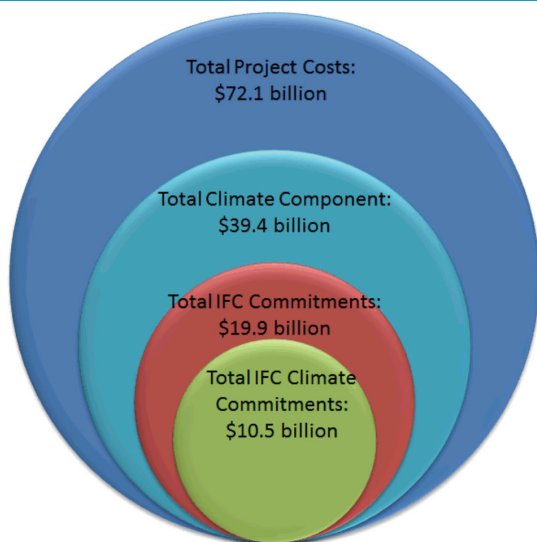
⁵³ IFC 2013. Patel, S. and Musić, R. Climate - Related Investment at the International Finance Corporation: A Review of 9 Years of Investment Activity (2005–2013).

⁵⁴ Investments that are carried on IFC's balance sheet; does not include monies mobilized through third parties.

⁵⁵ Available at www.ifc.org/ghgaccounting.

⁵⁶ For example, if total project cost is 100, the climate component is 50, and IFC has financed 20 overall, the “climate claim” will be 10.

**FIGURE 6: IFC's Climate-related Portfolio, 2005-2013
- Own-account Commitments**



Source: Patel, S. and Musić, R., (2013), *Leverage in IFC's Climate-Related Investments: a Review of 9 years of Investment Activity (Fiscal Years 2005-2013)* (IFC).

are few commercial opportunities in adaptation at the present time, although IFC expects this to be a growing part of its business going forward.

Leverage

Just as there are no standard definitions of climate finance, green investment, or IGG, there is no universally accepted definition of leverage. Leverage implies the use of a lever to enhance an action. In a financial or business context, it is the ability to have a relatively small amount of cost yield a relatively high level of return, and generally refers to the amount of debt that can be raised on the strength of equity⁵⁷ The Overseas Development Institute defines leveraging as the process by which private sector capital is mobilized as a consequence of the use of public sector finance and financial instruments. It recognizes that there is no uniform methodology to calculate leverage ratios, which can be expressed as the ratio of total funding to public funding; the ratio of private funding to public funding; or the ratio of specific public

climate finance to broader public and private finance flows.⁵⁸

In some quarters, leverage implies a more complicated calculation that attempts to measure the value of the lower return that investors may be induced to accept on account of the risk mitigation provided by the public support. The concept of “net” flows, evoked in the Secretary-General’s High-level Advisory Group on Climate Change Financing report (AGF), reflects this sentiment.⁵⁹

In this section, the term leverage is used to denote the ratio of project cost (as represented by the financing plan) to IFC’s portion of the financing. As the graph below suggests (See Figure 6), leverage could be calculated along several dimensions. One is to look at total project cost, divided by total IFC commitment; in the case of the climate portfolio, this yields a weighted average of 3.8, implying that one dollar of IFC financing mobilized close to three additional dollars of financing from other sources (essentially private). However, since IFC tracks the climate component of its financing separately, leverage could also be calculated as the climate component of the project cost as a multiple of the IFC climate claim. On a simple average basis, which is more representative of individual project experience, the project leverage was 4.1.

However, there is an additional aspect of leverage that must be pointed out here.

⁵⁷ A discussion of different approaches to leverage is contained in Brown, J. et al (2011) *Improving the Effectiveness of Climate Finance: A Survey of Leveraging Methodologies*, available at <http://climatepolicyinitiative.org/wp-content/uploads/2011/11/Effectiveness-of-Climate-Finance-Methodology.pdf>.

⁵⁸ <http://www.odi.org.uk/resources/docs/7082.pdf>.

⁵⁹ http://www.un.org/wcm/webdav/site/climateexchange/shared/Documents/AGF_reports/AGF_Final_Report.pdf.

IFC raises financing in capital markets on the strength of its balance sheet, which is itself derived from shareholders' contributions and retained earnings. IFC's balance sheet for 2013 reports a debt/equity⁶⁰ ratio of 2.6:1—implying that IFC borrowed 2.6 dollars for every dollar of capital. In that same year, IFC reported total capital of \$22.3 billion, including \$2.4 billion of capital stock (the rest being retained earnings and other accumulated income), and total assets of \$77.5 billion, including investments of \$34.7 billion. One dollar of shareholder paid-in capital could thus be considered to have leveraged 14 dollars of IFC investment. This is a simplistic calculation, to be sure—one could argue that retained earnings represent foregone shareholder returns and should therefore be considered as shareholder contribution, or that the appropriate numerator should be total assets, for example—but it does demonstrate the very high leveraging potential that one dollar of public contribution, judiciously managed and deployed, can have on private sector financing.

Furthermore, the summary data presented above do not tell the full story on leverage. IFC's climate portfolio review paper⁶¹ contains a detailed analysis of IFC's climate-related portfolio, and calculates the leverage ratios that were obtained for the different activities embodied in the three broad categories of classification mentioned above. Essentially, climate-related leverage ratios can range from 1 to 9, depending on the type of activity involved.

In terms of geographic distribution, Latin America and Eastern Europe hold the highest shares of climate business, followed by East Asia. These regions are home to the larger emerging market economies, which have the market size and industrial development necessary to support domestic mitigation activity.

This analysis suggests that even though the volume of financing may be small relative to the global need, development banks often play a very important role in demonstrating the viability of investments, thereby opening up

markets and paving the way for others to follow. The experience of other development banks, while unfortunately not publicly available for inclusion in this report, would undoubtedly add to our understanding of the role that development banks can play.

Observations

Even though IFC's climate-related portfolio has not been analyzed according to the degree of “inclusiveness” that the underlying projects embody, the climate portfolio review paper provides the following insights that are useful to consider when discussing green growth and climate-related investment more broadly; each of these could be the basis for additional analysis and questions for the DPIGI to pursue

There is great potential in leveraging private sector climate-related investment through multilateral development banks (MDBs). As IFC's experience shows, one dollar of IFC climate-related investment brings in close to 3 additional dollars from other investors on average; and that one dollar of IFC investment has itself been leveraged on the strength of IFC's shareholder capital. All MDBs follow a similar funding model, and would likely have similar leveraging potential.

Average leverage ratios, while useful, mask significant variations across project types. A nuanced picture of leveraging potential emerges when the underlying activities are broken

⁶⁰ Defined as the number of times outstanding borrowings plus outstanding guarantees cover paid-in capital and accumulated earnings (net of retained earnings designations and certain unrealized gains/losses); see http://www.ifc.org/wps/wcm/connect/92f23b804112384a89a1ff-fe5679ec46/AR2013_Results_Financial_Summary.pdf?MOD=AJPERES&Sections%206:%20Financial%20Summary.

⁶¹ Patel, S., and Musić, R, 2013.

down into “like” categories. Even within a relatively homogeneous category, such as renewable power generation, there are variations depending on technology and market characteristics. The private sector does not behave in a homogeneous fashion.

A simple leverage ratio calculation does not always tell the full story. Because of the way IFC accounts for investments, the leverage that will actually be achieved on the ground is not always captured. This is particularly the case for indirect investments, as through financial intermediaries (FIs). Direct investment financing better captures the actual investment that takes place. Neither case captures the broader multiplier effects of investment on income and economic development.

Greater leverage is achieved with well-established technologies. Where technologies are well established and understood by the market, it is easier to attract other financiers to participate in the investment plan. Where there are technical issues associated with a technology, as in solar thermal electric technology (concentrated solar power—CSP), or where the activities financed have not yet entered the mainstream, as in some types of energy efficiency (EE), leverage ratios are lower.

Leverage ratios are often higher for larger projects. Big, capital-intensive projects tend to attract more financiers, as individual lenders run up against exposure limits. Large projects can also absorb the higher transaction costs associated with multiple lenders and complex project finance structures.

Lower leverage activities may still fulfill important market development roles. In some cases, leverage appears to be low because of the conventions underlying project accounting for that type of activity (as in FI activity, for example). In other cases, the underlying

technology may be less well understood by the market, and a critical mass of activity may not yet have been attained for market demonstration purposes, leading to limited co-financing interest on the part of other investors. IFC can play an important role in financing such activities, so as to bring them up the curve and create greater market awareness and acceptance.

Climate-related investment follows underlying market trends. The growth in IFC’s climate-related business, particularly for renewable energy (RE), reflects underlying market trends in the RE business, which has seen significant growth in many of IFC’s markets. IFC has been ready and able to support such growth, but the supply of capital, while undoubtedly critical, is not necessarily the defining element in the growth of such activity.

Active “selling” of climate components can help. In some cases, climate-related opportunities may not be immediately obvious to a client. This is particularly the case in some EE improvements. In such cases, the difference between their adoption or not is the advice and technical expertise that can be brought to bear in a given project. IFC’s in-house technical experts (engineers and environmental specialists) are key to such active client engagement, particularly in the context of IFC’s Performance Standards which requires clients to consider resource efficiency possibilities.

Climate finance is often a portion of the overall financing. In many cases, climate-related components will be tangential to the main investment being pursued, yet there may well be opportunities to reduce the project’s emissions footprint through renewable energy (RE) or EE. Such components may be a small part of the project overall, but they should not be

discounted for their impact or demonstration value. Here again, active client engagement by IFC's technical staff is key.

Climate-related investment needs a conducive underlying investment environment.

Most of the activities that IFC has undertaken to date have not involved special subsidies. This means that their creditworthiness derives from the prevailing business environment, policy and regulatory regimes in the countries involved. In the absence of such conditions, such investments will simply not take place—or will require additional risk mitigation measures.

Blended finance can nudge investment into promising but as yet commercially unproven areas.

Often, being a first-mover entails risks that make it difficult for a client to complete a financing plan on acceptable terms. The perceived risk may be too high even for a development finance institution like IFC. A small amount of concessional finance can act as a catalyst and mobilize the necessary financing.

What gets measured gets managed. It is only in 2005 when IFC made a public commitment to grow its RE and EE activities that a tracking system was put in place; it is only when such investments began to be tracked that staff realized that there were several climate-related opportunities in the business that could, with a little extra effort, be materialized. IFC's commitment to grow its climate-related business has given a boost to such endeavors.

Advisory services and capacity building are essential components of some activities.

This paper has not examined advisory services (AS) and the role that it has played in supporting IFC's climate-related activities. The brief description of AS programs provided shows that some technical assistance and capacity building activities are essential building

blocks for certain types of climate-related investment.

Leverage is an important “bang for buck” measure, but not the only one.

Leverage shows how much money was mobilized on the back of a public dollar, but it does not capture the impact of that money in terms of GHG reductions, or employment creation, or any number of other objectives that a country may wish to pursue. These should be areas for further work for IFC and others.

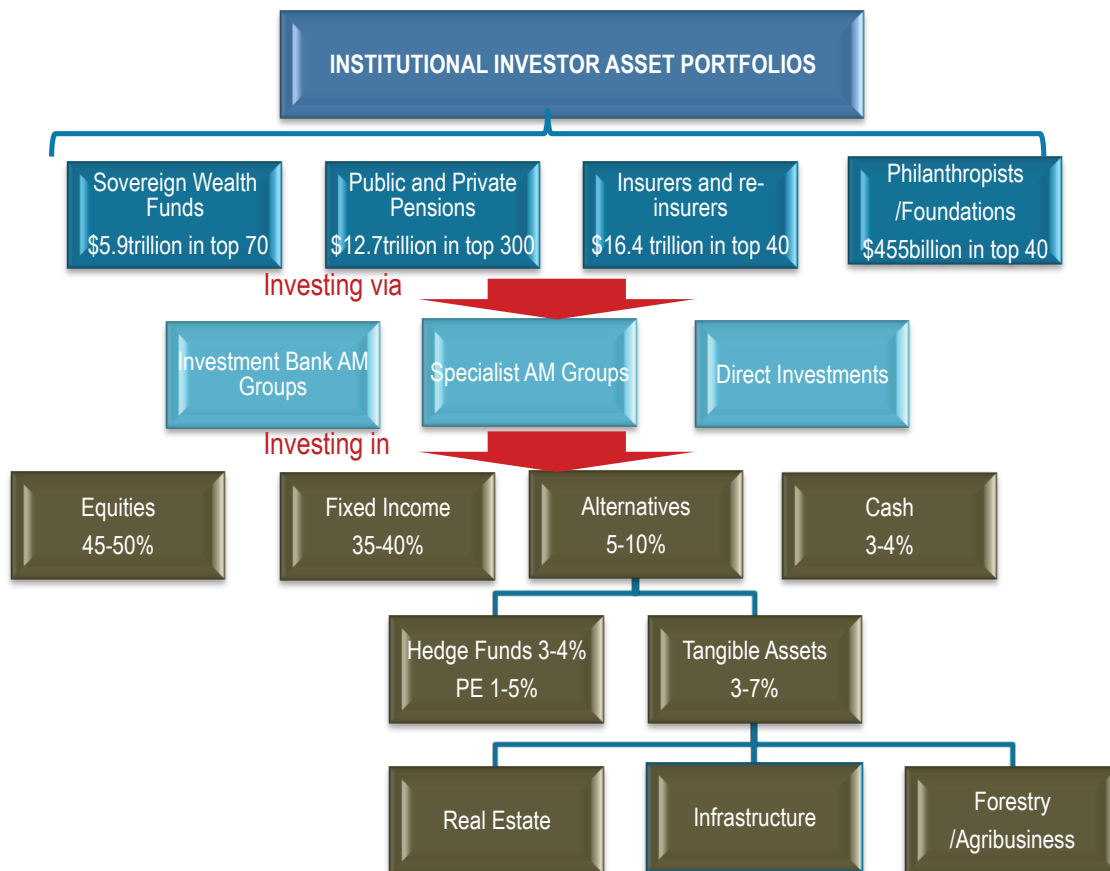
Institutional Investors: The Challenges and the Opportunities

Given the significant investment gaps to finance the transition to low carbon and climate resilient economies identified earlier, and the tightening of capital provision in key parts of the banking sector globally, policymakers and experts are looking to alternative sources of capital to bridge this need, including institutional investors⁶² who manage US\$75 trillion in assets in the OECD alone. Figure 7 outlines assets under management and typical portfolios and allocation for different types of investors. According to the OECD the asset allocation to direct infrastructure investments of pension funds is less than 1 percent, with the green investment component being even smaller.⁶³ Many factors contribute to this low percentage, including the diversity and complexity of the entities managing large assets, the dominant conservatism and inertia that govern their investments, and the emphasis on fiduciary duty that is driven in

⁶² This section focuses primarily on institutional investors as this was part of the terms of reference agreed with the Development Working Group, given the intended target of the Dialogue Platform on Inclusive Green Investments.

⁶³ Kaminker, C., and Stewart, F., 2012, OECD.

FIGURE 7: Typical Investor Portfolios and Allocations



Source: Compiled by IFC with estimates sourced from a range of industry publications current at June 2013.

large part by nationally specific regulation, lack of suitable financing vehicles and investor inexperience with direct investing. This section will attempt to deconstruct the asset allocation and decision making processes of institutional investors to identify opportunities for promoting the shift to green investment.⁶⁴

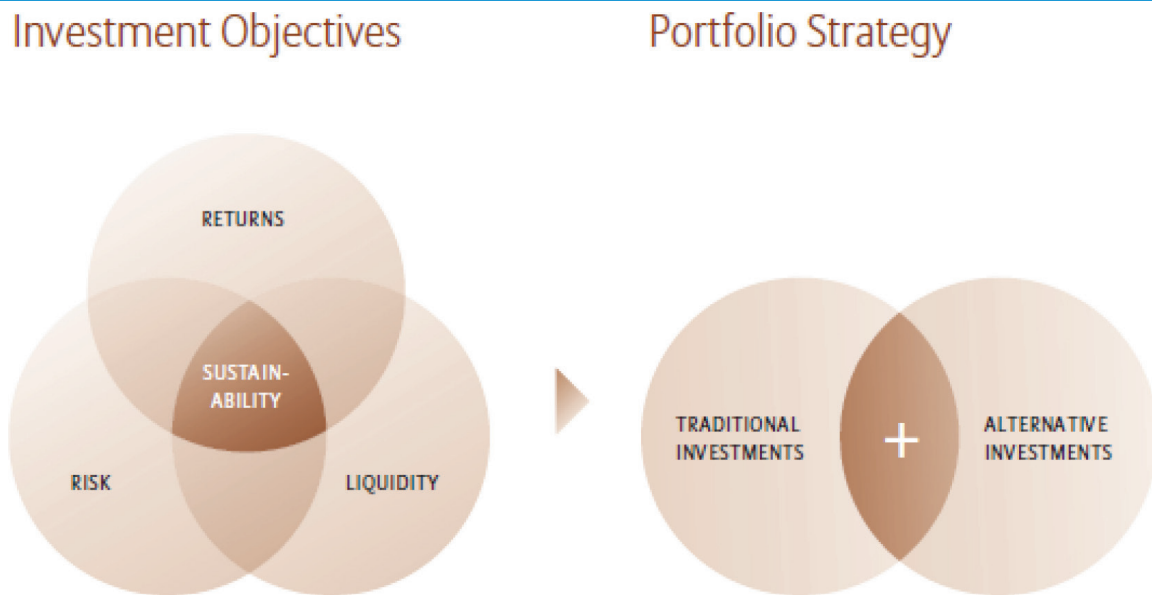
Decision Making by Institutional Investors

Globally institutional investors are a diverse, highly differentiated group. They include public and private pension funds, insurance companies and sovereign wealth funds—all of which are subject to very different regulatory and management environments. The mechanics of asset allocation vary significantly

across institutional investors, but there are common themes, with the primary one being the need for a solid investment case. By examining the structure of decision making it is possible to identify the main entry points to influence and inform on investing in green growth

⁶⁴ G20 leaders have highlighted the importance of long-term financing, focusing on infrastructure investment, to foster long-term growth. The OECD, within the framework of its project on Institutional Investors and Long-Term Investment, is participating in this work and has been working with IFC to analyze barriers and potential solutions to long term financing by institutional investors. See: www.oecd.org/finance/lti.

FIGURE 8: Sustainable and Responsible Investment Solutions



Source: Returns in Low-yield times: Alternatives for returns in a low interest rate environment, Allianz Global Investors, 2013.

opportunities. Retail investors fall outside the scope of this report as their decision making process and primary investment drivers are different to those of institutional investors. For the purposes of this paper the emphasis will be on pension funds.

The complexity of the current investment system means that institutional investors rely on a chain of service providers. Fund trustees, advisors, asset managers, policymakers and regulators play important roles in controlling the fund governance agenda, strategic direction and investment opportunities. The decisions on asset classes and allocations are subject to periodic review at the strategic level, which typically happen annually and are re-structured less frequently. This highly analytic review sets the broad policy frame and target that are broken down for portfolio managers in each of the major asset classes; considers inclusion of new (or redefinition of old) asset classes and examines the appropriate benchmarking. Internal and external third party consultants and advisers play a major role in guiding investment thinking and decision-making through

complexity, particularly when the asset owners are not undertaking direct investments in projects.

Portfolio managers are assigned an asset class (or sub-asset class), an allocation with a varying degree of autonomy (but very little variation in performance monitoring), and a benchmark—usually with a targeted increment beyond the benchmark specified. Thus portfolio managers are motivated by: the probability of any investment making the target on a standalone basis; the function of the investment in balancing the portfolio—for example in delivering returns at a specific point in time or in balancing risk; and compliance with the constraints of the allocation.

Therefore new asset classes or investment themes on a significant scale take time to embed in the decision making process. For example, in the case of infrastructure investments, deregulation and privatization in Europe over 10 years created a pool of projects ripe for investment, and investible structures at scale that offered long term steady yields. This prompted the advent of large private equity

infrastructure funds, which in turn attracted institutional investors' attention, with many of the largest pension funds making specific allocations to infrastructure of up to three to five percent of their portfolio in some cases.

The trajectory of investing in new asset classes by investors is often along the lines of initially investing in a fund of funds, then self-selected individual managers, followed by direct project investments in line with growing comfort levels, experience, and track record.

Given the time frames and process around including new asset classes, this suggests that to make sustainability concepts an integral, targeted part of financial investment strategies will require focused efforts to inform and promote inclusive green growth investments directed at the executive officers and the advisory firms that are supporting them. Moreover, engaging the investors will require a clear pipeline of investable products, at which point portfolio managers should be targeted when new investment products are available to be deployed in support of IGG investment.

Constraints to Shifting Asset Allocations

The governing principle for all asset allocations by investors such as pension funds is fiduciary duty, whereby they are obliged to act in the long term best interests of the beneficiaries of the fund. Coupled with stringent regulations that vary by country, and are supplemented by internationally agreed frameworks such as Basel III⁶⁵ that are adjusting capital adequacy requirements, investors are driven to act conservatively and seek relatively large, low-risk, liquid, long-term investments that deliver steady, preferable inflation-adjusted income streams.

This does not however imply a homogenous block of assets; different types of investors will have different motivations, investment requirements etc. A pension fund's investment approach is shaped by who bears the investment risks, the methodology funds use to fund

their liability through cash contributions, and the liability each fund owes for the benefits of its members. Table 6 provides a high level summary of the differing motivations and drivers of different types of institutional investors and their supply chains, which need to be considered when seeking to direct efforts at engaging their interest in IGG investments.

Drivers and Barriers to IGG Investment in Developing Countries

Most investors frame any green growth investing through the broader ESG (environment, social, and governance) lens. This catchall for sustainable investing is often focused primarily on protecting investors' reputation, or is limited thematically to a certain investment segment. Many investors have yet to think about how best to integrate sustainability into investment strategies; they usually underestimate the additional opportunities sustainability offers for effective risk management throughout the entire investment portfolio and the entire value chain. There are numerous studies available now that demonstrate that incorporating ESG considerations in the investment process can enhance returns and/or reduce risk. That said, the literature also states that the emphasis has been on the G (Governance), with fewer studies demonstrating focus on the E (Environmental) and S (Social) factors.⁶⁶ With respect to the lower focus on E, a key barrier to green growth is the mispricing of externalities

⁶⁵ Basel III: A global regulatory framework for more resilient banks and banking systems—revised version June 2011 <http://www.bis.org/publ/bcbs189.htm>.

⁶⁶ See Mercer's *Demystifying Responsible Investment Approaches Returns and Impacts* (2009) and a subsequent study by Deutsche Bank Climate Change Advisors *Sustainable Investing - Establishing Long-Term Value and Performance* (2012) (in particular at page 5) which essentially confirms and updates the findings of the earlier study.

TABLE 6: Summary of Indicative Drivers of Institutional Investors and their Supply Chains

	Institutional Investors			
	Sovereign Wealth Funds	Public and Private Pension Funds	Insurers and Re-Insurers	Foundations and Endowments
Assets under management US\$^a	Top 70, US\$5.9 trillion ^b	Top 300, US\$12.7trillion ^c	Top 40, US\$16.4trillion ^d	Total of Top 40 in each category US\$455billion ^e
Assets under management in the Alternatives Asset Class^f	Top 25, US\$154 billion	Top 100, US\$1.4trillion	Top 25, US\$244billion	Top 25, US\$72billion
Primary investment drivers	Capital Growth and Yield, Principal protection, long term outlook	Meeting current and future pension liabilities	Meeting current and future insurance liabilities, corporate profitability	Meeting Foundation objectives and principles, principal protection
Current ESG positions	While data is less complete on SWF, some form of ESG policy exists in the vast majority of the top ranks. It is typically found in a form developed along risk management principles, where the risk is placed where it is best managed within the investor's supply chain. Therefore there are internal activity requirements and thresholds on investment in certain sectors and asset allocation, but primarily base requirements in investment operations consist of governance requirements for asset managers and in direct investments for the asset.			
Sector engagement constraints	Investment mandate (varies by country), scale, suitable products	Industry and sector regulation, scale, suitable products, uneven knowledge distribution, internal bandwidth of resources.	Industry and sector regulation, scale, suitable products	Foundation objectives, scale, suitable products internal bandwidth of resources. Perceptions of difficulty achieving alignment with commercially focused investors in the medium-long term.
Influenced by	Traditionally access investments through managers and fiduciaries. Public Policy.	Traditionally access investments through managers and fiduciaries. Proven portfolio performance. Public sector influenced by public sector compliance requirements locally. Professional Associations.	Internal Analytics from risk management business. Proven portfolio performance.	Traditionally access investments through managers and fiduciaries. Trust structures and mandate are primary influences.
Invest Through Investment Vehicles And Managers				
Managers	Investment Banks and Large Multi-Asset managers	Asset Managers specializing by sector, region or product	Fiduciaries providing custom investment management solutions	Direct Investments and parallel investments
Current ESG positions	The majority of these intermediaries subscribe to (or have independently developed) ESG Frameworks. 78 have subscribed to the Equator Principles, and professional/industry bodies such as Venture Capital Associations across world regions have developed ESG reporting Frameworks which have wide credibility and membership. The principle follows that of the Investors – ESG is treated in risk management principles where it is managed in proportion to the directness of the investment.			

^a The total AUM of these investors is not indicative that these funds are available but indicates (a) the scale at which these institutions may exert influence through their portfolios management activities in disseminating ESG (b) the scale necessary to attract investment flows from them.

^b Sovereign Wealth Institute 2013

^c Towers Watson 2012

^d Pensions and Investments 2012

^e Pensions and Investments 2013

^f Towers Watson Global Alternatives Survey 2013

(e.g., pollution) in markets, favoring investments in brown assets given investors' primary driver is economic returns.

Institutional investors often put high priority on regulatory incentives, as changing the

“rules of the game” is often the most effective way of driving the internalization of costs and thereby improving the relative investment case of green (or greener) investments. Investors are nervous about the unfamiliar and

are cautious of repeating bad experiences resulting from some risky exposure, primarily in the clean energy space. The collapse and defaults of solar photovoltaic and wind turbine manufacturers, which were driven by price declines and retroactive policy changes (e.g., reversal of clean energy subsidies in parts of Europe), have damaged investor confidence. The definition of asset classes consistent with IGG investment is also a major constraint, with the most promising area being green infrastructure. For pension funds based in the OECD, these concerns are exacerbated in the context of investing in developing countries, let alone IGG investment in developing countries. Fundamentally, given their fiduciary responsibilities, for investors to increase allocations to IGG investment, these investments would have to compete on a risk return basis over all time horizons with all other investments. If the investments can meet the risk/yield thresholds that investors are seeking, capital will flow. The following Box 6 summarizes the main barriers identified by investors to scaling up green investments in interviews conducted by Mercer Associates.

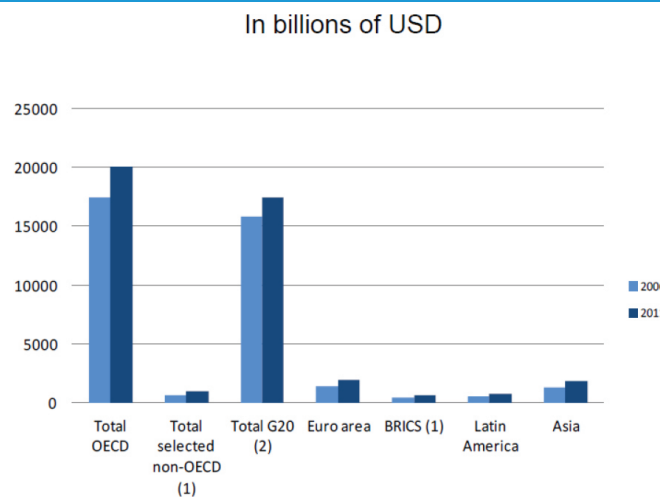
Moreover, a lack of investor experience in emerging markets and or with direct project investing and with new technologies and asset classes is an additional barrier to scaling up IGI. Typically making direct investments in projects is difficult and resource intensive, and can be prohibitively expensive due to the need to build in-house capacity. While direct investments should have higher risk-adjusted returns than investment in publicly traded shares or bonds, the additional return must be high enough to justify both the higher transactions costs and the possible illiquidity of the investment (OECD, 2012a, CPI, 2013).

For example, CPI (2013) suggest around US\$ 50 billion of assets under management are required to justify building a dedicated management team, focused on renewable energy investments. As such, only a small number of large pension funds have significant potential for undertaking direct investment in green infrastructure projects.⁶⁷

Domestic and South-South Investing

Within the universe of large institutional investors, those based in the OECD have decidedly more barriers to investing into IGG in developing countries. This opens up the question of other sources of capital that could be directed towards these types of investments. The chart below shows that pension fund assets in non-OECD countries has been growing over the last few years. While pension funds globally are motivated by their fiduciary duty, institutional investors in frontier and emerging markets are also challenged by the context in which their assets are accumulating, where the socio economic situation suggests there is a strong demand for capital to grow the local economy. Emerging markets present many opportunities to promote economic growth through wisely deploying capital and creating shareholder

FIGURE 9: Pension Assets by Regions, 2006–2011



Source: OECD Pension Markets in Focus
<http://www.oecd.org/daf/fin/private-pensions/PensionMarketsInFocus2012.pdf>

⁶⁷ OECD, forthcoming 2013

BOX 6: BARRIERS TO SCALING UP GREEN INVESTMENTS IDENTIFIED BY INVESTORS

1. **Lack of economic business case:** From a governance perspective, the funds must ensure that pension capital is used effectively within a risk-adjusted framework.
 - Currently, there is a perceived lack of investment-worthy opportunities.
 - Subsidies for renewable energy appear to be at risk of being eliminated (as has occurred in Spain).
 - Recent technology innovations have caused a collapse in natural gas prices in the United States, hurting the profitability of alternative energy and hindering green growth.
 - Related research has focused on the risks associated with a lack of green growth, as opposed to the opportunities that it presents.
2. **Policy uncertainty:**
 - Policy uncertainty (risk) is deterring investors from green investments.
 - Governments have not yet effectively tackled the climate change issue; thus, chance of meaningful near term policy change appears slim.
 - Policy risk is more relevant in developed countries because:
 - This is where the bulk of the pension fund assets are invested, and
 - The developed countries need to lead on any successful global framework.
3. **Higher risk in developing countries:**
 - *Geopolitical risk* – Corruption, political uncertainty and poor governance frameworks are barriers that are more prevalent in developing countries. Unless these barriers are adequately addressed (and related risks reduced), growth in IGI will be hindered, even if all other barriers to GI are addressed.
 - *Process risk* – Developing countries need improved investment processes; most of the investments are green-field assets and processes for procuring them are not up to developed country standards.
4. **Lack of a track record:** The business case for green investments has not unfolded in a favorable manner – track records are short and not compelling. As a result, investors have lost confidence. Until a more meaningful (and positive) track record is established, meaningful investment allocations are unlikely to be forthcoming. And without those allocations, the track record will be difficult to develop.
5. **Liquidity:** Many funds are subject to liquidity constraints imposed by the relevant regulator. This is a material issue as green growth requires significant infrastructure investments which may tie up capital in excess of 10 years. The economic business case for the infrastructure investment may be sound, but liquidity constraints may make it unfeasible.
6. **Investment time horizons:**
 - While evaluations of financial performance of listed equity investments may be stated to be quarterly, in effect managers / performance is now often monitored on a monthly or daily basis. This shorter timeframe can make it more difficult to quantify or ‘make a bet’ on green growth coming to fruition if the immediate market opportunity is not apparent.
 - A key trend for large corporate (defined benefit) pension plans is to ‘de-risk’, which involves moving away from long-horizon, illiquid investments. This means a smaller amount of longerterm capital is available for IGI (such as for infrastructure or venture capital).

value. Moreover, there is likely to be much greater political will to push for such policies, in emerging markets.

Pension assets in emerging markets are different from the largely private pension funds which form the bulk of assets in more developed economies. In emerging markets, private, voluntary pension savings form only a tiny tip of the market. The bulk of most pension systems in developing economies consist of PAYG, social security systems. Where asset

accumulation currently exists (due to young populations meaning that more money is being collected than being paid out), these are usually managed by central, government controlled (or at best ‘arms-length’), national social security agencies. National pension plans can be leaders in infrastructure investment, as the Canadian public pension plans have shown.⁶⁸

⁶⁸ See OECD Australia/ Canada paper.

Such a role can also be played by public plans in emerging markets, but strong governance oversight will be required to ensure that the assets are invested safely and prudently. Investment by centrally managed social security and provident funds has in the past in many countries been subject to political influence with assets directed towards projects with potential social benefits rather than delivering the required risk adjusted return which the beneficiaries of the fund require.⁶⁹

An example at the forefront of this type of shift is the Government Employees Pension Fund in South Africa, currently in the process of modifying its investment practices following adoption of a new policy that mandates consideration of social and environmental concerns as well as financial returns. Although the responsible Investment agenda in South Africa started out with very low awareness of the relevance of “sustainable/ responsible investment” from the pension fund side, it has picked up very fast as the connection/impact that institutional capital can have on climate change mitigation, unemployment and poverty has become clearer (see Box 7). Once the sustainable/ responsible investment policies and practices are in place (i.e. the pension funds have bought into the concept of sustainability risks and opportunities to their portfolios), it will be possible to discuss investment in specific green products/ investments that can deliver the desired development impact.

Another advantage in emerging markets compared to other markets is that as the pension fund industry is often at earlier stages of organization and governance, they are able to come together in a collaborative way, to develop industry-wide tools for implementation as in the case of South Africa. Arguably this leads to more efficiency, economies of scale and much faster implementation, compared to other OECD countries where responsible investing practices have developed over a much longer period of time, but in a non-coordinated

fashion. As such, in the short-medium term working with national development banks and emerging market based pension funds to promote IGI is promising.

Sovereign Wealth Funds based in emerging markets are another potentially major source of IGG financing, particularly with respect to green infrastructure. Unlike the world’s largest pension funds, most SWFs are based in developing countries in the Middle East and East Asia (Norway’s Government Pension Fund is the main exception) and manage public funds earned from natural resource exports or currency reserves. SWFs have increasingly searching for investment opportunities in growing markets, and green infrastructure could be a natural asset class for them, providing stable returns if properly structured and regulated. Moreover, South-South investment is becoming an increasingly feature of SWF investment. SWF assets continue growing rapidly and resource-rich developing countries are setting up their own SWFs to better manage the revenues from their natural resource exports. For instance, Nigeria recently set up a SWF to manage its oil wealth, while Ghana is planning to do so in the coming years. In addition, for SWFs based in less developed countries there is strong political pressure to dedicate some of their financing to local projects, in particular infrastructure ones, given their potential to boost economic growth, which could be greened.

Another large source of assets under private management are insurance companies. Opportunities to attract investment in green growth by insurers were discussed earlier in the case study on insurance.

⁶⁹ See Iglesias, A., Palacios, R., (2000), ‘Managing Public Pension Reserves Part I: Evidence from International Experience’ and David Hess, D., Impavido, G., (2003) ‘Governance of Public Pension Funds: Lessons from Corporate Governance and International Evidence’.

BOX 7: THE RISK IN NOT GOING GREEN

Strategies to overcome perceived greater risks and lower returns associated with investments in inclusive green growth are only part of the equation; there is increasing evidence that *not* focusing on the green dimension of investments has its own risks, which currently may be under appreciated by the financial community. Only a few years ago, the failure to properly quantify and communicate the risks of a widely traded commodity—mortgage-backed securities—caused major damage to the US and ultimately the global economy. According to the IMF, total resulting losses now approach \$4 trillion.^a A significant share of the losses were incurred by pension funds and insurance companies typically viewed as among the more risk-averse and cautious segments of the investment community.

One obvious source of risk from a failure to “go green” is losses due to extreme weather events. Although individually difficult to link to climate change, the number and severity of such events has risen dramatically in recent years with losses from weather-related events exceeding \$1 trillion between 1980 and 2011 in North America alone.^b Losses from extreme weather events are increasingly a factor in corporate balance sheets as exemplified by the floods in Thailand in December 2011.^c This single extreme weather incident, reduced the country’s GDP by several percent, eliminated tens of thousands of jobs, and disrupted global supply chains for manufacturing products from cars to computers.^d

The potential impact of expected changes in climate to investors was examined in a recent study by Mercer Associates.^e This looks at the financial implications from alternative climate change scenarios on the relative financial performance of different asset categories (equities, bonds, real estate) as typically categorized by pension funds and other long-term asset managers.^f The study concludes that climate policy could impose cumulative costs of as much as \$8 trillion by 2030, a significant source of portfolio risk for institutional investors to manage over the next 20 years and as much as 10 percent of overall portfolio risk. While not included in the study, the physical impacts of climate change as reflected in the consequences of recent extreme weather events represent another source of economic risk. A follow up study published by Mercer in 2012 found that a third of participating sponsors had decided to reallocate assets based on the study with another half indicating they may do so in the future.^g

Another recent assessment by the Carbon Tracker Initiative and the Grantham Research Institute on the Environment and Climate Change evaluates the failure to properly value the risks of climate policy to companies with major fossil fuel reserves and finds a similar potential for massive financial fall-out. They conclude that “Between 60–80% of coal, oil and gas reserves of publicly listed companies are ‘unburnable’ if the world is to have a chance of not exceeding global warming of 2°C.”^h Yet the same companies invested \$674 billion last year to find and develop additional resources consistent with plans to commit more than \$6 trillion to fossil fuel resource development in the decade ahead.

The potential for negative environmental news to adversely impact stock values is well documented.ⁱ There is also evidence that greenhouse gas emissions are negatively correlated with the value of traded equities.^j Yet to date pension funds and other large institutional investors have been surprisingly slow to appreciate and act upon this information. This may be starting to change. This year New York State became the first to include an explicit warning about the effects of climate change in its bond offerings.^k The investor advisory group Ceres also recently organized a letter on behalf of 14 investment groups representing \$40 billion in assets asking that the National Federation of Municipal Analysts (NFMA) issue stronger disclosure requirements for water and sewer utilities on risks including climate change impacts.^l

^a <http://www.imf.org/external/pubs/ft/weo/2009/01/pdf/exesum.pdf>

^b Munich Re Press Release, Oct. 17, 2012, http://www.munichre.com/en/media_relations/press_releases/2012/2012_10_17_press_release.aspx

^c See examples summarized in Ceres, 2012. Physical Risks from Climate Change: A Guide for Companies and Investors on Disclosure and Management of Climate Impacts

^d World Bank Global Facility for Disaster Reduction and Recovery, 2012. Thai Flood 2011: Rapid Assessment for Resilient Recovery and Reconstruction Planning (http://www.gfdrr.org/sites/gfdrr.org/files/publication/Thai_Flood_2011_2.pdf)

^e Mercer, Climate Change Scenarios – Implications for Strategic Asset Allocation (2011). The report was sponsored by 12 pension funds, the UK Carbon Trust, and IFC.

^f “Strategic asset allocation (SAA) is a key component of the portfolio management process, with some research estimating that more than 90% of the variation in portfolio returns over time is attributable to SAA decisions. While standard approaches to SAA rely heavily on historical quantitative analysis, much of the investment risk around climate change requires the addition of qualitative, forward-looking inputs. Given the unclear climate policy environment and uncertainty around the full economic consequences of climate change, historic precedent is not an effective indicator of future performance.” Mercer, (2011).

^g Through the Looking Glass: How Investors Are Applying the Results of the Climate Change Scenarios Study. Both the original study and the followup a year later are available on-line at <http://www.mercer.com/climatechange>

^h Carbon Tracker Initiative, 2013. Unburnable carbon 2013: Wasted capital and stranded assets (<http://www.carbontracker.org/wastedcapital>).

ⁱ Deloitte, Drivers of Long Term Business Value <http://www.deloitte.com/us/driversoflongtermbusinessvalue>

^j UC Davis Study Finds Greenhouse Gas Emissions Can Hurt Companies Stock Value (Jan. 24, 2011) (UC Davis Press Release, http://news.ucdavis.edu/search/news_detail.jasso?id=9741)

^k “New York State Sees Climate Change as Risk to Bond Holders,” Bloomberg, March 26, 2013 (<http://www.bloomberg.com/news/2013-03-26/new-york-state-cites-climate-change-as-risk-to-bondinvestors.html>)

^l <http://www.ceres.org/files/water/nfma-letter> (March 26, 2013)

BOX 8: SOUTH AFRICA'S PENSION FUNDS INITIATIVE

Recent studies of the retirement industry in South Africa show that this is an industry in full and rapid evolution. Comprising over \$400 billion in assets under management, the industry aggregates the savings of millions of individuals, and must operate under strict standards of fiduciary responsibility. Increasingly, “responsible investing” is seen as not only compatible with, but indeed, required by, fiduciary duty.

Responsible investing (RI) requires taking environmental, social and governance (ESG) considerations into account on all investments, in addition to financial considerations. There is no universally accepted list of ESG factors that pension funds should consider; rather, such a list will vary across countries and companies depending on local conditions and national priorities. In South Africa, for example, ESG issues may include climate considerations and energy security and efficiency, but also corporate governance, contributions to development infrastructure and water security, to name a few. Retirement funds, by virtue of their asset base, are major investors with the potential to support sustainable economic development.

The updated Regulation 28 of the Pension Funds Act 24/1956 in South Africa is considered groundbreaking at the international level in that it makes explicit the obligation to take ESG risks into account in pension fund investments. This represents a fundamental shift in investment philosophy: in order to honor their fiduciary responsibilities, pension fund trustees must consider ESG issues in addition to financial considerations. The Code for Responsible Investment in South Africa (CRISA), issued by the Committee on Responsible Investing by Institutional Investors in South Africa, aims to provide the investor community with the guidance needed to integrate ESG issues into their investment decisions.

The majority of pension funds are at an early stage in RI implementation, and the state of knowledge about ESG remains low. Recognizing this, an industry-led project, the Sustainable Returns for Pensions and Society Initiative, was formed to promote RI learning and guidance to pension funds as they embark on this journey. This guidance recognizes that the responsibility for RI sits with the trustees, and covers a range of issues to enable pension funds to devise appropriate investment strategies and disclosure policies.

Toward an Agenda for the DPIGI



The previous section highlighted the challenges and barriers being faced by institutional investors to scale up (inclusive) green growth-related investments. A number of initiatives have developed to seek to address investor issues in the context of knowledge sharing, influencing policy, and facilitating investment flows. To inform the proper specification of the potential role of the DPIGI, avoid duplication, and ensure its maximum impact, it is important to assess the experience of existing initiatives and understand what gaps remain. In support of this, IFC commissioned Mercer to map the current spectrum of initiatives⁷⁰ and compare them with perspectives of existing barriers to, or drivers of, allocations to inclusive green growth investments expressed by large institutional investors.

The Mercer report was based on interviews with investors,⁷¹ alongside an inventory and assessment of the range of related investor initiatives that exist in the market. The purpose of the interviews was to solicit input on how investors factor green growth and inclusive investment considerations into their investment allocations, and their views on the critical success factors and obstacles to an increase in IGG investment. The report then compares the barriers and key success factors identified by investors to the objectives and the extent to which these initiatives have progressed in progressing in influencing these outcomes resulting in a gap analysis that has helped to shape the

recommendations included here on the areas of focus for the DPIGI.

Investor Views of Challenges

It is important to acknowledge that there is considerable diversity in the institutional investor base, and accordingly, diversity in the approach and quantum by which each issue is dominant. For example, while larger investors have the resources and innovation capability to engage in thought and investment leadership on issues such as reconsidering the definition of fiduciary duty to include a broader custodianship element and/or integrating very long term issues such as adaptation and forming the

⁷⁰ The various investor initiatives related to green growth were mapped, capturing their objectives, size, geographical focus and other factors. The analysis includes comments about each initiative's progress against objectives, influence in the market with both policy makers and investors and future potential.

⁷¹ Mercer interviewed 9 of the 12 pension funds that participated in the Mercer Climate Change study in 2010/11 (Climate Change Scenarios - Implications for Strategic Asset Allocation, Mercer, 2011), together with three other pension funds of similar characteristics. These are all very large public sector pension funds with across the 12 funds managing assets exceeding \$1 trillion, located in Australia, Canada, Europe, the UK, and the U.S.

investment environment, their smaller peers do not. Similarly, for the larger investors, given their scale of operations, smaller investments typically associated with BOP opportunities can only fall within their investment programs if there is intermediate aggregation into sufficient scale.

The challenges emerging from the survey include:

- Deviation from a strict financial interpretation of fiduciary duty is challenging for institutional investors, both on policy and operational levels; a strong investment case with appropriate risk/return is the primary driver of attracting investment. If green investment opportunities with favorable risk-adjusted return potential exist in developing and frontier markets, the capital should follow, but such decisions are typically not driven by social objectives. Institutional investors do not put material weight (if any) on the “inclusive” element of an opportunity when making investment decisions.
- While many investors (70 percent within the survey group) have made allocations and/or are increasing allocations to relevant parts of their portfolios—including emerging markets, infrastructure and social infrastructure, agribusiness and forestry, and private equity in cleantech and renewables—this is not specifically associated with inclusivity objectives or even green objectives, but on the characteristic financial performance of the assets. Few of those interviewed (30 percent) allocate assets to the “bottom of the pyramid” (i.e., assets that are targeted primarily as “inclusive” assets), and even the allocations that have been made are very small (<1 percent of the fund).
- There is a wide range of inconsistent terminology used both by investors and their initiatives to define green investments, including sustainability-themed, ESG-targeted, climate-sensitive, or climate-related investments and green allocations. This is demonstrative of the lack of a consistent understanding of the issues in specifying and tracking opportunities and challenges. An emerging trend is to use some variation on “environmental, social and governance (ESG)” as a catch-all. Within this category the emphasis is often more focused on the governance criteria by which the underlying investment addresses the green investment issues. Similarly, a range of terms are used to capture the “inclusive” element, including social investments and impact investments; these are also embedded in broader investment strategies.
- All of those surveyed indicated a willingness to carry out more investment in the sector but cited a lack of suitable products and managers (e.g., lack of track record, lack of economic business case, or liquidity constraints). A compelling risk-adjusted return of any potential inclusive green investment is critical. However, there is also a common belief that the marketplace will respond and fill this gap once a more compelling economic business case develops. For example, almost half of the funds have increased asset allocations to emerging markets, but this is purely driven by growth opportunities (i.e., risk-adjusted returns), and not at all by an objective for inclusive investment opportunities.
- There is an appreciation of the need at the senior management policy and strategic level, driven both by growing understanding of the potential impact on their portfolio and pressure from lobbying and investors, to have some policy in the IGG investment area. There is a common belief in the ability of markets to identify the point at which the space becomes

investable for institutional investors and products to emerge that offer the required compelling economic case that creates momentum. Investors acknowledge that they have a proactive role to play in encouraging the policy changes they need: “We can’t simply wait for the government to implement ideal policies.”

Identification and Progress of Initiatives

Mercer assessed and mapped the impact of 48 initiatives, including industry groups and investment initiatives as they relate to green investments, assessing the alignment and progress toward filling the gap between investor interest and IGG investment needs on four criteria.⁷²

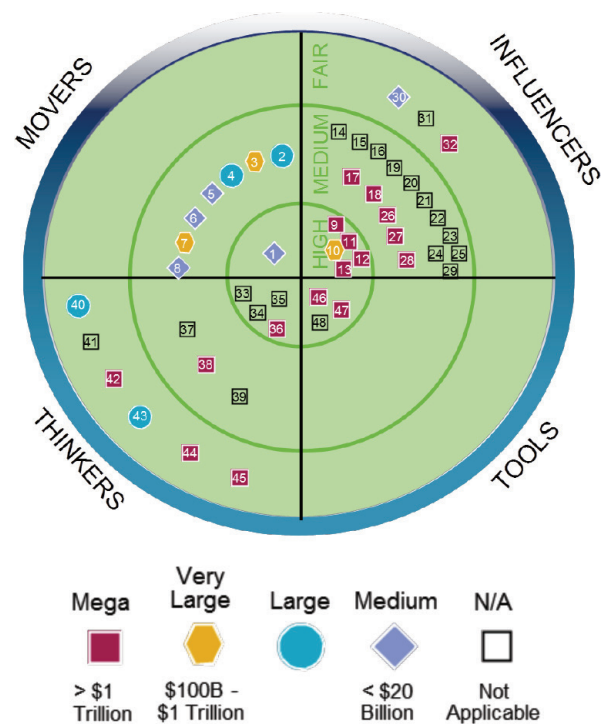
1. Impact on investment process: The organization has succeeded in influencing the valuation of investments to reflect the risk/cost associated with externalities, resource scarcity, and other factors.
2. Impact on public policy: The organization has been able to achieve material changes in legislation/regulation or other public policy mechanisms that impact on the pricing/risk of green growth in investment terms.
3. Impact on direct investments: The organization has become an actual conduit for the flow of funds to specifically address green growth.
4. Impact on industry mind-set: The organization has shifted the mind-set in relation to green growth, leading to concrete changes and action.

Most initiative activities relate to green investments without specific reference to “inclusive.” The different initiatives were divided into four categories based on their primary type of activity: Movers—those that directly allocate

capital and provide a conduit for asset flows; Influencers—those that seek to influence others in the finance system to behave in particular ways; Thinkers—those that provide thought leadership and research; and Tools—those that provide systems support via ratings systems, credit worthiness, and systems to measure risk/return, and were rated by an assessment of their progress to date in having a transformative effect: high, medium or fair.

The bias of current initiatives is clearly toward the Influencers and Thinkers, and the spread of progress achievement is quite significant within these groups.

FIGURE 10: Investor Initiatives mapping by Primary Role and Objectives



Source: Mercer, Internal Analysis Produced for IFC (2013).

⁷² Clearly, the analysis is affected by such factors as the relatively short period some initiatives have been in existence and allocation in each category has been done at high level rather than in full analytical detail.

Further analysis within the groups examined the extent of focus in each of the following categories of concern identified by investors.

However, there was little uniformity among the initiatives in their approach or their delivery. For example, although many

initiatives report their engagement on the basis of the value of their members' assets under management ("size" above), it is difficult to assess the level to which there is strong engagement of the underlying investors rather than "membership," particularly in the Influencers group.

TABLE 7: Investment Barriers and Opportunities

Barriers	Investor Types		Comments on Initiative Approaches to Addressing Each Barrier
<p>1. Lack of economic business case: From a governance perspective, the funds must ensure that pension capital is used effectively within a risk-adjusted framework.</p> <ul style="list-style-type: none"> Currently, there is a perceived lack of investment-worthy opportunities. Subsidies for renewable energy appear to be at risk of being eliminated (as has occurred in Spain). Recent technology innovations have caused a collapse in natural gas prices, hurting the profitability of alternative energy and hindering green growth. Related research has focused on the risks associated with a lack of green growth, as opposed to the opportunities that it presents. 	Movers	6%	<p>Many of the investor initiatives in the sample are broadly focused on addressing this barrier. However 44% of the total sample do not address it. In reality, few initiatives directly provide solutions to offset risk and help to steer capital toward green growth.</p> <ul style="list-style-type: none"> Increasingly, initiatives are focused on how to identify the potential investment risk associated with climate change, resource scarcity, and carbon pricing. However, this work has for the most part not been translated to implementation by individual funds. More needs to be done by investor initiatives to identify the investment opportunity. One investor noted that he feels he has only seen "<i>Part 1 of the business case.</i>" "<i>We are ok with the fact that private equity has a J-curve – you lose before you win, but it is worth it. With climate change, we only see the 'lose' part of the equation. If you convince us that the curve will rise, we will be able to act accordingly.</i>"
	Influencers	29%	
	Thinkers	15%	
	Tools	6%	
	56% of initiatives try to address this barrier		
<p>2. Policy uncertainty:</p> <ul style="list-style-type: none"> Policy uncertainty (risk) is deterring investors from green investments. Governments have not yet effectively tackled the climate change issue; thus, the chance of meaningful near term policy change appears slim. Policy risk is more relevant in developed countries because: <ul style="list-style-type: none"> This is where the bulk of the pension fund assets are invested, and The developed countries need to lead on any successful global framework. 	Movers	10%	<p>A majority of initiatives seek to address policy uncertainty and see it is a key barrier to IGG investment. Most of these initiatives, however, lack sufficient clarity on stating exactly what policy changes are required and or achieve policy change.</p> <p>This suggests a need for collaboration or focus among existing groups and not necessarily the creation of new groups – or a new mechanism for determining baseline consensus on particular issues from an investor perspective to achieve successful lobbying efforts.</p>
	27% of initiatives try to address this barrier		
<p>3. Higher risk in developing countries:</p> <ul style="list-style-type: none"> Geopolitical risk – Corruption, political uncertainty and poor governance frameworks are barriers that are more prevalent in developing countries. Unless these barriers are adequately addressed (and related risk reduced), growth in IGG investment will be hindered, even if all other barriers to green investments are addressed. Process risk – Developing countries need improved investment processes; most of the investments are greenfield assets, and processes for procuring them are not up to developed country standards. 	Movers	17%	<p>The barrier to investing in developing countries is not a primary focus for the investor initiatives in our sample. The Movers contribute most strongly to addressing this barrier in their work, especially where initiatives specifically focus on developing markets.</p> <p>Most initiative activities relate to green investments without specific reference to developing countries and 'inclusive' investments that target the poor. In our sample, there are no Tools based investor initiatives to focus on this barrier.</p> <p>There are a number of potentially relevant initiatives outside our sample which warrant further consideration (such as the World Forum on Governance at the Brookings Institute).</p>
	Influencers	8%	
	Thinkers	2%	
	Tools	0%	
	27% of initiatives try to address this barrier		

(continued on next page)

TABLE 7: Investment Barriers and Opportunities (continued)

Barriers	Investor Types	Comments on Initiative Approaches to Addressing Each Barrier
<p>4. Lack of track record:</p> <p>The business case for green investments has not unfolded in a favorable manner – track records are short and not compelling. As a result, investors have lost confidence. Until a more meaningful (and positive) track record is established, we will struggle to see meaningful investment allocations. And without those allocations, the track record will be difficult to develop.</p>	Movers	17%
	Influencers	4%
	Thinkers	0%
	Tools	6%
	27% of initiatives try to address this barrier	
<p>5. Liquidity:</p> <p>Many funds are subject to liquidity constraints imposed by the regulator. This is a material issue as green growth requires significant infrastructure investments which may tie up capital in excess of 10 years. The economic business case for the infrastructure investment may be sound, but liquidity constraints may make it unfeasible.</p>	Movers	0%
	Influencers	0%
	Thinkers	0%
	Tools	0%
	0% Gap – no initiatives address this barrier	
<p>6. Investment time horizons:</p> <ul style="list-style-type: none"> While evaluations of financial performance of listed equity investments may be stated to be quarterly, in effect managers / performance is now often monitored on a monthly or daily basis. A key trend for large corporate pension plans is to ‘de-risk’, which involves moving away from long-horizon, illiquid investments. This means a smaller amount of longer-term capital is available for IGG investment. 	Movers	0%
	<p>Almost none of the initiatives in our sample are contributing to the debate on addressing this barrier. It is a challenging issue to address and has multiple parts (“quarterly capitalism” on the hand, which contributes to short-term decision making by corporations; as well as the de-risking of corporate pension plans which reduces the availability of long-horizon capital). The DPIGI will need to consider these factors in how it is constructed.</p>	

Source: Mercer, Internal Analysis Produced for IFC (2013).

Investor Suggestions

Investors surveyed recognized their own potential role in the creation of the framework within which IGG investment issues might be addressed as both Influencers and Movers, and in actively seeking potential investments currently available. They were willing to engage in that role either directly or through their advisers or industry initiatives, and offered these suggestions to encourage investments in IGG in the developing country context:

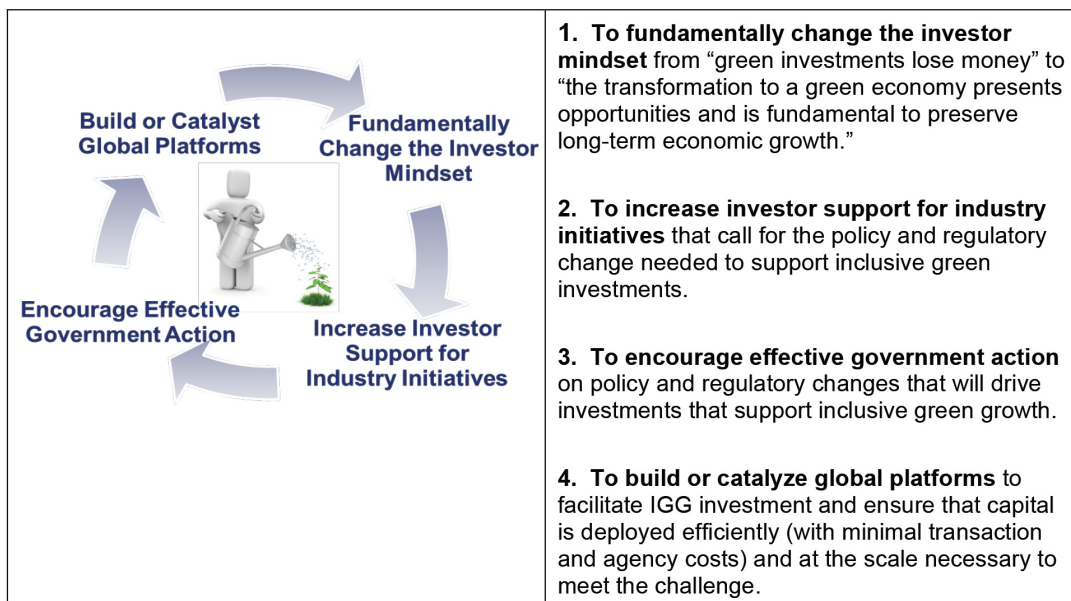
- Clear and effective government policy to deal with undesirable externalities (e.g., air

pollution, water usage, carbon emissions), addressing political and regulatory uncertainty, strong governance, and corruption.

- Expand the universe of targeted risk management tools for innovation—e.g., first loss guarantees.
- Expansion of the number of precedent and model initiatives or carefully structured entry opportunities to build confidence and experience in the investment models.

The primary gaps and needs suggested by this work as potential areas of focus of the DPIGI are:

FIGURE 11: Key Objectives to Enhance Investments in IGG



Source: Mercer, Internal Analysis Produced for IFC (2013).

- Coordination of the significant spectrum of initiatives in the Influencing area, creating consistency, optimizing focus, and disseminating best practices. Identifying areas for Thinkers to focus upon for greater effectiveness.

Supporting and expanding the Movers and Tools, which are assessed as having made significant progress relative to their objectives.

Next Steps Toward the Design of the DPIGI

Initiatives to define, track, and report financial flows for green growth-related goals have grown steadily. While as shown in this report gaps do exist—particularly for some sectors (adaptation to climate change) and low-income countries—existing organizations, multilateral processes, and international institutions would appear to be adequate if not always sufficiently well supported. On the other hand, there is one

important respect in which the G20 has an inherent comparative advantage and which does not appear to be effectively addressed today. That is in the creation of a forum that can bring together the mix of public and private finance and policy makers necessary to bring about increased investment in inclusive green growth. While such efforts are sometimes happening currently, the process is time consuming and arduous and requires very dedicated champions. The Deutsche Bank (DB) experience promoting its GET FiT - Global Energy Transfer Feed-in Tariffs Program is a good example.

DB publicly proposed GET FiT in January 2010 in response to a request from the UN Secretary General Advisory Group on Energy and Climate Change for new concepts to promote renewable energy in developing countries.⁷³

⁷³ See Deutsche Bank, “GET FiT Program: Global Energy Transfer Feed-In Tariffs for Developing Countries” (April 2010) (https://www.deutsche-bank.de/cr/en/docs/GET_FiT_Plus.pdf).

The key elements of the GET FiT proposal were to create new international public-private partnerships to mitigate investment risks for private financiers interested in renewable energy; technical assistance to support developing country policies supportive of RE investment; and ultimately to catalyze supply and demand for renewable energy projects in developing countries through strategies that provide the greatest incentive for the least cost to the funding partners. To build support and enhance the quality of the concept design, DB engaged with well over 100 experts from around the world and several international and multilateral organizations including UNDP, UNEP, IADB, IETA, and the University of California at Berkeley. These diverse views were included in a GET FiT report published in 2011. This extensive discussion process bore fruit this year with an agreement by the Government of Uganda, the World Bank, and the governments of the UK, Germany, and Norway to implement a version consistent with the GET FiT approach; financial incentives are offered to Ugandan developers interested in installing small (1 to 20 MW) hydropower, cogeneration, and biomass power projects.⁷⁴

DB is to be commended for its commitment to the lengthy and resource intensive process required to achieve initial implementation of the GET FiT concept—with little if any assurance of a business reward for its efforts. The process required might be made more efficient and less time consuming if a G20 initiative along the lines of the proposed Dialogue Platform were available to as a forum for public and private sources of finance interested in green growth related initiatives.

In addition, other issues for possible exploration by the DPIGI have been identified throughout the report, including in each case study. Several areas of general relevance for further exploration and discussion by the DPIGI include:

- **Exploring initiatives most likely to address BOP and IGG issues:** The case

studies discussed in the report—new technologies, new business models, and information provision—all have precedents in developed countries but relevance for the developing world, and in particular, the least developed countries.

- **Scaling up existing activity:** While very inadequate, substantial green investment is currently taking place within existing policy frameworks and without special incentives. This is the case for many development bank activities focused on SMEs and BOP needs, and investments in well-established green technologies through private financing. These activities provide a baseline for short-term opportunities to scale-up.
- **Tapping the institutional investor community:** The DPIGI has the opportunity to fundamentally change the investor mindset from the perception “green investment loses money” to green investment is seen as the fundamental path to preserving long-term economic growth. An objective of the DPIGI could be to help identify, validate, and communicate the risks of failing to take into account climate change, food security, and other objectives of inclusive green growth. Through a DPIGI, governments can call for policy and regulatory change; to increase investor support for industry initiatives; and to facilitate the efficient deployment of capital for green investments.
- **Shifting the metrics of financial returns to a broader concept of development dividends:** As traditionally defined, financial returns omit many broader and longer-term development considerations. An issue for the DPIGI to explore is how the two can be combined to the benefit of all, based on emerging initiatives such as the one in South Africa.

⁷⁴ (For more information about the Uganda program, see www.getfit-uganda.org).

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Appendices

Appendix I: Commissioned Research in Support of the IFC Project on IGG

1. Creation of a searchable database to facilitate research on the extensive literature identified related to investment in inclusive green growth
Author: Dr. Mark Trexler
2. Lessons from 20 years of international efforts to promote improved cookstoves, with particular reference to opportunities and limitations for finance
Author: Koffi Ekouvi, World Bank
3. Challenges and opportunities promoting more climate resilient buildings: the intersection between building practices, insurance, and climate change
Author: Evan Mills, Lawrence Berkeley Laboratory
4. Opportunities for innovative new technologies to promote inclusive green growth: a case study of emerging low cost technology for weather observation and early warning systems
Author: Dr. John Snow, Emeritus Professor, U. Oklahoma
5. Current forums for dialogue between sources of public finance and pension funds and other large institutional investors: a review and assessment
Author: Mercer Associates
6. An analysis of the potential feasibility and benefits of an index for private investment to enhance climate resilience with particular relevance to actions from SMEs and small enterprises in developing countries
Author: Deloitte Canada

Appendix II: Outreach and Consultation Undertaken in Support of the Project

- Club de Madrid - Institutional Investors and green investment, December 16-17, 2012
- Research Collaborative on tracking private finance, Paris, February 13 2013
- IFI Workshop on tracking private finance, Paris, February 14-15, 2013
- Citi-IFC event: Real world solutions for bridging the climate investment gap, London, 4 March
- Overseas Development Institute hosted workshop: Driving Private Investment in Inclusive Green Growth, London, March 6, 2013
- Climate Parliament Forum, Brussels, March 8 2013
- Research Collaborative on tracking private finance, Paris, March 18 2013
- Climate Change Experts Group Meeting, Paris, March 19-20, 2013
- Asia Low Emission Development workshop, ADB, Manila, April 3-4, 2013
- Bloomberg New Energy Finance Summit, New York, April 22-24
- Climate Resilience and Economic Growth in Developing Countries: Expert Workshop, April 24, 2013
- Workshop on the design of the GCF private sector facility hosted by the Government of Switzerland, April 29, 2013
- Global Green Growth Forum planning meeting, Copenhagen, May 2, 2013
- Ceres Conference - Institutional Investors Igniting Innovation, Scaling Sustainability, San Francisco, May 1-2, 2013
- Global Investors Coalition/AsRIA Meeting, Hong Kong 13-14 June 2013, including closed meeting with investors and policymakers

Appendix III: List of Publications Reviewed for Annotated Bibliography

#	Author	Title	Year	Link
1	Accenture, Barclays	Carbon Capital. Financing the low carbon economy	2010	http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_Barclays_Carbon_Capital.pdf
2	AFD	Partnering with banks to finance “green” growth	2010	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=36786618
3	AFDB	Facilitating Green Growth in Africa	2012	http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Facilitating%20Green%20Growth%20in%20Africa%20%20Perspectives%20from%20the%20African%20Development%20Bank%20June%202012.pdf
4	Africa Partnership, UN	Financial Resources and Investment for Climate Change	2009	http://www.africapartnershipforum.org/meetingdocuments/43551000.pdf
5	BNEF	Global Trends in Renewable Energy Investment	2012	http://fs-unep-centre.org/sites/default/files/publications/globaltrendsreport-2012final.pdf
6	BNEF	Crossing the Valley of Death	2010	http://www.newenergyfinance.com/WhitePapers/download/29
7	BNEF	Towards a green climate finance framework	2011	www.newenergyfinance.com/WhitePapers/download/46
8	BNEF, UNEP SEFI and Clean Energy Group	Weathering the Storm: Public Funding for low-carbon energy in the post-financial crisis era	2010	http://www.newenergyfinance.com/WhitePapers/download/31
9	Brandon Smithwood, CERES and Ryan Hodum, David Gardiner & Associates	Power Factor: Institutional Investors’ Policy Priorities Can Bring Energy Efficiency to Scale	2013	ceres.org/resources/reports/power-factor-institutional-investors2019-policy-priorities-can-bring-energy-efficiency-to-scale/view
10	CDC Climat	Financing the transition to a green economy: their word is their (green) bond?	2012	http://www.cdclimat.com/IMG/pdf/12-05_climate_brief_14_-_financing_the_transition_to_a_green_economy_-_their_word_is_their_green_bond.pdf
11	CDC Climat	Financing the Transition to a Green Economy: Their Word is their (green) Bond?	2012	http://www.cdclimat.com/IMG/pdf/12-05_climate_brief_14_-_financing_the_transition_to_a_green_economy_-_their_word_is_their_green_bond.pdf
12	CDC Climat	Assessing the Financial Efficiency of the Green Climate Fund: Leverage Ratios – From Theory to Practice	2012	http://www.cdclimat.com/IMG/pdf/12-09-10_climate_brief_no19_-_leverage.pdf
13	CDC Climat	Assessing the financial efficiency of the Green Climate Fund: leverage ratios from theory to practice	2012	http://www.cdclimat.com/IMG/pdf/12-09-10_climate_brief_no19_-_leverage.pdf
14	CDC Climat research	Operating and financial investments by European utilities over 2004-2009: what role for European mitigation policies?	2011	http://www.rumoursandfacts.com/wp-content/uploads/2011/01/11-01_cdc_climat_r_wp11-9_investments_by_eu_utilities_over_2004-09_eu_mitigation_policies_herve-mignucci.pdf
15	CDC Climat Research	The role of sub-national authorities in public support for renewable energies. Examples in Europe and France	2011	http://www.cdclimat.com/IMG/pdf/11-11-02_climate_report_30_-_the_role_of_regional_authorities_in_public_support_for_re.pdf
16	CDKN	Inside stories on climate compatible development: Seizing the sunshine: Barbados’ thriving solar water heater industry	2012	http://www.dfid.gov.uk/r4d/PDF/Outputs/CDKN/Barbados-InsideStory_WEB.pdf

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#	Author	Title	Year	Link
17	CDKN	Private conservation agreements support climate action: Ecuador's Socio Bosque programme	2012	http://redd-net.org/resource-library/CDKN+Inside+Story%3A+Ecuador%E2%80%99s+Socio+Bosque+Programme
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146	UNEP-FI	Catalyzing low-carbon growth in developing economies: public finance mechanisms to scale up private sector investment in climate solutions	2009	http://www.unepfi.org/fileadmin/documents/catalysing_lowcarbon_growth.pdf
147	UNEP-FI	Financing renewable energy in developing countries: drivers and barriers for private finance in sub-Saharan Africa	2012	http://www.unepfi.org/fileadmin/documents/Financing_Renewable_Energy_in_subSaharan_Africa_01.pdf
148	UNEP-FI	REDDy Set Grow: Private sector suggestions for international climate change negotiators Part 2	2011	http://www.unepfi.org/fileadmin/documents/reddysetgrowll.pdf
149	UNEP-FI	REDDy Set Grow: Briefing for financial institutions Part 1: A briefing for financial institutions, Opportunities and roles for financial institutions in forest carbon markets	2011	http://www.unepfi.org/fileadmin/documents/reddysetgrow.pdf
150	UNFCCC	Investment and Financial Flows to Address Climate Change	2008	http://unfccc.int/resource/docs/2008/tp/07.pdf
151	UNFCCC	Innovative options for financing the development and transfer of technologies	2007	http://unfccc.int/resource/docs/publications/innovation_eng.pdf
152	US EPA, JOSRE	Removing Market Barriers to Green Development: Principles and Action Projects to Promote Widespread Adoption of Green Development Practices	2009	http://www.costar.com/josre/JournalPdfs/06-Barriers-Green-Development.pdf
153	USAID	Fast out of the Gate. How Developing Asian Countries Can prepare to access international green growth financing. Vol 1.	2013	http://lowemissionsasia.org/sites/default/files/pdf_file/fast-out-gate-vol-1.pdf
154	W. Blyth and R. Baron, OECD	Green Investment Schemes: Options and Issues	2003	http://www.oecd.org/environment/cc/19842798.pdf
155	WEF & BNEF	Green Investing 2011: Reducing the Cost of Financing	2011	http://www.newenergyfinance.com/WhitePapers/download/37
156	WEF with PWC, UN Foundation and IFC (Critical Mass)	Scaling up low-carbon infrastructure investments in Developing countries:	2011	: http://www3.weforum.org/docs/WEF_EI_CriticalMass_Report_2011.pdf
157	World Bank Group (coordinator); IMF, OECD, RDBs	Mobilizing Climate Finance	2011	http://climatechange.worldbank.org/content/mobilizing-climate-finance
158	World Business Council for Sustainable Development (WBCSD)	Enabling Frameworks for Technology Diffusion	2010	http://www.wbcd.org/Pages/EDocument/EDocumentDetails.aspx?ID=149
159	WRI	Public-Private Finance Tools for Energy Efficiency	2011	http://pdf.wri.org/bottom_line_energy_efficiency_financing.pdf
160	WRI, ODI, OCN	The US. Fast-start Finance Contribution	2012	http://pdf.wri.org/working_papers/ocn_us_fast-start_finance_contribution.pdf
161	WWF & Credit Suisse	Transition to a Low Carbon Economy: The Role of Banks	2011	https://infocus.credit-suisse.com/data/_product_documents/_shop/324153/wwf_paper_low_carbon_economy.pdf

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Appendix IV: The Inclusive Green Growth “Brain”

In order to enable user-friendly access to the large amount of information covered in the literature review, The Brain® software (www.thebrain.com) was used. This is a powerful knowledge management tool that can organize a virtually infinite amount of information, simultaneously allow different stakeholder groups to explore the relevant issues, and hopefully help users zero in on the information they need to support decision-making. The *Inclusive Green Growth Brain* (IGG Brain) focuses on exploring the role of the private sector in green growth, and in particular the ability to leverage private sector funding to promote green growth policy objectives.

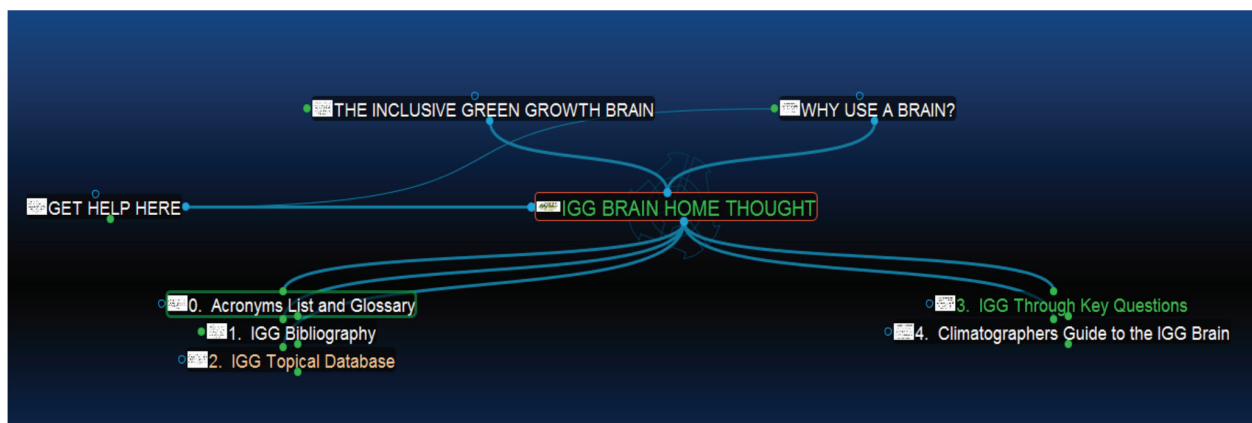
The Brain® software uses “thoughts” as basic building blocks. Thoughts can be connected to each other in multiple ways to organize information, to help explore that information in thought-provoking ways, and to help illustrate patterns and relationships in the underlying information. Version 1.0 of the IGG Brain contains approximately 2,500 “thoughts,” extracted from 150 source documents. Each document is assigned a unique identifying number, and extracted thoughts include the document identification number for easy source tracking. Many thoughts include “thought icons” that expand

when a mouse cursor hovers over them. These icons include material that has been “captured” from the source document, including tables, graphics or relevant text.

Users can access the information in the IGG Brain through several Portals (see figure above):

- *IGG Bibliography*: lists source materials by date, author, and title. From this portal, it is easy to see all the source documents, and the thoughts linked to each.
- *IGG Keywords*: Source documents and individual thoughts are linked to keywords.
- *Topical Database*: allows users to drill down through green growth topics.
- *Key Questions*: allows users to access included information through specific questions likely to be of interest to a range of users.
- *Climatographers’ Guide to the Brain*: raises and discusses key IGG issues. Whereas the bulk of the Brain organizes information without commentary or analysis, this Portal is organized around more subjective insights and conclusions regarding the green growth literature.

There are many topics for which one might want to use the IGG Brain. The goal of exploration could be to find a specific piece of



information. For example, searching the Brain and its attachments for the exact term “power sector in Africa” gives one result: Document #45, a 2012 UNEP report entitled “Financing Renewable Energy in Developing Countries.” Expanding the search to attachments in which the three words “power sector Africa” occur, gives 75 results. Using basic search function, a user can quickly zero in on documents they need to review in more detail.

The Brain, however, allows much deeper investigation of both technical and policy questions than the basic search function profiled just above can deliver. Using two broader questions as starting points, one substantive and one subjective, the following discussion illustrates how one might explore the Brain, and what one might find:

- *Question: What are the barriers to leveraging institutional funding into green growth sectors?* A quick look at the **IGG Topical Database** heading leads us to sub-heading #4, **Engaging Institutional Investors in Green Growth**. That heading has additional subsidiary headings including **How much are institutional investors investing in “green growth?”** and **Why are institutional investors important to green growth?** Under the sub-heading **Barriers to expanding institutional investors’ green growth investments**, there are some 15 thoughts, including:
 - (O24) *Need to strengthen price signals to make opportunities more attractive to investors*
 - (122) *Barriers to institutional investors in infrastructure investments*
 - (122) *Green infrastructure adds risks to conventional infrastructure investments*
 - (147) *There are several barriers to pension fund investments in infrastructure*
 - (O29) *Barriers and solutions to pension fund infrastructure investments*

Many of the 15 thoughts come from four of the documents in the Brain, which easily points the user to where to go for more information. In many cases, however, simply reviewing the relevant thoughts in the IGG Brain, and their associated “thought icons” that provide graphical and text-based extracts from the document in question, will tell users what they need to know about the kinds of information and analysis that can be found in the literature specifically on the topic of “barriers to expanding institutional interest in green growth.”

- *Question: How much of the green growth discussion is more rhetorical than real?* Searching the Brain for the word “rhetoric” results in a list of five specific thoughts in which the word “rhetoric” appears in the text of the thought. One of those results is a heading (identified by its font color, and by the fact that it is phrased as a question) entitled **How much of the “green growth” discussion is rhetoric?** That thought is linked to approximately 15 subsidiary thoughts, including:
 - (O16) *Institutional investors are embracing responsible investing and climate change investing*
 - (O36) *Policymakers are moving toward a new green economy paradigm*
 - (O70) *The green economy has arrived*

As can be seen, a number of the listed thoughts focus on statements found in the literature that can be perceived as rhetorical rather than analytical. Several thoughts, however, are more specific to the question, including:

- (O31) *Private sector finance has been touted for decades as the way to reduce global poverty, with little effect*
- (O31) *Should not rely on assumption that private finance can deliver large part of finances for developing countries to tackle climate change*

- (O62a) *Much of the “green growth” discussion has been political rhetoric, with little impact on green growth*

Several of these more skeptical thoughts come from the same source document (# 031), a 2011 report from the Stockholm Environment Institute entitled “Will Private Finance Support Climate Change Adaptation in Developing Countries?” Again, the thoughts in the Brain can easily point the user to where to go for more information, but the thoughts themselves (and their associated “thought icons”) may be sufficient to give users the information they need.

These two examples are illustrative in terms of demonstrating the kinds of information that can be found in the IGG Brain, and how it can be accessed. The power of The Brain® software is in organizing and displaying relevant information in different ways, and in the ease with which such information can be reorganized to respond to new needs. A Brain like the IGG Brain can never truly be “complete,” since there will always be new information to include. Even existing information can be linked in additional ways as a topic is further explored.

Appendix V: Publications With Substantial Financial Figures

No.	Publications	Sectors					Sources		Region		
		Mitigation	Adaptation	Water	Forestry REDD+	Renewables/ clean & Energy Efficiency	Public	Private	Developed	OECD	Developing
1	CPI: The Landscape of Climate Finance 2012										
2	EURODAD: Cashing in on Climate Change? 2012										
3	GCN: Investing in Clean Energy, 2010										
4	Green Investment Report: The Ways and Means to Unlock Private Finance for Green Growth (G2A2)										
5	WBG (coordinator)IMF, OECD, RDBs: Mobilizing Climate Finance										
6	Resource Revolution: Meeting the World's Energy, Materials, Food, and Water Needs (McKinsey Global Institute) 2011										China
7	BNEF: Global trends in renewable energy investment 2012										
8	ODI: The United States' private climate finance support: mobilizing private sector engagement in climate compatible development 2012	*								USA	
9	ODI: The UK's private climate finance support: mobilizing private sector engagement in climate compatible development 2012	*								UK	
10	WRI, ODI, OCN: The U.S. Fast-start finance contribution 2010-2011										
11	ECOFYS: Mapping of Green Finance Delivered by IDFC Members 2011										
12	UNEP: Bilateral Finance Institutions and Climate Change, A mapping of 2011 Climate Finance Flows to Developing Countries										
13	REN21: Renewable Energy Policy Network for the 21st Century (in the partnership with ISEP) 2013										Global
14	G20 / OECD Policy Note on Pension Fund Financing for Green Infrastructure and Initiatives, June 2012										

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No.	Publications	Sectors					Sources		Region		
		Mitigation	Adaptation	Water	Forestry REDD+	Renewables/ clean & Energy Efficiency	Public	Private	Developed	OECD	Developing
15	Global Gaps in Clean Energy RD&D : Update and Recommendations for International Collaboration 2010									Global	
16	USAID ASIA Fast Out of The Gate: How Developing Countries Can Prepare to Access International Green Growth Financing, vol 1, April 2013										

Legend:

- Cells filled with light blue color indicate that data of financial allocations is available, under sector, sources and geography.
- * There is no clear information in the report available on in which sector the financial resources were allocated, however looking at the existing global financial flow private sector money is mostly invested in the mitigation sector.

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