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Mobilising Investment for Inclusive Green Growth in Low-Income Countries

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Table of Contents

Abbreviations

AfDB	African Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
CDC	Commonwealth Development Corporation
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CESUL	Mozambique Regional Transmission Backbone Project
CFI	Commercial Financial Institutions
CGF	Credit Guarantee Funds
DFIs	Development Finance Institutions
CSR	Corporate Social Responsibility
DIE	Deutsches Institut für Entwicklungspolitik
ECOWAS	Economic Community Of West African States
EDF	Électricité de France
EDM	Electricidade de Moçambique
EE	Energy Efficiency
EEIF	Energy Efficiency Investment Forum
EERE	Energy Efficiency and Renewable Energy
EFSE	European Fund for Southeast Europe
EIBs	European Investment Banks
ESCO	Energy Service Company
EU	European Union
FC	Financial Cooperation
FITs	Feed-in Tariffs
GDP	Gross Domestic Product
GET FiT	Global Energy Transfer FiT
GHGs	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
ICLEI	International Council for Local Environmental Initiative
IDA	International Development Association
IEA	International Energy Agency
IFC	International Finance Corporation
IGG	Inclusive Green Growth
KETCO	Kenya Electricity Transmission Company
KfW	KfW Entwicklungsbank
KPLC	Kenya Power and Lighting Company
kWh	Kilowatt Hour
LIBOR	London Interbank Offered Rate
LIC	Low Income Country
LTWP	Lake Turkana Wind Power Project
MDBs	Multilateral Development Banks
MFI	Microfinance Institution
MGI	McKinsey Global Institute
MIGA	Multilateral Investment Guarantee Agency
MSME	Micro, Small and Medium Enterprises
MW	Megawatt
M&A	Mergers and Acquisitions
Norfund	Norwegian Investment Fund for Developing Countries
OBA	Output-Based Aid
PBs	Partner Banks
PE/VC	Private Equity and Venture Capital
PIDG	Private Infrastructure Development Group
PPAs	Power-Purchase-Agreements
PPIAF	Public Private Infrastructure Advisory Facility
RDBs	Regional Development Banks
RE	Renewable Energy
REEEP	Renewable Energy and Energy Efficiency Partnership
REGFIMA	Regional MSME Investment Fund for Sub-Saharan Africa
REN21	Renewable Energy Policy Network for the 21st Century
SF	Structured Fund
SMEs	Small and Medium Sized Enterprises
SSA	Sub-Saharan Africa
SWFs	Sovereign Wealth Funds
TENs	Trans-European Networks
TLCC	Transparency, Longevity, Certainty and Consistency
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
WAPP	West African Power Pool

Executive Summary

Low income countries (LICs) require very large investments if they are to move to a trajectory of inclusive green growth (IGG). As well as shifting the pattern of development from high to low carbon, these investments are needed to provide access to essential services like electricity. Achieving energy access for the poor requires physical access, particularly in rural areas, but also that additional supply is affordable. While energy from renewable sources remains more expensive than that from fossil-fuels, however, there may be tensions between these objectives. Although these tensions can be resolved, they must be actively addressed if growth is to be both 'green' *and* 'inclusive'.

Given the additional costs associated with renewable energy, attracting private investment into the sector generally requires public financial support to boost commercial viability. Ensuring this investment is also 'inclusive'[1] – for the poor to have affordable access to energy, for example – may require additional financial support. The question this raises, however, is who should pick up this bill? While there are a number of roles that donors can play in order to promote such investment, we argue that there is also a strong moral and practical case for using donor contributions to cover some or all of these additional costs. Moral, because it is unfair for LICs to be penalised for a problem they had no hand in creating, and developed countries have committed to finance the *"incremental costs of mitigating and adapting to climate change"* in developing countries. Practical, because external financial support may be needed to provide the policy credibility needed to attract international investors to these markets and sectors.

The most important sector for inclusive green growth is energy, both in terms of increasing generation from renewable sources, and improving the efficiency with which energy is used. This paper explores how additional private investment can be attracted into the energy sectors of LICs in both these areas at the scale and in the form needed. In this regard, institutional investors are considered to be particularly well-suited as they can provide large-scale capital with reasonable return expectations. Given their liabilities, they also have naturally long time-horizons, which align with energy sector investments.

We explore the private investment that has occurred, what obstacles exist for its expansion, and make suggestions on how these can be overcome, particularly the roles that public international or donor agencies could play in this process. We draw not just on the literature, but on case studies and extensive interviews with a range of actors.

One finding is that funds with an explicit focus on LICs find it easier to invest in renewable energy in these markets. These may be public bodies that work with private firms and provide commercial returns, or private, but regionally specialised funds. At one level, this is unsurprising as their investable universe is constrained, limiting alternative options. But it is more than this. Knowledge of LICs reduces asymmetries of information, grounding country risk perceptions in reality. Understanding of political systems does a similar job with regulatory risk. In-country networks and experience assist in the selection of viable projects and increase the chance that they are brought to successful fruition. A problem, however, is that specialised funds do not control assets at the scale required, which takes us back to institutional investors.

An important issue with these types of investors is return expectations. Whereas renewable energy investments in developed countries are increasingly seen by investors as low-risk, long-term sources of predictable income, this is not so in developing countries in general, and LICs in particular. In these countries the same investments are seen as high-risk, high-return, private-equity style investments. This is reflected in return expectations. Long-term renewable energy finance in the US and Europe may be obtainable at 200–500 basis points over LIBOR. As a private equity style investment, however, returns closer to 25% are expected in developing countries, and available finance is also more short-term. As well as affecting project viability, this increases the levels that tariffs need to be set at, which is negative for affordability, or 'inclusivity'.

1 Two definitions of 'inclusiveness' are used in the paper with respect to energy: weak and strong. 'Weak inclusiveness' refers to a situation where the poor are able to increase their access to energy in absolute terms. 'Strong inclusiveness' is where the poor are able to increase their access in relative terms – i.e. more than other groups, thus reducing inequalities in terms of energy access. Given the energy focus of the paper, we also adopt a restricted view of inclusiveness, considering only those elements that are relevant to the energy sector. The concept of inclusiveness, and inclusive green growth, is discussed in detail in section 1.1.

As most projects still require public support from mechanisms such as feed-in-tariffs (FITs) to be viable, these expectations also have important implications for their design. To avoid prices that are unaffordable, FITs have to be set at a high level, higher than is the case in developed economies, where financing is available on much better terms. As argued above, it is not reasonable to expect LIC governments through subsidies – or their populations through a surcharge on energy bills, for example – to absorb this.

Very high return expectations may also conflict with the drive towards 'inclusiveness'. When considering issues of energy access in particular, it is likely that the higher the return expectations are, the more difficult it will be to achieve inclusivity. Furthermore, as discussed in the paper, 'inclusive' can also be defined in either a 'weak' or 'strong' form, depending on whether poor groups benefit to some extent, or benefit more than wealthier groups. 'Strong inclusivity' would therefore see inequality fall, while 'weakly inclusive' growth would not. The stronger the form of inclusivity that is desired the more problematic are expectations of high returns, and the greater the level of public financial support required to resolve this tension.

As returns have fallen and risks increased in developed countries, it is somewhat surprising that return expectations have not fallen further in developing countries, particularly as the attractiveness of investing in developing countries has also increased. As well as their relatively strong growth performance, for example, developing countries often have advantages in the field of renewable energy, particularly in relation to supply (e.g. solar, but also wind). They also have the 'advantage' that there is relatively little infrastructure built, so there are fewer sunk costs and vested interests to deal with. Finally, there is the enticing prospect they could 'leapfrog' to renewable and energy efficient technologies, as was the case with mobile versus fixed lined telecommunications. Might this, for example, be possible with a move straight to 'smart grids'? Perhaps donors and international institutions could make these positive points to investors, as well as highlighting successful experiences of investment in renewables in LICs, encouraging them thus to invest in LICs without such excessive expectations of profit returns, that require returns so much higher than in developed economies.

There is no shortage of compelling investment stories in LICs, particularly as the cost of renewable energy has fallen so much in recent years. Despite this, measures to boost profitability and reduce risks are still needed to bring risk-adjusted returns to commercially viable levels. What are the most important areas, and what interventions by bilateral and multilateral donors could be most effective?

First, there is a need to identify potential projects and get them to the stage of being 'investment ready'. This is true for both renewable energy and energy efficiency, and there is significant potential for donors to contribute more to this stage of project development.

Second, to be commercially attractive renewable energy projects are likely to need financial support, which we suggest donors should contribute significantly to. The desire for 'inclusivity' is likely to increase these costs, which needs to be explicitly addressed if it is to be achieved, particularly if 'stronger' forms of 'inclusivity' are the goal.

Third, for energy efficiency, interventions are needed less to improve project economics, than to overcome informational and structural barriers. Projects tend to be small in scale but large in number, raising transaction costs. There are also costs to identifying viable projects, and structures need to allow diversified access to the sector. Here donors have an important role to play in helping develop these structures (which particularly aggregate projects, for example, across regions or countries); they may also play a role as co-investors and guarantors, especially initially. While still a work in progress, there are examples of best practices emerging in developed countries, but these would need to be adapted carefully for a LIC environment. One advantage, from the donors' perspective, would be that necessary financial resources need not to be particularly large; the task would be probably quite labour intensive, e.g. in designing fund-of-funds,[2] maybe carrying out pilot projects, overcoming institutional and regulatory barriers, etc.

Fourth, the interviews revealed strong concern by investors with regulatory risk in LICs, particularly that commitment to mechanisms such as FITs will not be honoured. Here, the willingness of donors to ensure some or all of these risks meet some or all of these costs was very positive for boosting credibility and mitigating these regulatory risks. Donor input into the design of these frameworks was also viewed

2 A fund-of-funds model is where exposure to different sectors and markets is achieved indirectly through investments in existing funds, rather than by directly buying the underlying financial assets.

in a positive light. For the interviewees, another effective way of mitigating regulatory risk was for donors to act as co-investors, as the view was that commitments were more likely to be honoured in these circumstances. As well as the structures suggested for energy efficiency investments, new investment vehicles for renewable energy investment in LICs are desirable. As pointed out above, a dedicated focus on this set of countries may be necessary to prevent investments being pulled to the 'easier' middle-income country investments. Such funds would need to operate on a large cross-country and regional scale to bring the benefits of diversification, however, suggesting that some form of fund-of-funds approach would be ideal. The experience of the IFC may be useful here, as is the ability of KfW to use concessional finance strategically.

Attention needs to be paid to avoiding excessive contingent liabilities for donors or multilaterals. In this regard, more research is needed on how to design financial support mechanisms that achieve the desired goal, but also avoid providing private investors with excessive 'rents' and can adjust dynamically over time. This is one potentially fruitful area that the proposed Green Intelligence Investment Unit ('Green U') could pursue. Another is to look at how best to structure investment vehicles that combine the detailed local knowledge required to overcome information asymmetries, with the scale required to minimise transaction costs and achieve diversification benefits.

A final crucial question is how to reduce the return expectations of institutional investors. As described above, achieving a shift to a trajectory of inclusive green growth in LICs requires very large investments. The assumption has been that only institutional investors can provide resources at the scale required. As well as the level of finance, however, the attraction of institutional investors is that they may also provide long-term finance with reasonable return expectations. As described in this paper, achieving growth that is both green and inclusive is inherently difficult. Doing so using private investment which requires very high returns may be impossible. Unless investors can be persuaded to adopt more reasonable expectations, alternative sources of finance may be needed if the goal of generating IGG in LICs is to be achieved.

Introduction

In this paper we link two goals – developmental and environmental – within a framework of 'inclusive green growth' (IGG). Given its importance for both environmental and developmental goals, our focus is on investment in the energy sector, where we identify two important aspects: first, the role renewable energy could play in fostering IGG; and second, the role that greater energy efficiency could play. For both areas, we examine the obstacles to cross-border private investment in low income countries (LICs) (faced especially by institutional investors) and consider how – and to what extent – these obstacles could be overcome, especially by actions by donors, development finance institutions (DFIs) and multilateral development banks (MDBs).

The paper is structured as follows. Part 1 introduces and defines the concept of IGG. We devote considerable space to this topic. To assess seriously the potential of private investment to foster IGG, it is important to be clear and transparent about what we actually mean by this, particularly as there is significant scope for disagreement. In light of this discussion, part 2 provides a rationale for a focus on our chosen sectors and reviews current trends and potential in both. Part 3 considers the types of investment needed and identifies the instruments and investor-types that are most likely to meet these needs. Part 4 examines the issue from the investor perspective, exploring their criteria for investment decisions and categorising obstacles as forms of risk. Based on interviews with relevant actors from the private and public investment industry, part 5 examines how these obstacles work in practice and suggests ways they could be overcome. Part 6 provides some case studies to illustrate emerging best practices, and part 7 assesses what public agencies could do to leverage private investment that fosters IGG in LICs.

1 Inclusive green growth in low income countries

1.1 What is 'inclusive green growth'?

The term 'inclusive green growth' is a recent hybrid, combining the concept of 'inclusive growth' with that of 'green growth'. Before examining the hybrid form, therefore, we consider the components from which it is constructed.

'Inclusive growth' can be defined in different ways, reflecting disagreements over the related concept, 'pro-poor' growth. In its 'weak' form, growth is 'pro-poor' when it results in *absolute* increases in the income of the poor. For the 'strong' form, pro-poor growth requires the *relative* incomes of the poor to rise, so that growth also reduces inequality.

For the World Bank (2009), 'inclusive growth' means equality of opportunity with respect to: *"access to markets, resources and unbiased regulatory environment for businesses and individuals"*. The authors are explicit that their *"definition is in line with the absolute definition of pro-poor growth, but not the relative definition"* (ibid.). As described in Klasen (2010), others take a different view. Rauniyar and Kanbur (2010), for example, define 'inclusive growth' as *"growth with declining inequality"*.

Ali and Son (2007), in contrast, define 'inclusive growth' as *"pro-poor improvements in social opportunities"*, which differs in two ways: first, it moves the focus from income to the non-income aspects of welfare; second, as with the World Bank definition, the emphasis is on equality of *opportunity* rather than equality of outcome.

Two dimensions of difference can therefore be identified. First, 'inclusive growth' may refer to *process* (i.e. access to income-generation opportunities, health or education). Or it may refer to *outcome* – i.e. how the benefits of growth are distributed across groups in the population. Second, growth may be considered 'weakly inclusive', if the poor – or other disadvantaged groups – are able to participate in, or benefit from, growth. Alternatively, in its 'strong' form growth may only be considered inclusive if these groups are able to participate *more*, or receive *more* of the benefits of growth than other groups.

The concept of 'green growth' is also contested. Some consider the term to be an oxymoron, with growth incompatible with sustainability. Others take the polar opposite view, arguing that 'green growth' is the *only* sort of growth that is possible over the longer-term.[3] These disagreements largely result from different views on what environmental sustainability actually means, particularly the extent to which 'natural capital' is substitutable for 'man-made capital'.

Those arguing from a 'weak sustainability' position are more likely to think such substitution is possible than would those taking a 'strong sustainability' position.[4] The implications for growth are significant. Growth involves the consumption of natural resources. From a weak sustainability perspective, this is fine as long as any natural capital that is used in the growth process is replaced with other forms of capital. The total stock of capital, within this framework, would therefore remain unchanged. From a strong sustainability perspective, this may not be the case. If it is not possible to replace natural capital with other forms (e.g. man-made capital), then natural capital that is used in the process of growth is lost permanently, and the total stock of capital is progressively reduced. Assuming that maintaining the total stock of capital is an objective, therefore, growth is problematic and 'green growth' a contradiction in terms.

In practice these distinctions are to be found on a spectrum of opinion rather than a binary dichotomy. Most 'weak sustainabilitists' accept that some forms of natural capital are not substitutable, while 'strong sustainabilitists' accept that some forms of natural capital are substitutable. The debate therefore centres around which forms of natural capital are most important, which are substitutable and which are not. For example, Gray (1990) identifies four forms of capital: critical (e.g. stable climate, rainforests, oceans, water supply); non-renewable/non-substitutable (e.g. oil and mineral products); non-renewable/substitutable (e.g. energy usage); and renewable (e.g. timber, fisheries). Using this categorisation, Neumayer (2004) argues that non-substitutability of capital is not the main issue. Fossil fuels are not

3 This is the position taken in the Stern Review, for example. A variant on this position is developed in UNEP (2010). It is argued that growth may be negatively affected in the short-term, as investments are made to recover 'natural capital', but long-term impacts on growth will be positive.

4 See Neumayer (2004) for an excellent review of the concepts of weak and strong sustainability.

substitutable, but this does not mean they should be preserved forever. What is important is energy production, and this can be substituted by using renewables, for example. The problem of exploiting fossil-fuels is the impact this has on climate change, not that they cannot be replaced, and this is a very different issue. For Neumayer, what matters is that 'critical capital' is preserved, as this is both essential for the maintenance of human civilisation and cannot be replaced.

While most agree that there are certain forms of critical capital that should be preserved (or planetary boundaries respected), there are major differences on how much critical capital should be preserved, or where planetary boundaries lie. The 'weak' versus 'strong' sustainability debate can be seen through this lens. Another point of contention, however, is the extent to which growth can be 'dematerialised' or 'decoupled' from resource use. Does more growth inevitably lead to more resource use or is it possible to grow while using fewer resources? From a climate change perspective, does rising GDP always mean rising carbon emissions or is it possible to grow while carbon emissions fall to sustainable levels? On both questions, those in the 'weak sustainability' camp tend to take a more optimistic view, while their 'strong sustainability' counterparts are more pessimistic, often invoking the 'precautionary principle'.

For both the 'inclusive' and 'green' components of 'inclusive green growth', we therefore have a spectrum of opinion, which can be described as moving from weak to strong forms. This is illustrated with four quadrants in Table 1 below.

Table 1: Dimensions of inclusive green growth

		Inclusiveness	
		Weak	Strong
Greenness	Weak	1	2
	Strong	3	4

Quadrant 1 describes those that see any form of growth that benefits the poor as 'inclusive', while also taking a relatively optimistic view on the substitutability of natural capital. The World Bank would broadly fit into this camp – when the Bank mentions 'inclusive green growth', therefore, this is what they are referring to.

Quadrant 3 combines a lack of focus on inequality, with a much stronger concern with preserving natural capital. 'Deep ecologists' who argue for the intrinsic worth of the natural environment and against an anthropocentric view that privileges human interests over those of other forms of life, would be located here.

Quadrant 4 combines a 'precautionary principle approach' to our ability to replace natural capital, with scepticism about the possibility of 'dematerialising' growth. There is also, however, a strong focus on poverty and inequality, as well as the non-materialistic aspects of quality of life. Given that growth may not be compatible with environmental goals, those who take this perspective argue for a more equitable distribution of (finite) resources. This is often portrayed in a positive light, however, with a greater focus on the non-material aspects of life – after basic needs have been met – being linked with higher well-being. Tim Jackson's *Prosperity without Growth* (2009) is to date perhaps the best-known exposition of this perspective.

Quadrant 2 is where much of those working in the international development community are to be found. A strong emphasis on poverty and inequality is the traditional focus of this community. This has been combined in recent decades, however, with an increasing emphasis on environmental sustainability, which has more commonly been of 'weak' than 'strong' form. An anthropocentric view is usually taken, with the 'value' of the environment being its use-value to human beings rather than anything intrinsic.

With these issues in mind, the World Bank (2012) defines 'IGG' as:

"... growth that is efficient in its use of natural resources, clean in that it minimises pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters. And this growth needs to be inclusive."

More expansive definitions of the 'inclusive' aspects of growth than this have been given. For example, the UNDP (2011) defines IGG as that which:

"... embraces social, economic and environmental pillars and is promoted based on principles of inclusiveness, equity, particularly gender equity and women's empowerment, and sustainability. It supports the alleviation of poverty through green job creation, sustainable energy for all, low-carbon technologies; and promotion of sustainable urban living. It

recognizes the importance of and interplay between natural capital and social capital, equally important assets that must be managed and invested in."

This is more aligned with a relative rather than absolute view of 'pro-poor' growth and would therefore fit in quadrant 2 in the figure above. While the Bank accepts that 'green growth' will not necessarily be 'inclusive', the UNDP argues for redistributive measures, emphasises active policies of 'green job' creation and the active targeting of sectors where growth would disproportionately benefit the poor.

A focus on 'green job' creation is common to all views of 'green growth', inclusive or otherwise. The UNDP aligns this with 'inclusivity' explicitly by calling for targeted investments in key sectors and also where 'pro-poor' job creation is most likely.

We cannot assume 'green growth' will be inclusive, particularly in its 'strong' form. While not always the case, policies associated with environmental sustainability can have regressive impacts. For example, removing fuel subsidies – and the imposition of some environmental taxes – may disproportionately affect the poor. Mechanisms to achieve environmental goals need to be carefully designed to minimise this risk, with complementary measures used to offset irreducible impacts. Generally speaking, the 'stronger' the definition of 'inclusive' and 'green' the more difficult it will be to strike this balance. That is, achieving (weak) 'inclusive' (weak) 'green growth' is likely to be considerably easier than achieving (strong) 'inclusive' (strong) 'green growth'. Just because it is easier, however, does not mean it is preferable. When discussing the merits of IGG and how it can be achieved, it is important to bear these issues in mind.

We do not offer our own definition of IGG here, but build on the above. As with all the definitions, we assume this to be broad-based across social and economic sectors. Beyond that, the distinctions illustrated in the figure above will be referred back to throughout the paper in order to be explicit about what form of 'inclusive green growth' we – and others – are talking about. More precisely, we will not just ask how investment can boost 'inclusive green growth', but consider how the form of 'inclusive green growth' we are talking about would influence the answer to this question.

1.2 How might cross-border investment boost inclusive green growth in LICs?

Given that our concern is with investment as an input – rather than the results of this investment – we are focused on the *process* rather than *outcomes*. The question is whether the level, allocation and forms of investment are such that poor groups will be able to *access* income-generating (including new job) opportunities or welfare-enhancing services. For our strong definition, the question is whether they can access these opportunities and services *more* than other groups. On the environmental side, the question is whether the investment is compatible with 'weak' vs. 'strong' forms of sustainability.

In the light of this, we can identify three conditions whereby cross-border investment could positively affect IGG in LICs.

First, investment needs to have appropriate *sectoral allocations*. As discussed above, some sectors are more important for the poor than others. This distinction will not always be clear, however. Some sectors, for example, are very important for facilitating growth throughout the economy, from which all benefit, including the poor. Infrastructure is a good example, as it promotes overall economic growth and job creation. Straight investment into these sectors could therefore be considered supportive of 'weak' IGG. As well as these indirect effects, investments in infrastructure also provide *direct* benefits as flows of goods & services, such as energy or clean water, for example. The ability of poor groups to access these goods and services – both physically and in terms of affordability – however, cannot be assumed. On the environmental side, investment in a range of productive sectors could conflict with the most strong forms of sustainability. This would be less of an issue with 'weak' sustainability. On the other hand, a small number of sectors would be compatible with both forms of sustainability in a more positive environmental sense, the most obvious being renewable energy production.

Second, the *financial structure* of the investment should be supportive of IGG. For example, investors with excessively high return expectations are unlikely to have positive impacts in this regard. Similarly, short-term, or rapidly reversible, finance is not conducive to the long-term development implied in IGG. The relationship between this condition and 'weak' vs. 'strong' IGG is complex and likely to be non-linear. For example, in the case of infrastructure projects, is the financial structure such that facilitating access to poor groups is made more or less likely? On the environmental side, is the financial structure more likely to encourage a short-term 'extractive' approach to the management of environmental resources than a longer-term 'stewardship' type approach? Generally speaking, the more long-term the financial structure the more likely that IGG – particularly in its stronger forms – would be encouraged.

Third, investment *project design* should be structured in an inclusive way. To continue the examples above, while investment in additional infrastructure or utility capacity is likely to have positive impacts on growth – and so indirectly on poverty – direct effects on the poor will be determined by issues such as physical access and affordability, which are a feature of project design. Similarly, the environmental impacts of projects will be strongly influenced by project design.

To summarise, three conditions have been described. First, appropriate sectoral allocations create the *potential* to boost IGG. Second, for this potential to be realised, investments need to have supportive financial structures (e.g. 'patient' rather than 'extractive' capital). Third, for the poor to take advantage of this potential[5] and for environmental impacts to be minimised (or positive impacts maximised), projects should be consciously designed to facilitate these ends.

5 For example, that they are able to directly access flows of goods and services, both physically and in terms of affordability.

2 Priority sectors

Although the focus of our study is on LICs, these are not distributed evenly across developing regions. Most notably, 28 of the 36 LICs as classified by the World Bank are located in sub-Saharan Africa. Given this, our focus is primarily on sub-Saharan Africa.

When considering priority sectors, two questions need to be answered. First, which sectors are most important for IGG in LICs? Second, of this set, which are most in need of, and potentially suited to, cross-border investment flows? The UNDP (ibid.) identified agriculture, fisheries and forestry as sectors upon which the poor are disproportionately dependent. While these sectors are important for 'inclusiveness', as well as from an environmental perspective, it is the nature of the industrialisation process in LICs that will largely determine whether growth is 'green'.

Our first criterion, therefore, is that prioritised sectors for IGG should be associated with the process of industrialisation. Which industrial sectors are of most interest? One option could be the extraction and processing of metals, minerals and other non-renewable resources. A problem, however, is that countries have different resource endowments and some LICs have none that are commercially exploitable. 'Manufacturing' is another obvious option, but is too broad. Again, we run into the problem that countries will specialise in different sectors, preventing analysis that is generally applicable to all LICs.

Our second criterion, therefore, is that the prioritised sector(s) should be relevant to all LICs. Combined with the first criterion, this leads us towards energy. Clearly, the generation, distribution and efficient use of energy are integral to the process of industrialisation. Moreover, regardless of natural resource endowments or patterns of manufacturing, the common factor is the necessity of energy inputs. The need for access to electricity is similarly universal. From an environmental perspective, fossil-fuel driven energy production is one of the key emitters of greenhouse gases, and all sustainable development trajectories (i.e. IGG) envisage a sharp increase in the long-term use of renewable energy. This holds for both 'weak' and 'strong' forms of sustainability. There is disagreement on how much total energy is required,[6] but across the full spectrum from weak to strong sustainability, there is consensus that it should come from renewable sources.

As well as being 'green', renewable energy is also central to 'inclusivity'. Energy poverty remains endemic in many LICs. 1.4 billion people lack access to reliable energy, while 2.7 billion rely on traditional biomass approaches to cooking. The IEA (2010) estimates that $36bn per year is needed to ensure everyone in the world has access to energy and clean cooking facilities – 1.4 million premature deaths per year (4,000 per day) are attributed to the use of biomass in inefficient stoves (ibid.).

As well as the type of energy produced, the efficiency with which it is used is crucial to both environmental and economic outcomes. The Energy Efficiency Investment Forum EEIF (2006) describes the benefits of renewable energy investments as follows:

"Intelligent use of energy can reduce waste, increase efficiency, and diminish costs while providing the same level of service with less consumption. Energy efficiency *can diminish infrastructure bottlenecks and future investment requirements, enhance competitiveness by lowering input and operating costs, free up capital for other social and economic development priorities, and advance environmental stewardship."*

Before deciding to focus on these two sectors, we need to determine their potential in our countries of focus. That is, are they potentially investable propositions in LICs in general, and in LICs in sub-Saharan Africa in particular?

2.1 Capacity and potential

Although sub-Saharan Africa has vast renewable energy reserves, these remain largely untapped. UNEP (2012) describes the region's significant solar, geothermal and wind potential as follows:

"The region has excellent solar power potential. Many parts of sub-Saharan Africa have daily solar radiation of between 4 kWh and 6 kWh per square meter (REEEP/UNIDO, 2011) … The Great Rift Valley, located in eastern Africa, is an area with

6 Some suggest that sustainable use of natural resources requires a reduction in total energy use, even if it comes from renewable sources (i.e. strong sustainability). Others see no reason to reduce our energy consumption, but simply want to replace fossil-fuel with renewable forms (i.e. weak sustainability).

high geothermal activity. It is estimated that around 9,000 MW could be generated from geothermal energy in this area, yet the installed capacity in Kenya and Ethiopia – the two main exploiters of this region – is far less, with 167 MW and 7.3 MW respectively (Holm et al., 2010) ... Wind speeds in Africa are best around the coastal regions and the eastern highlands. Countries like Cape Verde, Kenya, Madagascar, Mauritania, Sudan and Chad have great potential: Mauritania's is almost four times its annual energy consumption."

The World Bank (2007) estimates renewable energy potential at the country level. Of the top 10 countries globally, 7 are in sub-Saharan Africa. Mauritania, for example, has enough solar energy to meet its annual energy needs more than 30 times over, while the figures for Namibia, Chad, Niger and Mali are 29, 23, 19 and 17 respectively.

Of the 1.4 billion people without access to reliable energy sources, 85% live in rural areas. A distinct advantage of renewable energy in this regard is its off-grid potential, which is particularly important in sub-Saharan Africa, where 66% of the population are estimated to live in areas where grid connections are either too expensive or problematic for other reasons (AfDB, 2008).

As costs of renewables have fallen, this combination of high renewable potential and large rural populations means that: *"off-grid renewable solutions are increasingly acknowledged as the cheapest and most sustainable options for rural areas in much of the developing world"* (REN21, 2011).

The potential of energy efficiency measures has some similarities. Addressing energy poverty can be achieved by reducing wastage as well as by increasing supply. This is the cheapest way of increasing energy availability, as well as having all the other benefits described above. It is also compatible with 'weak' and 'strong' forms of sustainability. For the McKinsey Global Institute (2008):

"Big gains await developing countries if they raise their energy productivity, research by the McKinsey Global Institute (MGI) has found: they could slow the growth of their energy demand by more than half over the next 12 years – to 1.4 percent a year, from 3.4 – which would leave demand some 25 percent lower in 2020 than it would otherwise have been. That is a reduction larger than total energy consumption in China today."

The report suggests that energy efficiency measures could lead to annual savings up to $600bn per year in developing countries by 2020 if implemented at scale.

For 'investability', Alcorta et al (2012) estimate high internal rates of return for energy efficiency investments in developing countries. Alcorta et al (ibid.) conclude that such projects have:

"... very high level of internal rates of return at a project level – with payback periods ranging from 0.9 to 2.9 years."

To summarise, the energy sector is clearly important for the process of IGG in LICs and this is true of both generation and the efficiency of use. Furthermore, they both appear to have potential as profitable investment propositions. Having prioritised these sectors, we now turn to the forms of investments they need, and use this to identify and prioritise the types of investors that would be best suited to providing these investments.

3 Sectorial investment needs, instruments and prioritised investor 'set'

3.1 Investment needs

3.1.1 Renewable energy

In its *Clean Energy Investment Framework*, the African Development Bank (2008) estimates the costs of achieving universal access to reliable electricity by 2030 across sub-Saharan Africa at $275bn,[7] with an average annual investment of $12bn. Of this total, $102bn is for generating capacity,[8] $54bn for transmission and $119bn for distribution. In this context, UNIDO (2011) notes that total energy investment in sub-Saharan Africa has averaged around $2bn annually, showing thus a massive deficit in investment compared to needs.

Chart 1 below gives more detail of the pattern of renewable energy investment in sub-Saharan Africa since 2000.

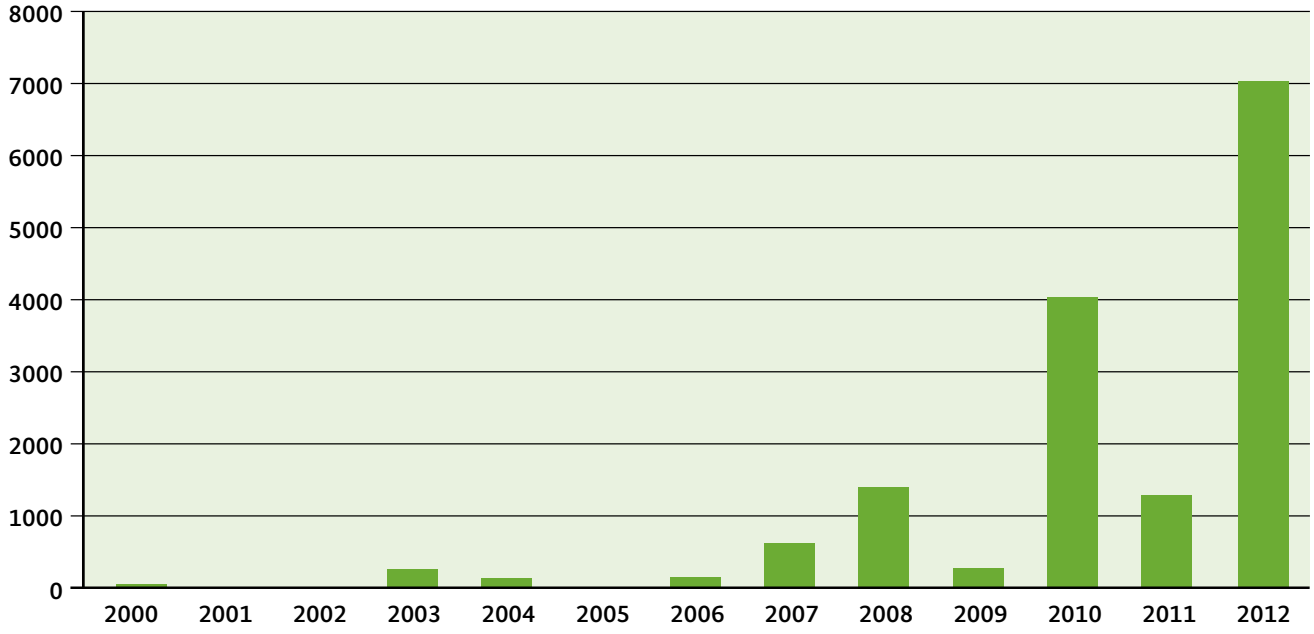
As well as the level of financing, there is the question of the type of funding. The most important aspect here is maturity. Renewable energy investments have long 'payback periods' and so require long-term funding. They also tend to have large up-front costs.

As well as these factors, renewable investments have traditionally not yielded high returns. As costs have fallen sharply, particularly in wind and solar, this has improved significantly, but investments remain unlikely to be the highest-yielding available.

A final complicating factor is the presence of risks not encountered with other forms of investment. Most importantly, the viability of investments is often dependent on the maintenance of policy support, such as cost subsidies or guaranteed payments for energy outputs, like FITs. Investors thus need to accept the risk that these will not be maintained, or require guarantees they will, or insurance to compensate them if not.

While all successful renewable energy investments will be supportive of both 'weak' and 'strong' forms of (environmental) sustainability, the situation is more complex

Chart 1: Renewable energy investments in sub-Sahara Africa (USD mn)



Source: Bloomberg New Energy Finance

7 In constant 2005 US dollars.

8 About 80% is for new capacity, with the remaining 20% replacing existing capacity.

for 'inclusivity'. Investors seeking to maximise short-term returns are unlikely to finance structures that are 'pro-poor' in important respects. Ensuring the rural poor have access to affordable energy, for example, may reduce the profitability of power projects in LICs, unless a subsidy is granted by governments to poor households, or there is cross subsidisation from other consumers.

DFIs in the infrastructure sector in developing countries have come to recognise this and have increasingly deployed concessionary finance in parallel with commercial investments to address the problem. Output-based-aid (OBA) is an example of a mechanism that can be used to directly fund rural access or subsidise tariffs in infrastructure projects. This enables private investors to retain their required levels of profitability, while ensuring development objectives are met. Another mechanism is 'blended finance', where concessional finance (grants or subsidised loans) are combined with commercial finance. The result is to boost returns to commercial investors, increasing the attractiveness of the investment.

For the renewable sector, the use of concessional finance may be required until costs fall sufficiently to achieve commercial parity with alternative investments, such as fossil fuels. Achieving the 'green' aspect of IGG – in both 'weak' and 'strong' forms – is likely to require some level of public financing until this point is reached. The need for 'inclusivity' may require further concessional finance. Moreover, the stronger the definition of 'inclusive' that is used, the more this is likely to be required.

These important points are insufficiently recognised: attracting investment into renewable energy in developing countries will come at a cost until commercial parity is reached with fossil-fuels; attracting investments that support (weak) 'inclusive' energy access may incur additional costs; attracting investments that support (strong) 'inclusive' access – i.e. where the poor gain disproportionately more access – will cost more again.

The risk is that more concessional finance is used than necessary, or for longer than necessary, providing windfall gains to investors. To protect against this, mechanisms should be structured to boost return on investments to commercially viable levels and no more, but be flexible enough to adjust to changing market conditions. One option would be to boost renewable energy investment returns to the level associated with fossil-fuel power, but vary the level of concessional finance as the cost-difference between renewables and fossil fuels varies. As the price of oil or gas moves, for example, the cost difference will change accordingly, as the 'price' of inputs to renewable energy production (wind or sunshine) is free. This is not the case with capital costs, of course, which will also vary – the cost of solar cells, for example, has fallen precipitously in recent years. Concessional finance mechanisms need to be structured to reflect this.

3.1.2 Energy efficiency

For energy efficiency investments, total developing country investment needs have been estimated in the order of $90bn per year (McKinsey, 2008). At between 2 and 6 years, payback periods on energy efficiency investments have typically been shorter than other forms of capital investment in energy. As pointed out by the International Council for Local Environmental Initiative (ICLEI), this represents an internal rate of return between 15% and 45% (ICLEI, 2013). Return expectations in comparable capital projects is generally between 5% and 10%, and has been at the lower end of this for North American energy projects, for instance, implying a payback period of around 12 years (ibid.).

There are thus low-hanging fruit where efficiency enhancing investments will generate savings quickly. As pointed out by the ICLEI, however, the risk is that investors focus only on these areas, ignoring the positive – though smaller – returns that could be achieved from 'deeper' energy efficiency measures with longer payback periods. From an investment perspective, there appears more scope for investors with different return expectations in energy efficiency than in renewables. Thus while longer-term, 'patient capital' may be needed for 'deeper' forms of energy efficiency, investors with shorter time horizons could provide the capital to finance 'quick-wins'.

Returns are also not as dependent on the maintenance of public financial support to underpin economic viability as with renewable energy. Indeed, energy efficiency investment is often seen as the classic 'win-win', with savings from the investments exceeding the costs of financing. This suggests that commercial entities should rationally undertake energy efficiency investments of their own accord. The fact that they do not in LICs – or not to the extent that it would be rational to do so – suggests either a lack of capital, credit rationing or the presence of other barriers, such as country risk concerns. More specifically, problems may arise from a lack of familiarity by lenders/investors with LICs, as well as insufficient knowledge of potentially

profitable investment in energy efficiency in these countries. These problems are likely to create high transaction costs for outside investors, particularly in energy efficiency where individual projects tend to be relatively small. The issue of aggregating projects in good investment vehicles becomes a central issue in which donors/DFIs could play a crucial role.

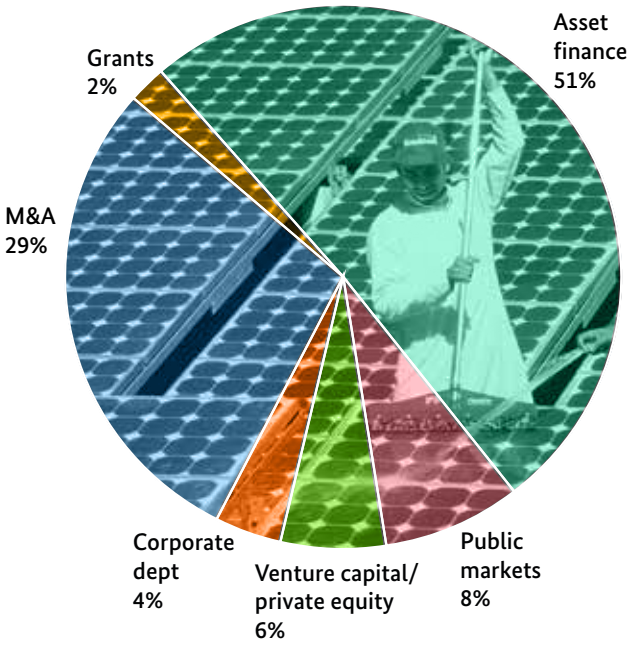
Given the prospect of commercial level returns – though at different rates and time periods – there may be less need to use concessional finance for energy efficiency than renewable energy investments. Obstacles are more likely to be institutional than strictly commercial, suggesting that different forms of support would be needed. In the next section we briefly review the primary instruments that have been used to finance, and facilitate, investments in both sectors, and consider their applicability in a LIC context.

3.2 Investment instruments

3.2.1 Renewable energy

Chart 2 illustrates the mix of financing forms that have been deployed globally to fund renewable energy facilities.

Chart 2: Mix of financing forms to fund renewable energy facilities (globally, 1990–2012)



As can be seen, 'asset finance' is by far the largest, followed by Mergers and Acquisitions (M&A). M&A does not represent investment in additional facilities, however, but the transfer of ownership of existing capacity. For new investments, public equity market financing, and private equity/venture capital (PE/VC) are the next largest. Their prominence is largely due to the US market. The corresponding chart for developing countries only would see 'asset financing' become even more dominant. For the same period in sub-Saharan Africa, for example, asset finance accounts for 80% of all finance, reflecting the relative immaturity of both public and private equity markets.

In table 2, Harper et al (2007) identify seven different structures for financing wind energy in the US market, depending on the combination of equity and debt, as well as the type of equity investors – i.e. strategic (active) vs. institutional (passive). The authors note that the choice of structure is heavily influenced by the nature of the tax incentives available. The key point is that these are not straight commercial investments, and the way that incentives are used (tax breaks, concessional finance, etc.) will have a strong influence on the attractiveness of projects to potential investors, who will have different degrees of risk-tolerance and asset-liability structures.

3.2.2 Energy efficiency

Given the assumed 'win-win' nature of energy efficiency investments with relatively high returns and short payback periods, companies have used internal cash flows to fund investments, and debt finance has figured prominently for external finance, as savings are likely to exceed debt service costs. The European Union (EU) (2010) describes its experience as follows:

"Because different EE [energy efficiency] *technologies and different types of organisations require distinct types of finance depending on their particular stage of development, financial instruments are needed along the entire finance continuum from technology/venture/project development to construction and commercial operation. The primary financing options available for project proponents to finance EE projects are via internal funding through capital budgets, debt financing (mostly loans and lease) and via energy performance contracts (shared and guaranteed savings)."*

The same report goes on to describe the most common instrument:

"The most common EE financial product is a loan directly to the energy end-user (owner of the premises) or to a project developer (e.g. an ESCO) – this is known as third-party financing. A basic loan is the simplest form of debt. (...) Most CFIs offer term lending for plants and equipment, while some have leasing units and structured finance and project finance

Table 2: Description of Seven Financing Structures

Financing Structure Name	Project Capital Structure	Likely Equity Investors	Brief Description of Structure Mechanics
Corporate	All equity	Developer (corporate entity)	Corporate entity develops project and finances all costs. No other investor or lender capital is involved. Corporate entity is able to utilize Tax Benefits (no flip).
Strategic Investor Flip	All equity	Developer and Strategic Investor	Strategic Investor contributes almost all of the equity and receives a pro rata percentage of the cash and Tax Benefits prior to a return-based flip in the allocations.
Institutional Investor Flip	All equity	Developer and Institutional Investor	Institutional Investor contributes most of the equity and receives all of the Tax Benefits and, after the developer has recouped its investment, all of the cash benefits, until a return-based flip in the allocation.
Pay-As-You-Go ('PAYGO')	All equity	Developer and Institutional Investor	Institutional Investor finances much of the project. Injecting some equity up-front and additional equity over time as the PTSs are generated. Includes a return-based flip in the allocation.
Cash Leveraged	Equity and dept	Developer and Institutional Investor	Based on the Strategic Investor Flip structure, but adds dept financing. Likely involves Institutional Investors, rather than Strategic Investors. Loan size/amortization based on the amount of cash flow from power sales.
Cash and PTC Leveraged	Equity and dept	Developer and Institutional Investor	Similar to the Cash Leverage structure, but the loan size and amortization profile are based on the cash flow from power sales plus a monetization of the projected PTCs from the project.
Back Leveraged	All equity (but developer uses dept outside of the project)	Developer and Institutional Investor	Virtualy identical to the Institutional Investor Flip, but with the developer leveraging its equity stake in the project using dept financing.

Source: Harper et al. (2007)

capacities and thus may already be doing lending similar to that required for EE projects."

Energy Service Companies (ESCOs) have been central to the drive to enhance energy efficiency, both in developed and developing countries. The results, however, have been disappointing. Generally, these kinds of structures require some form of guarantee, which is one area where public agencies can add value. The EU (ibid.) describes the role DFIs can play in supporting these investments:

"[DFIs] are capable of assuming risk and mobilising substantial public or donor funds. Because EE projects are usually too small for DFIs to finance directly, DFIs can support local DFIs to provide EE financing via the provision of tools such as:

- *credit lines for on-lending to EE projects,*
- *mezzanine debt facilities,*
- *guarantees and risk sharing facility programs, and*
- *technical assistance support."*

To date, equity investment has only played a limited role in energy efficiency investments. Where it has been used is by supplying risk capital to ESCOs, which makes it easier for them to attract debt finance for projects, as it essentially works as collateral: in the event of project failure, the creditors (i.e. holders of debt) are paid before equity investors, so the size of the equity investments is a minimum guaranteed return of capital to debt-holders.

3.2.3 Summarising financial instruments

The primary means of financing energy projects is with asset finance structures, which are financed with a combination of equity and debt, often involving institutional investors and syndicates of banks. For renewable energy, things are complicated by issues of commercial viability. In the US, for example, this is overcome with the use of tax breaks; in other countries FITs are used. In both cases, the effect is the same: to increase the profitability of renewable energy investments by boosting returns or reducing costs. Other instruments can perform a similar role. Various forms of public guarantee are also used to boost risk-return ratio, and thereby its public attractiveness.

The key point is that renewable energy investment will require that sort of mix: to leverage private investment (i.e. equity and debt of various forms) it is often necessary to increase underlying profitability, and/or reduce different risks associated with the project. Whichever sort of private

investors are prioritised, therefore, they will often also need to be joined with public 'investors' to make projects viable. As pointed out above, making invested projects 'inclusive' as well as 'green' may require further financial support.

For energy efficiency the situation is somewhat different. Here project economics are more likely to stack up, meaning less need for public finance to alter the underlying economics. As we have seen, debt is the most common instrument used, sometimes with an accompanying equity component which functions as collateral. In a LIC context, it is likely that the need for such risk-mitigation tools will be substantially higher, suggesting a higher equity-debt ratio may be required. A final important issue is the generally relatively small size (but large number) of individual energy efficiency projects.

The relationship between energy efficiency investment and inclusivity is less clear. As we have seen, many poor people do not have access to energy, so using it more efficiently is not relevant. Ensuring access is therefore a precondition for ensuring efficient access.

Given the uncertainties involved, there is a potential role here for public agencies to underwrite aspects of this investment with guarantees. There seems to be also a public role in reducing the high transaction costs resulting from a large number of relatively small projects, by packaging projects and possibly securitizing them.

3.3 Prioritising investors

As we have seen, both renewable energy and energy efficiency investments in LICs require large amounts of capital, but in different ways. Renewable energy investments have very high up front capital costs, which tend to be financed using asset-based structures with a mixture of equity and debt. The finance is raised on the basis of the future income stream from the project, which will only be realised over a long time frame.

If the project economics and risks are right, it seems possible that raising the debt component of such projects – from a syndication of banks, for example – would be considerably easier than the equity component. If large-scale equity investment, as well as long-term debt, is needed over long timescales, it is clear that institutional investors such as pension and insurance funds are the most suitable option, as well as sovereign wealth funds (SWFs).

As we have seen, however, such investors – as well as the private banks providing the debt finance – are unlikely to be attracted to renewable energy projects on the basis of their inherent profitability, especially given their very high expectations. Some forms of public finance support will be required to support this investment. As well as institutional investors, therefore, projects will require the participation of public investors such as MDBs or DFIs, such as KfW from Germany.

Investments in energy efficiency may also require the participation of public investors, though in different ways. Rather than boosting returns, different forms of guarantee to mitigate risk are likely to be needed. There may also be the need for support in terms of institution building and project structuring. For example, many energy efficiency projects are quite small-scale, but – taken together – add up to a very large total investment requirement. It is not feasible to attract large numbers of small investors to projects, each of which will have relatively large transactions costs.

To address this, two things may be needed. First, information-gathering and project development services, to identify potentially suitable projects, scope their investment needs and design suitable standardized projects and financing structures. These can then be 'taken to market', reducing investors transactions costs in this respect. Second, to enable larger investors to participate in some form of pooled structure may be required, where investors could gain exposure to the broad asset class without needing to engage at the individual project level.

As with renewable energy, some mix of equity and debt may be required, with the presence of equity investors reducing risks sufficiently to attract loan providers, and being compensated for this by a reliable stream of dividend income. As was the case with renewable energy, therefore, this suggests a combination of institutional investors and private banks, but with official bodies such as MDBs and DFIs providing logistical and structuring support, as well as potentially underwriting the risks faced by large pooled funds operating in this space in LICs.

4 Determinants of investment for prioritised investors

As we are interested in attracting particular forms of investors it is worth considering what investors are looking for in an investment.

4.1 Determinants of investment for institutional investors

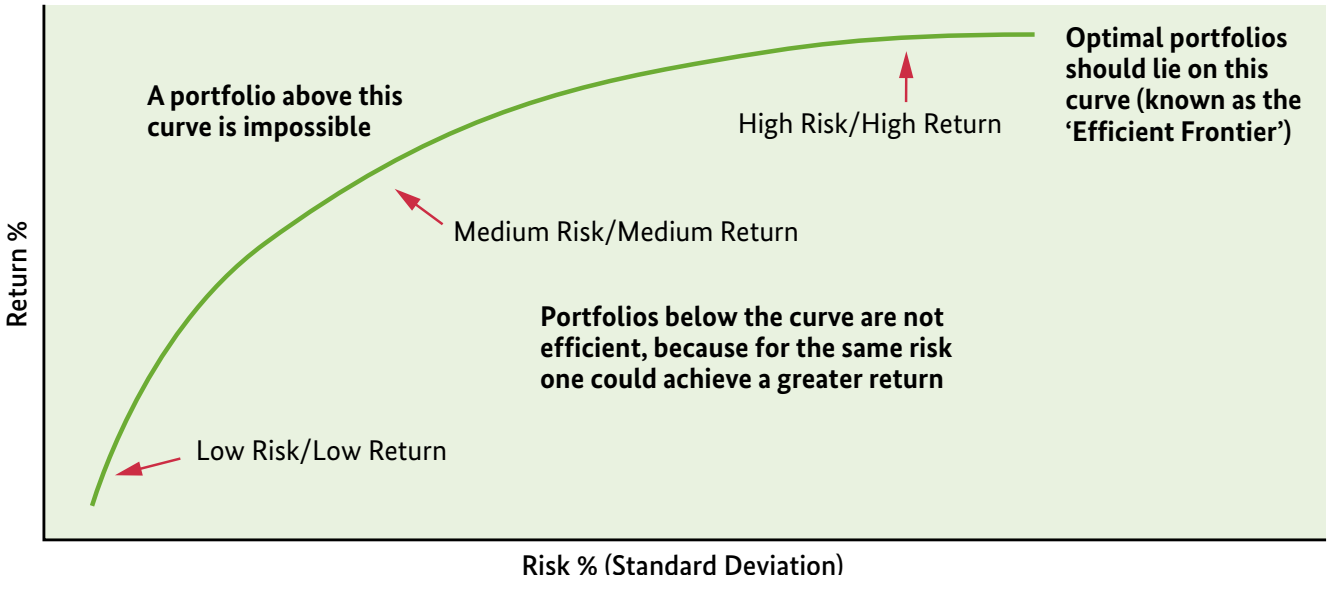
First, we consider common objectives for all institutional investors, before looking at the factors which drive differences between them. Institutional investors first and foremost want positive financial returns. With higher returns come higher risks, however, so the goal is positive risk-adjusted returns. Target levels of risk-adjusted returns are a function of an institution's level of risk tolerance, the determinants of which are discussed below.

Investors also want risk-adjusted returns that are at least as good as could be achieved elsewhere. That is, for a given level of risk – which is usually measured by the standard deviation of returns – an institutional investor will seek investments that maximise its financial returns. The set of potential investments this describes lies on what is known as the 'efficient frontier'. Investors hold more than one asset in their portfolio, however, so the next question is how new investments should be chosen given an existing portfolio.

Again, we want the portfolio that yields the highest returns for any given level of risk, as measured by the standard deviation of returns. The key factor now, however, is the extent to which this is correlated for assets within the portfolio – i.e. their covariance. If the returns from different assets move in sync with each other, then the standard deviation of the portfolio will mirror that of the assets within it. If they move up and down at different times, however, then they partially offset each other, reducing the standard deviation of the portfolio. In an ideal world, assets that are perfectly negatively correlated (i.e. one moves up as the other moves down) would completely offset one another, minimising risk in the portfolio. The ideal portfolio, therefore, is one that minimises risk for a given level of return, which is achieved through the diversification of assets within the portfolio. This 'efficient' set of portfolios is illustrated in the figure below.

Institutional investors want to be on this efficient frontier. Indeed, their 'fiduciary responsibility' requires them to be so. Where on the frontier they position themselves will vary, but all require risks to be below a certain level. They cannot afford to adopt a simple 'rule of thumb' that institutional investors use to ensure this is to only or dominantly invest in 'investment grade' assets, which are considered

Graphic 1: Optimal investment portfolios and the 'Efficient Frontier'



Source: Investopedia.com © (2003)

of very low risk of default, and which therefore protect the capital of the institutional investor. In fact, the 2007/2008 financial crisis has shown that even AAA ratings may not guarantee low risk.

Another shared characteristic is the need for minimum levels of liquidity. As large actors in the financial sector, institutional investors do not want their entry into, or exit from, markets to move market prices. A minimum level of liquidity is therefore required, though this varies, both between institutions and over time. Another aspect of liquidity is the ability to buy or sell financial assets at any time, which may restrict the willingness of investors to invest in assets where they are 'locked-in' for a lengthy period of time.

The financial crisis appears to have heightened these concerns. In a survey of investors, Prequin (2011) reports that 75% of investors are now looking for more liquidity in their investments and 30% will not invest in a fund with a lock-in period at all.

A final common feature is peer-group benchmarking. While institutional investors do aim to build efficient portfolios as described above, they are also concerned with their performance relative to their peers. That is, 'success' or 'failure' is not always viewed purely in relation to risk-adjusted returns, but also to how the institution fared relative to other institutions. In some ways this is sensible, as performance is a relative concept. In other ways it is less sensible, however. The Myners Report (2001) was heavily critical of this practice amongst UK institutional investors; such criticisms have become more widespread. As described above, different institutions will have different levels of risk tolerance. As we shall see, they also have different time horizons (Warwick Commission Report, 2010). This suggests that 'optimal' investment portfolios will differ considerably, which would lead to different financial 'performance'.

Benchmarking makes sense if all institutions are the same, but of course they are not. Although all institutional investors have a fiduciary requirement to maximise risk-adjusted returns and have minimum risk and liquidity requirements, the levels at which risk and liquidity thresholds are set vary significantly between institutions. Below we consider determinants in this respect.

4.1.1 Asset-liability structures and mandates

Institutional investors need revenues to meet the payments they are required to make: pension funds to pay pensions; insurance companies to pay insurance claims. It is important, therefore, that the pattern of returns is aligned with these payments. More formally, their assets (investments) need to match their liabilities (funding commitments).

One reason why those seeking long-term funds target institutional investors is because of the long-term nature of their liabilities. This is not constant, however. A pension fund's level of 'maturity', for example, is determined by the proportion of its members who have retired. This can be measured by the 'premium to payment' ratio, which captures the level of income relative to expenditure. A fully 'mature' fund has to meet pension obligations each month for all of its members, and so will have a low ratio. It cannot, therefore, afford to take on risk, but must guarantee that its income is sufficient for these commitments. A 'young' fund, in contrast, receives contributions from its members, but as few of these have yet retired, does not yet need to pay out any pensions; it has a high premium to payment ratio. Such a fund can afford to take on far more risk, with the potentially higher returns being used to build up a fund to pay future pension obligations.

Younger funds also have greater flexibility with respect to liquidity. As most payments are not required until a later date, it is less important to be able to liquidate all investments immediately. More investments can be made in relatively illiquid markets. Similarly, investments with lock-in periods are more feasible.

As pointed out above, most institutional investors have a fiduciary responsibility to maximise benefits for their members. This does not mean uniformity, however. First, institutions can interpret 'maximise benefits' differently.[9] Secondly, different institutions may have different mandates. This is most pronounced with SWFs and equivalent bodies. The China Investment Corporation, for example, has a mandate to generate returns ten years into the future and beyond.

As well as institutional investors, we also prioritised public entities such as MDBs and DFIs. In the next section we briefly consider the determinants of their investment and other activities.

9 See UNEP (2009) for an overview of fiduciary responsibility issues in relation to social and environmental aspects of investment policy.

4.2 Determinants of investment for public investors

While institutional investors seek to maximise financial returns for a given level of risk, this is not so for public investors. Generally speaking, the goal of such organisations is to maximise 'development returns', though there is considerable difference as to what that means, as well as the best way of achieving it. It is of course also important for public investors to have a minimum commercial return.

Indeed, it cannot be said that financial returns are unimportant. In some instances, the aim may be to demonstrate the commercial viability of investments, such that achieving high returns is important. Some, though not all, can only provide finance on commercial terms. Also, many – if not most – DFIs are required to be financial self-sufficient, so they have a strong incentive to invest in projects with reasonable rates of financial return. Finally, both DFIs and MDBs access finance on international capital markets and the terms on which they can borrow – and lend – will be influenced by their financial performance.

Having said that, these institutions are also able to access finance in the capital markets more cheaply as they are backed by governments (DFIs) or groups of governments (MDBs). This gives them greater flexibility than private institutions. In particular, it enables them to potentially assume higher levels of risk in their portfolios,[10] not least because borrowers will be more reluctant to default on loans from official borrowers.[11] Furthermore, in some cases, DFIs or MDBs have access to concessional finance, which they can for example blend with commercial investments or loans.

While public investors have greater commercial flexibility, they may face more restrictions in terms of their investable universe. Some, such as the UK's Commonwealth Development Corporation (CDC) and the Norwegian Investment Fund for Developing Countries (Norfund), are required to invest all or largely in LICs, for example. The creation or expansion of such dedicated funds by public investors may be one of the best ways of encouraging both public and private investment in renewable energy and energy efficiency in LICs. Others have sectoral requirements, with defined proportions of portfolios being allocated to infrastructure, or to agriculture, for example. It seems particularly valuable to think about the creation of funds dedicated to renewable energy and energy efficiency in developing countries.

10 See Spratt and Ryan-Collins (2012) for a broader analysis of the investment determinants of DFIs.

11 No borrower, for example, has ever defaulted on a loan from the IFC.

5 Obstacles to investment: Insights from practitioner interviews[12]

A number of studies have examined the obstacles to private investments in renewable energy. In line with the way that investors think about asset allocation issues, these are generally categorised as types of risk. Rather than to replicate this process, we have reviewed this literature[13] and propose the following set of risk categories, which we believe capture the main issues to be addressed:

- Economic risks (e.g. risk-return considerations)
- Project risks (e.g. technology failure; inadequate human capital)
- Regulatory risks (e.g. maintenance of FIT structure)
- Country risks (e.g. asset appropriation)

Although we did not confine ourselves to these categories, they were helpful in structuring the interviews undertaken with investors, and other key actors. To get insights from a variety of perspectives, different types of relevant actors were targeted. These include: pension funds, SWFs, private equity funds, hedge funds (which manage institutional investor money), bilateral development finance institutions and multilateral development finance institutions.[14] Interviewees are not quoted directly, but points made during the interviews are integrated in this section. These are organised according to the four types of risk introduced above.

5.1 General comments and points

An important distinguishing feature of those interviewed was their investment mandate. Some, such as pension funds and insurance companies seek to maximise risk-adjusted returns for their members with no restrictions on the investable universe.[15] Private investors with more focused mandates may specialise in particular sectors or geographical areas, and invest through public or private markets. Institutional investors may gain exposure to these markets directly, or by investing in specialised funds. Non-private entities, such as DFIs, also face restrictions, being required to focus on LICs or renewable energy, for example.

Investors do not view potential investment in isolation, but in comparison to the alternatives. The wider the investable universe, the greater is this range of alternatives. Those with more knowledge of a market tend to have a more accurate understanding of risks and opportunities than those with less. The wider the potential investment universe, the harder it is to have detailed knowledge of all the potential markets and sectors. Acquiring this information is costly and time-consuming. We can see, therefore, that investors with a global outlook will need more convincing of the merits of particular investments in LICs than those that focus more on emerging and developing economies.

A similar point can be made for sectors. While some large institutional actors invest in renewable energy projects in developed markets, others do not. An investor with (successful) experience of a sector in developed markets will be more open to a similar investment in developing countries. As we shall see, however, it is not quite as simple as this: many investors do not see these as the same type of investment, and therefore do not use the same criteria to assess them.

As well as these underlying distinctions, the fundamental differences between renewable energy and energy efficiency investments were stressed. To paraphrase one interviewee, renewable energy projects have one customer (i.e. the entity that purchases the power), while activities such as energy distribution have millions. As we shall see, the underlying economics of these types of investment differ radically. Most notably, energy efficiency projects typically pay for themselves within a relatively short period of time. Renewable energy investments, in contrast, may only be commercially viable with some form of public financial support, and over long payback periods. The risks associated with each form of investment are thus quite different.

A final introductory point is that institutional investors are cautious. While there are varying levels of risk tolerance, there is a uniform dislike of innovative or untried investments; a good example is the general preference for hydro power and on-shore wind, followed by solar, as the most

12 From literature & interviews.

13 See Parhelion (2010) and IFC (2011), for example.

14 A list of interviewees is provided in Appendix 1.

15 In practice, institutional investors' portfolios will be strongly influenced by weightings in benchmark indices.

'mature' renewable sectors. Therefore, show- casing successful and profitable investment in renewables or energy efficiency in LICs by donors/DFIs may have a particularly valuable demonstration effect.

There was also wariness about these kinds of investments from those who feel they heeded similar stories in the past, only to be disappointed. An example is investors who participated in projects generating carbon credits to be sold into the carbon market. An investor who undertook such an investment in 2005 would have estimated returns based on the future carbon price predicted at that time. 2013 saw carbon credit prices fall to record lows of less than $5, which compares to the $50 that some commentators think necessary to incentivise a wholesale transition to non-fossil fuel based energy supplies.

Institutional investors are thus highly unlikely to be the first investors into any market, sector or instrument. As we consider how such investors could be persuaded to support IGG in LICs, it is important to remember these caveats.

5.2 Economic risk

There was agreement that, fundamentally, the investment decision is one of risk and return: to be an attractive opportunity, returns must be commensurate with risk. Most – though not all – interviewees thought that a basic problem with renewable energy investments in LICs is that a good return-risk ratio is not available yet.

This was not mainly an issue of the investments in terms of sector, however, but more because they are located in developing, and especially LICs. Importantly, this leads institutional investors to think of them as a very different form of investment than in developed markets, indeed like a different class of assets. In developed economies, and particularly in European markets, renewable investments are sold to institutional investors as low-risk, stable investments which provide predictable income because of long-term price agreements. This is attractive to many institutional investors. In developing countries, in contrast, the same investments are seen by investors as high-risk, high-return, private equity type investments. Given the risk-tolerance of institutional investors, high-risk/return assets will only ever make up a small part of their portfolios. Maturities also differ. Whereas investors may hold renewable assets in developed markets for the long-term, this is less likely in developing countries.

These differences are reflected in return expectations. At one extreme, it is possible to obtain 20-year debt for a project in California at 200 basis points over LIBOR, while European investors may expect up to 400–500 basis points. Private equity investors, and institutional investors who approach developing economies with a private equity 'mindset', however, are looking for around 25% returns.

These expectations appear excessive and unrealistic, particularly in the light of the financial crisis of 2008. We found some evidence that investors are adjusting to low yields in developed country fixed-income markets, but more through a search for alternative sources of high yield, than a lowering of return expectations. The experience of DFIs, as well as developing country focused investors, suggests that it is possible to profitably invest in our sectors of interest in LICs. One fund has averaged 13% returns per year, for example. At present, however, this may be insufficient to attract large institutional investors.

The argument that returns of this scale are achievable elsewhere and do not carry the risks associated with renewable energy in developing countries may be overstated. In particular, it may both underestimate potential returns, and overestimate the risks of renewable energy and energy efficiency in LICs. In that sense, they may be missing profitable opportunities. This is a problem. Institutional investors are considered ideal investors in renewable energy projects in developing countries because they could provide long-term 'patient' capital with reasonable return expectations. As long as these types of investment occupy the high-risk/high-return part of the investment portfolio, however, this will not be so. The more expensive the funding for renewable energy projects, the higher the consumer tariffs need to be to meet these return expectations. Perversely, therefore, the poorer the country the more expensive its energy may need to be to attract private investors.

Problems in the carbon market accentuate this trend. As described above, investors who rely on selling credits into the carbon market have seen prices plummet. Given the failure to launch a 'cap & trade' market in the US, there is little prospect of a global market developing as had been foreseen. The European Trading System remains the primary international market, and there an over-allocation of credits – combined with the lack of demand from elsewhere – has put severe downward pressure on prices. In this context, it was suggested by one interviewee that only projects with short payback periods (i.e. less than 5 years) will be fundable where they are reliant on selling credits into the carbon market. Uncertainty over future prices beyond that is likely to be prohibitive.

The very low level of carbon prices is particularly problematic for investments in relatively high-risk countries. Investors require high returns to compensate for these risks, but a very low carbon price makes these impossible to achieve through the sale of carbon credits. Efforts to increase the flow of Clean Development Mechanism (CDM) projects into low-income developing countries are very challenging in this environment.

The carbon market is not the only route to economic viability, however. Renewable energy projects in developed markets are typically supported by public interventions. In the EU and many other parts of the world this has generally been through FITs, where a premium price is guaranteed over the long-term. In the US and some other regions, tax breaks have more commonly been used. The aim is the same: to boost the long-term profitability of renewable energy projects, ensure economic viability, and therefore attract commercial investors.

Developing countries are no different: more than 50 countries now have FITs, and an increasing proportion of these are developing countries. Although these types of mechanisms can successfully mitigate economic risk, they inevitable create regulatory risk. Will the mechanism be maintained for as long as is needed, for example, which may be up to 20 years in some cases?

This appears to be the main reason why investors view renewable energy projects in developing countries differently from the same project in some developed economies. Although some developed countries have retrospectively changed their tariffs, the prospect of this happening in developing countries is thought more likely. This may not be only a matter of political will but of affordability. Given current economic conditions, as well as the duration of many FITs, it is impossible to guarantee against this completely.

The expectation has long been that the decline in renewable energy costs, combined with upward pressure on fossil fuels, will ultimately create a cost advantage for renewables. Subsidies are seen as a temporary way of leveraging investment before this point is reached. And there is evidence to support this expectation. Prices of solar power cells have fallen between 40% and 50% in recent years. Wind energy production is increasingly competitive in some regions of the world. This is the most straightforward route to economic viability – to only invest in projects that *are* economically viable and do not require subsidies, or the sale of credits to the global carbon market.

Some investors do this already. Although it is difficult to find projects that can compete with fossil fuels, even though their price has been so high, they do exist it seems. Many developing countries have distinct advantages in this respect. Hydroelectric power generation is now commonplace. A large proportion of the untapped renewable energy potential in the world is located in developing countries. Africa is the region with the greatest potential.

While we do not doubt it is possible to find viable projects today, these remain the exception rather than the norm. Specific locations will be particularly suited to the generation of certain forms of renewable energy. The need for such strict conditions, however, makes full-scale replication impossible. Although it has narrowed, there remains a cost differential between fossil fuel and renewable energy production in most instances, and this is significant for some forms of renewable energy. As long as this remains, most projects will need public support, which creates regulatory risk. Mitigating this risk, therefore, is a precondition for leveraging large-scale private investment.

5.3 Regulatory risk

Most large-scale investment projects are dependent on the maintenance of a supportive regulatory framework. This is particularly true for infrastructure and utilities. Renewable energy shares this dependence, but has an added complication. Rather than simply receiving the market price for energy produced, renewable providers will often receive a premium over this price, and this premium will be guaranteed for a set number of years.

Credibility is key. It is simple for a government to announce a FIT at a suitable rate for a long time period. The question is whether this commitment will be met, especially in difficult times. Investors may take confidence from the presence of long-term renewable energy targets, but this also depends on the credibility of this commitment.

Rightly or wrongly, investors have more confidence in commitments from developed than developing country governments.[16] The latter either have to earn credibility by establishing a track record, or acquire it from elsewhere. The first option raises a classic problem: how can you build a track record of delivery when you need to have one to

16 A number of things may underpin this: adherence to international agreements, such as the Kyoto Accord; sufficient national income to finance the commitment for the long-term; less acute development needs; greater public support for environmental issues (though this varies across developed countries).

have anything to deliver? In some cases, countries will be establishing a FIT for the first time, and so cannot have a track record. In others, a FIT or equivalent may have been on the statute books for some time but not used; again, a track record is not possible.

If a track record cannot be demonstrated, the general credibility of the government becomes crucial. Investors would look at the government's track record in other areas: its ability to execute and maintain policy positions over time; its ability to resist opposition to these policies, particularly from powerful vested interest; its strategic commitment to increasing the role of renewable energy, perhaps as evidenced by credible targets. One way of assessing the credibility of commitments is to analyze how difficult they are to change: is the FIT enshrined in law requiring legislation to change it, or can it be changed as an administrative decision of the executive? How supportive are political opposition groups, and what is their likely influence over the lifetime of the mechanism?

While all of these factors may help, it is clear that they would not be sufficient to mitigate regulatory risk sufficiently to attract a significant proportion of investors. If more 'credibility' is required, where might it be required? There are two main options.

First, a FIT may be supported by an external body, such as a bilateral or multilateral donor. For example, the EU is in discussions with the Ghanaian government to provide financial support for its FIT. In Uganda, KfW contributes a proportion of the government's FIT, increasing it to levels thought to be sufficient to attract external investors; this is accompanied by provision of cheap credit. As well as providing more financial credibility, such mechanisms may provide additional confidence: investors may believe that developing country governments are less likely to renege on their own commitments if influential donors are also committed. This brings us to the second option.

Investors of all kinds recognise that governments are more likely to honour their commitments when influential agencies are co-investors. For many decades the IFC has operated its B-Loan programme, where IFC is the 'borrower of record' for syndicated bank loans, allowing other members of the syndicate to borrow on the same terms as IFC. Importantly, however, the structure also means that any default would be to a loan from the World Bank Group, which borrowers are reluctant to do. Indeed, it is remarkable that no borrower has ever defaulted on a loan from the IFC.

A number of interviewees made the point that they would be far more willing to invest if they were part of a consortium, which contained investors from other countries, possibly an investment from the government of the developing country concerned, and certainly a bilateral or multilateral development agency such as the IFC.

This is nothing new of course. 75% of IFC's energy portfolio is now in renewables, and they routinely co-invest as described above. The same is true of bilateral DFIs, with some projects having more than one such agency involved. What does not yet exist, however, is a formalised mechanism, which could attract institutional investors. The IFC is currently raising equity for an infrastructure equity fund, but not for the renewables sector. Were they to create such a 'wrapper' that allowed diversified exposure to renewable energy in developing countries, while also mitigating regulatory risk through IFC engagement, there might be considerably more appetite amongst investors.

The final key question with respect to regulatory risk is who pays the bill? Providing a mechanism such as a FIT comes at a significant cost. In developed countries this has often been covered by adding a surcharge to electricity bills. This is problematic in developing countries, particularly LICs, for two main reasons.

First, the reason why LICs need to shift to renewable energy in the first place is because of the nature of past industrialisation processes of other countries. A basic application of the 'polluter pays' principle would require these countries to compensate LICs for costs they have to bear as a result of this. Indeed, this is the basis under which developed countries have committed to finance additional costs resulting from climate change mitigation and adaptation in developing countries.[17] A FIT falls into this category as it is designed to offset the higher costs of renewable energy relative to fossil fuel energy. There is a clear moral case for the countries that have in the past created much of the problem – i.e. today's developed countries – to meet these costs, particularly where the alternative may be to increase the electricity bills of populations in countries where many people cannot afford electricity already.

17 Under Article 4 of the United Nations Framework Convention on Climate Change (UNFCCC) the developed world, including the US committed to provide 'new', 'additional', 'adequate' and 'predictable' resources to developing countries to fund the additional costs of mitigating and adapting to Climate Change (this was reiterated under paragraph 1 of the Bali Action Plan).

Second, as well as 'responsibility' there is 'capacity'. Some LICs may lack the institutional capacity to design and implement mechanisms such as FITs successfully. On the financial side, LICs may not be able to afford to maintain a sufficient FIT for the time required, or may become less able, for example if hit by an external shock, and investors know this. A commitment to support a FIT by a bilateral or multilateral donor is likely to be far more credible than one that is fully funded by a developing country, particularly a low-income one.

On both ethical and practical grounds, therefore, a case exists for donors to support price support mechanisms in LICs. A major problem, however, is the required level of this support. As discussed above, investors may require very high returns. In order to generate such returns, projects must attract high revenues. To be compatible with existing energy costs, this would have to be covered by mechanisms such as FITs (or tax breaks, which raise similar questions of who pays the bill). Given the different return expectations of investors in developed and developing markets, it is clear that mechanisms such as FITs would be much more expensive in the latter than the former.

Unless private investors could be persuaded to lower return expectations to more realistic levels, or credible commitments exist to provide finance at the level and for the duration required, this may be insurmountable. While different investors have different return expectations, the question is whether those with more reasonable expectations exist in sufficient scale to meet the very large investment needs. Our strong concern is that, at present, this is not the case.

5.4 Project risk

For most interviewees project specific risk was not a major issue. Most agreed that renewable technologies are now sufficiently proven and that developing countries have advantages in terms of renewable potential, due – for example – to intensity and length of sunshine. For some, construction risk can be mitigated by partnering with companies from their home countries with long experience of building and operating renewable energy facilities.

One issue raised was complementary infrastructure, such as for energy distribution. While it is possible to reduce construction risk of building the installation, problems can arise in connecting to the wider network. The reliability and capacity of power grids in developing countries can be a cause for concern, and this is heightened in LICs. Some investors address this by also investing in transmission and distribution, though this also brings challenges. Some expressed a preference for greater MDB involvement in energy distribution and transmission especially where cross border issues were involved, as this makes regulatory issues more complex. Furthermore, MDB finance for investing in LICs in energy transmission is done in IDA terms, which implies lower costs, and therefore higher overall profitability.

Another advantage of co-investing with influential agencies and particularly the host government, is that this will increase the probability of required grid improvements being completed and maintained. More generally, coordination between domestic and external agencies – both public and private – is essential to ensure that increased generation capacity is matched by improvements in distribution and transmission. Donors and MDBs can play a valuable coordination and credibility role here.

5.5 Country risk

To some degree country risk is captured in the risks already described: higher country risk is reflected in higher regulatory or project risk. There are some distinguishing features, however. As one interviewee pointed out, there is little value in a government honouring its FIT, if the assets are nationalised. The weight given to a successful mitigation of economic, regulatory and project risks will therefore be a function of perceptions of country risk.

Some investors thus use country risk as a first screen for their investments. 'Should we be here in the first place?' is the question one interviewee poses when considering any investment. As discussed at the outset, however, the importance of this question depends on the size of the investable universe open to different investors. For mainstream institutional investors who can invest anywhere in the world, this is an important issue. For investors who focus more on developing countries it is less relevant, and for those who target LICs the issue is less important still. This is particularly the case with DFIs who are mandated to invest in LICs of course. For commercial investors, a minimum level of stability is clearly needed for any investment to be viable, but beyond that the range of alternative locations for investment is likely to be decisive.

The political risk insurance cover provided by agencies such as the Multilateral Investment Guarantee Agency (MIGA) can be helpful in assuaging investors' concerns, but again this is a risk-return question. Insurance comes at a cost, which needs to be more than offset by higher returns, relative to alternatives.

5.6 Summary of interview material

We end this section where it began: investors will only consider projects that provide sufficient risk-adjusted returns. From their perspective, investments in renewable energy in LICs are very high risk. While these risks can be mitigated they cannot be eliminated. Some investors believe that regulatory risk – i.e. where commitments such as FITs are not maintained – cannot be mitigated sufficiently, and so either avoid such investments entirely, or look for projects that do not require public support to be economically viable.

For investors who think risks can be mitigated, the support of donors is important to add credibility to this process. This can take a variety of forms: co-investing; contributing to financial support mechanisms; or providing equity or loans on concessional terms.

The situation with energy efficient investments is different. Very few interviewees were engaged in these types of investments in developed markets, let alone LICs. While there was acceptance of the business case, the problem was in developing workable financing models. Progress has been made on this, particularly in the EU, but problems remain, particularly the fact that many small projects raise transaction costs. Some interviewees suggested that proving a replicable, simple structure in developed markets is required before they would consider these sorts of investments in developing countries.

The interviews therefore yielded some clear recommendations for donors. For renewables, donor support is most likely to be financial in nature. This is even more the case if the goal is also for 'inclusive' investments. Incentivising private investment in renewable energy comes at a cost. Ensuring investments are also inclusive, so that *affordable* access is extended to the poor, may entail additional costs. Ensuring 'strong' inclusivity – i.e. where the poor gain more access than wealthier groups – will add further to the bill. Bearing in mind the very high returns required by institutional investors, the finance required could be significant. Energy efficiency investments do not really need financial backing to be viable. Rather, support is needed to develop and prove structures that reduce transaction costs, overcome informational barriers, and diversify risk. Even in the case of renewable energy, support by donors and DFIs should not just be limited to financial support; institutional support, for example for designing regulations – especially where these include cross border issues – is a valuable role they can play. Also more generally, coordination of different actors, both private and public, is also a valuable role, DFIs, donors and MDBs can take on.

6 Some practical examples

In this section we present examples of successful private investments, details on the approaches taken by two leading European DFIs, and some examples of financing mechanisms that have been used.

6.1 Some successful private investments

6.1.1 Nzema Solar plant in Ghana: overcoming economic risk?

This solar plant, planned for Nzema, western Ghana, will be the largest in Africa. The project is being developed by Blue Energy, a UK-based SME, backed by a larger UK company. The company is in discussion with a range of potential equity investors and debt financiers and hopes to reach agreement by the middle of 2013.

The $400mio plant near the village of Aiwiaso will generate 155MW, enough electricity for 100,000 homes, increasing Ghana's electricity capacity by 6%. It will meet 20% of Ghana's renewables target, which is to generate 10% of its energy from renewable sources by 2020. The plant will be connected to the West Africa Power Pool Transmission Line,[18] thus also generating power for countries neighbouring Ghana. Construction is planned to start in 2013, with full capacity reached by 2015.

The plant will use photovoltaic cells to convert sunlight directly into electricity. Due to the suitability of the location there is a high degree of certainty in predictability of output. As well as enjoying good solar radiation, the site has access to the major road system and is within easy reach of a deep-water port.

In addition to supporting 'green' economic growth by increasing electricity supply from sustainable sources, the project developers argue that it will have additional 'inclusive-type' benefits. According to Blue Energy, for example, the two-year construction period will create a large number of jobs, 200 during operation, and around 2000 more through linkages. The plant is expected to contribute $100mio in tax revenue over its lifetime. Blue Energy will also provide a corporate social responsibility (CSR) programme including reliable electricity, healthcare and schools, as well as skills training.

Two factors lie behind the recent progress of the project. First, aiming to meet its renewable targets, Ghana has improved its regulatory environment through its 2011 Renewable Energy Act, which provides a 20-year FIT. This mitigates regulatory risk for investors, as the time frame for the FIT is commensurate with that for the project. Nzema would be the first project to go ahead under this Act, which guarantees premium prices for electricity for the working life of the site. This regulatory change has been decisive in increasing the relative attractiveness of Ghana. Second, a glut of solar panels on world markets has seen prices fall by around 40%. Costs have fallen significantly, while revenues have increased and become predictable for the long-term. The 'economic risk' attached to the project has therefore been substantially reduced.

Enshrining the FIT in the Renewable Energy Act is designed to provide confidence to investors that the FIT will be maintained. It is therefore an attempt to *credibly* mitigate regulatory risk. Ghana is currently seeking EU funding for its Renewable Energy Fund to help fund the FIT for a 5 to 10 year transition period from 2013. The EU is running feasibility studies into this proposition, the results of which will be important in investors' views of 'regulatory risk'. An interesting question is whether investors will have more confidence in the tariff if it is backed by the EU.

The project uses proven technology in an ideal location. 'Country risk' for Ghana is also low. The project is therefore an interesting test case: if the EU agrees to back the FIT, then all major risks would appear to be mitigated. In this situation the project would be as attractive as it is possible to be in some ways, so its ability to attract investors (or not) would send important signals about the viability of other projects, particularly less attractive ones, in Ghana, as well as other solar projects in other LICs.

18 The West African Power Pool (WAPP) was agreed during the 22nd Summit of the ECOWAS Heads of State in 1999: *"The vision of WAPP Organization is to integrate the national power system operations into a unified regional electricity market – with the expectation that such mechanism would, over the medium to long-term, assure the citizens of ECOWAS Member States a stable and reliable electricity supply at affordable costs."* http://www.ecowapp.org/

6.1.2 Wind power in Kenya: a complex set of risks

This wind farm project, financed by a complex consortium of power companies, investors and DFIs, could provide a major developmental and sustainability boost to one of the poorest parts of Kenya. The Lake Turkana Wind Power Project (LTWP), a $760mio wind farm in northeast Kenya, will generate 300MW for the grid, about 20% of current installed capacity. Covering 40,000 acres, the project would be sub-Saharan Africa's largest wind farm, as well as the biggest single private investment in Kenya's history. The site is particularly well suited to wind power: data collected since 2007 show that the site has some of the best wind resources in Africa.

The LTWP tax contribution is estimated at $590mio over the life of the investment. About 2,500 jobs will be created during construction and 200 during the operation period. The plant is expected to reduce the consumer price of electricity. As well as the 'green growth' benefits of a greater supply of clean energy, a reduction in the cost of electricity would have positive effect on real incomes, particularly of poorer groups. Marsabit West County is among the poorest in Kenya and the farm site is one of the poorest districts in Marsabit. A CSR programme is being finalised to ensure that the lives of local people are improved. LTWP proposes to use revenue from carbon credits and retained profits to fund a trust for this purpose.

The project was registered as a CDM project in 2011, with a gold standard rating. According to CDM documents, without Certified Emission Reductions (CERs) the project was not commercially attractive, as the tariff offered by local power distributor KPLC (Kenya Power and Lighting Company) in 2008 was too low. The CDM thus boosted potential returns from the project, mitigating economic risk sufficiently to attract private investors.

Despite extensive involvement of public agencies, the CDM project document says: *"There is no public funding involved in this project activity. The financing is being arranged through a purely project finance structure with commercial, market-driven terms and conditions"*. Not all aspects are proceeding on a commercial basis, however. The transmission line, for example, is being produced by the Kenya Electricity Transmission Company (KETCO) with concessional funding from the Spanish government.

Kenya Power has signed a power purchase agreement to purchase a set quantity of electricity from LTWP at a fixed price over 20 years. Kenya has had a FIT applicable to wind power from 2008, which should mitigate economic risks. Despite these attractive characteristics, however, the project has suffered from a series of delays. In 2009, the lead investor GlobalEq left the project. According to CDM documents, the small-scale of the developer and lack of track record, contributed to perceived risk. There was also some country risk related to political stability and the general investment climate in Kenya. Furthermore, despite its suitability in terms of wind, the location has poor infrastructure, as well as internal security issues.

Late in 2010, the government withdrew its offer of a sovereign guarantee, jeopardising financing through a sharp increase in economic and regulatory risk. However, it subsequently provided a 'letter of comfort' that it would assume the risk of KPLC and KETCO defaulting, which whilst less robust than a guarantee has been acceptable.

The most recent problem occurred in October 2012, when MIGA pulled out of providing guarantees. A number of reasons have been cited in the press. For example: that the Bank believed the plant would not provide sufficiently affordable electricity to consumers while Kenya Power held the power purchase agreement (PPA); or, that Kenya Power as exclusive purchaser might be exposed to the liability (and heavy penalties) for surplus electricity produced if the network could not take it all (and there were fears that the transmission line may not be ready to deadline).

The situation remains fluid. In late 2012 it was reported that the Spanish firm Iberdrola had signed a deal with KETCO for four new substations, which will draw power from TLWP, so Kenya Power would not be the exclusive purchaser. It was also reported that the AfDB would offer a partial risk guarantee and was in discussions about 'political risk insurance'.

This project thus illustrates a combination of risks, with the inability to successfully – and permanently – mitigate these causing protracted delays. The expectation of the country is that there will be an exclusive power purchaser – Kenya Power – but this is unacceptable to some global organisations such as MIGA. It remains to be seen whether the parties will be able to reach agreement on these issues. This example highlights the fact that all major risks must be mitigated so that they are within a range that investors are comfortable with. If one aspect of this package unravels, the whole deal is imperilled.

Box 1: Kreditanstalt für Wiederaufbau (KfW) – Green Financing in Germany

KfW is a government-owned development bank, established in 1948 to support the reconstruction of the West German economy with $1.4bn from the Marshall Plan. It is one of the largest national development banks in the world and one of Germany's three largest banks. It provides financial services across various areas including: infrastructure, SME finance and business start-ups, housing, and environmental and climate protection. At the end of 2011, KfW's balance sheet stood at €494.8bn. As a bank with no branch network or customer deposits, KfW refinances its lending business almost exclusively in the international capital markets. In 2011 this was more than €79bn.

The bank's primary function is to provide long-term, affordable credit to strategic sectors, usually through private banks that provide a long-term loan to a borrower and then receive a refinancing loan of the same maturity from KfW. The commercial bank benefits from a partial credit risk exemption as well as favorable refinancing conditions with long maturities (10-20 years) and low interest rates, due to KfW's AAA rating.

KfW divides its domestic financing programs into three different business areas: KfW Privatkundenbank, which mainly provides financing to home-owners and housing companies; KfW Mittelstandsbank, providing funds to SMEs, start-ups and the self-employed; and KfW Kommunalbank which promotes infrastructure investment by municipalities, municipal enterprises and social organizations.

In 2011, climate and environment protection financing, both domestic and abroad, represented around a third of KfW's lending volume. This is in part due to the commitment of the KfW to help achieve the targets set by the German Government, which include a 40% reduction of carbon emissions by 2020 and a share of renewable energy production of 35% by 2020 ('energy turnaround').

Over the period 2012-2016 the KfW seeks to provide more than €100bn for investments in the energy sector in Germany. The KfW Energy Turnaround Action Plan includes financing for renewable energy use such as offshore wind farms, for energy-efficient refurbishment and construction of residential buildings, and for larger municipal investments in energy efficiency.

KfW was involved in over 40% of all investments in renewable energy in Germany in 2010. The figure for wind energy – almost 80% – is particularly high. In 2011, KfW financed the energy-efficient refurbishment and construction of around 262,000 homes. Every second newly-built home in 2011 was funded by KfW to meet the KfW Efficiency House standard. In 2010 and 2011, the energy-efficient modernizations and new builds that KfW supported helped achieve an average of 23% of the annual saving needed to reach the 40% reduction in carbon emissions by private households set by the government.

Source: KfW Annual Report 2011. Report no. number missing! KfW Annual. 2011. Accessed March 6, 2013. http://www.kfw.de/kfw/en/I/II/Download_Center/Financial_Publications/Annual_Reports.jsp.

6.1.3 Mphanda Nkuwa Hydropower in Mozambique

Mozambique has 12.500 MW of power potential, most of which is on the Zambezi River. To date the sole developed potential is the hydropower plant of Cahora Bassa (2.075 MW) upstream of Mphanda Nkuwa. The power supply in Mozambique and neighbouring countries has become a critical constraint in recent years. With current capacity of 600 MW, Mozambique faces an ever increasing growth in unmet demand; projections show that on average 1,554 MW will be needed in coming years just to meet the needs of the population. Located on Zambezi River, between Cahora Bassa and Tete, this hydropower plant will have an annual generation of about 8,600 GW/per year.

A large percentage of power produced will support the electrification and development of Mozambique. The surplus will be exported, mainly to South Africa, reinforcing the role of Mozambique in the regional framework of energy integration, and earning additional foreign exchange revenues. There is a bilateral agreement between Mozambique and South Africa, for the sale of the electricity, which implies some disputes, that the World Bank is helping in a major way to bridge (interview material). This illustrates the additional complexity of inter-country projects and the positive role that multilateral institutions can play in resolving them.

A benefit will be the contribution to the feasibility of CESUL – power transmission line that will connect the centre of Mozambique to the South – through the power production based on a renewable resource. At regional level the

Mphanda Nkuwa Hydropower Plant will also contribute with 1,500 MW of clean energy generating a reduction in emissions of greenhouse gases (GHG) in the Southern Africa region.

The project has been in development for a long time (7 years). There is parallel World Bank (IDA) involvement in developing transmission capacity. Camargo is involved in the investment in generation of the Project, jointly with Brazilian Electrobras and French *Électricité de France* (EDF), as well as *Electricidade de Moçambique* (EDM) from Mozambique. EDM does not contribute capital, but provides a concession for water for 25 years, and an option for another 75 years (interview material). Camargo decided to go ahead with investment in such a big project, totalling around $5bn, given their experience as largest hydro investors in Brazil, and because of its potential profitability.

A key bottleneck for this project was the lack of an appropriate legal framework, which was overcome when Camargo funded the development of the legal framework for auctioning of bidders. While there was no economic risk in the project itself, as energy generation pays for itself, transmission does not. To address this, World Bank's IDA makes subsidised loans for transmission, and also acts as project manager. The integration of lines is required to make generation profitable.

The key phase from the Camargo perspective was project development, which was done by the private investors in this example, but where donor institutions could have played a key role. Project development costs can be very high and act as a major disincentive to large investors.[19] Mitigating this form of project risk is thus an important role for donor agencies and it cannot be assumed that the private sector will be prepared to absorb these costs, particularly given the other risks that often have to be mitigated in projects of this kind. As well as playing this role, Camargo's view is that MDBs and bilateral agencies should focus more on helping design energy regulatory systems, including for tariffs. Such regulatory frameworks could be especially valuable for connections between countries in Africa that can benefit from different seasonality, relevant for supply of energy. Lessons could be drawn from European experience, the role of European Investment Banks (EIBs) and Trans-European Networks (TENs).

19 Recognising this problem, the Private Infrastructure Development Group (PIDG) has launched dedicated project development facilities to take projects to the point where they are investment-ready. These are InfraCo Africa, and InfraCo Asia.

6.2 Some examples of financing and support mechanisms

As we have seen, private investors may use a variety of forms of investment – public or private equity, or loans of various forms. Similarly, public agencies such as DFIs or MDBs use a range of tools to facilitate such investments: co-investing, providing concessional loans or technical assistance, underwriting investments with guarantees, or providing financial support (and so enhanced credibility) for mechanisms such as FITs. Non-financial support, in terms of know-how and logistics is also provided. In this section, a small number of these mechanisms are showcased.

6.2.1 Global Energy Transfer FiT (GET FiT)

GET FiT was created in 2010, with resources from the German, UK and Norwegian governments, and support from Deutsche Bank and UNDP. Its aim is to support existing and emerging policy structures that appropriately adapt best practices to specific national contexts and that provide private investors with the policy: *"transparency, longevity, certainty and consistency"* (TLCC). The types of support under GET FiT include public money for renewable energy incentives (particularly linked to FITs), risk mitigation strategies such as international guarantees and insurance, and coordinated technical assistance to address non-financial barriers and create an enabling environment for project development. When tailored to meet specific national conditions, this combination of instruments aims to catalyse private sector investment to help achieve the goals of renewable energy scale-up and energy access.

GET FiT is designed to directly support FITs in countries that already have them in place or are considering enacting them. According to Bloomberg, New Energy Finance FiTs are linked to 87% of solar photovoltaic deployments and 64% of wind projects globally. Renewable energy policies are adapted for different countries, including those with low electrification rates and minimal electricity grid infrastructure. In recognition of this, GET FiT proposed to craft programs to support different types of policy models beyond FITs, including: 'Lighthouse' or stand-alone PPAs in countries that face grid integration constraints or for technologies that have a limited in-country track record; and mini-grids for off-grid applications in which performance-based incentives support decentralized multi-user energy systems, particularly in rural areas with limited grid infrastructure.

Box 2: Norfund and its investments in sub-Saharan Africa

In 1997, the Norwegian parliament established the Norwegian Investment Fund for Developing Countries (NORFUND) to reduce poverty and create sustainable economic growth by investing risk capital in profitable business in developing countries. Owned by the Norwegian Government, Norfund receives financing yearly, but good returns have enabled it to invest considerably more than its annual capital allocation, which has averaged around $200mio a year. Norfund invests directly in enterprises and indirectly through funds and loans. It focuses on some of the world's poorest countries, largely in Eastern and Southern Africa, Central America and Southeast Asia. By the end of 2011, Norfund had invested over $1.3bn.

By investing in some of the world's poorest countries, Norfund assumes higher country risks than traditional investors. Unlike traditional investors, it does not have a minimum return target for its portfolio, as this could create incentives to shift the portfolio away from high-risk projects. Rather than focusing on maximizing profitability, therefore, Norfund seeks to maximise development impacts, while obtaining positive returns. This strategy shows that it is feasible to invest directly in poor countries in a profitable way. Through its demonstration effect, it promotes private investment in developing countries, including the poorest ones, with a particular focus on renewable energy and energy efficiency. Since it was established, its average annual return on investment has been 10%. Norfund's portfolio companies currently employ 265,000 personnel. Moreover, in 2011 alone, the Fund projects paid over $750mio in taxes, fees and licenses to local authorities in the developing world. Given its investment approach, Norfund has developed real expertise in investment and risk management in LICs.

Norfund focuses on renewable energy, financial institutions, SMEs and industrial partnerships. Renewable energy is the most important and profitable sector, enjoying an average return of 13% since 1997. For 15 years, Norfund has mobilised private capital and expertise that would not otherwise have been available in poor countries due to high perceived risks. Working mainly as an equity investor, it both shares the high-risk exposure of equity and works closely with projects to mitigate risks. Given its role as a development investor, many of the projects Norfund considers are seen as high risk. Norfund is involved from the initial phase of projects. In some cases, Norfund provides grants through its Grant Facility to relieve the risk during project development and early operations. Norfund's Tender Guarantee Scheme, for example, is intended to encourage Norwegian companies to invest in poor countries.

Norfund works with SN Power to invest and build renewable energy projects in developing countries. SN Power is the leading commercial investor and developer of hydropower projects in emerging markets and produces over 5000GWh of electricity in developing countries through over $1.9bn in capital. One of Norfund's recent investments was in the company ToughStuff, a provider of affordable solar-powered energy solutions to users in developing countries. ToughStuff's mission is to bring affordable energy products to people 'living off the grid' to increase living standards, support the environment and build enterprise and employment. ToughStuff developed an inexpensive solar panel that can be used to charge a lamp, power a radio or charge cell phones. ToughStuff has sold over 700,000 products, retailed for less than $10 each.

Norfund's operations throughout the past 15 years have demonstrated that with the right combination of capital and expertise it is possible to deal with the many risks associated with investing in sub-Saharan Africa: country risk is not an issue, as they only work in relatively high-risk countries; they only choose to engage with countries with a minimum level of stability and capacity, however, which also mitigates regulatory risk; economic risks are mitigated by careful project selection and strategic co-investments; and project risks are mitigated by partnering with Norwegian companies.

Sources:

"About SN Power." SN Power. Accessed December 30, 2012. http://www.snpower.com/about-us/.

"Norfund Grant Facility." Norfund Grant Facility. Accessed December 30, 2012. http://norfund.no/index.php/en/norfund-as-a-responsible-investor/norfunds-grant-facility.

Norfund Report on Operations 2011. Report. 2011. Accessed December 30, 2012. http://norfund.no/index.php/en/publications/annual-report.

The first example developed as a pilot project is a 20 year top-up of FITs in Uganda, accompanied by guarantees granted by the World Bank, which reduce costs of borrowing for the developer. Terms for the FIT support have been agreed on with the Ugandan energy regulator, at a level thought sufficient to make project commercially attractive. Once this scheme has been proven in Uganda, it could be adapted for other countries.

6.2.2 KfW's financing mechanisms

In Box 1, we have provided information about KfW in Germany, including its important and growing role in financing energy efficiency and renewable energy in Germany. Most of KfW's efforts for the mobilisation of private capital for 'green growth' in developing countries is currently focussed on cooperation with the financial sector. The most widely applied approaches in this context are credit lines to local banks, the set-up of structured funds, guarantee schemes and securitisation, explained in more detail below. Credit lines are a very efficient tool for the mobilisation of private capital within developing countries, whereas structured funds are an approach that can attract the private sector and institutional investors within developed countries. To mobilise institutional funds on large scale, the experiences from both instruments can provide valuable insights on how to increase the volume of private investment opportunities and to contribute to further standardization (both essential conditions for institutional investors). Both credit lines and structured funds seem to be good instruments for risk mitigation by portfolio building through diversification. Credit lines can be particularly relevant for developing countries, including LICs.

a Credit lines for promotion of energy efficiency and renewable energy

Credit lines to financial institutions are used to fund investments for the purposes of increasing energy efficiency and using renewable energy sources (EERE). Such EERE credit lines are financial sector projects when the focus is on the introduction by the partner bank of the new EERE financial product (interview material).

Financial Cooperation (FC) schemes for EERE credit lines are geared to financial system development. The aim, therefore, is the introduction of a new financial product by financial institutions, with a view to these EERE loans being seen as part of their own product mix and offered on a standardised basis. EERE credit lines help to broaden the product range or, in some cases, facilitate access for certain target groups (low-income households and SMEs). As a general principle, for instance, all KfW programmes in the field of energy efficiency via the financial sector give banks the freedom to structure their interest rates and charges. No provision is normally made to subsidise the end borrower. The funding conditions for the banks may be slightly below those for a standard loan, should this help ease their entry into such a new market segment or programme.

EERE credit lines are specifically targeted at energy efficiency investments in housing construction and modernisation/building restoration and SME financing. The volumes of individual investments are rather limited: with schemes such as these, efforts are usually made to reach the 'mass market' of private households and SMEs with small-scale, frequently standardised products. The target groups mentioned account for the bulk of energy and electricity consumption, as well as GHG emissions, in numerous developing countries.

In principle, funding can be given to any kind of measures that lead to savings in primary energy and to a reduction of GHG emissions. Examples of typical EE investments in the case of SMEs and local authorities are: building envelope (insulation of walls, ceilings; replacement of windows and doors), systems engineering (heating and cooling systems, technical services), hot water supply, lighting, drive systems, heat and cooling.

If there is sufficient (long-term) liquidity available in the partner countries, it is possible to provide guarantees, e.g. for the partner banks, as an alternative to loans. Typical backers of climate protection funding projects are financial institutions with direct access to the target group which provide EERE loans as an independent product and seek to generate profits with them. Two-stage 'apex' structures can also be chosen in countries with fully functioning state development banks (e.g. India, Philippines). Private commercial banks tend to be the relevant financial institutions involved in such configurations, while the development bank functions as an apex institution.

Apart from inadequate long-term financing, KfW emphasizes as another obstacle a lack of awareness of the economic advantages and technical possibilities of sustainable EERE investments. This is exacerbated by insufficient knowledge and experience on the part of banks in the evaluation of projects designed to improve energy efficiency and finance renewable energies. Other problems are

absence of environmental awareness by loan recipients and, on occasion, the local shortage of modern technology.

b Structured funds

Generally speaking, the objective of the 'structured fund' (SF) is the low-cost refinancing of financial institutions, with the aim of expanding their range of financial products to priority target sectors. The SF is used regionally for cross-national schemes, in particular for the purpose of funding SMEs, housing development and environmental projects.

The SF combines the approach of an umbrella institution for the refinancing of several financial institutions with the instruments of structured financing, in order to obtain additional resources from (private) third-party investors. This can be used to produce a stronger leverage effect for the total amount. The scope and level of the duties involved in such funds and the high number of stakeholders make high demands in terms of project preparation and review, as becomes clear during implementation, with KfW acting as promoter, supervisory board member and credit committee member.

In the case of structured funds the investors assume a tranche of the total amount, tailored to their preferences in terms of volume and risk. The German Federal Ministry for Economic Cooperation and Development (BMZ) and other donors typically provide resources for the first-loss tranche. The mezzanine tranche, in which the KfW and DFIs have a stake, would bear any losses over and above this. Only if this were not sufficient would losses be incurred by the senior tranche, which consequently carries the lowest risk and is therefore also attractive – in spite of low interest rates – to private risk-averse investors. The financing is structured by distributing the overall risk, which means that there has to be enough information available to be able to split the pool of (sub) loans, with the individual risks of default to be expected, into the above-named risk categories.

The responsibility for management and control of the SF lies in the hands of a financial institution, which usually has to be set up and which (co-)selects the financial institutions participating in the programme and refinances and supervises the implementation of individual loans. An important task is risk management. Some responsibilities, which in other approaches are taken on by KfW itself, are in fact thus delegated to the latter. The tasks of the fund (including accreditation and controlling of the FI, risk assumption and distribution, loan terms and conditions, payment methods) are defined in guidelines.

An important prerequisite for the success of this approach is the existence of a sufficient number of financial institutions that already successfully work with a minimum level of business volume, portfolio quality, profitability and institutional stability.

A successful example is the European Fund for Southeast Europe (EFSE), which was set up at the end of 2005; further specific examples are the Regional MSME Investment Fund for Sub-Saharan Africa (REGFIMA) and the cross-national MFI refinancing facility.

c Guarantee schemes

Credit guarantee funds (CGF) or other guarantee facilities can be used in principle: (1) to mobilise local and/or international capital resources for partner banks (PB) to refinance sustained lending by PBs to micro, small and medium enterprises (MSME) (refinancing guarantees) and (2) to (partly) guarantee loans granted by PBs to MSMEs, so that the latter have sustained access to adequate funding (sub loan guarantees).

Besides credit lines and structured funds as the most widely applied instruments, KfW has been developing a variety of further financial structures for the mobilisation of private funds for 'green growth'. This includes the creation of funds-of-funds, where many standardized similar small projects are aggregated across different regions and/or countries, bringing the benefits of diversification and of a sufficiently large scale, to make them attractive to institutional investors, such as pension funds, which want to make large-scale investment (interview material).

With a particular focus on institutional investors, KfW bonds may be considered as another means to attract capital market funds for 'green growth'. Due to the AAA credit rating ensured by the German government guarantee, and the high degree of standardisation in terms of a capital markets product, they are highly attractive investment opportunities for institutional investors. However, they cannot be considered an instrument particularly focussed on the attraction of capital for 'green growth' in developing countries but rather provide for the general refinancing of all of KfW's activities, for which a quota of roughly 30% is used for climate and environment-related projects both within and outside Germany. In that sense issuing 'green' or climate bonds may be an interesting option.

6.2.3 Green Bonds

An interesting form of instrument to attract institutional and other investors are bond-type structures, which are particularly attractive for continental European institutional investors whereas Anglo-Saxon ones tend to prefer equity (interview material).

As developing country markets, including those of sub-Saharan Africa, have come to be seen as increasingly attractive, the level of yields necessary to attract investors has fallen – though, as we have seen in previous sections of this paper, many investors still expect very high returns. For those with more reasonable return expectations, however, bonds provide an interesting channel for attracting investment.

An instrument that has grown quickly in recent years is Climate or Green Bonds. These are bonds related to financing activities that mitigate climate change. A recent survey estimated that there are around $174bn in over 1000 climate-themed bonds, outstanding from 2017 issuers. Corporates – both public and private – represent over 80% of the total; development banks (that include World Bank, EIB and Asian Development Bank, as well as national development banks in Norway, South Africa and India) and financial institutions representing 13% of the total, with the rest corresponding to project bonds and municipal bonds (interview material). Of this total, around 20% correspond to renewable energy. If climate bonds are defined more broadly, to include issuers, with more than 50% of activities and revenues linked to the climate economy, then another total of over $200bn are added, making a grand total of almost $400bn.

One of the valuable features of Climate or Green Bonds is their thematic focus on projects mitigating climate change, which attract investors who wish to combine investing in an environmental way, with good returns; they may thus provide additional funding for climate change financing.

In the case of sub-Saharan Africa, Green Bonds are reportedly bought more by hedge funds and junk bond funds (interview material). This fits with our own findings on the approach of institutional investors to LICs, and an important aim would therefore be to alter these perceptions and attract longer term institutional investors like pension funds and insurance companies that are far more likely to be longer term holders. To tap the institutional investors market requires aggregation to scale, implying a suitable deal flow, with sizes probably above $500mio. Aggregation could facilitate entry into indices tracked by large institutional investors. The initiative of aggregation may be best undertaken by international public institutions, like IFC, or by national governments. Aggregation could also facilitate taking loans off private banks' balance sheets by securitization, allowing them more space to make more loans, hopefully in the same sector. It is important, however, that securitisation of bank loans needs to be done in a transparent, well-regulated and prudent way, to avoid the problems that contributed to the 2007/2008 crisis. Standardisation and third-party certification of climate bonds, based on agreed standards, could also be valuable. Allocating public capital to enhance credit of qualifying bonds, for example by taking first loss positions or providing policy guarantees (such as through the EU project bond initiative), could help these climate bonds reach investment grade, thus attracting a larger universe of investors. It could also lower the cost of this financing, making more renewable energy activity profitable.

6.2.4 Technical Assistance to reduce country risks

Although there are various mechanisms to adjust risk on the project level as described above, there remain aspects of perceived country risk that stem from the political and regulatory level and that can only be partly reduced by the mechanisms and tools described thus far (e.g. the political risk insurance cover by MIGA as described in 5.5).

A complementary approach to reducing risks for investors lies in providing technical assistance (TA) to developing country governments to support an enabling environment conducive to private investment. A sound enabling environment consists of, *inter alia*, strong institutions, legal systems and rule of law, high standards of public and corporate governance, transparency, competition, protection of investments, enforcement of laws, and dispute resolution mechanisms. Donors have vast experience in providing TA to governments to support the creation of a sound enabling environment for private investments, e.g. with regard to necessary policies, laws, regulations, institutions, and government capacity. Besides the bilateral programs donors dedicate to these issues, there are also a number of multilateral examples such as the 'Public Private Infrastructure Advisory Facility' (PPIAF).

Hence, through TA donors can also contribute to a reduction of the perceived risks on the project, political and regulatory level when they work together with the government

of the target country, thereby complementing their efforts in directly reducing or insuring risks of individual private investment projects. Linking investors' needs and priorities for a conducive business enabling environment with donor and multilateral technical advisory programs active in this field could be another area that the proposed Green Intelligence Investment Unit ('Green U') could pursue.

6.3 Summary of case-study lessons

As technologies become better tried and the cost of initial investment falls, the case studies show the existence of increasingly profitable opportunities for investing in renewable energies in LICs. Dedicated public funds – such as Norfund, but also others – seem particularly adept at identifying and co-investing in such projects with private investors. Their focus on these countries, as well as a deep knowledge of them, implies they see risks as obstacles to be overcome, rather than barriers that cannot be surmounted. The experience of other public investors, such as KfW, offers valuable lessons in the effective use of public funds and financing mechanisms to mitigate many of these risks.

Reducing information asymmetries is a crucial function that public agencies play. A particular important area is the reduction of project risk through the identification and development of attractive projects, which can be brought to the stage where they are 'investment-ready'. These activities significantly reduce transaction costs for investors, but also play a signalling role. If a bilateral or multilateral donor institution gives a project its 'seal of approval', investors are more likely to have confidence.

Although profitability has increased in many cases and project development costs can be greatly reduced, financial support through mechanisms such as FITs remains essential in most cases. Although this mitigates economic risks, it creates regulatory risk, which can be the most important consideration for investors, particularly where a FIT-type mechanism is essential for project viability. The credibility of these mechanisms largely determines a project's attractiveness to private investors; the role bilateral donors or MDBs can play in boosting this is therefore very important.

We should not allow the successes to be found to obscure the very large problems that remain, however. Most successful projects are funded by a mix of public agencies of various forms and quite specialised 'niche' private sector players. What we don't yet see is the widespread participation of large-scale institutional investors that would be required to leverage finance on the scale required. The Green Bonds sector is a good example. The attraction of bond structures of this kind is that they overcome information asymmetries and provide investors with diversified access to new sectors and markets, producing stable long-term returns. While this should be very attractive to institutional investors, we see that it is actually hedge funds which are more likely to buy these products in sub-Saharan Africa. Why this is, and what can potentially be done about it, is the subject of the remaining sections of this paper.

7 What is to be done?

7.1 Why is there only limited success and what can we learn from the successes we have?

As described previously, it is hard to find successful examples of energy efficiency investments in LICs at the scale required. Successful examples are largely to be found in developed markets, and even there we do not yet have clear, replicable examples of best practice. Regardless of the country concerned, however, the obstacles to be overcome are relatively clear: (i) information asymmetries, where the identification of potential projects is resource-intensive, particularly in LICs; (ii) transaction costs, where projects tend to be small in scale but large in number; (iii) availability of longer-term finance on suitable terms, which again is a more acute problem in LICs than in more developed markets. With the creative use of financing mechanisms such as credit lines and structured funds, KfW has done most to address the third of these obstacles. As we shall see below, however, more needs to be done to overcome the first two obstacles.

For renewable energy investments, the problem remains largely one of risk and return. Or, more accurately, perceptions among some market participants of risk and return. For many institutional investors, investing in LICs in sub-Saharan Africa is a very high risk activity. As a result, investments of this form tend to be located in the part of their portfolio reserved for high-risk/high-return ventures, such as private-equity plays.

Investing in renewable energy projects in countries considered to be high-risk is thought of by private investors in a very different way to the same investment in developed markets. Difficulties in ensuring the credibility of the policy support mechanisms are central to this. For some investors it is simply not possible to imbue mechanisms with sufficient credibility to enable them to invest. For those prepared to consider investments of this kind, very high returns are required to compensate for this risk. Furthermore, these investments will only account for a relatively small part of a diversified portfolio, which puts a limit on the total amount of funds that may be available for investments of this form.

Many of the initiatives that public agencies employ are designed to alter this risk-return calculus in one way or another. At least as far as most institutional investors are concerned, this is not currently thought to be sufficient. That is, either risks have not been sufficiently mitigated, or returns sufficiently boosted, for the resultant risk-return ratio to match investors' perceptions of appropriate compensation.

The many examples of success that can be found support this proposition. While we do not see large institutional investors operating at the scale required, we do see very active engagement of more specialised investors. As well as a narrower investable universe, these investors are more able to overcome information asymmetries due to better local knowledge. As a result, country risk issues are less of a problem and investors will have a clearer view of the likelihood of a government honouring policy support commitments. Regulatory risk, while still a major issue, is less likely to be an insurmountable obstacle to investment.

This is the first lesson that can be learned from examples of success: reducing information asymmetries about the reality of risk is an essential precondition to increasing institutional investment.

Even after risks are seen more accurately, however, we may still have an imbalance between the risk-adjusted returns required by investors and that which is currently available. There are three possible responses to this. First, risks could be further reduced, and/or returns boosted, so that they meet investors' return expectations. Second, the goal of attracting institutional investor funds into these sectors at scale could be abandoned, with the focus shifting to more specialist investors, including SWFs with more compatible investment mandates. Third, institutional investors could be encouraged to lower their return expectations. An interesting finding from the research is that general return expectations have not fallen since the financial crisis of 2007/2008. This is surprising. It is widely accepted that financial returns before the crisis were artificially boosted by leverage in an environment of asset price bubbles. It is simply not tenable for investors to expect returns of 25% and more to be delivered sustainably, even in fast-growing developing markets. This is particularly so given on-going economic problems in developed markets, where many countries are struggling to achieve positive growth rates, let alone deliver double-digit returns for investors. In such a climate a general lowering of return expectations is both

inevitable and essential for a more rational approach to asset allocation.

In the light of these options, the next section considers concrete activities that public agencies could undertake in each case, before giving a view on which of these are the most promising.

7.2 What is the potential and limits of public agency actions?

We are concerned with increasing the participation of institutional investors in renewable energy and energy efficiency investments in LICs. The reason why we are concerned with this, however, is because of: a) the importance of these sectors in fostering IGG in LICs; and b) the fact that only institutional investors appear to have resources at the scale required. An additional factor is that the long-term nature of institutional investors' liabilities appears to make them well suited to the long-term nature of the investments required, particularly for renewable energy.

In section 1 we argued that it is important to be clear on what we mean by IGG, illustrating how this can be 'weak' or 'strong' with respect to both 'greenness' and 'inclusivity'. For the first of these, the choice of renewable energy and energy efficiency allows us to sidestep this debate: these forms of investment are compatible with both weak and strong concepts of 'green growth', but this is not the case with many other forms of investment – the choice of industrial sectors being an example.

For 'inclusivity', however, the question cannot be avoided. Investments that are compatible with 'weak' inclusive growth require that the poor can participate. For our sectors, this means that the poor can access energy supplies (or benefit from energy efficiency investments). For energy, this is not just a matter of physical access, but of affordable supply. If the objective is to foster 'strong' inclusive growth, however, then this requires the poor to have more access than wealthier sections of the population. For energy, this means projects that specifically target the poor, such as extending supplies to poor urban or rural areas, or basing energy efficiency projects in the same areas.

Generally speaking, the stronger the form of inclusivity that is desired, the more difficult it will be to attract private investors, particularly institutional investors. The reason, as with much else addressed in this paper, comes back to risk and return. All other things being equal, the more inclusive a project becomes, the lower its potential commercial returns, but the higher its development 'returns'. What it means in practice, however, is that public mechanisms to boost commercial returns sufficiently to attract institutional investors will need to be more generous as more 'inclusivity' is sought. For public agencies seeking to maximise development returns, this is not necessarily a problem, but is important to recognise that achieving these 'development returns' will come at a price. If donors wish to support IGG they should be explicit about what they mean by this, but also prepared for the financial implications that result.

We have argued that the costs to public finances of supporting renewable energy investment in LICs should be met, at least in part, by donors. In part, this reflects historical commitments to fund the incremental cost of mitigating and adapting to climate change. It also, however, is probably essential in providing sufficient credibility to policy support mechanisms – i.e. mitigating regulatory risk.

The situation is different for energy efficiency. As we have seen, the economics of the sector are more naturally attractive than is the case with renewable energy. This does not mean that the appropriate level and form of investment is forthcoming, however, and KfW in particular has developed effective mechanisms to increase the supply of long-term finance. There has been less progress in developing and structuring investment propositions (i.e. investment demand) to meet this supply. As well as gathering and disseminating information about potential projects, there is much that donors could do to create investment vehicles that provide investors with diversified access to energy efficient projects. The best examples of such structures are to be found within the European Union, but proving these over time – particularly their adaptability for a LIC context – remains an important task. Until this is done, it is not realistic to expect large-scale investment from institutional investors in energy efficiency projects in LICs. The focus should be on getting the structures right so that it is easy (and profitable) to make such investments. Only once this is done, is investment at scale likely to follow.

As described throughout this paper, mechanisms to foster renewable energy investment either boost returns or reduce risks. In this regard, we can distinguish between three stages of a project: preparation, construction and operation. At each stage, donors can intervene to boost risk-adjusted returns. We can break this down further still, distinguishing between project- and policy-level interventions. Table 3 illustrates the different options in each of these areas for renewable energy.

Table 3: Donor options to leverage private investment in renewable energy

Project Level			
	Preparation	**Construction**	**Operation**
Ameliorate Risk	▸ Cover cost of project identification, preparation and development. ▸ Design 'investment ready' pilot projects. ▸ Disseminate knowledge of technologies.	▸ Invest in pilot projects. ▸ Provide equity/Loans for generation and/or transmission.	▸ Guarantee certain level of feed-in tariffs for particular projects/sectors. ▸ Co-investment by MDBs/ bilateral with private investors. ▸ Possibly guarantee currency risk.
Increase Returns	▸ Help transfer new technologies. ▸ Cover cost of project preparation. ▸ Showcase successful projects.	▸ Provide equity or concessional ▸ loans for renewable energy generation and/or transmission ('blended finance').	▸ Subsidize feed-in tariffs for particular projects/sectors.
Policy Level			
	Preparation	**Construction**	**Operation**
Ameliorate Risk	▸ Design bidding processes. ▸ Design regulatory frameworks, including links between countries. ▸ Encourage good macro-policies.	▸ Encourage good macro-policies.	▸ Design broad regulatory framework for feed-in tariffs, determining level of foreign subsidy, especially for energy supplied to poor people.
Increase Returns	▸ Design bidding processes.	▸ Help develop long-term domestic capital markets. ▸ Train banks and investors on merits of RE projects. ▸ Provide guarantees against country risk. ▸ Develop liquidity risk mechanisms.	▸ Encourage FIT framework to operate well, and provide desired subsidies from abroad. ▸ Convince investors of the need to lower excessive and unrealistic return expectations.

While all of these interventions entail some cost, this is greater in some cases than others. For example, interventions at the policy level are akin to forms of technical assistance, which largely rely on human resources. Their effectiveness, however, is not just a matter of designing interventions well, but of having the influence to see them successfully implemented. As well as influence of developing country governments, influence of institutional investors is also important here. A key goal should be to lower return expectations amongst institutional investors to more reasonable levels. As described above, careful use of TA to improve the enabling environment for investment can help to mitigate investors' risk perceptions over time. The extent to which public bodies can do more to reduce excessive return expectations, however, remains an open question.

Regardless of the ability to achieve this goal, mechanisms will be needed to boost returns and/or mitigate risks at the project level. Some examples of these are shown in table 2, but in the light of the findings of this research, we are also in a position to suggest some priorities.

For the preparation phase, identifying projects that are potentially viable, and getting them to the stage of 'investment readiness', should be the priority. This is only one side of the story, however: as well as creating viable projects, it is also important for investors to *believe* that they are viable. Here, creating and, more importantly, publicising (show-casing) successful examples of projects is essential, as is work to improve the general country investment climate.

For the construction phase, mitigating risk is key. For the project itself, the most direct means of doing this – as used by Norfund, for example – is to partner with trusted construction firms from donor countries. While this is a good way of reducing project risk, however, it is not supportive of broader economic development goals, where the aim is to support the growth of local companies. A balance, where companies from donor countries partner with local firms, may be appropriate here.

For supporting infrastructure, a significant risk is that increased supply of power is not matched by increased grid

capacity. Here it is important that projects are not viewed in isolation, but that complementary investments are supported in transmission and distribution. Even where concessional finance is not required for project economics (and in many cases it may be) it may be required with respect to supporting infrastructure of this form. As different agencies focus on different aspects of the value chain, donor coordination is vital here.

For the operation phase, *credibly* mitigating economic and regulatory risk should be the focus. For economic risk, this is likely to require financial support for mechanisms such as FITs. For regulatory risk, a number of approaches are recommended. First, either directly supporting financial mechanisms, or formally guaranteeing they will be maintained is the key to credibility. Second, co-investment from public and private agencies will help give private investors confidence. A good model is the IFC B-loan programme for bank lending, which could be extended to equity investments in renewable energy in LICs. Establishing investment funds (or 'wrappers') where institutional investors could share risk with public investors – including models where the public agencies absorb more risk as in KfW's structured funds – are a good option.

Specialised funds of this kind are essential to overcome information asymmetries. Local knowledge has to be combined with scale; however, suggesting a fund-of-fund structure may be ideal, with sector and country level specialist funds operating under an 'umbrella' that enables large-scale, diversified investments. What is important, however, is that the 'umbrella' is not too wide. A diversified fund that invests in all developing countries and seeks to attract private investment is likely to see the portfolio pulled towards middle-income countries over time. A large, diversified renewable energy fund with a mandate to only invest in low and lower-middle income countries could avoid this outcome.

8 Conclusions

In this paper we have explored how cross-border investment can support IGG in low-income countries. To this end, we have focused on institutional investors and the energy sector, particularly renewable energy capacity, as well as energy efficiency. The obstacles to these investments have been conceptualised as different forms of risk, and we have examined the role that donors could play in overcoming these obstacles, and providing recommendations for priorities in this regard.

Despite all the differences that exist between mechanisms, we have argued that – with respect to renewable energy – the task is to boost risk-adjusted returns, and to do this in a credible way. While this is far from easy, it is not impossible. These mechanisms come at a cost, however, so the question is whether donors are prepared to meet these costs, particularly where they are relatively open-ended. We have also suggested that the requirement to support 'inclusive' as well as 'green' growth may also come at a cost, particularly if 'stronger' forms of inclusivity, where the poor disproportionately benefit, are desired. It is beyond the scope of this paper to answer these questions, but it is important that they are openly addressed.

A final point that sets the parameters for these questions is the risk-adjusted returns required by investors. In our view, these remain unrealistically high in many cases, and do not appear to have been reduced – as would be expected – in the light of the financial crisis of 2007/2008. As we have seen, donors can do much to reduce real and perceived risks, not least through technical assistance to improve the enabling environment for business and investment. More is likely to be required, however. While it is possible to boost returns to the levels required by institutional investors, it does not follow that this is the best way to use public resources. Unless they can be persuaded to adopt more realistic expectations, it may be that donors and developing country governments should pursue other forms of investment to support the process of IGG.

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Petter Bjønnstu, Macro and Development Economist, Strategy and Analysis, Norfund

Andre Clark, Executive VP of International Business, Camargo Corrêa

Peter Dickson, Technical Director, BNP Paribas

Dag Dyrdal, Chief Strategic Relations Officer, Norwegian Government Pension Fund

Martin Ewald, Director, Allianz Global Investors Europe

Jamie Fergusson, Investment Officer, International Finance Corporation (IFC)

Mark Goldsmith, Director, Responsible Investment, Actis

Sebastian Hach, International Climate Finance Analyst, KfW

Jochen Harnisch, Climate Change Policy Coordinator, KfW

Sean Kidney, Co-founder and CEO, Climate Bonds Initiative

Matthieu Klinker, Environmental and Social Capital, Deutsche Bank

Silvia Kreibiehl, Frankfurt School of Finance – UNEP

Karsten Loeffler, CFO, Allianz Global Investors Europe

Aditi Maheshwari, Climate Policy Officer, International Finance Corporation (IFC)

Dirk Messner, Director, German Development Institute (DIE)

Richard Moon, Investment Manager, RPMI (UK pension fund)

Stephan Opitz, Director General, KfW

Avinash Persaud, Founder and Chairman, Intelligence Capital

Jens-Christian Stougaard, Director, PensionDenmark

Sylvia Wisniwski, Managing Director, Finance in Motion

Dana Younger, Chief Renewable Energy Specialist, International Finance Corporation (IFC)

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