

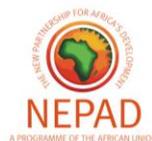


Accelerating reform in Africa: Mobilising investment in infrastructure and agriculture

Africa Investment Initiative

The role of pension funds in financing green growth initiatives

This document has been prepared as a background document for the 5th NEPAD-OECD Ministerial Conference on 26-27 April 2011 in Dakar, Senegal. This working paper was prepared by Raffaele Della Croce, Christopher Kaminker and Fiona Stewart from the OECD's Directorate for Financial and Enterprise Affairs and the Environment Directorate. The paper is still in a draft format and currently undertaking a consultation period before being published. The authors welcome further comments and suggestions. Though drawing on OECD Council approved recommendations and other work supported by OECD committees, the views expressed herein are those of the authors and do not necessarily reflect those of NEPAD, the OECD or the government of its Member countries.



THE ROLE OF PENSION FUNDS IN FINANCING GREEN GROWTH INITIATIVES

Raffaele Della Croce, Christopher Kaminker and Fiona Stewart

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ABSTRACT

It is estimated that transitioning to a low-carbon economy whilst adapting to and mitigating the effects of climate change over the next 20 years to 2030 will require significant investment and consequently substantial private sources of financing on a much larger scale than previously – both in terms of new flows and redirecting existing funds. With their USD 28 trillion in assets, pension funds - along with other institutional investors - potentially have an important role to play in financing such green growth initiatives. Green projects – particularly renewable energy and clean energy - include multiple technologies, at different stages of maturity, which will dictate the appropriate type of financing and will ultimately result in differences in risk/return profiles of green investment opportunities to investors. This paper focuses on ‘green’ bonds and alternative investments in existing renewable energy technology as it is through these instruments that additional pension fund assets could be tapped for financing green growth related projects

Despite the interest in such instruments, pension funds’ asset allocation to such green investments remains low. This is partly due to a lack of environmental policy support, but a lack of appropriate investment vehicles also play their part, as do regulatory barriers and pension funds’ lack of knowledge and expertise in relation to these investments and their associated risk. Governments have a role to play in ensuring that attractive opportunities and instruments are available to pension funds and institutional investors in order to be able to tap into this source of capital.

This paper examines some of the initiatives that are currently under way around the world to assist and encourage pension funds to become involved in financing green growth projects. It is drafted with a view to inform current OECD work on engaging the private sector in financing climate change action. Different financing mechanisms are outlined, and suggestions made as to what role governments in general, and pension fund regulatory and supervisory authorities in particular, can play in supporting pension funds investment in this sector. The paper concludes with policy recommendations.

THE ROLE OF PENSION FUNDS IN FINANCING GREEN GROWTH INITIATIVES

I. Green Growth Financing Needs

1. It is estimated that adapting to and mitigating the effects of climate change over the next 20 years to 2030 will require significant investment. The exact amount of financing needed to address climate change will depend on many factors, including the level of ambition of mitigation goals and adaptation objectives, and the extent to which ‘correct’ price signals are provided.¹

2. This is before the wider, aspirational goal of transitioning to a low carbon economy is considered. Addressing the challenge of climate change and ‘green growth’ more generally will require shifting significant amounts of capital from fossil fuels and conventional technologies to newer, clean technology and infrastructure. Green growth can be seen as a way to pursue economic growth and development while preventing environmental degradation, biodiversity loss and unsustainable natural resource use. It aims at maximising the chances of exploiting cleaner sources of growth, thereby leading to a more environmentally sustainable growth model (see OECD 2010a). Investing in infrastructure and innovation will be crucial for ensuring new sources of growth that better reflect the full value to economic activity to society (see OECD 2011a).

3. This paper does not propose to enter the debate on required financing levels, but rather will look at where such additional flows may come from.

Table 1: Estimating Financing Requirements for Climate Mitigation and Adaptation

<i>Financing Need</i>	<i>Capital Required</i>	<i>Source</i>
Climate change adaptation (est.)	\$170bn per year by 2030	UNFCCC (2008)
Climate change mitigation (est.)	\$200bn per year by 2030	UNFCCC (2008)
Water infrastructure	\$800bn per year (by 2015)	OECD Infrastructure to 2030 (2007)
IEA’s Blue Map scenario of halving worldwide energy-related CO ₂ emissions by 2050	\$750 billion per year from 2010 to 2030 and US\$ 1.6 trillion per year from 2030 to 2050	IEA Energy Technology Perspectives (2010)
Clean energy investment needs to restrict global warming < 2°C	\$500 bn per year (by 2020)	World Economic Forum and Bloomberg New Energy Finance (2010)

Source: Authors

4. There is already international agreement on the need to increase financing for climate mitigation and adaptation (though governments diverge on key issues such as architecture and institutions for delivery of new financing to support climate action). Indeed, governments have already made international financing commitments – including the Cancun decisions agreed at United Nations Framework Convention

¹ See OECD note on ‘Financing Climate Change Action and Boosting Technology Change: Key messages and recommendations from current OECD work’ <http://www.oecd.org/dataoecd/34/44/46534686.pdf>

on Climate Change (UNFCCC) COP 16 in December 2010, which reiterated the commitment made in the Copenhagen Accord, including the following:²

- *new and additional resources approaching USD \$30 billion for 2010-2012, with balanced allocation for adaptation and mitigation;*
- *developed countries to commit to a goal of mobilizing jointly USD \$100 billion p.a. by 2020 to address the needs of developing countries. This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance;*
- *the Copenhagen Climate Fund shall be established as an operating entity of the financial mechanism of the convention to support projects, programmes, policies and other mitigation and adaptation activities in developing countries.*

5. However, funding a transition to a low-carbon economy vastly exceeds the capability of the public sector – particularly given the current state of government finances. Such significant investment will require substantial private sources of financing on a much larger scale than before, both new flows and redirecting existing funds - though governments are still debating to what extent private finance should play a significant role, and if so how to account for it (see UNEP FI 2009).

6. The UN Secretary General’s High-Level Advisory Group on Climate Change Financing (AGF)³ studied potential sources of revenue that will enable the achievement of the level of climate change financing that was promised during UNFCCC COP15 in Copenhagen in December 2009. In their final Report, released in November 2010, they state that (UN AGF 2010 p12): “*enhanced private flows will be essential to economic transformation towards low-carbon growth; ultimately, these will need to be mobilized at a scale of hundreds of billions of dollars.*” In paper 7, looking at ‘*Public Interventions to Stimulate Private Investment in Adaptation and Mitigation,*’ four conclusions emerge (see Executive Summary UN AGF 2010b):

- *Potential private investment in 2020 is substantial;*
- *For this level of private investment to be realized, a range of existing country and project specific barriers will need to be overcome by domestic and international public interventions;*
- *The existing menu of interventions is largely sufficient, but needs better packaging, strategic focus, and greater scale;*
- *The large potential for private investment to achieve climate -related objectives justifies using a substantial share of the public funding available in and before 2020 to stimulate this investment.*

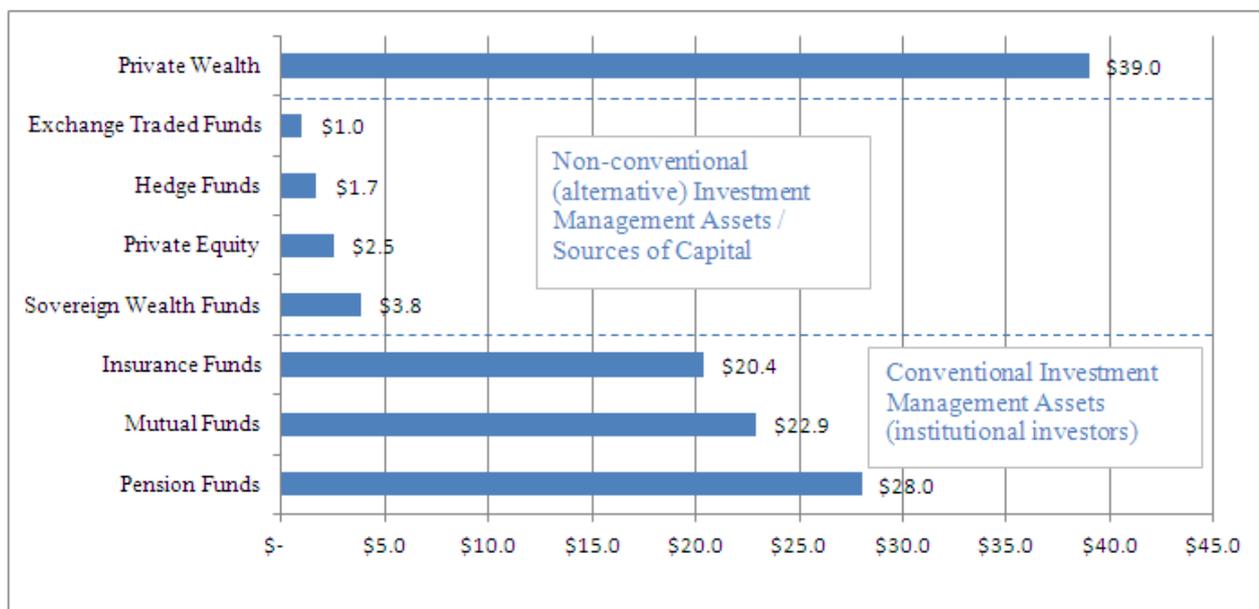
²See Copenhagen Accord (UNFCCC/CP/2009/11/Add1 p 7)
<http://unfccc.int/resources/docs/2009/cop15/eng/11a01.pdf>

³ The Secretary-General of the United Nations established the High-Level Advisory Group on Climate Change Financing in February 2010. Following its terms of reference, the Advisory Group worked around the goal of mobilizing USD 100 billion per year by 2020. See (UN AGF 2010a). Their report provides the first comprehensive analysis of the potential sources from across various options, and finds that it would be challenging, but feasible, to mobilise the necessary funds to meet the long-term USD 100 billion. Reaching the goal will likely require a mix of sources, both existing and new public sources, bilateral and multilateral, as well as increased private flows, including instruments to incentivize private flows such as carbon markets and other forms of carbon pricing.

II. Potential Role of Pension Funds in Green Investment

7. Pension funds, along with other institutional - and alternative - investors, potentially have an important role to play in financing green growth initiatives (see Jones et al 2010). With USD 28 trillion in assets held by private pension funds in OECD countries, and annual contribution in-flows of around USD 850bn,⁴ pension funds could be key sources of capital.

Figure 1: 2009 Global Fund Management Industry, assets under management (AuM), USD \$tn



Source: OECD, TheCityUK estimates, adapted from *Investing in Climate Change 2011*, (Deutsche Bank 2011)

8. There is no unique definition among investors of what green investing entails.⁵ However, for the purpose of this paper, ‘green’ investments refer to investments made in companies, projects and financial instruments that operate primarily in the renewable energy, clean technology, environmental technology or sustainability related markets. In terms of the OECD’s Green Growth Strategy (OECD 2010a), these would include energy efficiency projects, many types of renewable energy, carbon capture and storage, nuclear power, smart grids and electricity demand side-management technology, new transport technologies and water infrastructure.

9. According to a recent survey from EDHEC (see EDHEC 2010) the reasons for green investing can be categorised in four groups:

- First, investors may be driven by ethical considerations.

⁴ Asset figures as of 2007 taken from *Private Pensions Outlook 2009* (OECD 2009a). Contribution figures as of 2009 taken from OECD statistics database

⁵ Focusing on sectors having to do with environmental issues, popular investments are climate change and renewable energy funds. Climate change includes green technology or clean technology funds looking at alternatives to energy sourced from conventional fossil fuels. A broad definition of “climate change themes” could take into consideration rail, water and electricity infrastructure that is not specifically dedicated to clean energy. The World Economic Forum in its Green Investing papers considers as subset of all “Green Investment” opportunities, only investment in clean energy (defined as investment in renewable energy and energy efficiency technology, but excluding nuclear power and large hydro).

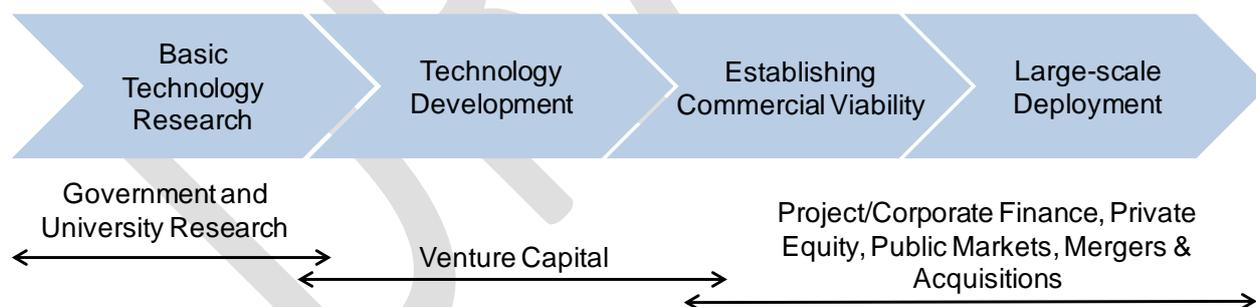
- Second, they may be interested purely in advantageous return profiles.
- Third, by making an environmental dimension an integral part of their investment decisions investors may simply be responding to legal or regulatory constraints.
- Finally, investors may be looking to improve their reputation by making a public showing of their concern for the environment

10. In other words there are two types of funds looking at green products. First the increase in ‘Socially Responsible Investing’ (SRI) has raised demand for what are seen as ethical (including ‘green’) projects and this has been furthered by the creation of Environmental, Social and Governance(ESG) focus lists for investment banking equity research desks.⁶ Asset owners representing more than \$15 trillion have recently signalled their support for U.S. and international action on climate change publicly.⁷

11. Secondly, the broader universe of pension funds may also be interested in these investments not so much because they are green, but because they provide an attractive return (whether environmental issues should be a considered within mainstream risk assessments by institutional investors is a topic beyond the scope of this paper). Pension funds are looking for long-dated assets with inflation protection, a steady yield and which have a low correction to the rest of their portfolio. This is particularly the case where investment or solvency regulations force funds into conservative assets which match their liabilities. If sizable assets are to be directed to green projects, financing instruments which meet the needs of this universe of broad, conservative pension funds will have to be created.

12. Green projects – particularly renewable energy and clean energy - include multiple technologies, at different stages of maturity. The appropriate type of financing will be chosen according to the stage of development of the technologies. For example venture capital financing is normally suited for un-proven and un-tested technologies, while project financing is used for mature technologies such as wind and solar.

Figure 2: Stages of technology development and sources of finance in the renewable energy sectors



Source: (Kalamova, Kaminker and Johnstone, [OECD](#), 2011)

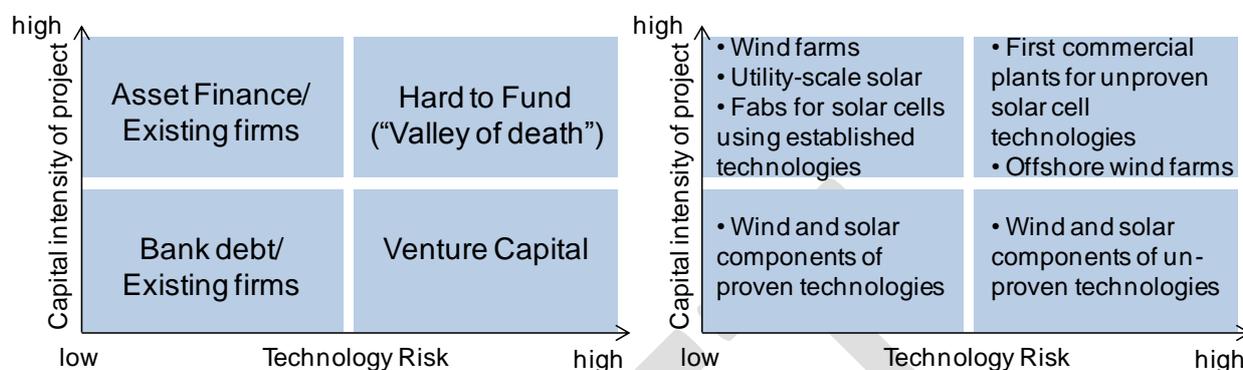
13. Maturity of technologies and type of financing available will ultimately result in differences in risk/return profiles of green investment opportunities to investors. Other elements that further define the investment opportunity are the contractual approach, the phase of asset development (existing vs. new facility), the geography, etc. For example an investment in equity of a new technology financed through

⁶ See for example the Goldman Sachs GS SUSTAIN Methodology, available: <http://www2.goldmansachs.com/ideas/environment-and-energy/goldman-sachs/gs-sustain/index.html>

⁷ <http://www.incr.com/Page.aspx?pid=1294>

venture capital would be part of the high risk/high return portfolio allocation of an investor, while a solar project relying on government subsidies would typically have a lower risk/return profile

Figure 3: Focus of different sources of finance with respect to technology risk and capital intensity



Source: Adapted from Ghosh and Nanda (2010)

14. Though some pension funds – mostly larger, more sophisticated investors - are able to invest at the riskier end of the spectrum (i.e. in start-up, venture capital type projects focusing on clean tech and other innovations), this will only ever constitute a small percentage of their portfolios. The broad mass of pension funds will be more interested in lower risk investments (i.e. in renewables etc.), which provide a steady, inflation adjusted, income stream – particularly where investment or solvency regulations require a relatively conservative approach to investment. Pension fund assets can therefore be expected to be directed more towards this type of green project (which are therefore the focus of this paper).

15. Institutional Investors can access green investments through traditional or alternative asset classes, more specifically:

- **Through equity:** vehicles for green equity investing include indices, mutual funds, and ETFs.
- **Through fixed-income:** investors have a choice of “green bonds”, that can be defined as fixed-income securities issued by governments, multi-national banks or corporations in order to raise capital for environmental projects
- **Through alternative asset classes:** the most common vehicles for green investing are real estate funds and infrastructure funds, which are often organised as private equity vehicles.

Table 2: An overview of vehicles for green investing

Asset class	Type of vehicle	Description	Example
Equity	Indices	Include only stocks of companies that have "good environmental practices".	Screening 1. FTSE4Good Environmental Leaders Europe 40 Index 2. S&P Global Eco Index
			Thematic 3. WilderHill New Energy Global Innovation Index 4. S&P Global Water Index 5. FTSE KLD Global Climate Index
	Mutual funds		1. Calvert Large Cap—screening large-cap stocks with good reputation for environmental consciousness 2. Winslow Green Growth –small- cap fund investing in eco-friendly companies 3. Guinness Atkinson Alternative Energy—investing in natural resources
	ETFs		1. PowerShares WilderHill Clean Energy Portfolio (PBW) 2. Claymore/LGA Green ETF (GRN)
Fixed-income	Bonds	Bonds are usually issued by federally qualified organisations to raise capital to solve environmental problems	1. European Investment Bank—Climate Awareness Bonds 2. U.S. Treasury—"Green Bonds" 3. SEB & Credit Suisse—World Bank green bonds to support low-carbon development in developing countries
Alternatives	Real estate	Real estate investment that is environmentally acceptable.	Micro: energy efficiency, recycling, etc. Macro: reducing greenhouse gases, carbon footprinting, less resource depletion, etc.
	Infrastructure/ private equity	Funds that invest in, e.g., environmental technology infrastructure	1. Miaoli Wind Macquarie Int'l Infrastructure Fund 2. Carlyle Infrastructure Partners (CIP)

Source : EDHEC 2010

16. The equity market is considered the most developed market for green investing. In fact traditionally investors have invested in the equity of companies such as utilities that are exposed to environmental themes. In recent years new investment vehicles were created for those not able or willing to make their own direct investments⁸. However, this listed equity type of investment is currently more the

⁸ In 2004, there were only 10 quoted equity funds targeting the sector, almost all of them run by specialist companies such as Triodos, Sustainable Asset Management and Impax. By the end of 2007, the lay investor had the option of more than 30 funds, several managed by highstreet names such as Deutsche Bank, ABN Amro, HSBC or Barclays. By October 2008 these funds had over US\$ 42 billion in assets under management (see Figure 9). A number of Exchange Traded Funds had also been launched, including the Powershares Global Clean Energy Fund, which tracks the WilderHill New Energy Global Innovation Index (NEX) and soon grew to have over US\$ 200m in assets under management. Source World Economic forum Green Investing

domain of SRI funds. As mentioned, whether environmental issues should be a considered within mainstream risk assessments is a topic beyond the scope of this paper. As these are not new investment vehicles, listed equity investments are also not the focus of this paper.

17. Fixed-income investments have recently drawn attention in the SRI universe of institutional investors with the flurry of green bonds issuance by states or multilaterals.⁹ Yet the comparable yields and strong credit ratings on these issues also make them attractive to more mainstream investors. It is through these bonds that significant pension fund assets could be directed towards green projects.

18. The past few years have seen another trend of significance in the financing of clean energy – the provision of investment vehicles such as private equity and infrastructure funds targeting opportunities in unlisted equity markets. These new investment vehicles represent “alternative” asset classes to the traditional equity and fixed income. Larger pension funds are able to invest directly in private equity and infrastructure projects. However, these private equity and infrastructure funds are an important way to broaden the scope and allow a boarder range of smaller pension funds to also get involved. Again, if offering an attractive risk-return adjusted yield, these funds will be of interest to a broad range of pension funds, not just larger entities and not only SRI style investors.

19. This paper focuses on ‘green’ bonds and alternative investments in existing renewable energy technology as it is through these instruments that additional pension fund assets could be tapped for financing green growth related projects. It should be noted that pension funds are only one source of green financing and will only be able to provide substantial capital for a limited range of green projects. For governments to meet their ambitious targets, other forms of institutional investors, private capital and public funds will also be required (particularly for more risky, untested technologies).

⁹ For example in Europe, the Eurosif (2010) study shows that bonds have replaced equity and become the most favoured asset class, accounting for 53% of all European investors’ SRI holdings. Equity accounts for another 33% of total SRI assets under management. The remaining 14% is invested in alternative asset classes.

III. Barriers to Green Investing + Potential Solutions

20. Despite their theoretical attractions, pension funds' asset allocation to green investments remains limited and is still at an early stage. Why is this?

Problems with Green Investment Policy Backdrop

21. Environmental or 'green' projects are currently often not viable on a stand-alone basis due to mispricing in the carbon markets which makes traditional or 'brown' projects more attractive, due to climate change externalities not being priced into these projects or mispricing due to government policies, such as fossil fuel subsidies.¹⁰

22. Before private investors will commit large amounts of capital to this sector there must be transparent, long-term and certain regulations governing carbon emissions, renewable energy and energy efficiency (see Deutsche Bank's TLC framework).¹¹ Such investments will only be made if investors are able to earn adequate risk-adjusted returns and if appropriate market structures are in place to access this capital. To quote the World Economic Forum's report '*Green Investing 2010*' (WEF 2010), "*While the world's investors may be ready to invest in clean energy companies and projects, they still have questions over the policy environment in which they operate.*"

23. If governments wish to encourage investors to finance climate change and green growth projects in future, clear and consistent policies over a long period of time are needed – most notably a clear signal in terms of carbon pricing (e.g. via emissions targets). Government incentives and guarantees can then also be used – from support for research and development (R&D) - which affects operational efficiency- to investment incentives (capital grants, loan guarantees and low-interest rate loans), taxes (accelerated depreciation, tax credits, tax exemptions and rebates), and price-based policies at the output stage (which affect revenue streams - e.g. feed-in tariffs), or policies which target the cost of investment in capital by hedging or mitigating risk.

24. These incentives and mechanisms are not specific to pension fund investment but aim to improve the general policy framework for green investment and make the risk-return profile of these investments more appealing to investors – including pension funds. Incentives (such as guarantees or insurance from governments or a new Green Investment Bank) are likely to efficiently leverage public money, whilst tax incentives may also play a role. As the World Economic Forum's report on green investing points out (see WEF 2010): "*Supporting green investment can be achieved in multiple ways: by modifying the rules of the energy markets, by promoting equity or debt investment, by means of tax rules or by creating carbon markets. The choice of mechanism must depend on local political and economic conditions*".

¹⁰ For example Kalamova et al (2011) discuss how the renewable energy remains more costly than conventional forms of electricity generation, particularly where subsidies to fossil fuels remain in place and the cost of carbon pollution remain unpriced.

¹¹ http://www.dbcca.com/dbcca/EN/media/Paying_for_Renewable_Energy_TLC_at_the_Right_Price.pdf

Table 3: Types of renewable energy promotion policies along the stages of technology development

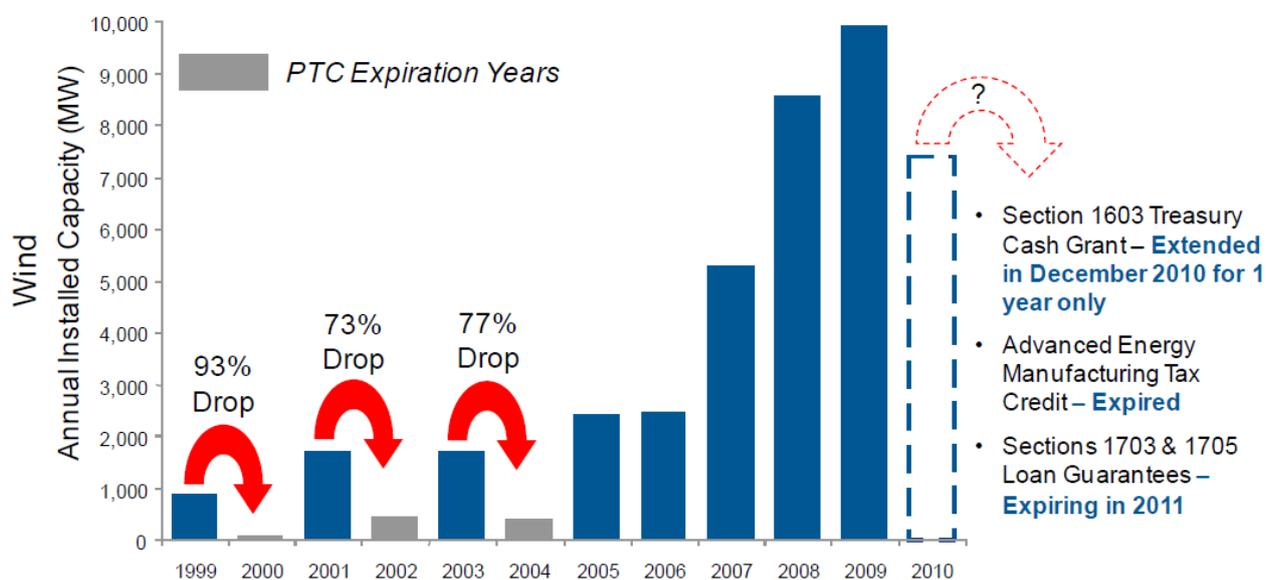
Classification	Policy examples	Stage of technology development		
		Research and Development	Capital investment	Large-scale Deployment
Energy market regulations	Feed-in tariff	Indirect impact	Indirect impact	YES
Direct financial transfer	Capital grants	YES	YES	
	Low-interest loan and loan guarantees	YES	YES	
	Government-funded/run venture capital funds	YES	YES	
Preferential tax treatment	Accelerated depreciation		YES	
	Investment tax credit		YES	
	R&D tax credit	YES	Indirect impact	
	Production tax credit		Indirect impact	YES
	Sales tax, energy tax, excise tax, VAT reduction			YES
Trade restrictions	Renewable portfolio standards (quotas)			YES
	Tradable renewable energy certificates			YES
Services provided by government at less than full cost	Public investment in infrastructure		Indirect impact	YES
	Government research and development	YES	Indirect impact	

Source: (Kalamova, Kaminker and Johnstone, OECD, 2011)

25. Transparency, predictability and longevity of government programmes are necessary if investors are to initiate a project in green technologies. For instance, the degree of high uncertainty in American Production Tax Credits (PTC) was a contributing factor to investor exit from the wind power sector, in particular - illustrating the importance for governments of ensuring that programmes are not subject to excessive policy uncertainty (see Figure 2). Retroactive policy changes regarding solar power projects in Spain have also been concerning investors.¹²

¹² For example see IPE Article 25/6/2010, 'Danish pension funds take on Spain over solar tariffs' http://www.ipe.com/news/danish-pension-funds-take-on-spain-over-solar-tariffs_35852.php?s=solar%20power#

Figure 4: USA Investment in Wind Power in Relation to Production Tax Credits (PTC)



Source: Deutsche Bank (2011), American Wind Energy Association (2009), US PREF (2010)

26. However, predictability should not be mistaken for permanence. In the case of policies targeting investment in physical capital, it is important to ‘sunset’ many of the policies. With time the financial market will price risk efficiently (assuming policy regimes do not generate shocks continuously) and learning benefits will be exhausted. While policies to support specific green technologies may be needed to overcome barriers to commercialisation, the design of such policies is essential to avoid capture by vested interests and ensure that they are efficient in meeting public policy objectives. Focusing policies on performance rather than specific technologies or cost recovery is essential. Other important elements of good design include independence of the agencies making funding decisions, use of peer review and competitive procedures with clear criteria for project selection. Support for commercialisation should also be temporary and accompanied by clear sunset clauses and transparent phase-out schedules. As noted before, support policies also require a good understanding of the state of development of green technologies; support for commercialisation should not be provided before technologies reach a sufficiently mature state.

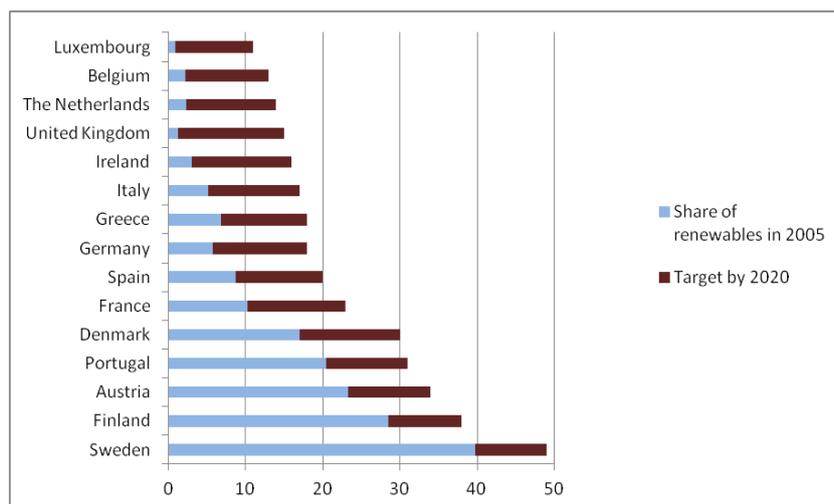
Box 1: Examples of Regulatory Support for Renewable Energy

EU Regulation

In 2001, the EU adopted a Directive on the promotion of renewable sources for the production of electricity (known as the Renewables Directive). This non-binding legislation set targets for a 12% share of renewables in the EU's energy mix by 2010, with individual targets for each country.

The requirement for EU members to maintain a supportive framework for renewables is now underpinned by the Renewable Energy Directive (2009/28/EC). In 2009, the 27 EU member states formally committed to green energy production targets as set out in the directive. The Renewable Energy Directive incorporates a mandatory target of achieving a 20% share of energy from renewable sources in overall EU gross final energy consumption by 2020. This overall commitment has been broken down into individual targets for each member state, taking into account existing levels of renewable energy production and the potential for growth. These national targets represent a legally binding undertaking for each of the 27 member states, to be implemented by each state through national legislation. Furthermore, member states have also committed to intermediate trajectory targets in the run-up to 2020 with mandatory ongoing reporting and action plans. The formal and binding commitments set out in the Renewable Energy Directive establish a credible and supportive policy framework across the EU.

Figure 3: EU15 renewable energy targets: Share in final energy by 2020 vs. share of renewables in 2005



Source: European Commission

Italian Regulatory Regime

Italy has historically had a comparatively higher dependency on energy imports than other countries of the EU. This dependency is a result of a rejection of nuclear energy, low fossil fuel reserves, and a lack of development of the renewable energy potential in Italy.

As a result of the EU targets and the Kyoto Protocol (Italy signed in May 2002), the Italian Government implemented a number of renewable energy directives, commencing with the Decree 387/2003 with subsequent amendments in 2005/2006 and the “Nuovo Conto Energia” (Italian Solar Decree) in 2007. The most important elements of these directives and associated amendments to the legislation were:

- The “Conto Energia”, which is a 20-year incentive tariff paid to the Project;
- The “Ritiro Dedicato”, which is the right to sell the Project capacity to the national grid for the market price of electricity;
- A single authorisation procedure which replaced all permits and licences required to build a photovoltaic (PV) solar power plant exceeding the threshold of 20kW.

These directives promoted the growth in the renewable sector. Italy is the third EU country after Germany and Spain to pass the symbolic marker of 1000 MW_p of installed PV capacity.

Problems with Green Financing Vehicles

27. There are also specific problems with the financing mechanisms which need to be overcome. Governments can also encourage pension funds to invest in green projects by helping to provide appropriate investment vehicles. To attract institutional investment into green projects governments have to structure projects as attractive investment opportunities for investors, providing risk return profiles that match the expectations of investors when considering such assets.

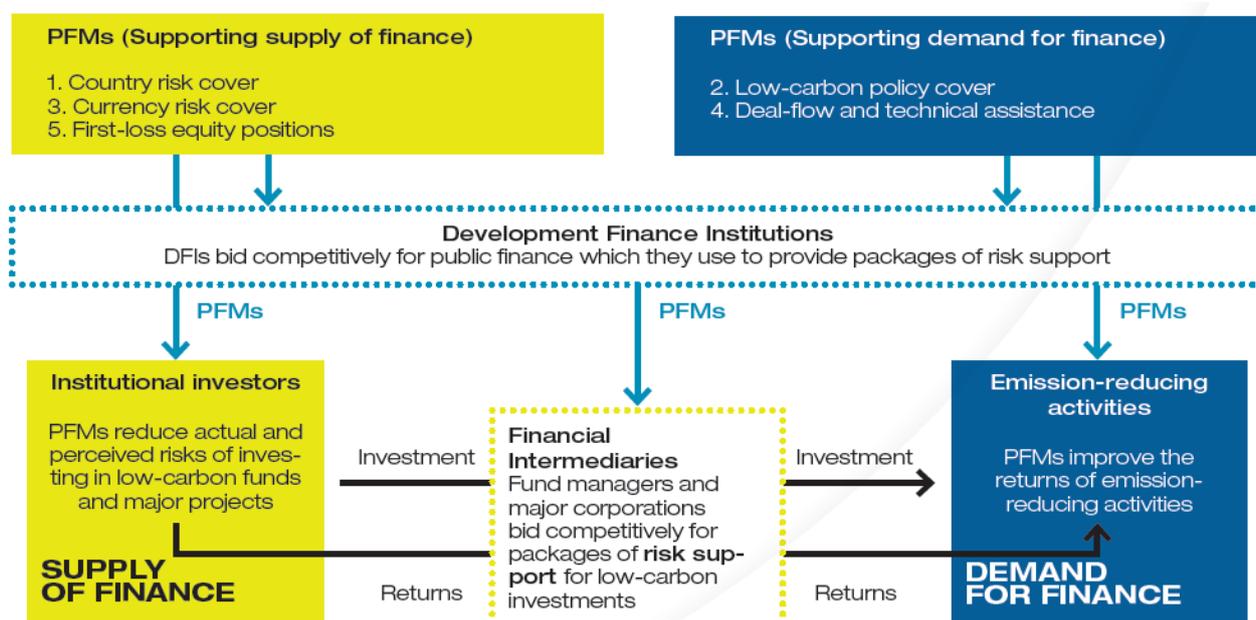
28. What appears to be a common problem is the mismatch between the desired risk/return profiles of pension funds when investing in infrastructure – including green projects - and the opportunities offered in the market. Pension funds are ‘buy and hold’ investors and their main focus is on long term income rather than capital accumulation. Governments and International Financial Institutions can work to improve deal flow – for example via vehicles specializing in early-stage projects and public sector taking subordinated equity positions in fund. A recent OECD report on infrastructure (see OECD 2011b) notes that in order to promote infrastructure investment by pension funds, a better alignment of interests between pension funds and the infrastructure industry is required in terms of: fees (which are too high); the structure of funds (which are too concentrated); and the investment horizon (which is too short). Improvements on these fronts would also help improve the deal flow into green projects. As discussed, it is only through providing stable investments via low risk instruments that the broad universe of pension assets will be tapped.

29. In addition to incentives, governments and public sector bodies have also been using risk mitigation techniques to partner with and assist institutional investors make green investments. These projects may involve new technologies and indeed new types of risk which pension funds have not been exposed before, and which are consequently difficult for them to assess or to hedge.

30. The UNEP FI has been examining Public Financing Mechanisms (PFM) which could be combined with financial instruments in order to encourage the involvement of private sector sources of capital.¹³

¹³ See UNEP (2009) See also World Bank/ PPIAF (2007)

Figure 5: PFM Increase the Supply of and Demand for Institutional Capital



Source: UNEP and Partners/ Vivid Economics (taken from UNEP (2009) p7)

31. Based on case studies, the following recommendations are made:

- **Country risk cover:** insurance against country risk should be expanded and explicitly provided to support low carbon funds (e.g. provided by Multilateral Investment Guarantee Agency (MIGA) of the World Bank and the US Government's Overseas Private Investment Corporation (OPIC));
- **Low-carbon policy cover risk:** insurance should be provided where countries renege on policy frameworks/ incentive schemes that underpin low-carbon investments;
- **Funds to hedge currency risk:** public finance could provide currency funds which offer cost-effective hedges for local currencies which would otherwise not be available in the commercial markets (e.g. provided by the Currency Exchange Fund supported by the Dutch Ministry for Development Cooperation);
- **Improving deal flow:** vehicles specializing in early-stage, low carbon projects could be developed and technical assistance provided; and
- **Public sector taking subordinated equity positions in funds:** public sector could invest directly in low carbon funds via 'first equity loss,' thereby improving the overall risk-return profile of such vehicles.

32. The World Economic Forum's report '*Green Investing 2010*' (WEF 2010) undertakes an analysis of 35 different types of policy mechanism that can be deployed to spur the transition to a low-carbon economy (broken down into five categories: energy market regulation; support for equity investment; support for debt investment; tax policies; creating markets to trade emission credits), ranking in terms of scale, efficiency and their multiplier effect. Sovereign or policy risk insurance (such as that provided by the

Multilateral Investment Guarantee Agency) was ranked as low in terms of efficiency but high in terms of scale and multiplier. The report notes that although this policy tool is currently popular as a way of encouraging private investment in clean energy, the problem is that the risk remains with the developed world's tax payers, who are also the investors, leading to potential systemic risk.

33. In addition, there is also the need for some sort of 'rating agency' or standard setter to 'approve' green projects (such as green bonds or green funds) to ensure that funds are used for green investments and that insurance and guarantees can therefore be reliably offered. For example a recent report on pension funds and infrastructure (see Inderst 2010) notes that within the Prequin infrastructure database a surprising high number of energy funds claim a focus on renewable energy (176 out of a total of 263 funds). This means that methodologies for environmental integrity must be solidified and agreed on.¹⁴

Green Infrastructure

34. A further reason for the lack of green investments by pension funds is that their asset allocation to private equity and particularly infrastructure related assets in general remains limited. To provide some context, pension funds' asset allocation to infrastructure assets in general is less than 1% in most countries,¹⁵ and pension funds' portfolios remain dominated by more traditional asset classes such as equities and bonds where investors have more experience, more data and generally feel more comfortable (outside the largest pension funds which are some of the world's most sophisticated investors). As discussed, aside from green bonds, it is through infrastructure and private equity related instruments that green projects will tap the broad mass of pension assets. Governments therefore need to consider how to increase pension funds allocation to these instruments in general if green investing more specifically can be expected to increase.

35. The 2009 OECD Working Paper '*Pension Fund Investment in Infrastructure*' (Inderst 2009) discusses barriers to pension funds' investment in infrastructure projects in general – which can be seen to apply also to green investments. These include a lack of knowledge and experience with infrastructure investments (including direct investment and other investment vehicles used), a lack of transparency and data related to infrastructure investments, potentially high fees, additional risks relating to such investments (including regulatory, social and political risks), and other regulatory constraints (by asset class, due to liquidity and diversification requirements, solvency constraints etc.)

36. The paper concludes that governments have a role to play in ensuring that attractive opportunities and instruments are available to pension funds and institutional investors in order to be able to tap into this source of capital. Furthermore, economic transformation and green growth opportunities can be constrained or enabled by the existing infrastructure of an economy. Thus, shifting to a new, greener growth trajectory requires special attention to network infrastructure such as electricity, transport, water and communications networks. For many countries, especially those outside the OECD, there are opportunities to leap-frog by introducing greener and more efficient infrastructures, and to improve the climate resilience of infrastructures such as water supply facilities, roads and ports.

¹⁴ OECD has started work on defining and measuring green foreign direct investment (FDI) with the aim to provide a statistical foundation in support of governments' efforts to evaluate the role of private sector investment flows and to assess policy performance in providing a framework for green investment (OECD 2011c). Follow up work could be envisaged to help pension funds and regulators share a common understanding of green investment and measure the scale and evolutions of such investment over time.

¹⁵ See (IOPS 2011), (Inderst 2010)

Table 4: Pension Funds' Infrastructure Investments: Barriers and Solutions

<i>Barriers</i>	<i>Solutions</i>
Lack of experience and knowledge (with infrastructure / private equity and other investment vehicles/ direct investments)	<p>Encourage improved knowledge and understanding of pension fund stakeholder and supervisors on infrastructure assets</p> <p>Encourage development of appropriate investment vehicles</p> <p>Support consolidation and pooling of pension funds</p>
Shortage of data (performance/ costs/ risks/ correlations)	<p>Support stronger efforts in independent data collection and objective information provision in the field of infrastructure investment</p> <p>Recommend upgrade of national and supra-national statistics data collection with a view to better capture infrastructure (and other alternative asset classes)</p>
Fees	Promote higher transparency standards in private equity vehicles and direct investments
<p>Political risks / regulatory instability</p> <p>Emerging market risks (currency etc.)</p>	<p>Enhance the investment environment</p> <p>Ensure stable regulatory environment</p> <p>Create a platform for dialogue between investors, financial industry and governments (e.g. the OECD)</p> <p>Development national, long-term policy frameworks for key individual infrastructure sectors, improving the integration of the different levels of government in the design, planning and delivery of infrastructures through the creation of infrastructure agency/bank, and the creation of a National Infrastructure Pipeline.</p> <p>Encourage the study of more advanced risk analysis beyond the traditional measures, including the specific risks of infrastructure.</p>
<p>Funding and accounting regulatory constraints</p> <p>Investment regulatory constraints (e.g. restrictions on asset classes/ liquidity/ non-listed/ diversification requirements/ leverage rules/ valuation rules)</p>	<p>Check funding and investment regulation is not inadvertently preventing infrastructure investments</p> <p>Recommend the establishment of international guidelines for performance and risk management of infrastructure (and other alternative) vehicles</p>

Source: Authors based on (Inderst 2009) (OECD 2011b) (OECD 2007)

IV. Pension fund initiatives in green investing

37. Some pension funds and other institutional investors have already expressed their interest in - or indeed already are - investing in climate change related assets. Consequently, various industry groups have been formed in order to increase industry expertise in this area and to engage in a dialogue with governments to explain the sort of investment environment and financing vehicles which are necessary to support their greater engagement. They are also exploring how to pool resources in order to achieve the scale which investment in some of these projects requires.

Table 5: Institutional Investors Climate Change Groups

<i>Group</i>	<i>Type of Investors</i>	<i>Size of Assets</i>	<i>Objectives</i>
IIGCC	70+ European institutional investors, including major pension funds	€6tn	Catalyse greater investment in low carbon economy
Investor Network on Climate Risk	90+ USA institutions	USD\$9bn	Identify opportunities and risks in climate change, tackle the policy and governance issues that impede investor progress towards more sustainable capital markets
Investor Group on Climate Change	Australian and New Zealand investors	AUS\$600bn	Raise awareness, encourage best practice in terms of analysis and provide information relating to climate change
P8	World's leading pension funds	USD\$3tn	Create viable investment vehicles to combat climate change and promote sustainable development
Long-term Investors Group	Mainly public sector financing institutions	USD\$3tn	Identify long-term investment fund and vehicles
Ceres –Investors Network on Climate Risk	Major global asset managers and institutional investors	USD\$9.5tn	Focusing on climate-related risks and opportunities for institutional investors

Source: Authors

IIGCC¹⁶ etc.

38. The Institutional Investors Group on Climate Change (IIGCC) is a forum for collaboration on climate change for European investors. The group currently has around 72 members, representing around €6 trillion of assets and is chaired by Ole Beier Sorensen, Chief of Research and Strategy at the Danish public pension fund ATP.¹⁷

39. One of the key objectives of the group is to catalyse greater investment in a low carbon economy by bringing investors together to use their collective influence with companies, policymakers and investors. It will continue to survey investors (including in collaboration with Mercer) on how they incorporate climate change into their long-term investment strategies.¹⁸

40. A similar US based group investor network on climate risk has also been formed (Investor Network on Climate Risk - 90 institutions with \$9trillion assets),¹⁹ as has the Australian / New Zealand Investor Group on Climate Change.²⁰

41. The IIGCC, Investors Network on Climate Risk and the Investor Group on Climate Change, along with the United Nations Environment Program Finance Initiative (UNEP FI) released a statement in November 2010, ahead of the COP16 Climate Financing Talks in Cancun, Mexico.²¹ This stressed that: “*Private investment will only flow at the scale and pace necessary if it is supported by clear, credible, and long-term policy frameworks that shift the risk-reward balance in favour of less carbon-intensive investment*” – noting that investors are in particular calling for:

- *domestic policy frameworks to catalyze renewable energy, energy efficiency, and other low-carbon infrastructure, so as to provide investors with the certainty needed to invest with confidence in receiving long-term risk-adjusted returns;*
- *international agreement on climate financial architecture, delivery of climate funding, reducing deforestation, robust measurement, reporting, and verification, and other areas necessary to set the global rules of the road, bolster investor confidence, and allow financing to flow;*
- *international finance tools that help mitigate the high levels of risk private investors face in making climate-related investments in developing countries, enabling dramatic increases in private investment.*

¹⁶ For further information see www.iigcc.org

¹⁷ <http://www.top1000funds.com/latest-news/latest-news/pension-funds-to-sustain-climate-change-pressure.html>

¹⁸ For information on Mercer’s Climate Change Report see <http://www.mercer.ie/summary.htm?idContent=1406410>

¹⁹ For further information see www.incr.com

²⁰ For further information see www.igcc.org.au

²¹ See http://www.iigcc.org/data/assets/pdf_file/0015/15153/Global-Investor-Statement.pdf

See also Responsible Investor 30/11/2010 ‘Cancun special: institutional investors bullish as they arrive at COP16 for climate financing talks’ http://www.responsible-investor.com/home/article/iigcc_cancun/P1/

P8 Group

42. The P8 Group²² consists of 12 of the world's leading pension funds collectively managing \$3 trillion, in partnership with the International Finance Corporation (IFC) of the World Bank. Members are made up of 4 funds from the United States, 4 from Europe, 3 from Asia and an Australian collective - including Universities Superannuation Scheme (UK), ABP (Dutch civil servants fund), AP7 (Swedish National Pension Fund), CalPERS and CalSTRS (the two largest US pension plans for California's civil servants and teachers), New York State and the sovereign wealth funds from Norway and Korea.

43. The aim of the group is create viable investment vehicles that could be used to simultaneously combat climate change and promote sustainable growth in developing countries. They also intend to engage in lobbying for the best possible regulatory and financial environment that would enable such investments.

44. The International Finance Corporation (IFC) – the private sector arm of the World Bank group - has already been working for several years on how to galvanize institutional investors around the issues of climate change and investment in poor countries.²³ The organisation is looking at instruments - whether funds or funding facilities - that can combine the IFC's ability to source projects, know the investment landscape and risks in developing countries and bring projects to the table for potential P8 investment. One example is using the IFC's experience in debt structuring for projects where the different risk appetites of investors can be accommodated (i.e. the IFC or another development finance organisations takes the first loss position, the mezzanine could be taken up by IFC and the senior debt be taken by private sector banks or institutional investors). Such structures have been used to fund energy efficiency financing in Eastern Europe and school and health financing in Africa.

45. Activities of the group so far include 5 Summits (held in Europe and the USA), as well as organising a P80 Asia Summit in Korea in 2010 (in partnership with the Asian Development Bank and the UNEP FI), for funds across Asia to share knowledge and experience and engage in the 'green growth' agenda. The P8 Secretariat has also been working with the Asian Development Bank, the UK Government, and the International Finance Corporation to help design a new public-private partnership fund concept (CP3 Fund) for mobilizing large scale capital for Asia low carbon infrastructure investing (see later section on *Green Funds*).

Other Groups

46. The Caisse des Dépôts, the French public investment group, has joined with three other European public financial institutions – Cassa Depositi e Prestiti, KfW Bankengruppe and the European Investment Bank – to form the 'Long-term Investors Club'.²⁴ The group is working with other financial institutions from Europe, Asian and the Gulf, with total assets of \$3 trillion. Long-term investors are defined as financial institutions which have low or no short to medium-term liability obligations, such as public financial institutions, sovereign funds and certain pension funds and insurance companies. The aim of the group is to address long-term challenges – such as finding the \$2 trillion required to cover investment needs in transport, energy, water and telecom sectors by 2020-2030. The InfraMed Fund (for investments in urban, energy and transport infrastructures in the southern and eastern regions of the Mediterranean) and the Marguerite Fund (2010 Fund for Energy, Climate Change and Infrastructure in the European Union) are examples of such a new type of financial engineering.

²²See <http://www.responsible-investor.com/home/article/p81/>

²³ <http://www.responsible-investor.com/home/article/ifc/>

²⁴ See OECD Observer, No. 279 May 2010

47. Ceres (Coalition for Environmentally Responsible Economies) is a national network of investors, environmental organizations and other public interest groups working with companies and investors to address sustainability challenges such as global climate change.²⁵ Ceres has organized a group known as the Investor Network on Climate Risk (INCR) which has almost 100 members, (including CalPERS, CalSTRS, various US state retirement boards, state treasurers and comptrollers, Deutsche Asset Management, Blackrock Financial, TIAA-CREF, State Street Global Advisors and Prudential Investment Management), representing over \$9.5 trillion in assets. This group is focused on climate-related risks and opportunities for institutional investors. INCR also has working groups focusing on specific issues, such as the Fixed Income Working Group which is educating investors on a fixed income vehicles in the low carbon space, as well as how to integrate environmental, social and governance (ESG) issues into the bond underwriting, disclosure, rating processes etc.²⁶

48. The Capital Market Climate Initiative (CMCI) is a UK initiative, bringing together experts from the financial and public sector to help deliver private climate financing at scale in developing countries by: identifying deliverable propositions to mobile private capital; developing a base of evidence build developing country interest and support; and building private sector confidence in the feasibility of the task and opportunities. Target implementation is for COP 18 in 2012.²⁷

49. The World Bank²⁸ has also been in discussion with a group of the world's biggest public sector pension funds about ways to structure joint investment products that could channel funds into climate change projects.

Pension Funds

ATP

50. ATP is Denmark's largest pension fund with total assets of more than EUR 66 billion. As of 31 December 2009 ATP's infrastructure investments equated to 1.8% of the total portfolio. With just below 3% committed. ATP does not have a target for its infrastructure investments but has an overall target of 25-30% of its risk budget to inflation class.

51. ATP Pension Fund has invested in renewable energy infrastructure and technology, such as solar wind and hydro, as well as emerging technologies, such as biofuels and biomass for a long time. ATP invested DK 600 million in renewable and has committed 2.2 million to concrete assets and over DK 2 billion of equity in companies that are related to the renewable and clean energy sector.

52. At the COP-15 summit in December 2009, ATP pledged €1 billion to a new climate change fund for investing in emerging economies, with an open invitation to other European investors to join it. The new fund (run as a specialist entity within ATP with its own management) will invest in existing growth structures, aid programmes and funds in emerging economies that are overseen by the UN, World Bank

²⁵ See www.ceres.org

²⁶ Taken from presentation made by Chris Davis, Director Investors Programme, Ceres, to P8 Summit, Brussels, February 2011

²⁷ Taken from 'Leveraging Low-carbon private investment: AGF and UK policy', presentation made by Tamsin Ballard, UK Department of Energy and Climate Change, to P8 Summit, Brussels, February 2011

²⁸ <http://www.responsible-investor.com/home/article/charles/>

and regional development banks. ATP have announced that its first investment (directly into a renewable energy project) will be made in the first quarter of 2011.²⁹

PGGM

53. PGGM currently administers some EUR 100 billion of pension assets for five Dutch pension funds, including Stichting Pensioenfonds Zorg en Welzijn (“PFZW”), the second largest pension fund in the Netherlands. PGGM is especially interested in renewable energy opportunities and has already invested in wind farms. In December 2010 PGGM committed capital to the BNP Paribas Clean Energy Fund

CalPERS

54. The Californian Public Employees’ Retirement System (CalPERS) has approximately \$219 billion in assets and is the largest public pension fund in the United States. Since 2006, CalPERS has committed \$500 million to external managers in its Global Equity asset class who restrict companies with a negative environmental footprint. CalPERS has committed more than \$1.5 billion to its private equity Environmental Technology Program, and has strongly advocated the reporting of environmental risk in its engagements with federal regulators and portfolio companies.

55. On the 10th of November 2010 CalPERS announced the investment of \$500 million into a new internally managed strategy for investing in global public companies that are actively working to improve the environment and mitigate the adverse impact of climate change. The internal team at CalPERS responsible for managing the strategy will model it after HSBC’s Global Climate Change Benchmark Index (HSBC CCI). As of year-end, the model had 380 securities across 36 countries with a minimum total capitalization of \$400 million. In order to be included in the portfolio, companies must derive a material portion of their revenues from low-carbon energy production including wind, solar, biofuels and other alternative energy; water, waste and pollution control; energy efficiency and management including building insulation, fuel cells and energy storage; and carbon trading and other capital deployment and financial products.

56. The goals of CalPERS’ Environmental Investment Initiatives are to achieve positive financial returns, while fostering energy savings, sustainable growth and sound environmental practices, including:

- *AIM Environmental Technology Program:* CalPERS Environmental Technology Program Board targets investments in environmental technology solutions that are more efficient and less polluting than existing technologies such as recycling; minimizing the use of natural resources; and reducing emissions, refuse, and contamination to air, water, and land. The primary objective of the Program is to achieve attractive investment returns over the long-term and help catalyze clean technologies.
- *Corporate Governance Environmental Strategy:* CalPERS Board has adopted a plan to shine a light on corporate environmental liabilities, improve transparency and timely disclosure of environmental impacts, and improving environmental data transparency.
- *CalPERS Public Market Environmental Managers:* CalPERS Board is investing in stock portfolios that use environmental screens.

²⁹ See Responsible Investor 30/11/2010 ‘ATP targets first direct renewable investment for €1bn emerging markets climate commitment’ http://www.responsible-investor.com/home/article/atp_targets_first_direct/

V. Vehicles of Green Investing for Pension funds

57. Some larger pension funds are already investing in green investments via direct infrastructure investments and through private equity. Yet such direct financing mechanisms are only really an option for large pension funds with considerable in-house resources. Many smaller pension funds are likely to increase their asset allocation to such projects via Green Bonds, structured instruments, or green equity funds. This section looks at some of the initiatives underway to provide pension funds and institutional investors with such opportunities.

a) Green Bonds

58. Green Bonds can be defined as fixed-income securities issued (by governments, multi-national banks or corporations) in order to raise the necessary capital for an environmental project. These have been issued by the World Bank and other development banks and other entities in order to raise capital specifically for climate change and green growth related projects. Though generally offering these bonds with the same interest rate as other instruments, and with the same credit rating, ring-fencing the financing for such projects allows the issuers to tap a broader range of investors, such as SRI funds (see section on World Bank bonds).

59. Green bonds involve the issuing entity guaranteeing to repay the bond over a certain period of time, plus either a fixed or variable rate of return. They can be asset backed securities³⁰ (see Breeze Bonds Case Study – Box 3) tied to specific green infrastructure projects or plain vanilla “treasury-style” bonds issued to raise capital that will be allocated across a portfolio of green projects (such as the World Bank’s issuances).³¹ Some green bonds utilized structured note mechanisms³² (see following section on Structured Green Products), with payments linked to inflation or other underlying derivatives. Already the World Bank has issued green bonds with returns partly linked to an index of traded ‘green’ companies, and another linked to the successful achievement of certified emission reductions in projects receiving funds.

60. There are many classes of green bonds that have been issued or proposed, and they have taken on a confusing plethora of names such as green gilts, green retail bonds, green investment bank bonds, green infrastructure bonds,³³ multilateral development bank green bonds, green corporate bonds, green sectoral bonds, rainforest bonds and index-linked carbon bonds. One class of green bonds that has attracted attention recently is the *climate bond*, which is a type of green bond issued to raise capital for investments in projects which mitigate or adapt to climate change. These instruments have allowed governments to raise capital, or support the private sector in raising capital, to build renewable energy generation and its enabling infrastructure, widely implement energy efficiency measures in cities and industries and support

³⁰ Asset backed or securitized bonds are similar to ordinary bonds but have specific assets whose revenues pay the interest and principal. An ordinary bond’s payments are generally guaranteed by the company that issues them. In asset backed or securitized bonds a set of revenue generating assets are put into a special purpose company and these assets pay the bond holder their interest and principal.

³¹ <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>

³² A structured note is a debt obligation that also contains an embedded derivative component with characteristics that adjust the security’s risk/return profile. The return performance of a structured note will track that of the underlying debt obligation and the derivative embedded within it.

³³ Climate Change Capital describes green infrastructure bonds as being the most important in the short- to medium-term, and describes them as “*bonds issued to refinance built and operating low-carbon infrastructure, such as offshore wind turbines and grid connections. They are asset-backed corporate bonds that would be rated by ratings agencies (so as to be investment grade) and issued in sufficient quantities to be easily tradable.*” <http://www.guardian.co.uk/environment/cif-green/2011/jan/11/what-are-green-bonds>

adaptation measures that will boost the economic development of communities in the face of climate change.

61. In order to take advantage of feed-in tariffs and other government incentives, bonds have been issued exclusively for financing renewable energy (see the discussion on CREB's in the following section on US Government Green Bonds). The projects which underlie the bonds are subject to a certification mechanism to qualify for commercial advantages such as off-take price support³⁴ offered by governments or regulators. The credit risk of the bonds may be directly enhanced by government-related entities or indirectly through regulatory support for the underlying project.

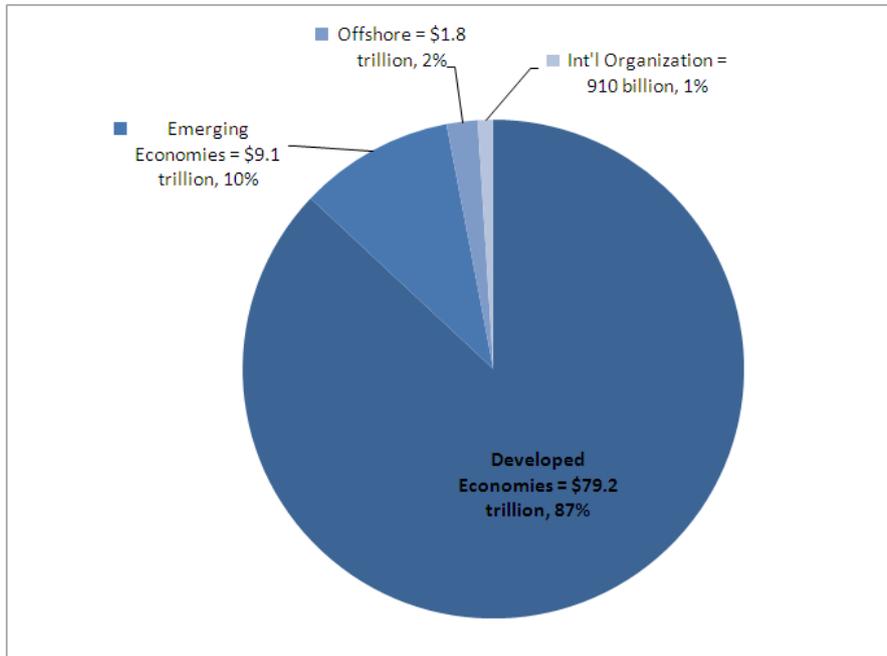
62. Final demand for bonds comes from different core constituencies and a paramount issue for climate policy makers is how to find investors to buy green bonds. Green bonds have been designed to attract capital from institutional investors with SRI mandates, such as the Danish pension fund ATP, the UN Joint Staff Pension Fund and the Norwegian Global Fund, or as a means for governments to direct funding to climate change mitigation. These bonds have also been directed towards the retail sector, whilst sovereign wealth funds, hedge funds and private equity are also seen as important sources of demand (see Fig 1).³⁵

63. The market size for all green bond issuances to date is approximately \$11 billion (with \$1.9 issued by the World Bank alone), a drop in the ocean (0.012%) of the capital held in the global bond markets, estimated to be worth \$91 trillion globally. There is scope for scaled up issuances of green bonds (in the hundreds of billions per year) but if this capital is to be raised through a thriving and liquid green bond market, transparent policies based on long term, comprehensive and ambitious political commitment are needed. The recent UK political commitment to a Green Investment Bank is an encouraging step in the right direction if it is included in their final budget.

³⁴ A mandatory off-take system provides a government guarantee for purchasing the electricity generated, and purchasing supported electricity is ultimately the obligation of electricity users. Mandatory offtake may be implemented at market price or support price.

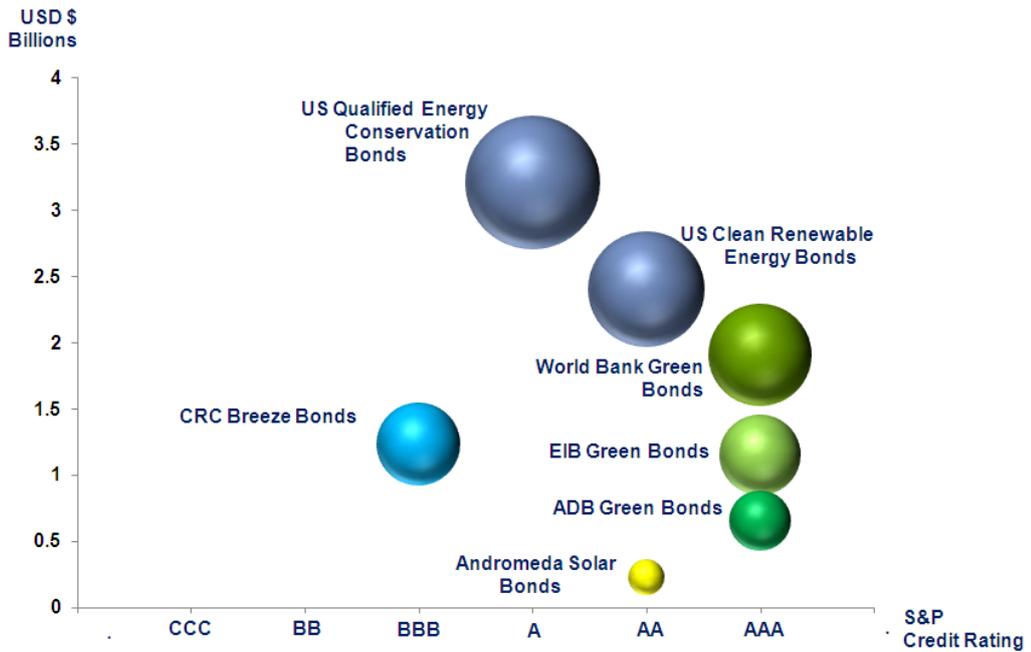
³⁵ McKinsey in 2007 dubbed the following as the “four new power brokers”: petrodollar investors, Asian sovereign investors, hedge funds and private equity buyout funds. While hedge funds and private equity have been battered by the crisis, their assets have mostly held steady while the other two have been on the upswing. <http://bis.org/statistics/secstats.htm>

Figure 6: Global Bond Market



Source: OECD Analysis, Bank for International Settlements Quarterly Review

Figures 7: The Green Bond Market



Source: OECD Analysis, Bank for International Settlements Quarterly Review

Table 6: Selected Existing Issuances of Green Bonds

	World Bank	EIB	CRC Breeze	CREB	QECB
Rating	AAA	AAA	BB- CCC	AAA-BBB	AAA-BBB
Currencies	Multiple	EUR	EUR	USD	USD
Amount Outstanding (\$)	1.90 Billion	1.15 Billion	1.23 Billion	2.4 Billion	3.2 Billion
Return	Fixed/Floating	Fixed and equity linked	Fixed	Fixed	Floating
Use of funds	Broad adaption and mitigation projects	Renewable energy and efficiency projects	Wind turbine projects	Renewable energy projects	Energy Efficiency

Source: OECD Analysis

64. The World Economic Forum’s policy analysis in its report ‘*Green Investing 2010*’ (WEF 2010) ranks green bonds as high in terms of scale and medium in terms of efficiency and the multiplier effect.

World Bank Green Bonds

65. The World Bank’s green bonds have been well received by investors since they were structured to have simple and standard financial features, such as equivalent credit quality and yield levels to other World Bank triple-A rated bonds so that there is no sacrifice to the end-investor in terms of returns. They were also issues into a liquid market and can be as easily traded as other ‘plain vanilla’ bonds issued by the World Bank. Because of these predictable and attractive features and the dedication to climate change, they attracted the interest of a broad range of investors – from retail and high-net-worth, to institutional investors with large allocations to fixed income (being especially attractive to those investors who incorporate ESG into their analysis). The relative “greenness” of the bonds is solid and linked to a due diligence process that the World Bank conducts to identify and monitor ‘green’ projects. The World Bank’s issuances have been limited to \$1.9 billion mostly because borrowing requirements are primarily determined by its lending activities for development (in this case climate change) projects and because of the highly prudent financial policies that restrict its lending to a maximum of one dollar in loans per one dollar of total capital (the current ratio being as low as 47 cents in loans per one dollar of capital).

66. The World Bank (IBRD) has issued an equivalent of USD 1.9 billion in Green Bonds through 32 transactions and 15 currencies since the inaugural issue in 2008.³⁶ These are mostly 3-7 year, fixed and floating rate notes (i.e. which pay a variable rate of interest), issued via the AAA rated IBRD, designed to raise capital for projects that aim to combat climate change in developing countries. Projects funded include alternative energy installations, funding for new technologies that reduce greenhouse gas emissions, reforestation, watershed management and flood protection. The World Bank is issuing these bonds at identical yield levels to their conventional bonds, thus there is no sacrifice to the end-investor in terms of returns.

67. The first issue, or tranche, in the series (€233m) was made in Swedish Kronor in November 2008, with the second tranche (\$300m) launched in spring 2009, which was bought by the state of California’s pension fund. Subsequent tranches have been issued in other currencies (including Yen), as

³⁶ <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html> To provide context, since the first issuance of the green bonds in November 2007, the World Bank has issued USD \$51 billion of non-green bonds.

well as another Swedish Kronor bond which has attracted investors including the Swedish National Pension Funds (such as AP2 and AP3). Skandinaviska Enskilda Banken (SEB) has been working with the World Bank and is the lead underwriter for the Swedish Kronor bonds, and is said to be looking for international partners to increase distribution (particularly in southern Europe, parts of Asia and parts of the USA).³⁷ Issuing bonds denominated in foreign currencies gives issuers the ability to access investment capital available in foreign markets. In 2007 the Bank also issued Euro denominated bonds targeted at retail investors.³⁸ Issues in the series continue, as shown in Table 4.

68. Nikko Asset management intends to launch a World Bank Green Fund which can invest up to 100% of its assets in World Bank green bonds. The fund will specifically target a range of institutional investors, including pension funds in Europe and the Middle East.³⁹

Table 7: World Bank Green Bond Issuances and Denominations

Amount	Coupon	Issue Date	Maturity Date
USD 300 million	Floating	2009	2012
USD 180 million	2%	2009	2013
SEK 2.85 billion	3.50%	2008	2014
AUD 30 million	5.40%	2010	2015
MXN 40 million	6.15%	2010	2015
MYR 12 million	1.38%	2010	2015
ZAR 25 million	7.20%	2010	2015
USD 10 million	Floating	2010	2015
USD 50 million	1.38%	2010	2015
USD 10 million	1.50%	2010	2015
USD 10 million	2.05%	2010	2015
NZD 150 million	5.23%	2010	2015
USD 10 million	2%	2010	2016
USD 30 million	2.14%	2011	2016
USD 10 million	Floating	2011	2016
AUD 205 million	6%	2010	2017
BRL 40 million	9.50%	2010	2017
EUR 2 million	2.50%	2010	2017
HUF 3.7 billion	5.50%	2010	2017
NOK 400 million	3.75%	2010	2017
NZD 50 million	5.63%	2010	2017
RUB 750 million	7.50%	2010	2017
SEK 700 million	3.25%	2010	2017
TRY 50 million	10%	2010	2017
ZAR 350 million	8.75%	2010	2017
COP 155 billion	8%	2010	2020
JPY 125 million	0.88%	2010	2020
MXN 550 million	7.50%	2010	2020
SEK 100 million	3.50%	2010	2020
USD 5 million	3.50%	2011	2021

Source: <http://treasury.worldbank.org/cmd/htm/GreenBondIssuancesToDate.html>

³⁷ See FtFM 24/5/2010 'Swedish bank seeks partner to market green bonds.'

³⁸ The return on the bonds was tied to the performance of an "Eco Index" which was linked to the equity performance of a set of companies defined by ABN AMRO as being green. The outstanding amount is about \$ 297 million. They also then launched a small bond (about \$30 million) that was linked to carbon credits, in this case UN Clean Development Mechanism certified emission reductions (CERs). These were specifically linked to particular projects and again retail targeted.

³⁹ <http://beta.worldbank.org/climatechange/news/nikko-asset-management-set-launch-green-fund-world-bank-bonds>

Figure 8: World Bank Green Bond Illustration

ISSUER INFORMATION		IDENTIFIERS	
Name	INTL BK RECON & DEVELOP	Common	042534331
Type	Supranational Bank	ISIN	US45905UGD00
Market of Issue	Euro MTN	CUSIP	45905UGD0
SECURITY INFORMATION		RATINGS	
Country	SNAT	Currency	USD
Collateral Type	Sr Unsecured	Moody's	Aaa
Calc Typ	(21)FLOAT RATE NOTE	S&P	AAA
Maturity	4/24/2012	Fitch	AAA
Series	EMTN NORMAL	Composite	AAA
ISSUE SIZE		BOOK RUNNER/EXCHANGE	
Coupon	0.52813 Floating QUARTLY	Amt Issued/Outstanding	USD 300,000.00 (M)
QUARTL US LIB+22.5	ACT/360	USD	300,000.00 (M)
Announcement Dt	4/16/09	Min Piece/Increment	100,000.00/100,000.00
Int. Accrual Dt	4/24/09	Par Amount	100,000.00
1st Settle Date	4/24/09	SEB	
1st Coupon Date	7/24/09	LUXEMBOURG	
Iss Pr			
HAVE PROSPECTUS DTC			

1) Additional Sec Info
2) Floating Rates
3) ALLQ
4) Corporate Actions
5) Cds Spreads/RED Info
6) Ratings
7) Custom Notes (Avail)
8) Covenant/Default
9) Identifiers
10) Fees/Restrictions
11) Prospectus
12) Sec. Specific News
13) Involved Parties
14) Pricing Sources
15) MTN Drawdown
16) Related Securities
17) Issuer Web Page
18) ML/Bloomberg Info.
66) Send as Attachment

THE BOND PROCEEDS ARE RESERVED FOR FINANCING CLIMATE FRIENDLY PROJECTS ACCORDING TO THE "GREEN BOND" CRITERIA.

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2011 Bloomberg Finance L.P.
SN 791435 6542-32-1 03-Feb-2011 11:23:36

Source: Bloomberg Terminal

Figure 9: Price Evolution of a World Bank Green Bond



Source: Bloomberg Terminal

European Investment Bank

69. The European Union (EU) and its long-term financing institution, the European Investment Bank (EIB), have made climate change mitigation and adaptation a top policy priority. Indeed the European Commission recently adopted a 'Low Carbon Economy Roadmap to 2050' (see EC 2011), which states that: *"This will require major and sustained investment: on average over the coming 40 years, the increase in public and private investment is calculated to amount to around €270 billion annually, This represents an additional investment of around 1.5% of EU GDP per annum on top of the overall current investment representing 19% of GDP in 2009."*

70. The EIB supports the EU's goal of low-carbon and climate-resilient growth within and outside the Union. The EIB's financing in these sectors is one of the largest among international financial institutions: in 2009, the Bank invested almost EUR 17 billion in climate action. Acting as a financial leader supporting innovative clean and climate-resilient technologies, the EIB is committed to catalysing investment with partners both within and outside Europe.

71. The EIB has been targeting investors with its 'Climate Awareness Bonds.' Around €1 billion has been raised since 2007. Funds raised are ring-fenced from the EIB's general funding portfolio and used for EIB projects in the fields of renewable energy (such as wind, hydro, solar and geothermal energy production) and energy efficiency (such as district heating, co-generation, building insulation, energy loss reduction in transmission and distribution etc.).

72. The first bond was issued in 2007 in Euros. This is a 5 year bond, AAA rated (i.e. the rating of the EIB), with the coupon (or interest rate paid by the bond) indexed to the FTSE4Good Environmental Leaders Europe 40 Index, with a minimum rate guaranteed.⁴⁰ The following bonds, issued in November 2009, are denominated in Swedish krona, with an issuance size of SEK 2.25 billion, with a 6 year maturity and a fixed (2.95% coupon) and floating (i.e. variable depending on interest rates) tranche. These are also triple AAA rated and the lead manager was Swedbank.⁴¹ The April 2010 issuance (again AAA rated) was lead managed by Daiwa securities and targeted at Japanese investors. The latest bond is denominated in Australian dollars (AUD 231 million, 4.27% coupon for 2 years) and South African rand (ZAR 1375 million 6.68% coupon for 3 years).⁴² The EIB also issued 'Earth's Future Bonds' in February 2010, targeted at individual investors in Japan.⁴³

73. The European Bank for Reconstruction and Development (EBRD) has issued its first green bonds on December 2010, with funds raised being used to finance environmental sustainability projects. The issue is largely targeted at the Japanese retail market. The AUS \$25 million bond is denominated in Australian dollars and pays 4.80%.

Asian Development Bank

74. Asian Development Bank (ADB)'s investments in clean energy increased from \$668 million in 2007 to nearly \$1.7 billion in 2008, helping install 4.7 gigawatts of renewable energy capacity and reduce

⁴⁰http://businessresponsible.libcastcorp.com/episodes/uploads/i_communication_responsabilite_globale_seminaire_b_usiness_responsible_une_obligation_climatique.pdf

⁴¹ http://www.eib.org/investor_relations/press/2009/2009-215-eib-launches-debut-swedish-krona-climate-awareness-bonds.htm?lang=en

⁴² http://www.eib.org/investor_relations/press/2010/2010-067-issuance-of-climate-awareness-bonds.htm?lang=en

⁴³ http://www.eib.org/investor_relations/press/2010/2010-062-earths-future-bonds-launched-to-fund-projectssupporting-climate-protection.htm?lang=en

30 million tons of Co2 emissions. In 2009 ADB invested \$1.3 billion in clean energy and will further increase annual investment to \$2 billion by 2013.

75. The ADB issued on the 29th of September 2010 \$232.2 million in Clean Energy Bonds to support its renewable energy efficiency projects in Asia and the Pacific. The bonds were primarily issued to Japanese retail investors and included four tranches: four year bonds denominated in Australian dollars, four year and seven year bonds in Brazilian real, and seven year bonds in Turkish lira. Earlier in 2010 the ADB launched its first thematic bond –a water bond which raised \$619 million in 2 and 3 year fixed rate notes. Although both bond issuances had mainly retail investors participation, the ADB believes there is a huge demand from both –institutional and retail – to fund sustainable and environmentally friendly energy, infrastructure and water projects.

US Government Green Bonds

76. The federal Energy Policy Act of 2005 established Clean Energy Renewable Bonds (CREBs) as a financing mechanism for public sector renewable energy projects. This legislation originally allocated \$800 million of tax credit bonds issued between January 1, 2006, and December 31, 2007.

77. CREBs may be used by certain entities - primarily in the public sector - to finance renewable energy projects. The list of qualifying technologies is generally the same as that used for the federal renewable energy production tax credit (PTC). CREBs may be issued by electric cooperatives, government entities (states, cities, counties, territories, Indian tribal governments or any political subdivision thereof), and by certain lenders. CREBs are issued -theoretically - with a 0% interest rate. The borrower pays back only the principal of the bond, and the bondholder receives federal tax credits in lieu of the traditional bond interest.

78. The Energy Improvement and Extension Act of 2008 (Div. A, Sec. 107)⁴⁴ allocated \$800 million for new CREBs. In February 2009, the American Recovery and Reinvestment Act of 2009 (Div. B, Sec. 1111)⁴⁵ allocated an additional \$1.6 billion for New CREBs, for a total New CREB allocation of \$2.4 billion to generate financing for renewable energy initiatives. These essentially function as low-interest loans to renewable project owners, providing them with an alternative to traditional sources of finance, many of which had dried up as a result of the recession. The Bonds are similar to production tax credits awarded to renewable projects, and apply largely to the same projects. However, they differ in that they serve as a financing tool rather than providing post-implementation tax relief; they are intended to help get planned projects, such as wind or solar farms, into construction. Under the scheme, the borrower, in this case a government agency or a utility, sells the bond to an investor such as a pension fund, which then becomes the bondholder. In normal bond conditions, the issuer then has to pay interest to the bondholder.⁴⁶

79. The Energy Improvement and Extension Act of 2008 also authorized the issuance of Qualified Energy Conservation Bonds (QECBs) that may be used by state, local and tribal governments to finance "qualified energy conservation projects".⁴⁷ QECBs are qualified tax credit bonds, and in this respect are

⁴⁴ <http://thomas.loc.gov/cgi-bin/query/z?c110:H.R.1424.enr>

⁴⁵ http://thomas.loc.gov/home/h1/Recovery_Bill_Div_B.pdf

⁴⁶ Database of State Incentives for Renewables & Efficiency (DSIRE)

⁴⁷ The definition of "qualified energy conservation projects" is fairly broad and contains elements relating to energy efficiency capital expenditures in public buildings; renewable energy production; various research and development applications; mass commuting facilities that reduce energy consumption; several types of energy related demonstration projects; and public energy efficiency education. Renewable energy facilities that are eligible for CREBs are also eligible for QECBs.

similar to new Clean Renewable Energy Bonds or CREBs. The October 2008 enabling legislation set a limit of \$800 million on the volume of energy conservation tax credit bonds that may be issued by state and local governments. The American Recovery and Reinvestment Act of 2009, enacted in February 2009, expanded the allowable bond volume to \$3.2 billion. In contrast to CREBs, QECBs are not subject to a U.S. Department of Treasury application and approval process. Bond volume is instead allocated to each state based on the state's percentage of the U.S. population as of July 1, 2008. Each state is then required to allocate a portion of its allocation to "large local governments" within the state based on the local government's percentage of the state's population.

80. The important distinction between the US green bonds described here is that in the case of CREBs, the federal government pays interest directly in the form of a tax credit to bondholders, rather than subsidising payments issuers make to investors, as is the case, for example, with Build America Bonds (see Box 2).⁴⁸

Box 2: Build America Bonds

Though not strictly for 'green investments', another interesting financing mechanism introduced by the Obama administration in 2009 is known as *Build America Bonds (BABs)*. This program is part of the \$787 billion American Reinvestment and Recovery Act. Through BABs municipalities could issue taxable debt and have the option of receiving a 35% rebate on their interest cost from the US Treasury.

Since the program began in April 2009 more than US\$165 billion of BABs were issued by local government or municipalities with institutional investors buying more than a quarter of the debt. The BABs program ended on 31st of December 2010. There are talks of a return of the bond program in 2011 however with a lower tax rebate.

BABs represent a significant shift in the way municipal debt is structured. Historically, interest earned on municipal bonds issued for most governmental purposes has been exempt from federal income taxation. This implicit subsidy limited the investor base mainly to retail and individual parties (they hold an estimated two thirds of the US\$2.8 trillion US municipal bond market through mutual funds or individual accounts).

Many institutional investors such as pensions, who are tax exempted, were natural buyers of BABs, which provided a perfect match of long term demand and supply and an introduction to infrastructure exposure via debt linked to capital project like schools, road expansion and bridge construction.

Note 1: Republican Congressman John Mica, Chair of the House of Representatives Transport Committee said: *"I can almost guarantee that a bond program will be one of a number of options considered in legislation to finance America's infrastructure projects. However, BABs terms were considered too generous and any future bond program would need to be a new iteration or reformed version."* Source Wall Street Journal, 30 /12/2010

81. A relatively new US municipal bond sector has recently been introduced which is made up of PACE bonds (Property Assessed Clean Energy bonds). These PACE bonds are, and will be, used to finance energy efficiency and renewable energy improvements in buildings. The particular innovation that makes this financing popular, and widely available, is that the security for the repayment of the loans underlying the bonds lies with the property and not with the owner of the property. Hence, when the property is sold, the liability to repay the loan is transferred to the new owner of the house. In this way the

⁴⁸ Financial Times (FTfm) 1/22/2010 'Success continues of Build America Bonds'

benefits from the improvements stays “on the hook” for the repayments and increases the incentive for the home owner to make improvements.⁴⁹

b) *Structured Green Products*

82. In 2008, Société Générale offered the first “synthetic green bond” structured note⁵⁰ called the Environment Optimizer/Top Green Bond 1. In essence, this was a synthetic green bond linked to the performance of the Lyxor Dynamic Environment Fund, which offered exposure to the SGI Global Environment Index. This is notable because it is a product synthesized through financial engineering to give the investor exposure to the environment sector while protecting all of the invested capital through the use of a zero-coupon bond which will pay its face value at maturity.

83. The SGI Global Environment Index tracks the global environment sector and comprises stocks of companies including First Solar Inc., Gamesa, QCells, Suzlon Energy, United Utilities, Veolia Environment, REC Group, Severn Trent, Vestas Wind Systems and Waste Management. Every quarter the performance of the fund is measured over that quarter. The bond holder receives the return based on the index (with a minimum return of 0% guaranteed and the maximum return capped at 8%).⁵¹

84. Across Europe there is increased attention to the funding gap that needs to be filled to meet renewable energy targets. A bond market for institutional investors could open up a new global-scale pool of capital to fund renewable projects beyond traditional financing from utilities and banks whose balance sheets are still constrained. Issuance of the Breeze bonds or the more recent Sunpower’s bonds were new structured green products to investors

85. The successful bond issuance for SunPower's Montalto di Castro solar PV park in Italy in December of 2010 could represent the start of a new form of financing for renewables projects in Europe. Half of the bond issuance in fact was placed to institutional investors suggesting that a vast new liquidity pool for the renewable energy market is starting to emerge. While the project relied heavily on the support of the European Investment Bank (“EIB”) and Italian export credit agency SACE it may nevertheless provide the template for other bond issuances in 2011.

86. The Breeze series of bonds are an important innovation in the world of green bonds for multiple reasons and present an interesting case study for policy makers who would consider structuring regulatory environments to be amenable to private sector capital markets innovations along these lines. The bonds were created by a hedge fund and are the very first series of green asset-backed securities (ABS), and according to Windpower Monthly (2006), were also notable for representing the first time the international capital markets had been tapped to finance renewable energy more generally. They are also distinct from the multilateral bank or government bonds examined previously, as a private investment company issued them.

⁴⁹ http://www.whitehouse.gov/assets/documents/PACE_Principles.pdf

⁵⁰ Definition – this is a synthetic bond

⁵¹ <http://www.structuredetailproducts.com/products/details/download/id/728176/brochure/f5554a9dcca1cf1c76659132230df1122e2eaab9>

Box 3: Case Study - CRC Breeze Bonds

There are seven bonds outstanding for approximately \$1.16 billion and were conceptualized by Dr. Richard Robb, a Professor at Columbia University and CEO of the hedge fund Christofferson, Robb & Company (CRC). They were all issued through a Special Purpose Vehicle (SPV) called “CRC Breeze Finance” and are secured on a number of wind farms in Germany and France.

As described by Dr. Robb, in 2005 CRC started looking at a securitisation of loans to wind farms as they felt it was a good fit with CRC’s traditional business of investing in asset-backed securities and private structured credit transactions that help European banks transfer risk and improve their balance sheets or their return on regulatory capital. CRC decided that the money to be made at the time, at least in onshore wind, was through owning the farms, not lending to them and they discovered an opportunity for a solution that would buy a scale portfolio and benefit from efficiencies in operating, maintenance and financing. Once the wind farms are constructed, returns largely depend on how hard the wind blows, therein producing a return stream that would be highly valued by CRC’s investors.

CRC bought its first onshore German wind farm within their credit fund in July 2005 so that they could learn about how they worked. In the worst case, they were confident in being able to sell it in a year if they changed their minds about the economics of wind.

The bonds are structured so that the revenues from the wind farms pay interest and capital back on the bonds. This is clearly an important structure as it is using the bonds markets directly, rather than through the banks, to finance renewable energy projects. The wind that powers the turbines is reasonably consistent year to year. The wind turns the generators, which produce electricity and receive a set payment through the German and French Feed in Tariffs. These revenues are reasonably consistent, so they fit neatly with the demands of the fixed income bond investor.

By the spring of 2006, CRC had used the Breeze Finance structure to acquire a wind farm portfolio of 39 wind farms with a nameplate capacity of 303.8 megawatts (MW) in Germany (Breeze Two) and 27.05 MW capacity in France (Eoliennes Sûroit). They repaid construction debt by issuing a Creating a securitisation structure called CRC Breeze Finance that HVB underwrote. CRC Breeze issued EUR 300 million of senior notes rated triple-B by S&P and Fitch and \$64 million of junior notes rated double-B plus.

The investors (such as pension funds) were exposed to the following risks:

- 1) The cash flow from each project depends directly on energy production that, in turn, depends on the wind resources. The lack of long-term on-site wind-resource data at most of the sites introduces the risk that projected energy production levels, and therefore cash flows, might not be realized.
- 2) The revenues of the individual projects rely on support provided by the regulatory systems in France and Germany for renewable energy. Any change in these regulations could affect the support for the underlying wind projects, which could result in lower revenues than predicted. The existing regimes, however, were expected to be grandfathered should any changes in regulation be implemented.

Box 4: Case Study - Andromeda Finance Srl

The project consists of the development, construction, operation and maintenance of two photovoltaic (PV) solar power plants with 45.3MW and 6.1MW capacity located at two adjacent sites in Montalto di Castro, Italy. The site benefits from an existing high voltage substation, which facilitates the Project to export electricity to the grid. The high voltage substation is owned and operated by Terna, the Italian power grid operator.

Andromeda Finance Srl or Project Co will receive a fixed regulatory incentive for the electricity produced by the plant based on the Italian legislation to promote renewable energy production (see Box 1). In addition to this incentive tariff, Project Co will also be able to sell the electricity on the wholesale market at the prevailing market prices. The plant will benefit from priority dispatch rights (i.e. the right to sell its output first) thereby removing volume risk.

Andromeda Finance Srl issued two classes of bonds to finance the solar plant:

- EUR97.6m in fixed rate notes with a coupon of 5.715%, due Nov. 30, 2028 rated Aa2 by Moody's thanks to the benefit of the guarantee of the Italian export credit agency SACE S.p.A. ("SACE") and
- EUR97.6m in fixed rate notes with a coupon of 4.839%, also due Nov. 30, 2028 rated Baa3 by Moody's and subscribed by the European Investment Bank ("EIB").

Moody's said that the Baa3 underlying ratings reflect project strengths including a large portion of the revenues based on a fixed feed-in tariff paid by a government-related entity, as well as the straight forward construction and operation of the project, the reliable and established technology (monocrystalline silicon panels), the reputable world-class manufacturer and contractor providing comprehensive performance guarantees and a 20-year operation and maintenance contract, resources estimates being based on 14 years of data, as well as structural protections. The rating was marked down due to potential project weaknesses, including exposure to wholesale power prices (with Italian pricing potentially converging towards lower European levels), potential errors in the resource estimate, potential yield reduction which could stem from even minor deviations in the manufacturing process; and potential construction delays leading to lower feed-in tariffs.

Financing - Securitisation Structure: In order to finance the construction works, Project Co will raise project loans from two international banks, Société Générale (Aa2, negative) and BNP Paribas (Aa2, stable) (together, the Originators). In addition, Société Générale will provide a VAT Facility to Project Co of up to €22 million. The terms and conditions of the project bank loans and the VAT Facility are set out in the common terms agreement (CTA), the Project Loan Facility Agreement and the VAT Facility Agreement (together the Facility Agreements). The project loans (but not the VAT Facility) will be securitised through the Issuer, which is set up as a bankruptcy remote SPV under Italian Law No 130 (the Securitisation Law). The Securitisation Law sets out the legal framework for asset-backed securitisation transactions in Italy.

Incentive Tariff – "Conto Energia": In addition to the regulatory incentives discussed in Box 1, tariff incentives were also attached to this issue. The incentive is granted for 20 years and is based on remuneration for the electricity generated ("feed-in tariff"). Once granted to a PV plant, the tariff Euro/kWh rate of the feed-in tariff remains fixed for all the 20 years of subsidisation and is not subject to any adjustment or inflation indexation.

The incentive scheme under the Italian Solar Decree shall apply to a maximum aggregate capacity of 1,200 MW of photovoltaic plants. However, plants built by private entities in the 14 months (or public bodies in the following 24 months) following the achievement of this limit are still eligible for subsidisation under the Italian Solar Decree.

The value of the tariff is based on the size, the installation features of the plant and the date at which the plant enters into operation. Both the 6.1MW and a 45.3MW plants benefit from a fixed €346 /MWh (€0.346/kWh) feed-in tariff if the plants start operation in 2010.

In order to apply for the incentive tariff the Project must (i) have independent connection and independent meters, which are not shared with other generation facilities; and (ii) apply for grid connection. Once the plant is completed, the Project must notify the end of works to the grid operator (Terna) and request to be admitted to the incentive tariff.

The incentive tariff is granted upon "connection", which requires physical connection of the plant to the grid by Terna. However, to mitigate the risks for photovoltaic project developers not accessing the 2010 tariff due to Terna's failure to connect to the grid, the Italian Parliament passed law No. 41 of 22 March 2010 (Decreto Salva Alcoa) pursuant to which the 2010 feed-in tariff will be granted even if a plant is not connected to the grid by the end of the year. The tariff is granted provided that the following conditions are met; (i) the plant is completely built by 31 December 2010; and (ii) the producer applies for the connection to the grid in time to obtain it by 31 December 2010 in accordance with the timeline set by the applicable regulations.

The 2011 Solar Decree has confirmed the feed-in tariff as the system for incentivising solar PV plants that will become operational from 1 January 2011. The maximum aggregate capacity of PV Plants to be incentivised has increased from 1,200 MW to 3,000 MW.

c) *Green Infrastructure Funds*

UN Green Climate Fund

88. Under the Cancun Decisions, developed countries agreed to set up a Green Climate Fund with the capacity to raise resources on a scale commensurate with the Copenhagen Accord (\$100 billion a year by 2020 - first proposed at COP15 in Copenhagen), which will be accountable to the UNFCCC⁵² and will support projects, programmes, policies and other mitigation and adaptation activities in developing countries. It will comprise a Board of 24 members (equal membership from developed and developing countries) and will be administered by a Trustee. The World Bank will act as interim trustee for at least the first three years.

89. An IMF Staff Briefing Note proposed that the Green Fund would use an initial capital injection by developed countries in the form of reserve assets, which could include IMF Special Drawing Rights (SDRs), to leverage resources from private and official investors by issuing low-cost green bonds in global capital markets. SDRs are an arcane financial instrument but essentially constitute additional foreign exchange reserve assets of the IMF. Resources mobilized by the Green Fund could be channelled through existing climate funds, or via newly created special-purpose disbursement facilities.

90. Once its capital base is established, the fund could begin issuing highly-rated (and hence, low-cost) green bonds that could be sold to institutional investors. As a result, the Green Fund would be able to mobilize a multiple of its paid-in capital. In the steady state, the Green Fund would combine the proceeds from bond issuance with subsidy resources that would be provided through budgetary transfers from contributing countries.⁵³

91. To generate financing on the scale envisaged in the Copenhagen Accord (and given the phase-in assumptions outlined above), the fund would need to issue about \$1 trillion in bonds over 30 years of operation. However, the UN AGF's Final Report notably did not consider this proposal in detail, observing that the political acceptability of using SDRs is low due to lack of consensus on the appropriate role of SDRs in the international monetary system. Nonetheless, the issue of how to capitalize the Green Climate Fund remains on the agenda of the G20 for 2011.

EU Funds

92. The EIB's traditional financing instruments are medium and long-term loans with fixed or variable interest rates in euro or other currencies. However the EIB offers also other financing instruments – including equity funds through which the EIB indirectly participates in companies and projects promoting low-carbon investments in particular in renewable energy, energy efficiency and forestry. The funds can have different geographical coverage and are established with the private sector and a range of international financial institutions. Though mostly targeted at retail investors, such instruments could be used to target institution investors, including pension funds, in future.

93. EIB financing may be accompanied by EU grants to finance investment promoting the reduction of energy consumption, pollution and CO2 emissions and by technical assistance to help build up the relevant administrative and institutional capabilities and to provide other technical support to promoters.

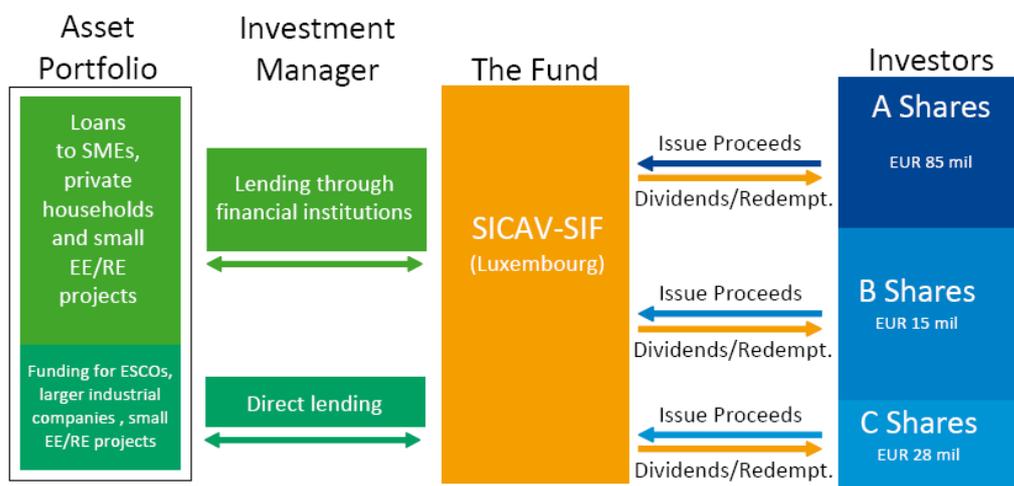
94. *The Green for Growth Fund* was launched in 2009 together with KfW (Kreditanstalt für Wiederaufbau, or Reconstruction Credit Institute - a German government-owned development bank)to

⁵² United Nations Framework Convention on Climate Change

⁵³ <http://www.imf.org/external/pubs/ft/spn/2010/spn1006.pdf>

provide financing, including loans, equity and technical assistance, for sustainable energy projects in the Western Balkans and Turkey. Financing is provided through financial intermediaries and energy service companies (ESCOs).

Figure 10: EIB Green Growth Fund



Source: EIB⁵⁴

95. In addition, the EIB has set up a series of other funds together with other institutions and the private sector to provide equity for investment in particular in renewable energy, energy efficiency and forestry: the *Dasos Timberlan Fund* (forestry), the *Marguerite Fund* or 2020 European Fund for Energy, Climate Change and Infrastructure and the *DIF Renewable Energy Fund*, to name but a few.

96. *The Global Energy Efficiency and Renewable Energy Fund (GEEREF)* is an innovative financing vehicle in the form of a fund of funds designed to promote energy efficiency and renewable energy in emerging markets outside the European Union. It is active in African, Caribbean and Pacific developing countries, but also supports initiatives in Latin America, Asia and the EU neighbourhood countries.

CP3 Fund

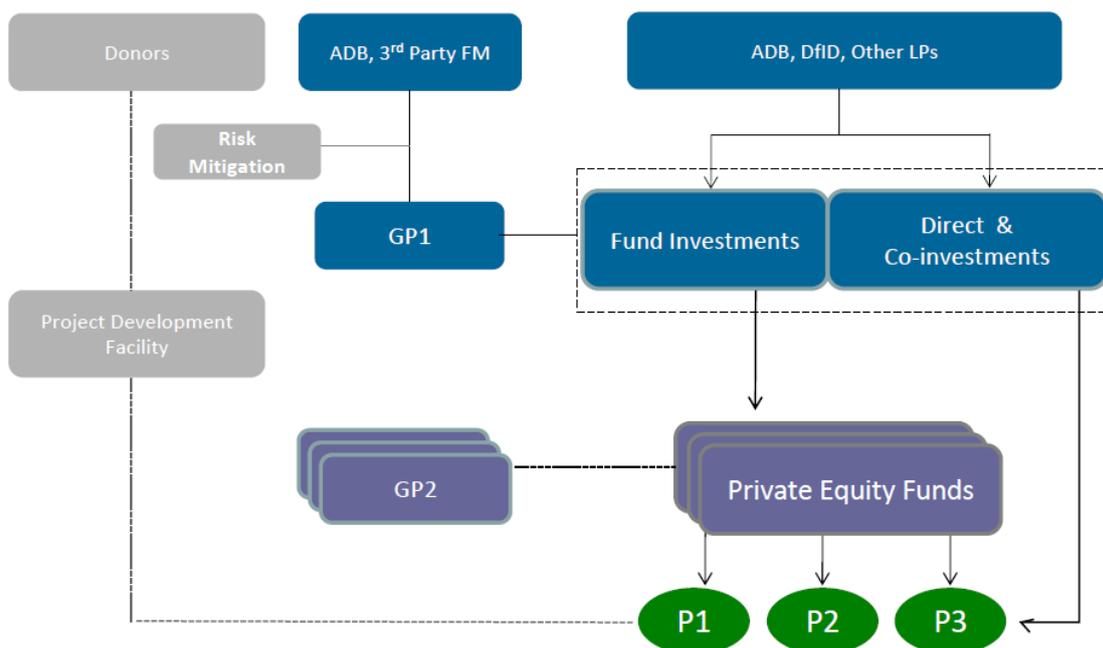
97. The P8 Group has been working with the IFC and Asian Development Bank (ADB) on launching an infrastructure fund for Asia, known as the Climate Public Private Partnership Fund (CP3). The mission of the fund is to mobilize large scale capital into low carbon investments in developing Asia, targeting projects in sustainable energy, water and waste treatment, land use (agriculture and sustainable forestry), sustainable transport (bio fuels, fuel cells, mass transport), and the built environment (sustainable buildings, infrastructure etc.). The fund aims to invest at scale for significant impact; to generate highly favorable risk-adjusted returns; to mobilize private sector capital; to develop investment infrastructure; to incubate quality low carbon specialist funds; to increase the pool of investible projects; to provide risk mitigation tools; to bridge knowledge gaps; and to build trust regarding such investments in the region.

98. This is envisaged as a fund of fund and co-investment structure (consisting of a fund development facility, a co-investment facility and a direct investment facility), allowing a range of pension funds to become involved (including smaller pension funds in the region which may only be able to invest in specific projects due to restrictions on overseeing assets). It is envisaged that this will be a USD \$2-5

⁵⁴ http://www.ggf.lu/media/public/pdfs/downloads/factsheets/2010/GGF_At_a_Glance_2010_09.pdf

billion fund, managed by the IFC and ADB. Concessionary financing will be involved (i.e. mechanisms for the International Financial Institutions to take on some tranches of risk) and the project is seen as a way of testing various Public Finance Mechanisms to see how barriers to institutional involvement in such projects can be overcome. The design and consultation of this fund concept is ongoing and it is hoped that a launch will take place (with investment capital secured) in the course of 2011.

Figure 11: CP3 Structure



Source: P8⁵⁵

Others Fund Proposals

99. Drawing on the experience of initiatives such as the CalPERS Green Wave programme in California, the United States Overseas Private Investment Corporation (OPIC), the UK Private Finance Initiative (PFI) and the strategic climate funds of the World Bank, the World Economic Forum's Task Force on Low Carbon Prosperity has proposed a potential mechanism for leverage private sector investment, following mechanisms known as 'Challenge Funds' or using 'Cornerstone Equity'.⁵⁶

⁵⁵ Taken from CP3 presentation made by Robert van Zweiten, Director, Capital Markets & Financial Sector, Private Sector Operations Department, Asian Development Bank, to P8 Summit, Brussels, February 2011.

⁵⁶ See 'Task Force on Low Carbon Prosperity Recommendations October 2009' <http://www.weforum.org/documents/gov/Environment/TF%20Low%20Carbon%20Prosperity%20Recommendations.pdf>

Figure 12: Challenge Funds

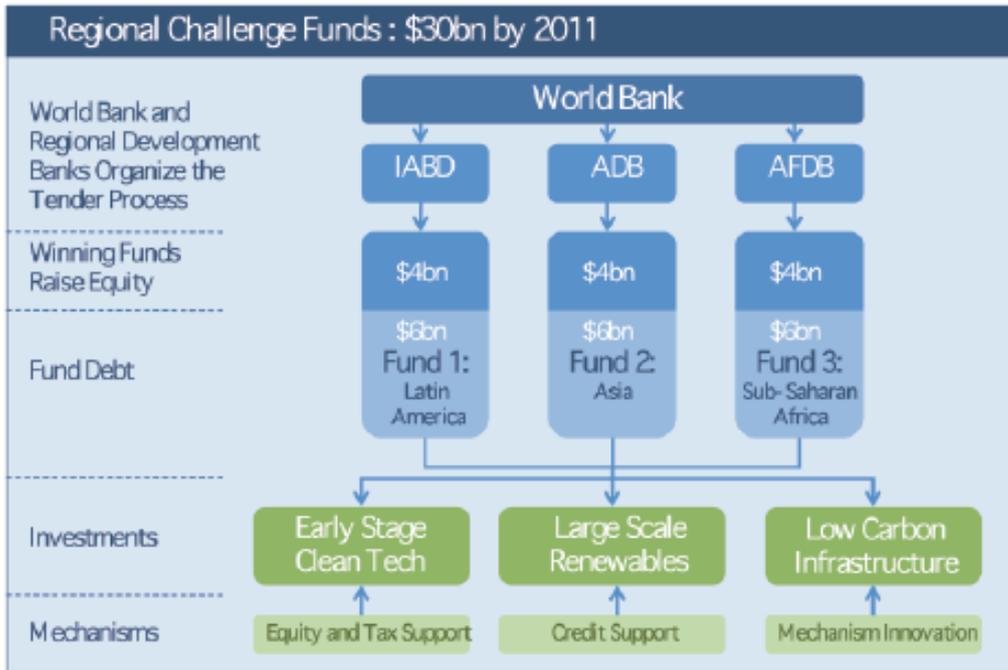
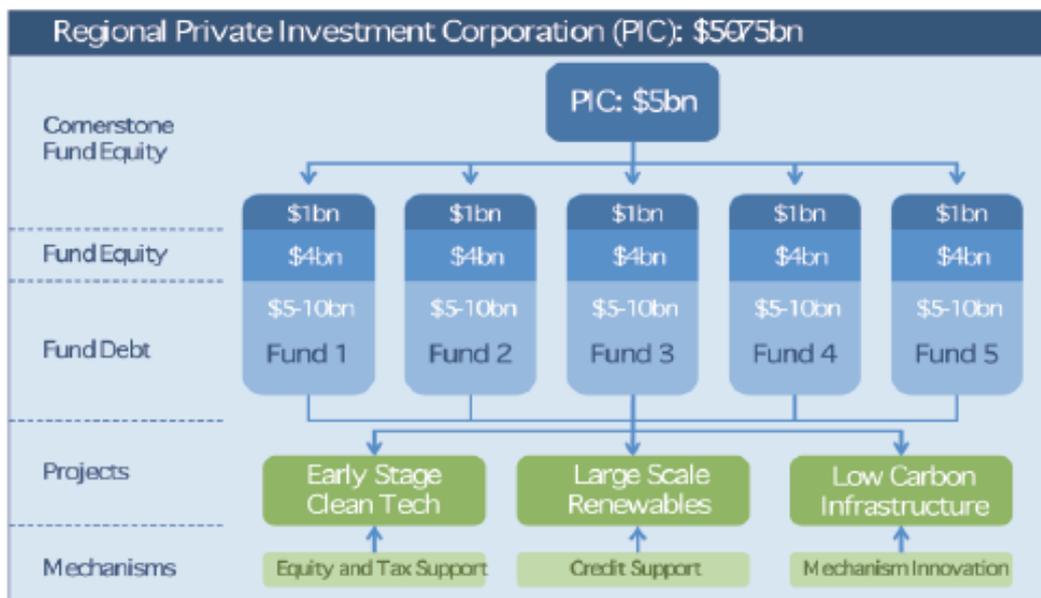


Figure 13: Challenge Funds using Cornerstone Equity



Source: WEF

d) *Other Initiatives*⁵⁷

100. **Green Infrastructure Banks** have been mooted as a policy proposal. These could be structured so that, instead of providing debt, government money will take on more of the risk – thus reducing the risk that private sector equity and debt has to take.⁵⁸ For example, the UK government is planning to launch a Green Investment Bank in 2012. It will have a mandate to tackle risk that markets currently cannot handle, thereby acting as a catalyst for further private sector investment. Initial capitalization for the bank will be GBP 3bn, and the bank is expected to be able to borrow as of 2015 (once national debt begins to fall as a percentage of GDP), and it is estimated that £18bn of funding could be generated through syndication and co-financing by the private sector within four years for low-carbon energy projects.⁵⁹

101. Though not providing green funding specifically, several countries have experience of instruments which have allowed pension funds to become involved with infrastructure investing. Such initiatives could be extended to the green financing arena. For example, **infrastructure securities funds** have been launched in Australia which provide access to a wide range of global equity stocks and other types of financial instruments (bonds, stocks, securities and notes) related to infrastructure, allowing for a greater diversification of positions towards infrastructure in countries that are still in an early stage of privatizing their infrastructure.⁶⁰

102. Also in Australia, unlisted wholesale funds exist, which are balanced funds that also include assets from other sectors beyond infrastructure. These have proven attractive to pension funds due to their degree of diversification, the long-term nature of the investments and the fact that they do not require a great capital contribution.⁶¹

⁵⁷ See also 'Meeting the Climate Challenge: Using Public Funds to Leverage Private Investment in Developing Countries'

<http://www2.lse.ac.uk/GranthamInstitute/publications/Other/Leveragedfunds/Meeting%20the%20Climate%20Challenge.aspx>

⁵⁸ See Financial Times 8/6/2010 'The Future of Global Infrastructure'

⁵⁹ See Responsible Investor, 23/3/2010, 'UK's new Green Investment Bank gets asset boost, borrowing powers' http://www.responsible-investor.com/home/article/uks_new_34bn_green_investment_bank_to_get_borrowing_powers/

See also Green Alliance Briefing and FAQ's October 2009, 'Establishing a Green Investment Bank for the UK' http://www.green-alliance.org.uk/uploadedFiles/Our_Work/Green%20Investment%20Bank%20Briefing%20final.pdf

⁶⁰ See BBVA Pension Watch, July 2010

⁶¹ See BBVA Pension Watch, July 2010

VI. Policy Recommendations

103. What role can governments (in general) and pension fund regulatory and supervisory authorities (in particular) play in supporting the involvement of pension funds in these types of green financing initiatives?

Provide Supportive Environmental Policy Backdrop

104. To date, OECD analysis and policy dialogues have helped countries to understand the climate change policy challenge and to advise them on how to improve policy frameworks overtime. Some of the key findings of the work to date with respect to private financing for climate action include:

- domestic policy frameworks have a central role to establish framework conditions, incentivise and stimulate private investment into low-carbon development (Corfee-Morlot et al., 2009, Kim et al. 2009; Kalamova et al. (forthcoming));
- opportunities exist to improve the economic efficiency of current mitigation policy frameworks and/or policies in related areas (e.g. energy),⁶² which will in turn sharpen the incentives for private sector investment in low-carbon economic development.

105. As discussed, clear and consistent policies over a long period of time are needed so that strategic and financial players have the confidence to invest in green growth projects. Most notable a clear policy signal is required in terms of carbon pricing. To make green related projects attractive and profitable, governments need to deploy both regulatory constraints (such as emission caps or carbon pricing) and incentives (such as subsidies, government guarantees etc.).

Create Right Investment Vehicles

106. In order ensure that appropriate financing vehicles are available, providing suitably risk-adjusted, long-term income opportunities, governments and International Financial Institutions can also work to improve deal flow – for example vehicles specializing in early-stage projects and public sector taking subordinated equity positions in funds can be used.

107. In order raise the necessary scale of funds required, vehicles which are appropriate for all pension funds, including smaller funds (which lack the in-house expertise to invest directly in projects) will also need to be supported – such as green bonds and green funds. Only in this way will the necessary scale to match future climate change and mitigation needs be met and the public sector be able to successfully leverage private sector investments into the field.

108. As the World Economic Forum report points out (WEF 2010): “*First and foremost, any policy mechanism needs to be chosen according to the stage of development of the technologies that are to be developed or deployed, and hence the type of financing that the private capital markets should be encouraged to commit.*”

⁶² For example see country specific recommendations on more cost-effective policy frameworks are provided by OECD [Economic Surveys](#) (climate chapter of the US review, energy chapter of the South Africa, Korea and Indonesia reviews, and [Environmental Policy Reviews](#) (China, Japan).

109. As discussed, International Finance Institutions and governments can also assist by mitigating green growth project related risks which are new to pension funds and therefore difficult for them to assess or to hedge. Public Financing Mechanisms providing such mitigation such as the following could be combined with financial instruments:

- Country risk cover;
- Low-carbon policy risk cover;
- Currency risk cover;

110. Governments should also support the setting up of a ‘rating agency’ or standard setter to ‘approve’ green projects (such as green bonds or green funds). The OECD has started work on defining and measuring green FDI with the aim to provide a statistical foundation in support of governments’ efforts to evaluate the role of private sector investment flows and to assess policy performance in providing a framework for green investment (OECD 2011c). Follow up work could be envisaged to help pension funds and regulators share a common understanding of green investment and measure the scale and evolutions of such investment over time.

Support Investment in Green Infrastructure

111. The OECD *Principles for Private Sector Investment in Infrastructure* (OECD 2007) outline how governments can enhance their investment environment to promote infrastructure development through private sector participation.⁶³ They are a relevant conceptual framework to encourage investment in green growth projects, which are mainly about infrastructure projects. The *Principles* focus on five main areas of policy making and include the following recommendations, which are also relevant for green projects:

- ensure the financial sustainability of projects through an assessment of long-term revenue flows, affordability for government and the costs and benefits of alternative modes of financing. Incentives and guarantees may be necessary to make returns on green projects comparable to ‘brown’;
- provide a sound institutional and regulatory environment for infrastructure investment, including facilitating access to capital markets through the phasing out of unnecessary obstacles to capital movements and restrictions on access to local markets and removing regulatory barriers. For green investments, providing a stable policy environment around carbon pricing is required;
- ensure public and institutional support for the project and choice of financing;
- make the co-operation between the public and private sectors work by promoting transparency and appropriate contractual arrangements. Including environment performance criteria into contractual specifications / calls for tender could specifically assist the development of green growth related projects;
- promote private partners’ responsible business conduct.⁶⁴

⁶³ See also (OECD 2010c), (OECD 2008b), (OECD 2006)

⁶⁴ See Environment Chapter in OECD Guidelines for Multinational Enterprises (OECD 20008b)

112. (OECD 2011b) also argues that in order to promote infrastructure investment in general by pension funds, a national, long-term policy frameworks for key individual infrastructure sectors is required, as well as improving the integration of the different levels of government in the design, planning and delivery of infrastructures through the creation of infrastructure agency/bank, and the creation of a National Infrastructure Pipeline. Likewise, governments should lay out their low-carbon policies in order to specifically encourage investment in green growth initiatives.

113. In addition, (OECD 2011b) recommends that an association of infrastructure investors should be formed, which would be able to bring forward institutional investors interests, and creating a platform for dialogue between investors, financial industry and governments. Within the green growth sphere, policy makers should be encouraged to engage with groups such as the IIGCC, and such a platform could build on the OECD's work on how to promote green growth.

Remove Investment Barriers

114. Recent changes in both pension regulatory frameworks and accounting rules in the OECD area (e.g. the Pension Protection Act of 2006, FAB 158 in US and IAS19) have put increasing pressure to reduce funding gaps in defined benefit plans (see OECD 2011b). Such changes (including the move to market to market accounting) ironically may be forcing pension funds into shorter-term assets and into matching their liabilities with government bonds (which require the smallest solvency buffers).⁶⁵

115. In addition, there are concerns that the AIFM Directive and the Volcker rule (part of the Dodd-Frank Wall Street Reform and Consumer Protection Act in the USA) could negatively impact private funds and the alternative asset management industry increasing barriers to investment in infrastructure. However, the full impact and scope of these provisions is still not clear. New bank regulation (Basel III) is expected to increase credit and liquidity costs, affecting in particular long term bank debt and limiting its availability. This regulation could negatively impact infrastructure loans that are typically heavily structured and would be treated as long term and illiquid. Basel III changes will come into force in 2013 and will be introduced gradually.

116. Governments and regulators should therefore revisit their funding regulation to make sure that they are not inadvertently discouraging pension funds from making in long-term projects, which green projects will often require.

117. Other regulatory restrictions may also apply. For example, quantitative and qualitative investment restrictions on pension funds' investments still exist to a greater or lesser extent in most OECD countries (see (OECD 2009b)). Pension funds may therefore be unable to invest in climate change financing instruments due to restrictions on foreign currency or overseas investment, non-listed investments, or structured products, private equity, fund or funds or other restrictions on alternative investments. Pension fund regulatory and supervisory authorities may therefore wish to check that they are not inadvertently preventing pension funds from taking advantage of the opportunities offered by the climate financing initiatives.

118. Where pension regulatory authorities rely less on quantitative restrictions and more on the 'prudent person' investment rule, they may wish to clarify that how green investments would comply with such regulations.⁶⁶

⁶⁵ See for further reference; Yermo, J. and C. Severinson (2010) and Impavido et al (2009)

⁶⁶ (Kaupelyte and Jankauskiene 2009) notes that pension funds investment into venture capital in the UK and USA increased after implementation of the prudent person rule.

Education and Guidance

119. Pension regulatory and supervisory authorities may also have a role to play in provide education and guidance regarding the types of instrument which are available to pension funds in relation to green growth initiatives, advise of their suitability for different types of funds, and guidance of the sort of due diligence and risk management pension supervisors would expect pension funds to undertake before investing in such instruments. As the OECD's infrastructure paper (Inderst 2009) outlines, such a role could include:

- supporting stronger efforts in independent data collection and objective information provision in the field of infrastructure investment in general and green projects specifically;
- promote higher transparency standards (in terms of investment information, performance numbers, fees charged etc.) in private equity vehicles and direct investments;
- recommending the establishment of international guidelines for investment performance and risk measurement of infrastructure (and other alternative) investments;
- encouraging the study of more advanced risk analysis beyond the traditional measures, including the specific risks relating to climate change impacts or climate change regulations;
- encouraging improvements in knowledge and understanding of pension fund stakeholders and supervisors on green growth related investments.

Improve Pension Fund Governance

120. Pension fund knowledge regarding infrastructure and green investments could also be improved by appointing trustees and fiduciaries with experience of these sectors - particularly where investments are intended to be undertaken in-house. Such appointments would improve pension fund governance and oversight.

121. However, an increase in the scale and size of pension funds may be necessary in order to improve pension funds ability to undertake these investments. As noted in the paper, it is currently the larger funds that are involved in green projects as they have the resources to support the development of internal expertise and hence build the capacity to invest directly in green projects. Some pensions funds have therefore expressed the interest in pooling resources to invest jointly (in order to acquire expertise, lower fees, better align interests, exercise greater control over projects, to scale up their commitments, improve their knowledge and spread risks). Better pension fund governance of the green finance issue comes with greater scale (see (Stewart and Yermo (2008)). Governments and regulatory authorities should therefore encourage and work with the industry groups (described in this paper) which are striving to pool resources to develop greater expertise in the green investment arena.

122. Regulators and supervisors also have a role to play in encouraging pension funds to act as more long-term investors and to improve pension fund governance (see (OECD 2009c)). Given climate change related investments are involved long-term commitments, pension funds need to be truly acting as long-term investors to align the interests (liabilities) of their beneficiaries with these assets.

123. However, the structure of corporate ownership has changed and become more disintermediated. Rather than shareholder interacting directly with the firms they invest in, pension fund members may have to go through many layers of decision-makers (from pension fund trustees, to investment consultants, fund of funds and external asset managers) before getting to the actual companies which they are the ultimate

owners of. The incentives along this investment chain have become short-term and misaligned with the ultimate, long-term goals of the pension fund. Hence as institutional ownership has grown, the holding period of stocks has declined. Before pension funds can be expected to invest in green projects or financial instruments, they must be encouraged to once again act as providers of long-term capital.

124. What can be done to encourage institutional investors to be active, long-term investors?⁶⁷ On the one hand, barriers to active ownership and voting can be removed (such as taxation or takeover rules), incentives put in place (such as requiring voting disclosure), and collaboration initiatives encouraged. Regulators and industry bodies can also provide guidance as to how they expect institutional investors to behave and use supervisory inspections to examine and influence behaviour in order to realign incentives towards long-term, active ownership (e.g. checking the length of mandates given to external managers, the turnover of funds, fees paid, voting behaviour etc.). Pension funds can also be encouraged (or even required) to consider environmental, and social and governance (ESG) issues in their investment analysis.

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⁶⁷ See *Corporate Governance Lessons from the Financial Crisis* (OECD 2009d)

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*Green Infrastructure and Africa*⁶⁸

125. Although the African continent contributes less than 4% of total global greenhouse emissions, it is widely recognized that it is the most vulnerable to climate change. The African continent has warmed about half a degree over the last century and the average annual temperature is likely to rise an average of 1.5-4°C by 2099, according to the most recent estimates from the International Panel on Climate Change (IPCC). Africa is a continent already characterized by a highly variable climate. However, climate change models suggest that, in general terms, the climate in Africa will even more so.

126. The Third Assessment Report (TAR) of the IPCC⁶⁹ highlights major issues related to potential impacts that could occur as a result of climate change in Africa, including: water resources, agriculture and food security, human health, ecosystems and biodiversity, forestry, coastal zones and attaining the Millennium Development Goals (MDGs).⁷⁰

⁶⁸ This section builds on the following OECD papers on infrastructure in Africa:

Stocktaking of the Water and Sanitation Sector and Private Sector Involvement in Selected African Countries
<http://www.oecd.org/dataoecd/17/8/39679099.pdf>

How to increase sound private investment in Africa's road infrastructure
<http://www.oecd.org/dataoecd/40/23/41775855.pdf>

Increasing Private Investment in African Energy Infrastructure <http://www.oecd.org/dataoecd/44/46/43966848.pdf>

Engaging the Private Sector in African Infrastructure <http://www.oecd.org/dataoecd/39/41/41775965.pdf>

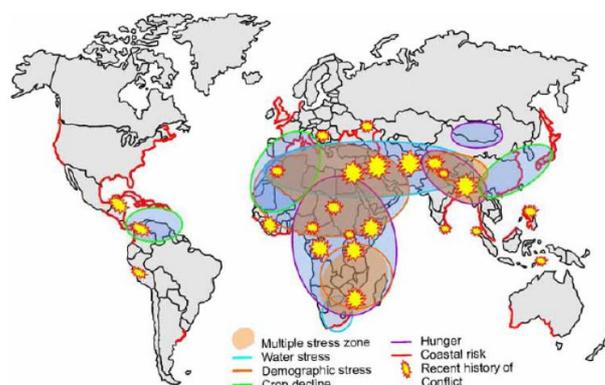
Boosting Africa's Energy Sector through Carbon Finance <http://www.oecd.org/dataoecd/45/23/43966892.pdf>

Africa Risk Mitigation Initiatives for Infrastructure Financing <http://www.oecd.org/dataoecd/27/47/42749326.pdf>

⁶⁹ IPCC (2001), 'Climate change 2001: The scientific basis', Cambridge University Press

⁷⁰ *Background paper on Impacts, vulnerability and adaptation to climate change in Africa* for the African Workshop on Adaptation Implementation of Decision 1/CP.10 of the UNFCCC Convention Accra, Ghana, 21 - 23 September, 2006
http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/200609_background_african_wkshp.pdf

Figure 15: Climate Change Vulnerability by Region



Multiple Stress Zones: Instability is likely to be greatest in areas of Multiple Environmental Stress
Source: The DCDC Global Strategic Trends Programme 2007-2036
(UK Government Ministry of Defence)

Source: P8⁷¹

127. The continent also has a low capacity for adaptation, which it is estimated will cost between \$10-\$40 billion in 2020 (World Bank estimates) to the UNDP's 2007 estimate of \$86 billion per year in 2015. The United Nations claims that there is a convergence in the recent cost estimations at around US\$100 billion to \$200 billion for climate change mitigation.⁷²

128. Various sources of funds to finance the impact of climate change in developing countries have been pledged – for example the Global Environment Facility (GEF), the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund set up under the UNFCCC, as well as the Clean Development Mechanism (CDM).⁷³ As noted earlier in the paper, developed countries have already set the goal of providing developing countries with \$100 billion a year (Cancun Decisions December 2010 COP16) by 2020 to combat climate change.

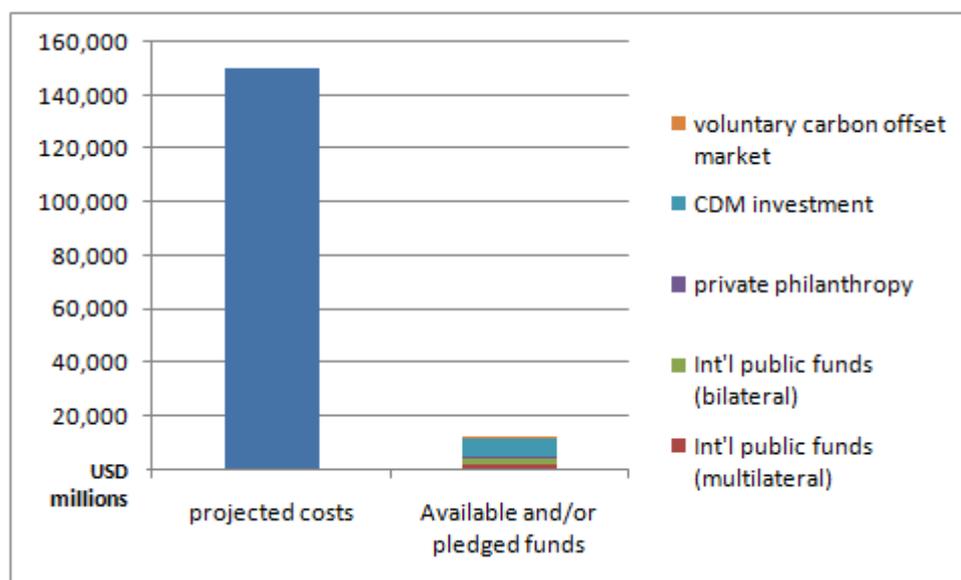
129. Yet the UN estimates that voluntary contributions by developed countries will not be enough to meet Africa's adaptation needs. Private sector funding will also need to be leveraged.

⁷¹ Taken from presentation made by Dr Aled Jones, Deputy Director, University of Cambridge Programme for Sustainability and Leadership, to P8 Summit, Brussels, February 2011

⁷² See 'Financing Climate Change Adaptation and Mitigation in Africa: Key Issues for Policy-makers and Negotiators', policy brief paper prepared for 3rd Financing for Development Conference on Climate Change, Kigali, Rwanda 21-22 May, 2009 and The African Ministerial Conference on the Environment (AMCEN) Special Session on Climate Change Nairobi, Kenya 25-29 My 2009 http://www.uneca.org/adfvii/documents/FINALPolicyBrief_FinancingCC130509.pdf

⁷³ The Clean Development Mechanism (CDM) was established under the Kyoto Protocol and designed to assist Annex I Parties to comply with emission reduction commitments and to foster sustainable development in developing countries. As of end-2007, proceeds from the sale of emission credits from CDM projects amounted to \$7.4 billion. However, only 17 out of 1186 CDM projects are located in sub-Saharan Africa, most of which (14 out of 17) were located in South Africa. http://www.uneca.org/adfvii/documents/FINALPolicyBrief_FinancingCC130509.pdf

Figure 16: Gap in Available Funding for Climate Change in Africa



Source: United Nations Economic Commission for Africa (UNECA)⁷⁴

130. The World Bank's strategy for climate change adaptation and mitigation in Africa includes 4 pillars – from building climate risk management into development, to taking advantage of carbon finance opportunities to capacity development – and notably scaling up financing opportunities.⁷⁵

131. What are the prospects for green infrastructure investments – such as those discussed in this report – in the African region? Certainly there are opportunities in the region – from the forests of the continent to its potential for hydroelectric power (such as Gilgel Gibe III project in Ethiopia, the Bujagali Hydropower Dam in Uganda or the Grand Inga hydropower project to be located in the DRC). Other renewable energy projects are also underway (such as the Lake Turkana wind farm in Kenya, which is the largest planned for the Continent, or the Cabeolica wind farm in Cape Verde).

132. Multinational organisations – led by the African Development Bank (AfDB) - are providing capital, incentives, expertise and risk mitigation and working with other groups, such as the Private Infrastructure Development Group (PIDG) to help overcome the obstacles to private sector involvement in infrastructure projects in the region. The AfDB is also working to set up a fund of funds to provide vehicles of access to African infrastructure and green projects.⁷⁶

133. Pension funds are also starting to get involved. For example South Africa's Public Investment Commission (PIC) has created a multi-billion dollar, 25 year, pan-Africa infrastructure fund to mobilize local and international investment in infrastructure development in Africa. The PIC includes the Government Employees Pension Fund.⁷⁷ South Africa also has a 'Green Economy' plan which is a

⁷⁴ http://www.uneca.org/adfvii/documents/FINALPolicyBrief_FinancingCC130509.pdf

⁷⁵ <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/EXTAFRREGTOPENERGY/0,contentMDK:22777785~menuPK:717329~pagePK:2865114~piPK:2865167~theSitePK:717306,00.html>

⁷⁶ PEI, Infrastructure Consortium for Africa, (2011) '*Infrastructure Investor Africa Intelligence Report*'

⁷⁷ <http://www.southafrica.info/business/economy/infrastructure/pic-080606.htm>

government priority and includes the goal of maximising benefits from investment and finance opportunities arising from the shared efforts between the public and private sectors – including an Implement Clean Technology Fund Investment Plan (CTF –IP).⁷⁸ Meanwhile, the Kenyan government sees pension funds as one group of potential investors for its infrastructure bonds (including incentivizing them with tax breaks).⁷⁹

134. Yet the private finances needed for green investment projects in Africa are still limited. In addition to the general barriers to green finance discussed – and potential solutions outlined – Africa faces some unique challenges to raising the necessary investments to meet its climate change and mitigation needs. These include the challenging investment environment (where the higher costs and longer delays of doing business seem to increase the risks of investing in infrastructure in comparison with other regions). Despite a decade of growth, the numerous reforms carried out by the continent are still not fully reflected in the investors’ perception – this has led the G8 to support the improvement of Africa’s image as a “continent of opportunity.”⁸⁰

135. Moreover, the actual levels and kinds of risks may vary widely from one country to another. While the regulatory risk is the most critical issue in some particular countries, others are more vulnerable to currency fluctuations; others again are more exposed to the risk of corruption or political interference, renegotiation or bailout, political or financial instability. The political and regulatory risk mitigation tools discussed above, such as the Public Financing Mechanisms, may be even more vital to encouraging pension funds to invest in green growth projects across the continent.

136. In addition, countries in the region lack financial access and markets. For example, the vast majority of African countries still do not have foreign currency debt ratings (Nigeria was the 14th African country to be rated by Standard and Poor’s in 2007), and only a very few have ratings of at least BB-2, which provide access to international financial markets. At the same time, whilst African financial markets are growing at a steady pace, they are still predominantly narrow and illiquid. Pension funds in African countries are also often subject to tighter investment restrictions than in other parts of the world. For example, South African pension funds can only invest 5% of their portfolio in non-listed equity, 20% in assets denominated in a foreign currency and are prohibited from investing in retail and private funds (OECD 2009b).

137. Specific solutions will therefore be required to encourage and incentivize pension funds and other institutional investors to provide the necessary private capital to cover Africa’s green financing needs.

⁷⁸ *Towards a Low Carbon, Resource Efficient and Pro-Employment Growth Path* presentation made by Nosipho Ngcaba and Zaheer Fakir of South African Department of Environment to the OECD, 19th October 2010

⁷⁹ *Pension Funds in Capital Market and Infrastructure Development*, Stella Milonzo, Chief Executive, Capital Markets Authority Kenya, remarks made to IOPS /OECD Global Forum on Private Pensions, Mombasa, Kenya, October 2008

⁸⁰ See: G8 Heiligendamm Summit Declaration: *Growth and Responsibility in Africa* (8 June 2007), Paragraph 30.

Impediments to Green Infrastructure Investment in Africa ⁸¹⁸²	Potential Solutions
<p><i>High costs of and lack of access to finance</i></p> <p>Limited access to funding</p> <p>Poor or non-existent sovereign credit ratings</p> <p>Limited access to international credit markets</p> <p>Under developed domestic capital markets</p>	<p>Strengthen local financial markets</p> <p>Improve banking sector (encourage microcredit banks)</p> <p>Phase out obstacles to international capital movement</p> <p><i>Funds and other finance sources to support private actors</i></p> <p>Political risk mitigation tools (possibly provided by African Development Bank)</p> <p>Other regional and global guarantee facilities (e.g. World Bank, MIGA, Agence Française de Développement developing the BOAD (Banque Ouest Africaine de Développement) Infrastructure Guarantee Facility)⁸³</p> <p>Currency risk mitigation tools (possibly provided by African Development Bank, also G8 initiative)</p>

⁸¹ IFC-sponsored survey, foreign investors cited three key factors as impeding their involvement in Africa - OECD African Economic Outlook 2005-2006 p394
^{3rd} IFC inadequate infrastructure, especially electricity and roads

⁸² OECD report on *Increasing Private Investment in African Energy Infrastructure* <http://www.oecd.org/dataoecd/44/46/43966848.pdf>

⁸³ This facility offers three types of guarantee instruments which cover both commercial and political risks, thus providing flexible guarantees to small and medium infrastructure projects in the WAEMU. Matsukawa, Tomoko and Habeck, Odo. "Review of Risk Mitigation Instruments for Infrastructure Financing and Recent Trends and Developments". *Trends and Policy Options, No.4. World Bank and Public-Private Infrastructure Advisory Facility (PPIAF)*, p.33

<p><i>Cumbersome regulatory and policy environment</i></p> <p>lack of independent or impartial regulators in some countries Weak procurement laws</p> <p>Inefficient or non-transparent tendering processes that result in cancelled, postponed or disputed tenders</p> <p>Poor contract laws</p>	<p>Overcome cumbersome economic legislation and a lack of transparency via business-friendly reform and transparency of information (AU Convention on preventing and combating corruption and EITI, OECD Anti-Bribery Convention and the Stolen Assets Recovery (STAR) Initiative)</p> <p>Strengthen competition laws</p> <p>Institute formal dispute resolution mechanism</p> <p>Tackle weak property rights and contractual law via reinforcing governance-monitoring units to guarantee fair competition in bidding</p> <p>Monitor projects (independent regulatory authorities – move from traditional government bodies to performance-based agencies)</p>
<p><i>Capacity impediments</i></p> <p>Lack of skills among public officials to manage Public Private Partnerships (PPPs)</p> <p>Most local judicial systems do not have the capacity to handle complex contracts or disputes</p> <p>Regional and sub-national regulatory frameworks are not harmonized, which poses problems for projects that cross borders.</p> <p>Bureaucratic procedures that effectively halt or delay a project;</p> <p>Change in administrations and consequently different rules for investors;</p> <p>Nationalization or expropriation.</p>	<p>Stream public agencies to minimize bureaucracy;</p> <p>Hire and develop individuals who have experience in PPPs</p> <p>Strengthen regional PPP capacity and cooperation</p> <p>Political risk mitigation tools</p> <p>Enhancing AfDB's capacity to use coverage mechanism and catalyse private investment for infrastructure financing</p>