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# Green bonds: a model to mobilise private capital to fund climate change mitigation and adaptation projects

by Heike Reichelt, The World Bank<sup>1</sup>

THE CAPITAL MARKETS WILL NEED TO PLAY AN IMPORTANT ROLE IN MOBILISING PRIVATE FUNDING FOR CLIMATE CHANGE MITIGATION AND ADAPTATION PROJECTS. HOWEVER, TO RAISE THE FUNDS REQUIRED TO MAKE AN IMPACT IN THE FIGHT AGAINST CLIMATE CHANGE, INVESTMENT PRODUCTS MUST BE DESIGNED TO APPEAL TO INVESTORS WITH A SUBSTANTIAL ASSET BASE. PENSION FUNDS AND SOVEREIGN WEALTH FUNDS HAVE LARGE ALLOCATIONS TO FIXED INCOME. GREEN BONDS ARE AN EXAMPLE OF AN INNOVATIVE FIXED INCOME INVESTMENT PRODUCT THAT APPEALS TO INVESTORS FOR THIS ASSET CLASS AND CAN PAVE THE WAY FOR THE NEXT PHASE OF PRODUCTS TO MOBILISE SIGNIFICANT CAPITAL TO FINANCE THE GREATEST CHALLENGE FACED BY OUR GENERATION.

## Climate change is a problem of global proportions

Estimates of financing needed to mitigate the effects of climate change range from about US\$200bn to US\$1,000bn a year.<sup>2</sup> At least tens of billions of dollars each year should be added to finance the cost of adaptation caused by an inevitable amount of global warming that the world will experience.<sup>3</sup> Clearly, the task is too great for government resources alone to tackle, especially in developing countries.<sup>4</sup> Private investment is urgently needed to supplement scarce government funds and credit. On a large scale, this can only be generated through the global financial markets, with innovative solutions across asset classes. New products must have the right financial incentives to attract private investment<sup>5</sup> and use public credit efficiently.



Heike Reichelt  
Head of Investor Relations and New Products  
The World Bank

## Climate-related investment opportunities

Climate-related investment opportunities have emerged in response to investor demand across asset classes. A rise in the number of investors who incorporate environmental, social and governance criteria (ESG) into their analysis<sup>6</sup> has supported this trend. Many are going a step beyond an ESG approach and specifically developing environmental strategies<sup>7</sup> and incorporating climate change into their decisions.<sup>8</sup> Considering climate as part of the investment process has potential short- and long-term financial implications and longer-term consequences for humanity.

Investors can choose climate-related investments in a variety of asset classes.<sup>9</sup> So far, such opportunities have been more concentrated in equity – both private and public – rather than fixed income. Private equity allows investors to target ‘green’ investments like renewable energy more directly, but it also lacks liquidity and requires significant up-front due diligence costs. And allocations to private equity tend to be small. Although allocations to public equity are larger and are considered more liquid, most options offer opportunities to invest in big companies where renewable energy is only one of many business areas.

Though the equity markets are an important source for channelling resources into projects that support solutions to problems created by climate change, tapping that capital can be challenging – especially in times of crisis in the financial markets.<sup>10</sup> Government fiscal stimulus packages focusing on green investing are starting to support these companies in search of financing,<sup>11</sup> but resources are limited. There is dire need to find other sources of private capital and try to benefit from public credit enhancement to use available public credit efficiently.

To succeed in channelling larger sums of capital into green initiatives, investment products must appeal to investors with large volumes of assets under management. In today’s markets, these are with pension funds, endowments, asset managers and sovereign wealth funds. According to International Financial Services London, at

the end of 2008, pension funds alone had about US\$25 trillion of assets under management.<sup>12</sup> Although many have been increasing allocations to alternative assets classes, fixed income still makes up about 25% to 40% of their assets. And sovereign wealth funds managed almost US\$4 trillion, with about 35% to 40% of their assets allocated to fixed income.<sup>13</sup> Regardless of whether these investors pursue ESG strategies or not, the numbers show that there is a large untapped potential in the fixed income space to access capital for climate-related sustainable development through investors that value both liquid high-grade investments and contributing to climate change solutions.

## Extraordinary challenges require extraordinary solutions

The World Bank has been designing investment products that raise awareness for and support the financing climate change mitigation and adaptation. As an issuer of debt securities, it has focused on products for investors’ fixed income allocation. The popularity of the ‘cool bonds’ and ‘eco notes’ launched in 2007 and 2008,

### Green bond 101

Green bonds are a ‘plain vanilla’ fixed income product that offers investors the opportunity to participate in the financing of ‘green’ projects that help mitigate climate change and help countries adapt to the effects of climate change. The bonds have similar features to regular bonds by the issuing entity, including credit risk and size. Because of the standard financial features and the dedication to climate change, they are of interest to a broad range of investors – from retail and high-net-worth, to institutional investors with large allocations to fixed income. They are especially attractive to investors who incorporate ESG into their analysis, pursue specific environmental strategies and/or have a separate asset class for climate-focused investments. A key feature of these bonds valued by many investors is the due diligence process that the issuer of green bonds conducts to identify and monitor ‘green’ projects.

showed that investors are interested in products that offer both appropriate risk-adjusted returns and contribute to the climate. Other issuers, such as the European Investment Bank (EIB), also appealed to similar investors with the climate awareness bond issued in 2007.<sup>14</sup>

The success of these initiatives showed investors' interest in climate-related investments and – through the associated hedging activity – created incremental demand for carbon credits and green equity. However, the amounts raised were not as large as they could have been, because these structured products sought mainly to attract individual

## Green bond issuance to date<sup>22</sup>

Exhibit 1

### Summary of first US dollar-denominated green bond terms

<b>Issuer</b>	International Bank for Reconstruction and Development (IBRD)
<b>Rating</b>	Aaa/AAA
<b>Total amount</b>	US\$300m
<b>Investor</b>	State of California Treasurer's Office
<b>Settlement date</b>	April 24, 2009
<b>Maturity date</b>	April 24, 2012
<b>Coupon</b>	Floating rate
<b>Lead manager</b>	SEB

### Summary of inaugural green bond terms

<b>Issuer</b>	International Bank for Reconstruction and Development (IBRD)		
<b>Rating</b>	Aaa/AAA		
<b>Tranches</b>	<b>Tranche 1</b>	<b>Tranche 2</b>	<b>Tranche 3</b>
<b>Launch date</b>	Nov. 6, 2008	Nov. 14, 2008	Feb. 6, 2009
<b>Amount</b>	kr2.325bn	kr375m	kr150m
<b>Settlement date</b>	Nov. 12, 2008	Nov. 24, 2008	Feb. 13, 2009
<b>Aggregate amount</b>	kr2.85bn		
<b>Maturity date</b>	November 12, 2014		
<b>Coupon</b>	3.5% ( <i>per annum</i> )		
<b>Lead manager</b>	SEB		
<b>Syndicate</b>	Credit Suisse International - senior co-lead manager Landesbank Baden-Württemberg - co-lead manager		
<b>Investors</b>	AP2 (second Swedish national pension fund) AP3 (third Swedish national pension fund) Länsförsäkringar Bank & Försäkring MISTRA Skandia Life The United Nations Joint Staff Pension Fund Others		

Source: The World Bank

Proceeds from World Bank green bonds are used to support projects that address the climate challenge as selected by World Bank environment specialists based on a predetermined set of criteria that promote low-carbon development. These bonds allow investors to take advantage of the World Bank's rigorous process of appraising and implementing suitable projects, as well as monitoring their effectiveness in countries that the investors would not normally be able to invest in without an expensive due diligence process.<sup>21</sup>

**Examples of the types of mitigation projects supported by green bonds are:**

- rehabilitation of power plants and transmission facilities to reduce greenhouse gas (GHG) emissions;
- solar and wind installations;
- funding for new technologies that result in significant reductions in GHG emissions;
- greater efficiency in transportation, including fuel switching and mass transport;
- waste (methane emission) management and construction of energy-efficient buildings; and
- carbon reduction through reforestation and preventing deforestation.

**Examples of the types of adaptation projects supported by green bonds are:**

- protection against flooding (including reforestation and watershed management);
- food security improvement and stress-resilient agricultural systems (which will slow down deforestation); and
- sustainable forest management and preventing deforestation.

**Following these criteria, projects like the following would be eligible for support from World Bank green bond proceeds:**

- energy efficiency investments in China that reduce the energy consumed and associated GHG emissions in medium-sized and large industrial enterprises, and in central heating and gas services for municipalities;
- generating alternative energy in rural areas of China through methane capture and other biogas technologies associated with rural farm production;
- helping to install new energy-efficient and solar thermal technologies in public buildings in Montenegro;
- scaling up renewable energy systems in Argentina; and
- an integrated climate change approach, that supports renewable energy and energy efficiency, reforestation and sustainable forest management, and soil carbon conservation in Mexico.

**Source: The World Bank**

investors. They were not pure fixed income products and, thus, not designed for institutional investors' fixed-income allocations. Green bonds are starting to focus these large investors on climate-related financing activity and broadened the investor base for climate-related products.

Green bonds take investor interest in 'green' capital markets finance a step further. The World Bank green bonds, for instance, appealed to large institutional

investors who had both significant allocations to fixed income and a strategic interest in investing in the climate with their assets, and reached investors who would not otherwise have purchased World Bank bonds. This validated the notion that an issuer can broaden its investor base by providing 'green' products and that investors are focusing on climate-related investment opportunities as part of their fixed income allocation.

## World Bank green bonds: paving the way for innovative fixed income solutions

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In November 2008, responding to investor requests, the World Bank offered a fixed income product dedicated to supporting climate change mitigation and adaptation projects in developing countries.<sup>15</sup> The product was developed in close collaboration with SEB and the group of investors for the inaugural World Bank green bonds. Proceeds from World Bank green bonds are credited to a special account that supports World Bank loan disbursements on qualifying projects in client countries.<sup>16</sup>

The appeal of the product lies in its simplicity – the credit quality of the bonds is the same as that of other World Bank triple-A rated bonds, it is a ‘plain vanilla’ structure, a liquid instrument – it can be traded as easily as other ‘plain vanilla’ bonds issued by the World Bank, and offers a competitive return. With these characteristics, it fits the requirements of core portfolios of large fixed income investors. In addition, bond proceeds support activities that have a positive impact on climate change.

World Bank green bonds generated significant interest worldwide. They reached investors who did not normally purchase World Bank bonds. Investors took the opportunity to diversify their fixed income portfolio holdings through a product that met the risk-adjusted return expectations for their core portfolios and let them take advantage of the World Bank’s due diligence process in identifying and monitoring suitable projects in developing countries.

## Looking to the future: finding the next generation of green bonds

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The urgency of the climate change issue and investors’ interest in ESG issues is supporting the growth of a ‘climate’ asset class to which institutional and individual investors are increasing allocations. Green bonds are a fixed income product that supports initiatives that cut greenhouse gas (GHG) emissions and help countries adapt to climate change. Although funds generated from green

bonds so far are small, relative to the estimated amounts needed to fill the climate change funding gap, they serve as a first step and model to mobilise private sector financing from large institutional and retail investors for climate change solutions. As more investors integrate climate change risks and opportunities in their asset management process, there will be stronger incentives for market participants to design more financial instruments for investors interested in putting their assets to work for financially sound investments that also have a positive impact on climate change. Having standardised criteria for project eligibility (as far as possible) and other minimum financial characteristics (size, rating, structure) plus a rigorous governance and due diligence process for project finance will help index providers put green bonds into a fixed income ‘Green Index’<sup>17</sup>, so that investors who manage their assets based on an index add the bonds to their portfolios.

The investor interest in World Bank green bonds has already captured the attention and imagination of other issuers – including governments – who recognise green bonds as a way to tap private capital to support their own climate change mitigation and adaptation efforts.<sup>18</sup> As issuers recognise the product’s potential, they can replicate it to take advantage of the opportunity to diversify their investor base, raise funds for their ‘green’ activities and raise awareness for their climate change efforts.

World Bank green bonds can be seen as an experiment that demonstrated that the capital markets can be a source of funding for climate-related initiatives. But triple-A rated public credit that can be used to channel funds to mitigation and adaptation projects is scarce. To mobilise resources in the massive scale that is needed to tackle climate change, the next step must be to design fixed-income products that optimise the trade-off between volume and credit.

Investment opportunities must be created that will attract the maximum volume of finance with an efficient use of direct or indirect sovereign credit. Innovative solutions are needed to blend government credit into activities in which mitigation or adaptation activities generate cash flow returns that, with appropriate credit-enhancement, can be

moved from investors' small allocations to alternative investments, to the mainstream fixed income allocation in the portfolios of the largest investors. Green bonds could develop from a simple, high-grade product to a more complex one that appeals to investors with different risk habitats - those looking for high-grade products (with credit-enhancements) and others searching for higher yield potential, taking on more credit risk. Products such as 'rainforest bonds'<sup>19</sup> or 'energy efficiency bonds'<sup>20</sup> with different risk characteristics and tranches could be issued or credit-enhanced by multilaterals or governments to support specific climate change activities. Private capital can be mobilised if products are designed that fit the risk/return characteristics, offer portfolio diversification, provide liquidity and give investors opportunities to benefit from the success of projects that address climate change.

#### Notes:

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2. United Nations Framework Convention on Climate Change (UNFCCC), 2008 – *UNFCCC 2007 Report on Investment Flows, Dialogue Working Paper 8*, Stern, Nicholas; *The Economics of Climate Change: The Stern Review*, 2007.
3. *Development and Climate Change: A Strategic Framework for the World Bank Group*, Technical Report 2008.
4. It is estimated that dedicated resources cover only about 5% of funding needed for mitigation and adaptation.
5. To stimulate investment opportunities, McKinsey & Company has published extensive research on how financial institutions can develop a climate change strategy to profit from a low-carbon economy, including a detailed analysis showing the potential GHG savings for various technologies (global carbon abatement cost curve). McKinsey & Company, *Pathways to a Low-Carbon Economy*, February 2009.
6. *United Nations - Principles for Responsible Investments (PRI)*, July 2009; In 2009, 63% of surveyed asset owners put responsible investment elements into contracts for the external managers of their investments, up from 38% in 2008.
7. KBC Asset Management, *Secular Growth Opportunities in Global Equities: Environmental Strategies*, May 2009.
8. Investor Statement on Climate Change Report 2008, Institutional Investors Group on Climate Change (IIGCC): asset owners are increasingly taking steps to encourage their asset managers to incorporate climate change into their investment analysis – from 2007 to 2008, there was a rise from 30% to 50% in the proportion of asset owners questioning existing and potential managers on how they integrate climate change into their decision-making activities.
9. Investment consultants analyse implications that climate change scenarios have on portfolio structuring and recommend possible actions investors can take to manage the climate change risk in their portfolio and take advantage of investment opportunities in various asset classes. Mercer is undertaking a new project in this area as a collaborative effort that will be carried out with some of the leading pension and wealth funds from around the world.
10. According to the *World Wealth Report 2008*, investment by individuals in the clean technology sector rose by 41% from 2005, to a total of US\$117bn in 2007. But the World Economic Forum's Report on Green Investing states that by the end of 2008, the volume of clean energy investment had dropped by over half from its peak at the end of 2007, and public market funding for clean energy businesses also decreased significantly, with valuations down by nearly 70% during 2008.
11. Such as: American Recovery & Reinvestment Act of 2009 (see: [http://www.epa.gov/cleanenergy/documents/local\\_guide\\_to\\_arra.pdf](http://www.epa.gov/cleanenergy/documents/local_guide_to_arra.pdf)).
12. International Financial Services London (IFSL) Research, March 2009.
13. Fernandez and Eschweiler (2008) estimate that total assets of sovereign wealth funds are invested about 35% to 40% in fixed income, 50% to 55% in public equity, and 8% to 10% in alternatives – with the bulk in private equity followed by real estate and hedge funds.
14. For a summary of the terms of these bonds, see: *The Euromoney International Debt Capital Markets Handbook 2009*: Capital markets as greenhouse gas emission reduction drivers, pg33.
15. To date, Scandinavian investors including AP2 (second Swedish national pension fund), AP3 (third Swedish national pension fund), Länsförsäkringar, MISTRA, Skandia, and the State of California Treasury, the United Nations Joint Staff Pension Fund, and others have invested over US\$665m in World Bank green bonds.
16. Selecting the climate change criteria for mitigation and adaptation activities was part of the product development. The World Bank's environmental, energy, and climate change experts recommended key criteria that would support low-carbon development. SEB agreed that projects that met these criteria would be of interest to their investors. In addition, the criteria underwent an independent third party review by the Center for International Climate and Environmental Research at the University of Oslo (CICERO). CICERO concurred that, combined with the governance structure of the World Bank and safeguards for its projects, the criteria provided a sound basis for selecting climate-friendly projects. Oekom research, a rating agency for sustainable investments that is based in Munich, Germany, also analysed the product. Based on their analysis, oekom research is supportive of World Bank green bonds as an investment product that may be of interest to investors pursuing sustainable investment strategies.
17. Equity indices have been created to respond to investor demand for investment strategies that incorporate opportunities and risks associated with the effects of projects and companies' business on the climate, including ABN Amro's Eco Price Return Index, HSBC's Global Climate Change Benchmark Index, the GEI series launched by KLD and Jantzi, in addition to larger providers such as S&P, FTSE

and Dow Jones. There are also corporate bond indices that enable credit investors to make return-driven investment decisions that take into account risks and opportunities issuers face as they address climate change, but so far there is no 'Green Bond Index' that includes only bonds like the World Bank green bonds that raise proceeds specifically to support investments in climate change mitigation and adaptation activities.

18. For example, in March 2009, a 'US Green Bank' was proposed to provide financing support to clean energy and energy efficiency projects in the US that suggests financing from 'green bonds' issued by the US Treasury. It was proposed that the US Department of Treasury would provide the Green Bank with an initial capitalisation of US\$10bn through the issuance of green bonds (see: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111\\_cong\\_bills&docid=f:h1698ih.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1698ih.txt.pdf)).
19. An initiative by the Prince of Wales is developing a proposal in collaboration with investors and institutions such as the World Bank to raise funds from investors through 'rainforest bonds' as part of a mechanism to compensate nations with rainforests for not deforesting. More information is available at: [http://princes.3cdn.net/f29d276ce664b2db67\\_y6m6vtxpe.pdf](http://princes.3cdn.net/f29d276ce664b2db67_y6m6vtxpe.pdf).
20. The World Bank, in partnership with government officials in two pilot countries, is looking at possibilities for governments to finance energy efficiency activities through structures linked to green investments, such as through 'energy efficiency bonds' that offer

investors opportunities to invest capital in emerging market countries implementing a green agenda.

21. See *World Bank Sustainability Report: Focus on Sustainability, 2005/2006*, Chapter 4: <http://go.worldbank.org/HL5D9KMEN0>; How the Project Cycle Works: <http://go.worldbank.org/GI967K75D0>; Safeguard Policies: <http://www.worldbank.org/safeguards>; Disclosure policy: [www.worldbank.org/disclosure](http://www.worldbank.org/disclosure); The Quality Assurance and Compliance Unit: [www.worldbank.org/qag](http://www.worldbank.org/qag); An Independent Inspection Panel: [www.worldbank.org/inspectionpanel](http://www.worldbank.org/inspectionpanel); The Independent Evaluation Group (IEG): [www.worldbank.org/ieg](http://www.worldbank.org/ieg).
22. See: <http://go.worldbank.org/LFS55Z7LL0>; <http://treasury.worldbank.org/newsinvestors>.

**Contact us:**

**The World Bank**

1818 H Street NW, Washington, DC 20433, US

tel: +1 (202) 477 2880

web: [www.worldbank.org](http://www.worldbank.org)

e-mail: [debtsecurities@worldbank.org](mailto:debtsecurities@worldbank.org)