Project Report on

CLIMATE THEMED BONDS: AN INITIATIVE FOR LOW CARBON ECONOMY

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CERTIFICATE

This is to certify that the Project Report titled "**Climate Themed Bonds: An Initiative for Low-Carbon Economy"**, is a bonafide work carried out by Ms. Sakshi Gupta of MBA 2012-14 and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfillment of the requirement for the award of the Degree of Masters of Business Administration.

Signature of Guide (Dr. Archana Singh) Signature of HOD (DSM)

Place:

Date:

DECLARATION

I Sakshi Gupta, student of MBA 2012-14 of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 declare that Project Report on **"Climate Themed Bonds: An Initiative for Low-Carbon Economy"** submitted in partial fulfillment of Degree of Masters of Business Administration is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This Report is not being submitted to any other University for award of any other Degree, Diploma and Fellowship

Sakshi Gupta

Place: New Delhi

Date: 06/05/2014

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ABSTRACT

The project aims to review the various instruments that have been proposed and implemented for financing renewable energy and low-carbon technology projects, in both the developed and developing world, with a focus on private sector involvement. The review is done through analyzing the existing climate bonds scenario- the state of climate bond market, the regulatory framework and standards, scope in Indian market- analyzing the buy and sell side perspective.

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Introduction

Climate change is not just an environmental challenge – it is a fundamental threat to development in our lifetime. The World Bank Group has made confronting climate change a top priority in our push to eradicate extreme poverty and boost shared prosperity. At IFC, the World Bank Group's private sector arm, we are stepping up our investments in climate change mitigation and adaptation and helping our clients understand and manage the risks and opportunities climate change presents.

Since 2005, we have invested more than $11 billion in 600 climate-related projects that have helped developing countries meet their energy needs while supporting a green growth path. IFC made its first investment in renewable energy in 1989 and is now one of the world's largest financiers of wind and solar power for emerging markets.

In fiscal 2013, IFC invested a record $2.5 billion in climate-related projects, up 50 percent from the year before. This funding supported new solar power technology for South Africa, energy efficiency gains in Cote d'Ivoire, water conservation in Turkey and green buildings in India, plus innovative financing for renewable and clean power through commercial banks. IFC is also working to leverage new sources of funding for green growth through its green bonds program that raised $2 billion in 2013 alone, as well as through the Catalyst Fund and its co-investments with governments through its blended finance work.

The International Energy Agency estimates that some $36 trillion of investment above 'Business As Usual' will be needed by 2050 to make the global shift a low-carbon economy.

The key word is investment; these are not sunk costs, they are energy and infrastructure investments that can be structured to provide a decent return on capital. But investment must happen quickly; emissions are increasing to a relentless drumbeat. Existing finance mechanisms, such as carbon markets, are not going to achieve the rapid change we need.

But there are other options. Governments have throughout history used various forms of "capital steerage" to shift investment into areas of urgent policy priority. For instance, most of the urban infrastructure that developed countries take for granted – from sewers to railways to aviation and to highways – depended on active government steps to ensure necessary capital investment.

Capital steerage has involved tools ranging from policy and regulation to credit enhancement, guarantees, and tax credits. At times it has involved special deals, like agreeing real estate concessions in mid-19th century America so railroad companies had the extra incentive to connect the West Coast (a model copied for the Copenhagen Metro only a few years ago). In the 1990s the German government tweaked regulation of the Pf and brief market to promote bank lending to housing and public sector projects in newly integrated East Germany.

Bonds: covered, asset-backed, sovereign, housing, war, highway, railroad — even sewer bonds — have been the recurring financial instrument of choice underpinning such capital steerage.

The use of bond finance has been enormously successful. Vast infrastructure projects have been completed; hundreds of thousands of unemployed people or de-mobbed soldiers have been re-integrated into economies; finance has been democratized in many sectors. We now face the defining challenge of our times: a global switch away from carbon-dependency to a rapid transition to a low-carbon and climate resilient world. Our opportunity is that this is about investment, not cost. Government's role is not to fully fund, but to sort out economic and energy planning and then to reduce key risks — notably government-related policy risk — enough to deliver secure long-term investment returns.

What is a bond?

A bond is a type of loan or IOU which companies, governments, and banks use to finance projects. The issuer of the bond (the borrower) owes the holder (the creditor) a debt and, depending to the terms they agree on, is obliged to pay back the amount lent within a certain amount of time and with a certain interest.

When institutions, companies, governments and other entities want to raise long term finance but do not want to dilute their share holdings (or, indeed, cannot issue share capital ─ like the UK Government), they turn to the bond markets. Here they can raise money without having to pay it back for possibly decades. On the other side of the deal are the investors. The biggest investors in the UK are the insurance companies and pension funds. They buy bonds to generate return, offset their liabilities, generate income or diversify their portfolios.

What is a Climate Bond?

Climate bonds are used to finance – or re-finance – projects needed to address climate. They range from wind farms and solar and hydropower plants, to rail transport and building sea walls in cities threatened by rising sea levels. Only a small portion of these bonds have actually been labeled as green or climate bonds by their issuers.

Climate bonds are fixed-income financial instruments (bonds) linked in some way to climate change solutions. Climate bond is a relatively new asset class.

Climate Bonds are issued in order to raise finance for climate change solutions - climate change mitigation or adaptation related projects or programs. These might be greenhouse gas emission reduction projects ranging from clean energy to energy efficiency, or climate change adaptation projects ranging from building Nile delta flood defenses or helping the Great Barrier Reef adapt to warming waters.

Like normal bonds, Climate Bonds can be issued by governments, multi-national banks or corporations. The issuing entity guarantees to repay the bond over a certain period of time, plus either a fixed or variable rate of return.

Most Climate Bonds are asset-backed, or ring fenced, with investors being promised that all funds raised will only go to specified climate-related programs or assets, such as renewable energy plants or climate mitigation focused funding programs.

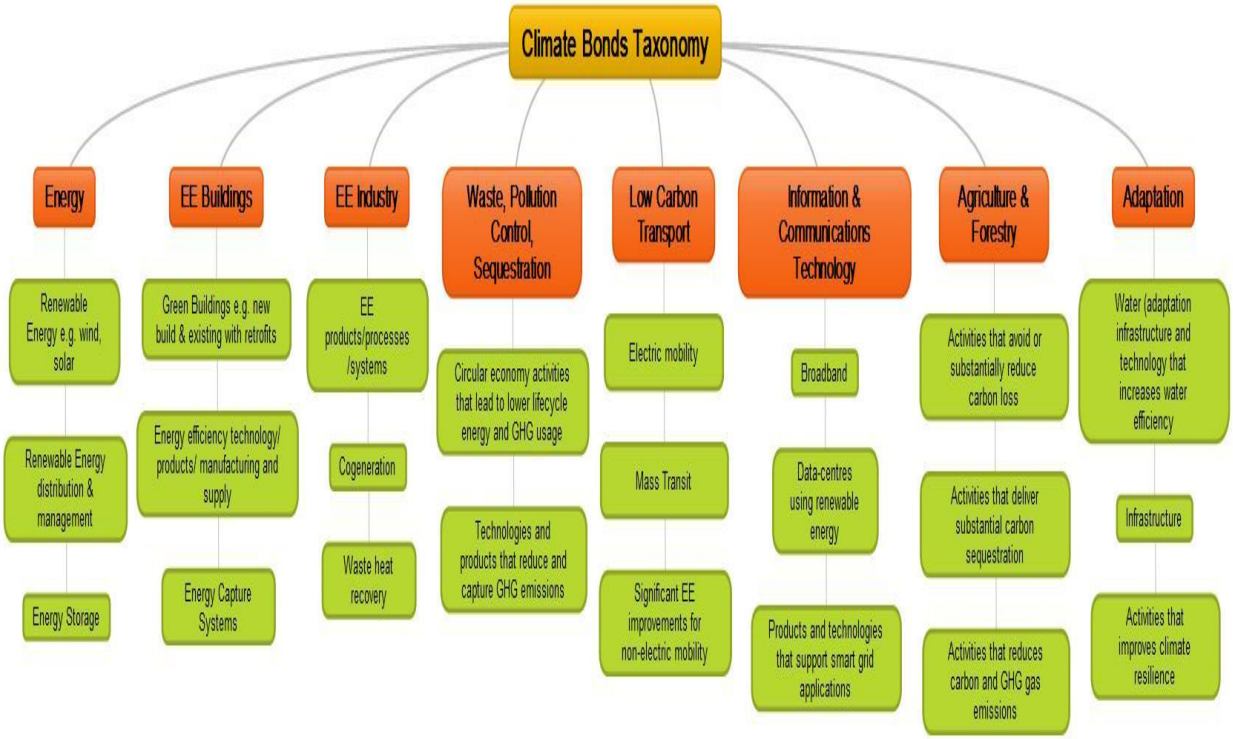
In their UNEP paper on investors and climate change, Mackenzie and Ascui differentiate a climate bond from a green bond: "(A climate bond is) an extension of the green bond concept. Green bonds are issued ... in order to raise the finance for an environmental project. Climate bonds (are) issued ... to raise finance for investments in emission reduction or climate change adaptation."

The London-based Climate Bond Standards Board provides a certification program for Climate Bonds.

Climate Bonds are theme bonds, similar in principle to a railway bond of the 19th century, the war bonds of the early 20th century or the highway bond of the 1960s. Theme bonds are designed to:

- Allow institutional capital - pension, government, insurance and sovereign wealth funds - to invest in areas seen as politically important to their stakeholders that have the same credit risk and returns profile as standards bonds.
- Provide a means for governments to direct funding to climate change mitigation. For example, this might be done by choosing to privilege qualifying bonds with preferential tax treatments.
- Send a political signal to other stakeholders.

Otherwise, for operational purposes, theme bonds largely function as conventional debt instruments. They are risk-weighted and credit rated in the usual way based on the creditworthiness of the issuer, and tradable, market conditions permitting, in international secondary bond markets. These instruments can theoretically be issued at all levels of the fixed income market, from sovereigns to corporate.



Source: climatebonds.net

What is a Green Bond? Is it the same as a Climate Bond?

A Green Bond is where proceeds are allocated to environmental projects. The term generally refers to bonds that have been marketed as “Green”.

In theory Green Bonds proceeds could be used for a wide variety of environmental projects, or even parks development; but in practice they have mostly been the same as Climate Bonds, with proceeds going to climate change projects.

In some cases a portion of proceeds have gone to areas seen as environmental but not necessarily related to climate change. For example, proceeds from RaboBank’s green retail bonds in the Netherlands may go to organic farm loans as well as to climate change related areas like sustainable buildings.

Who issues these bonds?

The bonds are largely issued by corporations and state-owned rail companies, with some from multilateral development banks and some asset-backed bonds.

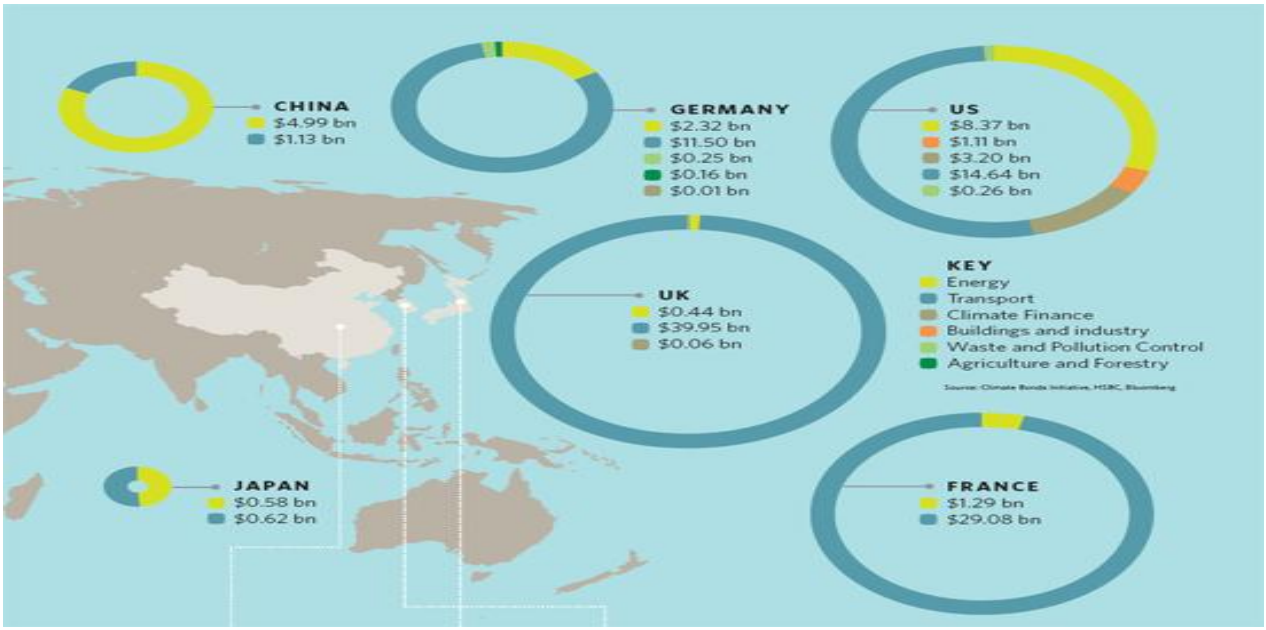
The pioneer issuers of “labelled” green or climate bonds, where proceeds are allocated to climate projects, have been the World Bank and its sister organisation, the International Finance Corporation, with their Green Bonds, and the European Investment Bank, with their Climate Awareness Bonds.

Who buys climate bonds?

The vast bulk of climate bonds have been bought by institutional investors like pension funds and fund managers. In the Netherlands and South Africa banks have also offered green bonds to individuals; and some fund managers have, using World Green Bonds, created special funds that individuals can invest in.

How big is the climate bonds market?

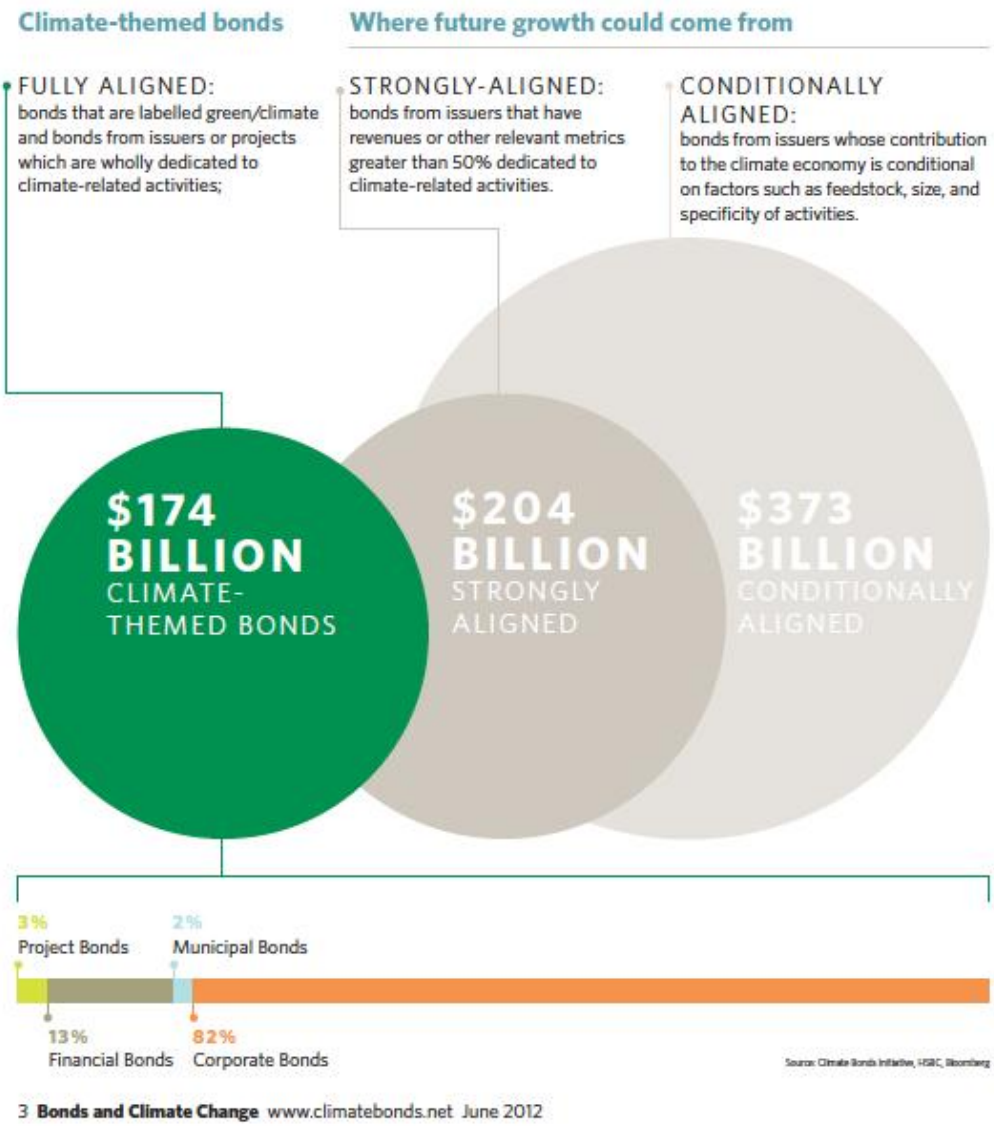
The climate/green bond market includes all of those bonds which have been issued to help finance climate-friendly projects. At present, the climate bonds market has an estimated value of $346bn.
There are around $14.5 billion outstanding of labelled climate bonds and green bonds.



Source: HSBC's report on Climate Themed Bonds

What types of climate bonds are there?

Broadly speaking, climate and green bonds can be categorized according to:
Their investment rating: most bonds receive a credit rating from agencies like Standard & Poor's and Moody's.
Their label: climate bonds may have been labelled "green" or "climate" – or not. Both types of bond are equally "green", but labelled bonds are more easily identifiable.



3 **Bonds and Climate Change** www.climatebonds.net June 2012

Are climate bonds cheaper than other ones?

They are about the same. The difference is that green bonds will attract new investors who are interested in climate friendly projects funded by all types of companies. However, these investors generally want to know that their funds are indeed being spent in a climate friendly way.

What are the benefits of green bonds?

They offer the same returns as other bonds, but with the added benefit that funds are only going to climate change solutions. For a lot of people – like the $22 trillion of investors who are members of the Global Investor Coalition on Climate Change – this is important.

They give investors a chance to direct capital to climate change solutions, where at the moment there is little opportunity (“lack of deal-flow”).

Climate bonds satisfy the needs of issuers, bondholders and the environment.

So why aren’t more companies investing in green bonds?

Many investors are aware of the problem of climate change, but translating that awareness into investment decisions is usually seen as a major challenge. However, many investors say that given the same conditions in terms of time and investment, they would choose green bonds over brown ones due to the climate change solution opportunities they offer.

This is a matter of perception; while they have generally assumed that climate bonds were high-risk investments, in fact 89% are investment-grade.

1. Evolution And History

2.1 Climate theme bonds: a new fixed income asset class

The past few years have seen the growth of a small ‘green bond’ market in Japan, Europe and North America anchored by nearly US$1bn of agency issuance from the World Bank. This chapter argues that this nascent market has been driven by the demands of global carbon mitigation and adaptation programmes as institutional investors and governments devote capital to a product which both fulfils risk/reward expectations and signals their de-carbonization efforts to their member and voter stakeholders. The potential is for a future market with notional issuance to compete with traditional fixed income sectors.

1.1.1 Shifting capital flows

The Copenhagen Accord 2 commits developed countries to a goal of “mobilizing jointly US$100bn per year by 2020 to address the (mitigation and adaptation) needs of developing countries”. This agreement assumes that funding will come from public and private sources. Although funds from the private sector are already the main source of investment in renewable energy and energy efficiency (about 94% of the investment in sustainable energy in 2007 came from the private sector – source: UNEP and SEFI, 2008) the wide range of risks facing emerging clean technologies limit the volume of private capital flowing into these sectors. These risks include country and financial risks, policy risk, technical and project specific risk, and market risk, among others.

So while asset finance has become the most important form of new investment in clean energy, reaching US$79.2bn of the US$148bn in global alternative energy investment in 2007, present capital inflows are still small in comparison to the International Energy Authority’s estimate 3 of US$10trn required over the next 10 years for “above business as usual” energy infrastructure investments. Because a significant number of power stations in developed countries will be coming to the end of their lives in the next 15 years, energy investments will already be at an unusually high level. On top of the transformation and renewal of existing infrastructure, growing economies in

South and East Asia will require a significant increase in generation capacity. In principle, funds are available. Assets of the global fund management industry totaled around US$90trn 4 at the end of 2008 (a fall of 17% on the previous year). As such, the challenge is not to create capital, but to shift what is a relatively a small portion of global capital. As the recent history of project finance shows, large capital intensive projects with long payback periods of 25–40 years have typically been funded with bonds. We expect that to again be the case.

1.1.2 21st century theme bonds

Green or climate bonds are 'theme' bonds, similar in principle to a railway bond of the 19th century, the war bonds of the early 20th century or the highway bond of the 1960s. In principle, green bonds might be designed to address a wide variety of environmental matters. Issuance to date has in practice been focused on climate change mitigation.

Climate theme bonds are designed to:

- Attract institutional capital – While this has been a niche socially responsible investment (SRI) area in the past, the last year has seen substantial moves by both institutional investors (e.g. ATP, Norwegian Global Fund, Skandia Life) and government Treasuries (notably California) to invest;
- Provide a means for governments to direct funding to climate change mitigation – This is done either by choosing to privilege qualifying bonds with preferential tax treatments (e.g. 'clean renewable energy' bonds in the US) or by providing government guarantees to non-sovereign issues;
- Send a political signal to other stakeholders – On purchasing US$300m of World Bank green bonds in 2009, the California Treasurer allowed the announcement of their investment to be used to encourage other investors to support debt issuance related to climate change policy agendas.

Otherwise, for operational purposes, theme bonds largely function as conventional debt instruments. They are risk-weighted and credit-rated in the usual way based on the creditworthiness of the issuer, and are tradable in the secondary market, market conditions permitting. These instruments can theoretically be issued at all levels of the issuer universe, from sovereigns to corporate.

Theme bonds are also ready adopters of structured note technology, 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. More of these can be expected.

The London Accord's Professor Michael Mainelli has more recently promoted the issuance of index-linked government bonds 5 with interest payments linked to the actual greenhouse gas emissions of the issuing country against published targets. A holder of this type of bond would receive an excess return if the issuing country's emissions are above the government's published target. The bond would thus provide a hedge against the issuing country's government not delivering on its commitments or targets.

2.1.3 Liquidity subject to contingent definitions

Liquidity in financial markets is a function of confidence in standardized definitions and risk/reward, among other factors such as market size, transparency and disclosure. In this sense, the definition of what constitutes funding for climate change mitigation and adaptation is problematic. Arguably, historic theme bond asset classes had it easier: highway bonds were government bonds designated for a specific purpose, and railroad bonds were generally issued by railroad companies to build railroads and to develop related infrastructure. Designating funds for climate change or for component policy areas, such as renewable energy or energy efficiency, is, in contrast, potentially vexed.

Debates include, for example, the question of whether renewable energy bonds for European or US ethanol plants with dubious emissions profiles should be eligible for tax concessions. Descriptions inserted into the Waxman-Markey climate change bill at the behest of agri-business lobbyists imply they should. Other issues include questions around whether bonds to build highways, arguably lowering emissions by reducing bottlenecks that cause cars to produce excess emissions while idling in traffic jams, given the evidence that road building encourages car use over public transport. Is debt for energy efficiency refits for business buildings that reduce emissions – but at fractional levels – the sort of thing that should be supported by taxpayers? What level of emission reduction should qualify? The complex nature of these issues suggests that absolute definitions could remain elusive. The complexities of decarbonization notwithstanding, liquidity will be essential to the success of climate bonds as a mainstream asset class.

As the infancy of the climate theme bond market illustrates, early issuance has been dominated by major governmental institutions that have both mandate and political will to label bonds, as well as the level of prestige and trust that gives investors confidence to report these fixed income holdings to stakeholders. In late 2009, Bloomberg's definition of a green bond was based largely on the World Bank green bond:

"…a plain vanilla bond issued by a recognized supranational or sovereign institution where the proceeds are marked for global warming. The majority of the projects financed are climate mitigation projects."

However, transparency and standardization has been sub-optimal even in the SSA sector. When SEB was mandated to underwrite and place World Bank green bonds, the bank commissioned an independent audit of the product's environmental claims as part of its labeling due diligence. The findings of this review drove the ring-fencing of capital expenditure programmes that gave the underwriter comfort to label the bonds as 'green'. The World Bank, with the input of independent, Norway-based consultants CICERO,6 identifies specific activity programmes where it will apply the proceeds raised by climate bond issuance. The European Investment Bank (EIB) argues that it does the same with its Climate Awareness Bonds.

As private sector players and other shareholders enter the market, the question of agreed and credible definition becomes more urgent. To that end, more sophisticated descriptions are emerging. In their UNEP paper on investors and climate change, Mackenzie and Ascui7 define a climate bond and relate it to a definition of a green bond:

"[A climate bond is] an extension of the green bond concept. Green bonds are issued by a government or corporate entity in order to raise the finance for an environmental project. The issuing entity guarantees to repay the bond over a certain period of time, plus either a fixed or variable rate of return. Climate bonds would be issued by governments (or others) to raise finance for investments in emission reduction or climate change adaptation."

Furthermore, 'renewable energy bonds' have emerged as an asset class to provide financing for energy projects, especially those taking advantage of renewable energy feed-in tariffs now operating in many countries. Issued either directly by renewable energy companies or by special purpose vehicles/funds, these instruments raise capital for entities engaged in the business of supporting, undertaking or investing in renewable energy projects. The underlying projects are subject to a certification mechanism to qualify for commercial advantages such as off take price support 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.

Over the past few years many companies have made greening claims. However, some companies, especially larger ones, have significant parts of their portfolios in relatively unsustainable assets. For these entities, the idea of ring-fencing assets to address labeling expectations is problematic. Doing so would mean identifying that a portion of their assets are not green, belying the public relations claims they have made in the less-regulated past. Issuing company green bonds without any qualification about their assets, on the other hand, risks embarrassing examination when asset criteria are compared with those of other bond issuers in the market. Investors who manage their portfolios in line with green or climate-related standards will require a reasonable verification mechanism.

The Climate Bonds Initiative proposes an international standard labeling scheme using a transparent 'transition' model for the labeling of issuance by companies that have both sustainable and non-sustainable assets in their portfolios. This could provide a framework that would allow some flexibility in the first years, diminishing to a stricter set of definitions.

This position will likely attract the criticism from non-governmental organizations (NGOs) that it supports businesses that are only sustainable when and where it suits them. However, a key precept behind the climate bonds idea is that it provides a path for carbon sector companies to take advantage of growing investor interest in climate change-focused investments. The issue is the asset being funded, not the project managers past or unrelated activities.

1.2 Drivers for a sustainable debt capital market

1.2.1 Growth of longer-term investment horizons

The past 15 years have seen a large increase in the proportion of global assets under management by institutional investors, notably pension funds and sovereign wealth funds, with a thirst for long-dated investment. This dynamic has a fundamental influence on global capital markets. As a result there has been growth in the variety and type of long-dated investment opportunities. Governments, for example, have contributed to the pool of investment opportunities by privatizing infrastructure assets. Airports, energy grids and toll roads are all examples of an asset with price regulation that has become 'investible' and is keenly sought after by pension funds.

1.2.2 Re-weighting by institutional investors

In the UK, for instance, allocation to equities has dropped 15% since 2006 as more pension funds pursue de-risking strategies. Fixed-income allocations have increased by 5% over 2008 and now stand at 38% of net portfolio allocations, according to the National Association of Pension Funds (NAPF). Corporate bonds have seen a sizeable increase, with over 76% of pension schemes now investing in the asset class. The average allocation among these schemes is 19% and now represents the second largest asset class after UK equities.

A number of factors have driven this change, including the reduction of risk for pension schemes driven by asset liability modeling and accounting rules and the recent financial crisis. In the US many defined benefit funds have been spooked by the impact that reduced equity values have had on their ability to meet forward commitments and have made huge shifts in their weighting to bonds. While an ongoing shift cannot be guaranteed, it is likely that investors will continue to reassess the risk associated with equities and the risk associated with their liabilities.

1.2.3 Large investors taking an interest in carbon risk

The increasing recognition of the threat of climate change has led to a significant number of governments and institutional investors looking for climate change-related investments within their existing portfolio weightings. In Europe, the Norwegian 'Global' fund, one of the largest in the world, has been active in shifting funds away from investments regarded as harmful to the environment; Denmark's ATP pension fund has recently set up a billion dollar climate change investment fund; and Holland's APG asset manager claims to be integrating climate risk assessments across its whole portfolio of investments.

As Christina Kusoffsky Hillesöy, head of Communication and Sustainable Investments at AP3 (Third Swedish National Pension Fund), has commented: “For us as long-term investors, it is important to find responsible investments targeted at the global climate challenges.”

California State Treasurer Bill Lockyer said in 2009 when announcing their US$300m green bond purchase: “Buying these green bonds strengthens our portfolio’s diversity while adding a sound investment with a triple-A rated issuer. And it tells the world that when it comes to battling climate change, California is prepared to contribute not just its policies, but its money, too.”

The California State Teachers’ Retirement System (US$131.9bn in assets) recently went so far as to instruct its active equity and fixed-income managers

to incorporate climate risk into their investment analysis and corporate governance voting practices to ensure that climate-related risk was being consciously factored into investment decisions.

1.2.4 Legislative and regulatory pressure

Governments have increased their green rhetoric. This trend was highlighted by the election of the Obama administration. The US has seen the introduction of a raft of policies aimed at creating jobs and stimulating investment in low-carbon industries; many EU countries have long been active in the area; and both Korea and China have devoted high proportions of their economic stimulus packages to low-carbon industries.

1.2.5 Constraints on public spending

There has been significant pressure to pay for both domestic and, in the case of richer countries, international mitigation efforts through taxation and recurrent revenue streams. However, the financial crisis has constrained the already limited ability of governments to fund mitigation efforts through tax revenues. However, many, if not most, mitigation efforts have the potential to be designed as long-term revenue generators. This is especially the case for assets open to price regulation, where governments have the power to provide long-term certainty of revenue to support capital market investment.

The failure of international governments at the end of 2009 to strike a global cap and trade deal, and the consequent deflation of expectations of an international carbon prices, has brought the issue of public funding into relief. Whatever their merits in advanced regions such as Europe and the US in slowing carbon intensity, carbon prices are unlikely to play any significant role in developing countries, where low energy prices are the prime means of development and a driver of international competitiveness. Climate bonds offer governments an alternative approach to financing the development of low-carbon assets. Large-scale energy efficiency measures, for example, could be funded by national borrowings against future energy savings; equally, low-carbon energy resources

could be developed at scale using private sector capital leveraged with government price regulation. We expect government and climate change policy-makers to exploit debt market opportunities in the mobilization of capital for low-carbon industry investment by offering incentives in the form of tax breaks, guarantees, price regulation and other support mechanisms.

2.2.6 Potential to become a significant fixed income asset class

Taken within the context of the global fixed income market, where new issues amounted to USS2.4trn in notional terms in 2008 versus US$3trn in 2007, we envisage a situation where the funding requirement to transition to a low-carbon global economy over the coming 10 years supports substantial climate bonds issuance making up a significant slice of the market. The depth of the market will develop as a means of channeling finance and savings towards renewable energies and energy efficiency measures, and accelerating their uptake. As such, we anticipate that themed green or climate bonds will become one of the most important debt securities to be found in the global financial system.

2.3 Issuance Review

Despite seed issuance in the green debt capital market by the World Bank, the EIB and other parties, volumes so far clearly go nowhere near the scale required. Most of the issuance has been limited to structured notes, a relatively less liquid market driven by bespoke product requests from buy-to-hold investors. Such as it is, previous supply serves to both illustrate potential directions for the market and provide a signal as to investor appetite.

2.3.1 UK funding

Assuming Professor Stern's revised estimate of the annual cost of climate change mitigation of 1–2% of global GDP and current UK GDP levels of £1.4trn, if the UK were to shoulder its share of the funding requirement in proportion to its GDP it would need to invest between £14–28bn p.a. The UK pension industry has funded assets of about £1.8trn, about £1.7trn of which is held in the private sector. An asset re-allocation of just 1–2% p.a. into climate theme bonds would effectively shift £17–34bn into adaptation and mitigation and make a substantial contribution to the estimated cost.

A constant annual rebalancing of 1% p.a for 10 years would allow the pension fund sector to accumulate a 10% holding in climate-related theme bonds. We feel that a 1% p.a shift is small taken in the context of pension fund investment behaviour. According to Mercer consulting, between 2003 and 2007, UK pension funds reduced their equity holdings by 7% (source: Mercer). The required move of 2% toward the bonds sector is a relatively low shift in this context, and thus has a potentially high degree of likelihood, given current drivers for change.

This re-allocation faces two major obstacles: the willingness of trustees to move money into this area when they are more focused on tackling their deficits; and the availability of investment vehicles. The willingness of investors to move into climate-related investments is driven by a variety of factors, among which are the risk/return profile of the opportunity, the needs of the investor, in terms of their risk/reward profile, and potential legal and regulatory impediments or encouragements. The availability of investment vehicles is an issue that market participants and regulators must address.

Indeed, secondary market performance data for the World Bank issues show that the new asset class has outperformed standard World Bank bonds, suggesting that investors are looking for otherwise scarce opportunities for climate change-related value differentiation.

Within issuing institutions and investment managers the development of green bonds has generally come about as a result of the initiative of internal champions. Most investment banks, for example, have invested little in developing the market. That seems to be changing now that we've seen a number of successful climate and green bond issues.

2.3.2 World Bank green bonds: 2007, 2008 and 2009

The first green bonds issued by the International Bank for Reconstruction & Development (IBRD) were relatively small in notional terms from retail investors. In December 2007 the IBRD issued euro-denominated, six-year 'Eco 3+ bonds', targeted at Benelux retail. The structured notes pay a floating rate annual coupon of at least 3% per year subject to the performance of the ABN AMRO Eco Price Return Index, an equity index that tracks the performance of companies that produce alternative forms of energy, engage in water and waste management, or are involved in the production of catalysts used to reduce pollution.

In June and again in September 2008 the IBRD launched US$31.5m of five-year bonds linked to certified emission reductions (CER). The bonds pay a fixed rate coupon for an initial period and then a coupon linked to future CER market prices and the actual volume of CERs issued by a hydropower plant in China and a bio-energy project in Malaysia.

IBRD issued the first vanilla theme bond designed for institutional investors in November 2008. The SKr2.7bn (US$350m) deal was issued through the Scandinavian bank SEB, with proceeds earmarked to support projects in client countries that meet criteria for low-carbon development; IBRD increased the issue by SKr150m in February 2009. Interest payable on the bond was 0.25% above current Swedish government bond rates, giving investors a yield of 3.15% p.a. Investors included Swedish National Pension Funds AP2 and AP3, Skandia Life and the United Nations Joint Staff Pension Fund.

A second, dollar-denominated bond issue of US$300m launched in April 2009, with a maturity of three years, and was purchased by the State of California as a sign that California wanted to contribute tangibly to climate solutions. It paid a floating rate.

IBRD launched a third institutionally-targeted deal in early December 2009, raising US$130m lead managed by SEB. The bond matures in December 2013 and pays a coupon of 2% p.a. The borrower quickly added by another US$50m later in the month and a SKr600m tranche in February 2010. Among the investors participating in the deal were the New York Common Retirement Fund, the California State Teachers' Retirement System, the Swedish life insurance provider SEB Trygg Liv, and Swedish National Pension Funds AP2 and AP3.

In February 2010, Nikko Asset Management launched two World Bank green bond funds and, in tandem, the World Bank issued 10 new green bonds denominated in different currencies. By the end of February 2010 World Bank green bond issuance totalled US$1.1bn.

According to Bloomberg data, World Bank green bonds have outperformed a euro-denominated IBRD vanilla offering with comparable maturity and liquidity.

2.3.3 European Investment Bank: Climate Awareness Bond 2007 and 2009

The EIB launched its first Climate Awareness Bond in 2007, a €600m five-year zero-coupon, underwritten by Dresdner Kleinwort. The funds raised have been used in EIB renewable energy and energy efficiency projects. In 2009 the EIB issued a second Climate Awareness Bond in Swedish krona, targeted at the borrower's Scandinavian investor base via Swedbank. The proceeds are being used for projects in the fields of renewable energy and energy efficiency.

Issued in fixed and floating rate format for a total amount of SKr2.25bn, the bonds mature on 17 February 2015. The SKr1.7bn fixed rate tranche will pay an annual coupon of 2.95%. The SKr550m floating rate tranche will pay a quarterly coupon of three-month Stibor +10bp.

2.3.4 US government clean renewable energy bonds

The US Treasury in its stimulus package of 2009 issued green bonds to a value of US$2.2bn to generate financing for renewable energy initiatives. These are known as clean renewable energy bonds (CREBs) and 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 CREBs 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, issues the bond. The Federal government supports the borrower's economic liabilities, paying 'coupons' to the lender in the form of a tax credit to the bondholder.

'Build America Bonds'

In 2009 the US government introduced a programme to encourage the issuance of municipal bonds as part of the fiscal stimulus. The government 'topped up' bond yields by 35%, leading to a boom in issuance, in many cases for local green energy projects.

Triodos Bank climate change bonds

In December 2009 Dutch bank Triodos launched a range of retail climate change bonds. The two, three- and five-year bonds offered interest rates of between 2 and 3.25%.

2.4 Recent Trends

There has been a bit of interest recently about rapidly expanding options for retail investors to get involved in renewable energy projects. While we still see retail bonds as making a relatively modest contribution to the transition to a low carbon economy, they are important in engaging the public and creating awareness for green thematic investments which can only be good. Here's a roundup of some of the activity going on in the retail bond market.

- **Good Energy bond 3x oversubscribed**

UK-based Good Energy's aimed to raise £5m through a retail bond offering to finance investment in solar and wind energy generation. Within 3 weeks, Good Energy easily met their target, closing the book at £15m three weeks ahead of schedule! The demand demonstrated for this bond and the earlier Ecotricity bonds is very encouraging.

- **Bonds to finance solar rooftop generation**

In the UK, CBD Energy offered "Secured Energy Bond" to raise finance to install solar panels for chosen UK businesses at no cost to the business but with income derived from Feed-In Tariffs. The bond is secured against the assets of the company and also has a corporate guarantee from the parent company. It will pay an annual coupon of 6.5%. The minimum investment into the bond is £2,000 for a 3 year fixed term and as the bond is non-transferable, it has to be held to maturity in late 2016. A similar offering come from UK-based A Shade Greener which is aiming to raise £10m from small investors (min £1000) by offering 3 year retail bonds at 6% annual return, but with an interesting twist – all the interest paid upfront as a lump sum. Bizarre indeed (we've never seen it before) but according to the company, the decision demonstrates the confidence it has in the reliability of its income plus it wants to differentiate itself from similar offerings. The company, which has installed 25,000 solar panel systems, installs panels at no cost to the householder and collects the feed-in tariff payments. As with the CBD bond, this must be held for three years until maturity.

- **Canada's largest solar co-op**

Bullfrog Power and Solar Share have recently announced the completion of Toronto's largest solar co-op project. The 'Goodmark' project is an 18,000 square-foot rooftop installation providing 100kW of

power to a variety of companies within the building. With the successful completion of the installation, the project goes into a portfolio of PV assets against which Solar Bonds are issued and offered to SolarShare members. The bonds offer a return of 5% per year on a 5 year bond. The bonds are secured against a portfolio of solar PV assets (no construction risk), each of which has secured a 20 year Feed-in tariff power purchase agreement from with Ontario Power Authority.

- **Crow-source funding grows**

There's been a bit of hype recently about the potential for crowd funding as a tool for financing renewable energy. To be honest, we've mostly put this into the 'great but not nearly big enough' category. However, some recent articles have shown that, while it's still not likely to finance all the $1trn per year needed globally to avoid catastrophic climate change, numbers are growing. In Europe in 2012, crowd funding (not just energy) grew 65% over 2011 to reach EUR735m. This is not insignificant compared to the European venture capital market which is EUR3bn. Some estimates put 2013 growth at 81% which would push it over $1bn. It also has some major advantages over regular debt funding or bank lending – it can fund small businesses and organisations that don't have access to the regular financing channels and it can be much faster and more nimble than traditional funding sources. In Europe crowd funding has mainly been a tool for energy cooperatives. Europe has a strong tradition of cooperatives (apparently more Europeans are invested in cooperatives than in the stock market). The speed with which crowd funding and the energy cooperative sector are expanding (European energy cooperatives grew from 1,200 in 2012 to 2,000 this year) demonstrates that there is potential for community-financed initiatives to shake up the energy market. A number of crowd funding platforms have sprung up to focus on renewable energy projects including Solar Schools, Abundance Generation, SunFunder and Solar Mosaic. Solar Mosaic in the US has so far invested $3.8 million in different projects ranging from 1.5kW – 500kW. Abundance Generation in the UK is smaller but using a similar model has just raised £400,000 for SunShare Community Nottingham Project. SunFunder is focussed on emerging markets and connects investors to vetted solar businesses working on the ground in Africa, Latin America, Asia and the Caribbean.

2. Literature Review

To avoid dangerous climate change will require the equivalent of another industrial revolution. This can only be achieved if finance into the green economy is increased by an order of magnitude. This may be possible as many low carbon technologies are competitive with fossil fuel if the cost of finance is low enough.

Reducing the risks of climate change is not a technological problem. There are many ways to generate electricity, drive cars or grow crops without emitting much carbon dioxide—but they are expensive. According to the International Energy Agency, $13.5 trillion must be invested in low-carbon energy by 2035 to reduce emissions. That sort of money can be found only on capital markets. Yet investors' appetite for green schemes is unproven.

Hence growing interest in one of the more promising efforts to encourage it: “green bonds”. These instruments look like any other fixed-income offering except that the proceeds are invested in environmentally friendly projects. Estimating the size of the market is hard: according to Climate Bonds Initiative (CBI), an NGO, between $10 billion and $30 billion of bonds related to renewable-energy projects have been issued. Bonds that are explicitly advertised as green, mostly issued by the World Bank and other multilateral lenders, are easier to count. Around $5 billion-worth have been issued; by one estimate, they could amount to $30 billion by 2015.

Greenness aside, such bonds are indistinguishable from any other investment-grade “plain vanilla” security. They carry no extra costs: investors are not exposed to the risks in the World Bank projects that are funded by the bonds. Nor do they profit if those projects, which typically include renewable-energy initiatives and reforestation schemes, do well.

To reach the scale of finance needed to combat climate change, protect and manage forests, and maintain the world’s natural capital, increasing engagement with the private sector is necessary. That engagement can come in many forms, and bonds are one option. By using public funds to support private-sector investment in forests, bonds could leverage additional finance from global capital markets.

Time is fleeting, scale is essential

Two fundamental issues for financing forest preservation are time and scale. Time is a concern because the longer we wait, the more climate change we experience. All of these effects reduce the resilience of climate and the broader economic-ecological systems that depend on them, increasing the risk of irreversible loss and long-term damage to the global economy.

The scale of financing is important for three reasons. First, the challenge itself is large and requires significant levels of finance to overcome. Second, investing at scale can reduce the risk of investing in one place. Investing at scale can also target multiple types of investment: multiple sectors that directly and indirectly impact forests must be improved to protect forests from within and reduce the external drivers of deforestation. Third, the investment proposition needs to be large and liquid in order to attract the largest investors.

Why bonds?

Climate bonds can play a powerful role in financing climate preservation as the policy landscape, globally and within countries, takes shape. The issuance of bonds directly addresses the concerns of time and scale, enabling issuers to raise large-scale finance now that will be repaid by existing and anticipated future income. Importantly, bonds are also a familiar and proven mechanism for leveraging private-sector finance; they have been used to finance public-private partnerships around the world that have invested in infrastructure, development and health.

Carbon finance is a key opportunity, but demand is weak

Prospective issuers of climate bonds will need to convince investors that the cash flows they plan to pay the bond back with are sufficiently secure and predictable. Carbon markets are an important source of cash flows that could be used to back a bond, but they are not yet reliable enough. Lack of regulation certainty within the UNFCCC and the absence of demand from large compliance markets such as the European Union's Emissions Trading Scheme (EU ETS) cast doubt on future income from regional or global compliance carbon markets. Demand for forest carbon through smaller markets, such as the California cap-and-trade program or the voluntary carbon market, offers some potential for return on forest investments now and is useful in the context of a broader range of income streams.

The investment proposition must be attractive to investors and equitable for all stakeholders

Impact investors and other socially responsible financiers target clear social and/or environmental returns alongside financial returns. They may be willing to sacrifice financial returns for social and environmental returns and potentially compromise in other areas, like secondary market liquidity. This could make these investors the ideal pioneers in a new asset class like forest bonds. Larger institutional investors such as pension funds will generally not be able to sacrifice financial returns for other forms of return due to their fiduciary duty. Yet, under the right conditions, larger institutional investors could be interested in these bonds. These bonds should target impact and socially responsible investors initially, while the market develops, then begin to target institutional investors as

the forest bond market deepens. A tranche structure with different risk/return profiles could also be used to simultaneously appeal to both groups.

Improved access to finance for eco-entrepreneurs may be needed

In some cases, the first issue to resolve will be how to make it possible for enterprises, communities and households to access the finance they need to shift towards more forest-friendly livelihoods and land uses. Such activities often require greater upfront expenditures than non-sustainable activities. So actors in forest countries that want to adopt more sustainable land uses and access the associated cash flows will not be able to if they do not have access to affordable financing first. Forest bonds provide one avenue through which the public sector could support the provision of affordable financing to forest-friendly activities.

Risk mitigation is paramount

Potential investors are concerned about a number of risks, including security of future cash flows and failure of enterprises, but they are particularly concerned about political risk. Public-sector funds could ease such risk through a variety of actions, including paying for or providing political risk guarantees. However it is achieved, mitigating risk will be a crucial factor in attracting potential investors to a forest bond.

Assurance of environmental and social benefits is essential

As with any form of environment finance, safeguards will be required to ensure the environmental and social integrity of climate bonds. All potential stakeholders in a climate bond require this, even potential bond investors, since they are motivated to invest (and potentially take lower returns) because they want to make an investment that has environmental and social returns. Standards that are currently under development for forest and other green bonds will provide assurance of these sustainability benefits.

International donor finance has a catalytic role to play

A primary role of the public sector is to find the appropriate leverage point to make large-scale forest finance attractive to both the investors that will provide finance and to the enterprises and communities that will carry out activities to preserve climate. To do this, international donors and multilateral institutions can support a bond by acting to:

1. Ensure cash flows arise to reward investment in climate preservation;
2. Make finance or capital expenditure more affordable for environment-friendly enterprises; and
3. Become directly involved in structuring the bond by, for example, providing credit enhancement.

The relative effectiveness of these strategies will depend upon the country where the finance is to be delivered, but in all cases a combination of approaches is likely to be needed. Multilateral institutions could play an additional catalytic role by issuing a climate bond themselves and helping to pump-prime the climate bond market.

Demonstrations and dialogue will improve understanding

A disconnect remains between the international investor community, from which finance would be leveraged, and the projects on the ground that would use that finance. The greatest catalyst to stimulating continued work in this area would be the issuance of a climate bond to demonstrate how capital from international markets can be funnelled down to climate-level actions. Lessons from that experience would highlight how to continue improving on the mechanism and how to scale up green finance in the future.

At the same time, dialogue between private- and public-sector actors must also be increased. There is currently a lack of understanding of each sector's expectations and needs for working together to leverage finance. Communication between the private and public sectors must be increased if public funding is ever going to catalyse a much larger scale of green initiative than it can achieve on its own.

2.1 Ten tweaks to transform the green economy

Below are 10 tweaks based on the premise that if financing the green economy becomes attractive for actors within the financial system, in particular banks, investment banks and the shadow banking system, then these actors will aggressively promote investment into this sector. If the capital requirement for green economy assets is made lower than for other sectors, lending by banks into this sector becomes more profitable than other sectors.

All of the "tweaks" sit within the existing institutional framework of capital markets and so only require relatively minor changes in legislation in a few jurisdictions.

Green mortgages and loans: These are mortgages against real estate with very high energy efficiency specifications, or loans into low carbon economy. The tweak is to reduce the risk-weighting of green mortgage backed securities either through Basel III or through credit risk definition defined by the European Parliament. This is supported by evidence that these are indeed less risky than conventional mortgages.

- **Green securitisation:** These are securities backed by green economy assets. Facilitate the growth of this market through favourable legislation and providing first loss provision or mezzanine finance for qualifying investments.

- **Covered bonds:** These are an existing instrument issued by a bank with an underlying portfolio of assets, with low capital requirements for the issuing banks. The tweak is to allow clean energy lending to be an allowed category within the existing covered bonds market.

- **Green monoline:** Credit ratings can be enhanced by government guarantee, making clean energy infrastructure or asset backed securities allowable under Tier 1 capital. A green monoline would be a government (or multi-government) supported enterprise that insured green securities.

- **Tax benefits:** Investment into clean technologies would benefit from favourable tax treatment, which is economically justifiable due to the positive externalities generated. Favourable tax treatment could be introduced for R&D, green pension investments, VC funds, green real estate investment trusts and green muni-bonds.

- **Basel III:** Currently Basel III introduces adverse incentives for long-term investment. This should be removed for clean energy investment, and all proposed regulations should be assessed for their potential impact on the rapid transition to a low carbon – and thus more sustainable -economy.

- **Government guarantees:** Credit ratings can be enhanced by government guarantee, making green corporate or municipal securities allowable under Tier 1 capital.

- **Green development banks:** Existing development banks need to become green banks that deliver government policy towards a low carbon economy. At a minimum they should not be investing in coal of any sort. That's beginning to happen with recent moves by the EIB and the World Bank.

- **Introduce a policy risk insurance facility for clean energy:** Some clean energy requires policy support, which in itself introduces risk that this will be removed. Regional or national facilities can be set up to insure this risk and hence de-risk these investments.

- **Quantitative easing:** Direct quantitative easing into green infrastructure bonds would support urgently needed investment.

2.2 Climate Bonds Initiative

The Climate Bonds Initiative is an investor-focused not-for-profit working to mobilize bond markets for climate change solutions. Climate change solutions involve a rapid transition to a low-carbon and climate resilient economy.

It aims to reduce the cost of capital for climate related investments, while at the same time seeing the creation of safe and secure investments suitable to the needs of pension and insurance funds.

The current value of the bond markets is estimated (by the Bank of International Settlements) to be worth $78 trillion at the end of December 2012. The goal: $1 trillion of investment flowing each year to low-carbon industries.

The Climate Bonds Initiative is:

- **Providing policy models and advice**

Rapid change at very large scale will depend on a close working relationship between government, finance and industry. The Climate Bonds Initiative is developing policy proposals for all three sectors, including:

- How to boost bank lending to renewable by adapting the $3 trillion covered bonds market to create renewable energy covered bonds.
- Delivering on the promise of large-scale energy efficiency (e.g. getting to 85% of housing stock within 10 years).
- Policy risk insurance for renewable energy bonds, to be provided by a consortium of governments.

- **Developing trusted standards**

The Climate Bond Standards Board is developing standards for investments eligible to be called Climate Bonds.

This will provide greater certainty for investors about the climate benefit of their investments, especially in controversial areas like energy efficiency and bio-energy.

Board members are California State Teachers' Retirement System (CalSTRS), the State Treasurer of California, the (US) Investor Network on Climate Risk, the Natural Resources Defense Council, the Carbon Disclosure Project, and the (Australian) Investor Group on Climate Change.

An Industry Working Group consults with the Climate Bond Standards Board. Members include representatives from: Standard & Poor's, Aviva Investors, the IFC (a part of the World Bank Group), KPMG, PricewaterhouseCoopers, DNV and Calvert Funds Management.

The Board has already created standards for wind energy bonds and has certified its first bond, soon to be launched. Solar and energy efficiency investments will be the next to be certified.

- **Launching demonstration projects**

The aim of these 'proof-of-concept' projects is to demonstrate investibility and the potential to finance with Climate Bonds.

For example, working with municipalities in England, the Climate Bonds Initiative is developing a plan for securitization of residential energy efficiency loans with the aim of providing a financing pipeline for the whole country.

A recent report co-authored by HSBC and the Climate Bonds Initiative, is a strong indication that the climate for climate bonds has improved. In the report, HSBC estimates that to transition to a low-carbon economy, $10 trillion needs to be invested globally between 2010 and 2020. At the same time, many global investors now consider the carbon footprint of prospective investments as a part of their analyses when just a few years ago this was a concern for only a fringe segment of investors.

More Stringent Definition of Climate Bonds

According to the Climate Bond Initiative, a climate bond now must meet strenuous criteria for how its proceeds are ultimately invested to receive the "climate bond" label. This emphasis on actual use of proceeds marks an important analytical shift away from considering a bond "green" based solely on its stated intention to use proceeds to lower carbon output. Standard setting around nomenclature now allows investors to buy a bond marked "climate bond" with confidence that it will meet the rigors of investment policy statements and charters. Furthermore, diligent and continuous evaluation by the Climate Bonds Initiative ensures that an issuer's claim to be a "green bond" is accurate. By comparing a firm's revenue breakdown and description of "use of proceeds" on Bloomberg with company disclosures, as well as other market sources, the Climate Bonds Initiative is able to affirm that climate bonds meet tough underwriting standards.

Improving Liquidity and Credit Quality

Early in the history of climate change investing, bond financing was a distant second to equity financing. Climate change investments were perceived as too risky and too volatile to generate the steady stream of cash flows that bond investors covet. But now we seem to have reached a tipping point, with climate-themed bonds totaling $346 billion globally. What's more, fully 89% of these bonds are considered investment grade, with approximately $163 billion considered benchmark-type investment grade. This amount is double the amount outstanding at year-end 2012.

Public Sector Support of Climate Bonds Market

Public sector support is already in place in the climate bonds market, for example:

- Some governments provide credit enhancement to certain bonds
- Governments are investing in climate bonds directly
- Providing tax incentives
- Providing retail pension incentives
- Providing discount rates for green mortgages based on improved credit scores stemming from lower monthly utility bills for borrowers
- Allowing climate bonds to have a risk preference rating under Basel III standards

Diversification of Industries and Geographies

More diversity is needed. By far the most represented industry in the world of climate bonds is transportation, which is estimated to account for 76% of the entire universe. That's because railroads, the classic technology solution of the nineteenth century, has found new life in the transformation to a low-carbon emissions economy. Railroads are far and away the cleanest, most scalable transportation technology excluding coal transportation. Compared with railroads, energy and climate finance represent 11.8% and 9.2% of the climate bond universe, respectively. Investors will doubtless want additional industry breadth from the climate bond universe going forward.

Geographic diversity is also a challenge. China dominates the low-carbon bond universe at 36.7%, or $127 billion. A distant number two is the United Kingdom (UK) at $50 billion. For the climate bond universe to be considered deep and broad, and to generate additional investor interest, more geographies will likely need to be represented.

Future of Climate Bonds

Although they have clearly turned a corner, in order for the market to be considered fully mature some key additional positive factors need to be put in place, such as:

- **Greater scale** – in particular, this would help with creating portfolio benchmarks
- **Aggregation** – to allow for securitization, standardization of climate bonds needs to be put in place so that they may be aggregated
- **Assurance** – the Climate Bonds Initiative is already providing due diligence for the space, but additional assurance of the qualification of bonds as definitive "climate bonds" should be provided by other parties to attract new investors and, ultimately, greater deal flow

In just the last two years, climate bonds have moved beyond the existential question of "to be, or not to be." Still, some more important mile markers need to be surpassed before these instruments become a truly a mainstream product. Even supporters still have questions and doubts. For example, enthusiasts believe that the asset class remains very small relative to others, especially US dollar-

denominated climate bonds. In addition, greater participation from non-governmental entities and pure-play climate issuers — that is, conglomerate-type corporate issuers — is a watershed moment that still has not shed water. Even so, climate bonds seem here to stay.

2.3 An 8 point plan for Mobilizing Bond Markets for the low Carbon Transition

We need a FAST transition; the emissions horse is about to bolt and we have yet to significantly deploy solutions that will allow us to rein it in.

The needed climate change solutions will require a lot of investment. The International Energy Agency (IEA) estimates that, worldwide, $1 trillion of investment in energy, transport and building sectors are required each year above business as usual. According to the UN Environment Programme, if the sustainable management of natural resources such as forests, fisheries, agriculture and water is included, an average additional annual investment of $1.3 trillion is required out to 2050.

Public sector balance sheets are, to say the least, constrained. The bulk of the money is going to have to come from the private sector, in particular from the $75 trillion of assets under management by institutional investors.

This is possible to achieve. Investments in climate resilient infrastructure, from renewable energy to energy efficiency, typically involve high capital expenditure that creates secure and predictable long-term assets — very close to what pension funds and insurance investors are looking for. Investment in these asset have so far focused on equity; but bonds are a great funding instrument for such high capex, long-life projects. On top of that we are, in the light of the crash of the past few years, entering the Age of Bonds. Institutional Investors have realized that high returns in equity can be illusory and have been busily shifting across to the bond market; that market is now worth $78 trillion compared to $53 trillion for equities, the reverse of a few years ago.

Climate Bonds, asset-backed or ring-fenced bonds issued to raise finance for climate change solutions, have been developed as one means of tapping that market.

Thus to create fund flow, following steps should be brought to action:

- **To create deal flow, think big.**

Investors say there are simply not enough big deals on offer — bond markets want deal flow lumps of half to one billion dollars and investors will only buy if there's going to be liquidity as a result of large volume issuance. Which means bigger the opportunities the more investors will be interested. In equities this is beginning to change, with landmark deals such as Pension Danmark's recent acquisition of a huge offshore wind farm from Dong energy. Bond opportunities remain few. One of the big challenges is that both the renewable energy and energy efficiency markets are much more disaggregated than traditional energy sectors with many small projects. Bond investors need scale;

those smaller projects need to be aggregated into larger offerings suitable for the appetite of the big investors. Banks providing project finance is having to recapitalize, a process that is going to happen with even more vigor as new Basel III regulations come into force. That means they are curtailing their smaller business and project lending, and will squeeze even more in the future. Other players, like utilities and governments, are similarly constrained in their financing capacity. If banks and utilities are to be major players in growing the Climate Economy, we need them to change their focus. They need to be project developers and financiers, dealing with the upfront risks of setting up new energy infrastructure. Once they've done that they should be flipping what will then be low-risk assets and loan portfolios into the calm waters of the institutional investor ocean, using equity and asset-backed security offerings, and aggregating smaller offerings to do so as well. Governments may have to kick start this process. Connecticut and Pennsylvania, for example, are setting up warehouses to buy up energy efficiency loans and securitize them. The UK Government is working with financiers to set up a "Green Deal Warehouse". These aggregation facilities need to be big, and we need them everywhere. The same lesson applies with applies to wind farms. But post-crash, the securitization market is on life-support and the appetite for exposure to renewable energy assets is low. Apart from government getting the new regulatory environment right, to revive it we're going to have to take investors on a journey of understanding. The Climate Bonds Initiative has developed a mechanism for issuing "asset-linked" corporate climate bonds. These are fully backed by corporate treasuries but report on the performance of the underlying asset as part of the package. Institutional investors have expressed strong interest in this style of debt. Five of the world's largest insurers, for example, publicly called in December for more aggregation, and for standardization of products as climate bonds. The corporate climate bond market can then be developed with partial treasury guarantees, ensuring that investment grade ratings are maintained, until investor and market maturity allow the development of a fully asset-backed market.

- **Engineer investment grade offerings.**

When institutional investors say "big deals" they mean low risk big deals. For better or worse, the yield curve in the bond market is not going to change — the demand is for investment grade, although BBB, A and AA will do just fine. As most people in the renewable energy field would appreciate, ratings agencies persist in over-estimating policy and resource risks for renewables, while under-estimating the carbon penalty risk for coal and oil companies. Until there is a longer track record for at-scale renewable investments to counter perceptions of "novelty", major deals are likely to depend on various kinds of public sector support, from the nature of power purchase agreements (such as feed-in tariffs) and tax-breaks (common in the US), to low-cost loans to show how its done (as KfW Bank is providing for offshore wind farms in Germany) and regulatory support (in some markets just removing subsidies for fossil fuel energy is all that's needed). What's needed is a grand pact between

governments and institutional investors: government engineers a stream of large scale investment opportunities and does everything it can do make sure they are investment grade; in return institutional investors turn on the taps.

- **Be clever about public sector risk-sharing.**

Public support doesn't always have to be fiscal. There are many options, from guarantees to knocking heads together to regulatory measures, all which can encourage institutional investors. Insurance products could include: > First loss and selective loan guarantees. Well known tools for development banks; a lot more could be done with them in renewable energy investing and other climate change solutions. > Policy risk insurance (e.g. building on the under-utilised Multilateral Insurance Guarantee Agency). > Currency risk insurance (like the scheme run by the Dutch Government for development finance). But regulatory support can also work: > The UK's Green Deal legislation collects energy efficiency loan repayments through the utility bill and ties those loans to the dwelling not the mobile dwellers. The legislation effectively de-risks investments by ensuring that default rates will be minimal (everyone pays their power bills). On the back of that loan portfolios can be built and securitised. > In Germany the Covered Bond (Pfandbrief) market is worth nearly a trillion dollars. By extending that legislation to cover renewable energy assets German can hugely expand institutional investor access and participation in the renewables market and lower borrowing costs. > In Japan the government is legislating to give preferential treatment renewable energy bonds over other unsecured debt. This tactic has worked for the Japanese nuclear utilities; it can work for renewables. In summary, the mantra has to be leverage leverage leverage (of private finance), but can be regulatory leverage as much as financial. Build green enabling institutions. We know that the solutions have to involve new forms of private/ public risk sharing. We also know that the "understanding" gulf between Treasuries and investors is astoundingly large. Rapid change requires special purpose teams and institutions operating at the border between investors and government and tasked with finding quick ways to achieve change. Green Investment Units and Banks are needed where State banks are not strong. Where they already exist they need to be greened. The European Investment Bank, for example, is the world's largest clean energy lender – but they have a dark side that uses cheap public money to build new coal-fired power stations. It's policy lunacy because it means the EU's bank is undercutting EU emissions reduction targets (let alone the world's). They should be switching that dark side money to the light side and then leveraging it, for example by offering guarantees for qualifying climate bonds. Same thing applies to all the development banks (ask the EBRD about their coal lending!) While we're at it, can we cut back 100% project lending by development banks in favour of leveraging private finance? The EIB for example talks a lot about leverage but doesn't do that much; it's still lending 100% of funds willy-nilly. Time to better stretch that public sector balance sheet.

- **Give tax incentives for climate bonds.**

This is not rocket science; it's been used for many years to support the oil and gas industry in the US for example. Very little treasury loss can be a big boost to investment.

- **Build an economic recovery narrative.**

The money is there, much of it parked in cash, sitting out the crash. Shifting the economy by building productive investments is a recipe for a long-term economic stimulus plan. And that's what it would be. The economy needs a narrative to right itself. A green growth narrative does that, while addressing the single most substantial threat of our era. Part of that narrative is signalling where we can expect to see the economy go. As we address climate change we will need to revamp our economies across every sector.

- **Use Climate Bond Standards as a screening and preferencing tool.**

Climate Bonds offer a tool to help investors and policy-makers to rapidly scale-up finance and action for the transition to a low carbon economy. There is growing appetite from the investment community for investment-grade bonds that are specifically targeted at financing the low-carbon economy. However, in order for the market to grow and for liquidity to develop investors need tools to help them monitor and verify the climate effectiveness of their investments. There are many benefits to Climate Bond Standards: > Governments need to be able to signal encouragement for and track private capital financial flows in investment-poor areas of the economy. > Institutional Investors, particular public sector funds that dominate the rankings of largest funds in the world, need to be able to signal investment areas they are interested in and assure the public that institutional capital is being invested in their interest. > The public needs to know that a vehicle for catalysing large-scale financial flows to ensure future environmental stability is available and that the financial sector is supporting this future. A large and liquid Climate Bond market will stimulate innovation from banks, issuers and policy makers alike and will make an important contribution to bridging the financing gap that currently exists.

- **Make it easy for politicians.**

This is where real work is needed. Investors are aware of the risk of climate change; organisations representing $20 trillion have been calling for change for years — without huge success. That's because too many politicians are focused on the short-term, caught in the headlights of the fossil fuel lobby (just go to Washington DC and feel the number of coal and oil lobbyists around). If concerned bond investors and business issuers are to see the policy settings needed to address climate change, they have to get better at packaging politically sellable solutions, not just making inchoate demands

like protesters in the street. That means working on and supporting industrial and investment plans that can address the challenge; that means showing how multiple sectors of the economy can be engaged in the task; and that means developing marketing campaigns to get those plans adopted and helping politicians see how they can successfully sell those plans to voters.

2.4 Globally Networked Carbon Markets

Putting a price on carbon is a necessary step in avoiding a 4 degree-warmer world. A long-term, predictable price signal is needed to direct investment toward low-carbon growth. While negotiations on a global climate agreement continue, countries are taking action individually, and many are focusing on market-based approaches. From 2013 onward, 36 countries, 11 sub-national jurisdictions in the United States and Canada, and seven cities and provinces in China are participating or preparing to participate in emissions trading systems. Other countries are considering market options.

The benefits of a global carbon market include a widely accepted price on carbon, significant scale to attract investment, a strong signal to the market that carbon pricing is here to stay, improved price stability, and cost-efficiency. Domestic priorities as well as climate change mitigation goals will drive national decisions on policy and design of carbon pricing instruments. It is widely recognized that heterogeneity across market designs and carbon asset types will be a feature going forward.

Heterogeneity is important in terms of innovation but could lead to market fragmentation, potentially putting some of the benefits of a global carbon market beyond reach. If separate markets can be connected with very low transaction costs, they will achieve many of the benefits of a single market. The challenge is to develop the next generation of carbon market services and institutions that will connect heterogeneous carbon markets and support fungibility across a variety of carbon asset types to achieve the scale and price signal needed to direct investment to low-carbon opportunities.

Source: worldbank.org

The idea put forward by the World Bank Group for globally networked carbon markets is at an early stage and is intended to stimulate discussion on services and institutions that would be needed for the ”next generation” of carbon markets. The key elements include:

- An independent rating system and independent, private sector rating agencies applying a risk-based approach to rate the environmental integrity and climate change mitigation value of carbon assets in the international market.
- An International Carbon Reserve to help in addressing market risks and failures.
- An International Settlement Platform to track cross-border trades and potentially provide a clearing house function.

A "globally-networked carbon markets" approach would offer flexibility in connecting heterogeneous carbon markets and fungibility across a range of carbon asset types. Participation would be on an opt-in basis and would be compatible with a new global agreement when that is achieved.

3. Objective

The project aims to review the various instruments that have been proposed and implemented for financing renewable energy and low-carbon technology projects, in both the developed and developing world, with a focus on private sector involvement. The review is done through analyzing the existing climate bonds scenario- the state of climate bond market, the regulatory framework and standards, scope in Indian market- analyzing the buy and sell side perspective.

- Studying the existing state of Climate Themed Bond Market
- Studying the regulatory frameworks and standards
- Evaluation of scope in Indian Market

4. Research Methodology

The project is divided into three parts, including both primary and secondary research. The various sections are:

- **Existing state of Climate Bond Market**

It involves descriptive analysis, based on secondary data research. It reviews the existing state of climate bond market- the instruments, size of market, credit ratings, bond universe etc.

- **Regulatory Frameworks and Standards**

It involves descriptive analysis, based on secondary data research. It studies the existing standards, and its need for the asset class to be accepted with confidence. It also analyzes the process the issuer has to undergo in order to qualify as a climate bond.

- **Scope in Indian Market**

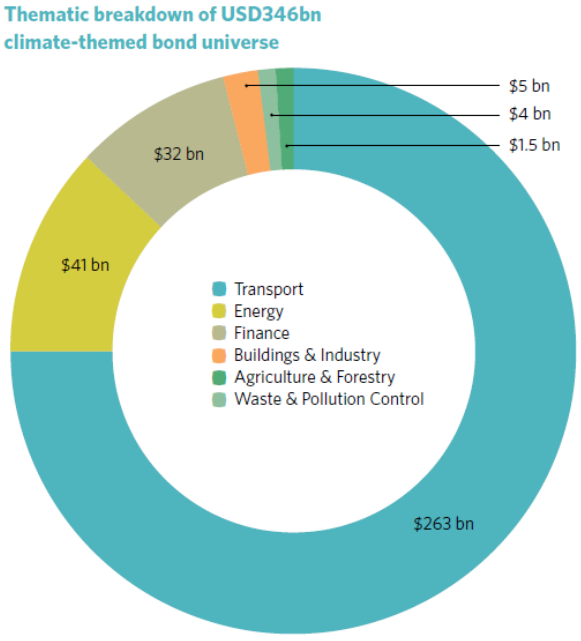
The research is based on primary research, which examines the acceptability and willingness of retail customers to launch of new asset class “Climate Bonds”. The analysis will also be conducted from the perspective of the sell side i.e. the motivation for Government and corporate to issue such green bonds.

5. Analysis

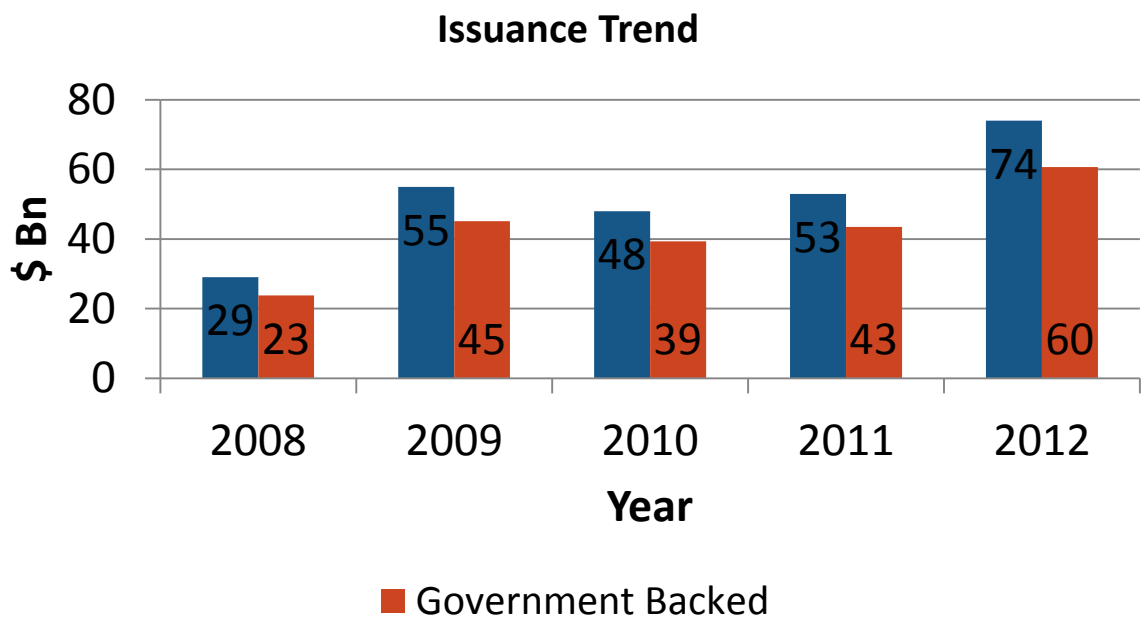
5.1 Existing state of Climate Bond Market

Following the recent financial crisis, the bond market is attracting growing interest as a source of debt capital to finance the 'green infrastructure' the climate economy needs. The seven climate themes of Transport, Energy, Climate Finance, Buildings & Industry, Agriculture & Forestry, Waste & Pollution Control, and Water correspond to the view of the emerging low-carbon, climate resilient economy. It is designed to ring-fence goods and services that enable the transition to low-carbon growth that is also resilient to the impacts of a changing climate. These bonds are derived from corporates, financial institutions, municipalities, state-backed entities and project SPVs (special purpose vehicles). Each issuer's Bloomberg description and revenue breakdown is cross-checked with company disclosures and other market sources to confirm alignment with climate themes. Credit ratings of parent companies, or governments in the case of state agencies, are applied if existing bond rating data is not available on Bloomberg or from other sources.

The universe of climate-themed bonds outstanding in 2013 totaled USD346bn, a significant expansion on the 2012 estimate of USD174bn. It remains dominated by Transport (USD263bn), Energy (USD41bn) and Finance (USD32bn).



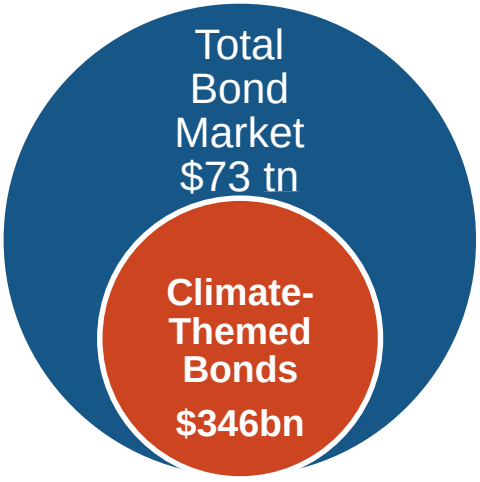
Source: HSBC & Climate Bonds Initiative report



Source: HSBC & Climate Bonds Initiative report

It is estimated that around USD10trn in cumulative capital investments will be required globally between 2010 and 2020 to drive low-carbon energy alone. The historical 60:40 split between debt and equity means that cUSD6trn could be required in the form of bank loans and bonds.

The success of climate policies has meant that key clean technologies are now reaching a stage of maturity appropriate for greater bond investment. From a regulatory perspective, new financial regulations (such as Basel III) could result in a shift to more capital-market funding of project finance transactions. Basel III could discourage banks from holding longer-term loans on their balance sheets, prompting increasing costs, reductions in the term of loans and introducing greater refinancing risk. In addition, changing asset allocation strategies are generating greater demand from investors such as pension funds and insurance companies who need long term fixed-income investments to match their liabilities. Finally, institutional investors are extending the integration of sustainability factors beyond listed equities into other asset classes, creating appetite for bonds linked to climate change.

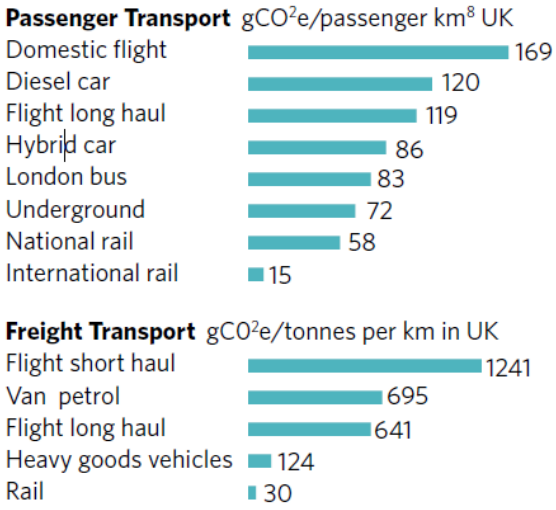


5.1.1 The various themes can be described as follows:

- **Transport**
  a. Includes rail operators, infrastructure and rolling stock, due to its low carbon intensity compared to other passenger and freight transport modes, as well as manufacturers of sustainable biofuels and electric vehicles.
  b. Rail built for coal transport has been excluded.
  c. As with last year's report, rail remains the dominant technology at USD263bn.
  d. Many of the bonds relate to high-speed rail and rail refurbishment in China, where annual USD100bn capital expenditures have been announced.
  e. Other significant players are Network Rail in the UK, SNCF and RFF in France.

The carbon outperformance of rail:

The UK is shown here as an example where rail has a far lower carbon footprint than flights or diesel cars. The difference between these carbon footprints would likely become starker as the grid greens.



Source: www.climatebonds.net

- **Agriculture and Forestry**
  a. Increase of chain-of-custody sustainability certifications across supply chains in sustainable forest management and pulp & paper production allows increase in bonds identified.
  b. USD3.8bn identified in this year's screen.
  c. 88% of the theme from forest management and paper manufacturers particularly in Sweden, Portugal and the US.

d. Climate resilient agriculture practices such as improvements in crop yields and resistance to drought and flooding yet to feature in bond market.

- **Energy**

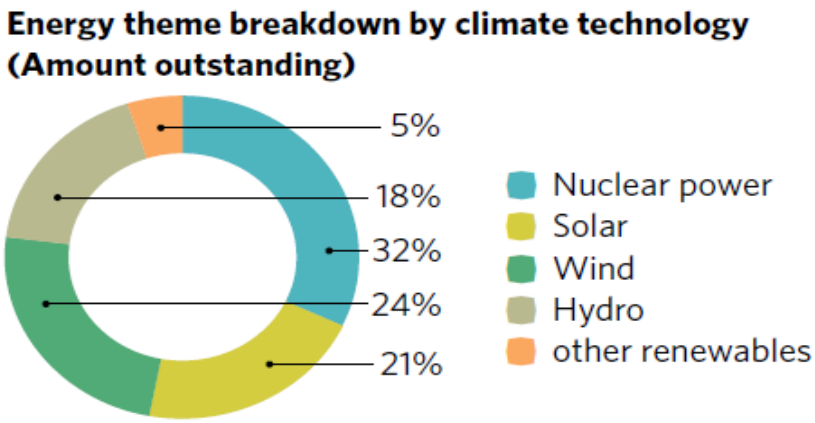
a. USD11.6bn in issuance in 2012 and early 2013 brings this theme to USD41bn with bonds linked to nuclear power (32%), solar (21%), wind (24%), hydro (18%) and other renewable (4%).

b. Bonds linked to large hydropower in tropical regions are not included due to potentially high carbon footprints which can be equal to, or double that of coal-fired plants.

c. USD5.5bn of wind and solar project bonds with three landmark Canadian project bonds.

d. In Mexico, the Oaxaca II and IV 18-year wind bonds issued by Spanish developer Acciona, represented the first investment-grade project bonds from an emerging market at USD300m BBB-rated.

e. Non-rated renewable energy technology manufacturers issued USD2.3bn in 2012.



Source: www.climatebonds.net

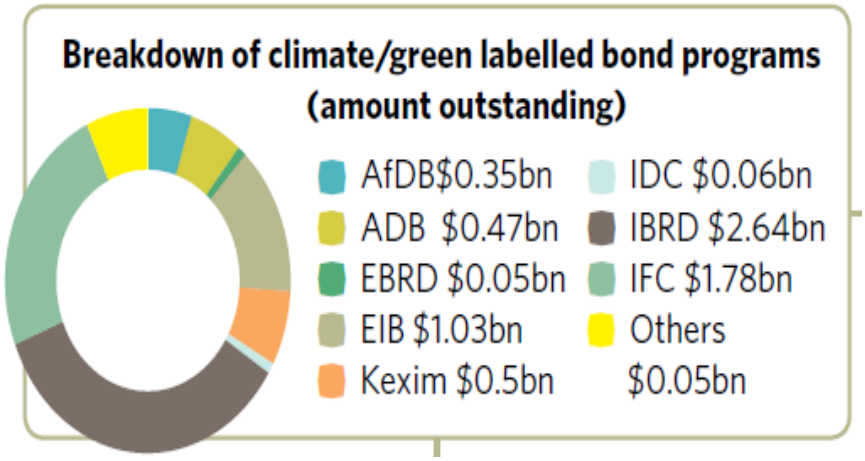
- **Climate Finance**

a. USD5.2bn of financial institution bonds were issued in 2012 and early 2013 to bring this themes total to USD32bn.

b. The green labelled bond programmes of multilateral development banks (MDBs) saw significant issuance in the last year of USD2.5bn, but its overall amount outstanding remains static at USD7.4bn due to previous bonds reaching maturity.

c. The benchmark AAA-rated USD1bn green bond from the International Finance Corporation (IFC) and the AA+ rated USD 500mn bond of Export-Import Bank of

Korea in February represented a breakthrough for investor awareness of labeled bonds.



Source: www.climatebonds.net

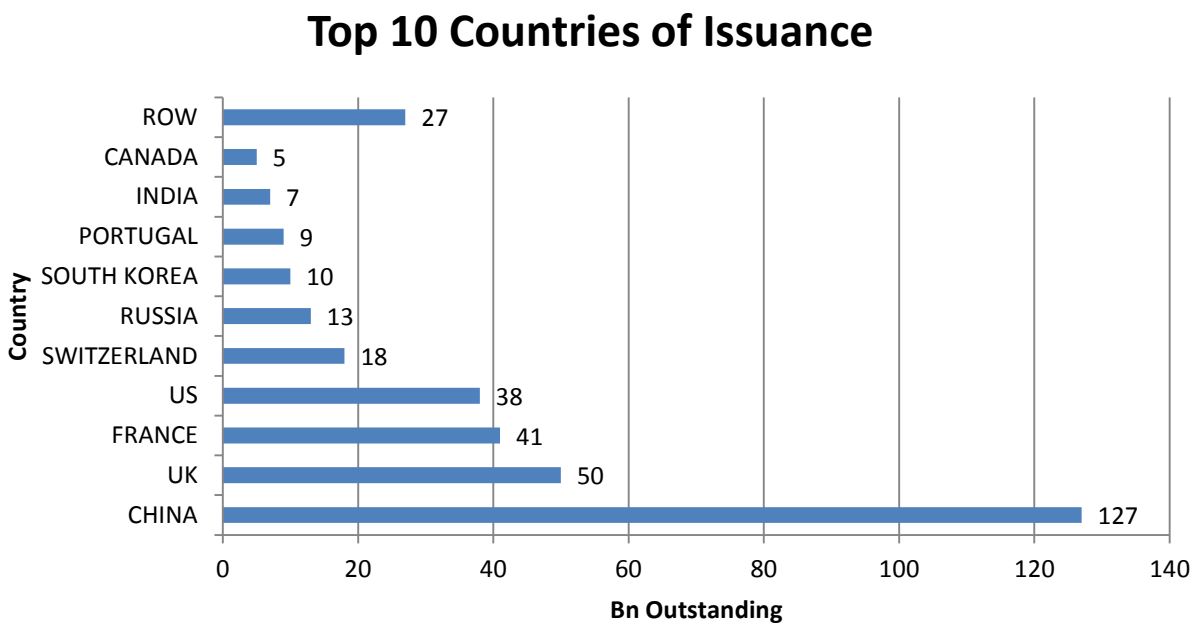
- **Water**
  a. Bonds that finance a water supply resilient to the impact of a changing climate remain elusive to our screening of the bond market.
  b. This year we found greater appreciation of the need to integrate climate adaptation scenarios into business planning, particularly in the UK, although we were unable to identify with sufficient confidence any bonds linked to climate compatible water infrastructure or conservation solutions.

- **Waste and Pollution Control**
  a. USD1.4bn in bonds outstanding identified mostly derived from industrial recycling activities.
  b. Large waste management companies remain too diversified to allow their bonds to be identified as fully dedicated to climate and sustainability solutions.

- **Buildings and Industry**
  a. Bonds linked to manufacturers and service providers fully dedicated to energy efficiency in buildings and industry now total USD4.8bn.
  b. 13% are derived from LED manufacturers, 52% from LG Electronics due to its near-total Energy Star certification penetration across its appliances with other bonds from US municipal EE programmes.

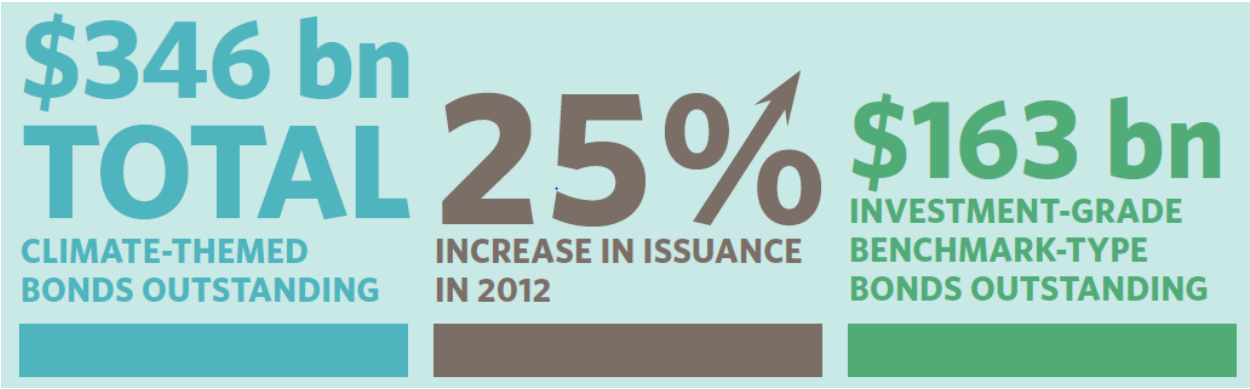
c. Many energy efficiency solutions are located in internal divisions of large corporates such as Siemens, GE and Schneider Electric and so their bonds are not fully aligned.

5.1.2 Across the regions: Market of Climate Bonds



Source: www.climatebonds.net

5.1.3 Key Findings



Source: www.climatebonds.net

Climate Bonds 3-point agenda for market acceleration

- **Entrench Standards for what is climate or green**

Mainstream investors require both liquidity and commoditized products in order to participate in this market. For this, scale is required in the thematic market. The industry backed Climate Bond Standard has the potential to scale up the market by standardizing and commoditizing climate products.

- **Support a Green Securitization market**

Recapitalization pressures on banks have reduced their allocations to project lending; developing a loan securitization pipeline would allow them to do more with less. Green securitization of operating assets will help aggregate a fragmented renewable energy market to meet the needs of institutional investors. This will involve appropriate regulatory measures and support by developing banks to help kick start markets.

- **Structure to Investment Grade**

Policy imperatives means low-carbon assets need to be developed at an unprecedented speed and scale; without track record ratings for assets can be expected to remain in the low investment grade bands or below. Public sector support in the form of policy guarantees, tax incentives and credit enhancements will be essential if targets for emissions reduction are to be met.

5.2 Standards and Regulatory Framework

The Climate Bonds Initiative seeks to develop mechanisms to better align the interests of investors, industry and government so as to catalyze investments at a speed and scale sufficient to avoid dangerous climate change. A key project is the Climate Bond International Standards and Certification Scheme ("Certification Scheme"). The Certification Scheme allows investors, governments and other stakeholders to prioritize 'low carbon' investments with confidence that the funds are being used to deliver a low-carbon economy. The Certification Scheme will include mechanisms for verification and, where relevant, monitoring of standards compliance. An international Climate Bond Standards Board comprised of large institutional investors and leading environmental NGOs will provide oversight. The Climate Bond Standard ("the Standard") is not a financial standard —the obligation to perform financial due diligence remains with investors, just as it does for other investments. The Climate Bond Certified mark ("Certification Mark") is registered in multiple countries. It is used to designate certified Climate Bonds.

The standard aims to provide assurance that funds rose using a Climate Bond are being used in ways consistent with delivering a Low-Carbon Economy.

Governments and leading climate scientists agree that to avoid dangerous climate change, the global average temperature increase above pre-industrial levels must stay below 20C. A 'Low-Carbon Economy' is defined as a world economy operating within these limits. Even to achieve a 'likely' probability – that is at least a 66% chance of success2 – of limiting temperature increase to this level requires global greenhouse gas (GHG) emissions to reduce by 50-70% by 2050 relative to 1990 levels. This requires significant emissions mitigation leading to global annual GHG emissions well

below 20 gigatonnes CO2-e by 2050. The lower the GHG emissions, the greater the chance, of avoiding dangerous climate changes. The Climate Bond Standard will aim to encompass projects or assets that contribute to the transition to this 'Low-Carbon Economy'. Specifically, this includes projects or assets that directly contribute to:

- developing low-carbon industries, technologies and practices that achieve resource efficiency consistent with avoiding dangerous climate change;
- essential adaptation to the consequences of climate change.

The Climate Bond Standard (version 1 prototype) supports the certification of three types of bonds:

- Corporate bonds: Corporate bonds are defined as a general obligation debt security issued by a corporation or other legal entity, whose credit is not tied to any specific Nominated Project(s) or assets. In the case of certified Corporate Climate Bonds, the bonds are verifiably linked to eligible physical assets or to a pool of loans to eligible physical assets. This is in order to verify the low carbon claims of the Corporate Climate Bond. For credit purposes, the bond retains the corporate bond rating of the issuer.
- Portfolio Bonds issued by securitization vehicles comprised of individual loans to finance physical assets or equity investments in physical assets. Portfolio bonds are defined as a debt security of a securitization vehicle that contains a pool of loans each of which qualifies as a Nominated Project or contains a pool of equity interests in Nominated Projects.
- Project development bonds: Project Development Bonds are defined as a debt security issued by a project development company or by the parent of a project development company that is issued to finance specific Nominated Projects on a non-recourse or limited recourse basis.

5.2.1 General Requirements:

These requirements apply to all Climate Bonds. They are designed to ensure uniformity and consistency across the Climate Bonds asset class.

5.2.1.1 Project Nomination:

An issuer of a Climate Bond must ensure that at any point in time, the bond is associated with eligible projects or physical assets and that this association can be verified. An issuer is not permitted to double-count eligible projects or physical assets that have been associated with previous Climate Bonds.

5.2.1.2 Use of Proceeds:

An issuer of a Climate Bond must use the funds raised to finance eligible projects.

5.2.1.3 Non- Contamination

An issuer of Climate Bonds must make sure that compliant projects and related financial flows are not "contaminated" by activities inconsistent with a Low-Carbon Economy. Poor outcomes would occur if funding intended for a compliant project were temporarily invested in non-compliant activities — for example, conventional coal-fired power generation.

5.2.1.4 Environmental and Social Integrity

An organization applying for a Climate Bond certification must disclose the extent to which the relevant Nominated. Project(s) have given, or will give, due regard to environmental and social regulations and good practices — whether national or international. The clause seeks:

- to protect the reputation of Climate Bonds; and
- to encourage good social and environmental practice.

5.2.1.5 Verification

Verifiers will audit whether or not an issuer of Climate Bonds is complying with the Standard. A verification audit takes place as part of the issuer applying for a Climate Bonds Certification Mark for issuance of Climate Bonds. Also, a verification review may be triggered by:

- An assessment of a claimed breach of compliance by interested Parties. Claims of breach of compliance may only be lodged by parties to the transaction. Claims are to be lodged with the Climate Bond Standards Secretariat.
- Any subsequent Climate Bond transaction — for example, the issue of another Climate Bond from the same organization —will require the issuer to provide documentation on the compliance of the existing Climate Bonds to the Verifier.

The Standards Board reserves the right to conduct random or periodic reviews of Climate Bond certifications. In such an instance organizations issuing bonds will provide information as requested by the Board.

5.2.1.6 Climate Bond Certifications and Limits of Use

The Standards Board will issue a Climate Bond Certificate to an issuer of Climate Bonds when the report of a Verifier confirms that the proposed issue complies with the Climate Bond Standard. The issuer can then hold and use the Climate Bond Certificate and Mark until the Bond term is complete —as long as the issue continues to comply with the Standard.

An organization which has had a Verifier confirm that one of its existing or proposed bond issues complies with the Climate Bond Standard, may register these bonds with the Climate Bond Standards Board. The organization then has the right to use the Climate Bond Certification Mark in association with the relevant bonds (but no others) for the duration of the bond term — provided that the Bonds

remain Climate Bond Standard compliant. An organization must stop using the Climate Bond Certification Mark if:

- It voluntarily identifies that it is no longer compliant; or
- An independent verification audit commissioned by the Climate Bond Standards Board finds that the bond is no longer compliant.

5.2.1.7 Non-Compliance

If a bond issue becomes non-compliant, then the issuer must disclose that fact to the Standards Board. However, this does not relieve the issuer of the obligation to continue to service the bond.

If a Climate Bond is no longer compliant with the Climate Bond Standard, then the issuer is required to disclose that fact to the Climate Bond Standards Board, the bondholders and the relevant exchanges. Once a Bond is deemed to be non-compliant, the issuer:

- may not use the Climate Bond Certification Mark in association with the Bond; and
- Must take all necessary steps to remove that bond from Climate Bond listings and inform Climate Bond market participants.

Once non-compliant, a Climate Bond cannot become Climate Bond Standard compliant again without undergoing a full verification process.

5.2.1.8 Eligible projects and physical assets

Projects and physical assets will be eligible for Certification if they directly contribute to:

- developing "low carbon" industries, technologies and practices that achieve resource efficiency consistent with avoiding dangerous climate change;
- Essential adaptation to the consequences of climate change.

For a bond to be certified as a Climate Bond, the funds raised under it must be used to finance or refinance:

Wind Energy Generation– that is, activities to generate energy from wind, specifically:

- The development and construction of wind farms.
- Operational production or manufacturing facilities wholly dedicated to wind energy development
- Wholly dedicated transmission infrastructure for wind farms
- For a bond to be certified as a Climate Bond, the funds raised under it must be used to finance or re-finance:

Solar Energy Generation – that is, activities to generate electricity directly from solar resources, specifically:

- The development, construction and operation of solar electricity generation facilities, where a minimum of 85% of electricity generated from the facility is derived from solar energy resources.
- Wholly dedicated transmission infrastructure for solar electricity generation facilities.

5.2.1.9 Technical Criteria

For the physical assets listed below to qualify for Climate Bond certification, they must comply with specific technical criteria if specified.

5.2.1.10 Other Requirements

These are specific to the different types of bonds. They include:

- Traceability
- Project holding
- Confidentiality
- Settlement Period
- Ring-fenced Cost Centers

Sean Kidney, Chair of the Climate Bonds Initiative, said the standard would provide the foundations for a new fixed income asset class, "focused on recognizing the investments needed to deliver a Low Carbon Economy by 2050 and on limiting the risk of dangerous climate change". It is designed to provide investors and governments with independently certified bonds that provide assurance that the investments are making a contribution to the delivery of a Low Carbon Economy.

5.3 Scope in Indian Market

6.3.1 Need for Climate Theme Bonds in India

India has both the most to lose and the least to lose from climate change. India may be growing rapidly, but it lags well behind the other regions in our survey in terms of economic development. While the need to develop and alleviate poverty may seem to trump longer-term climate concerns, the challenge here is to build infrastructure and foster economic growth down paths which entail fewer greenhouse gas emissions.

Yet in 2012 India was the world's fourth-largest market for new wind power projects, it has ambitious solar energy targets, and it has significant government programs focused on energy efficiency (Global Wind Energy Council 2012). Renewable energy, energy efficiency, and land use policies have been about improving energy security, reducing energy imports, improving the nation's balance of

payments, creating new and profitable industries, and providing affordable energy and food to the poor.

India's climate policy challenge—and one shared by the other rapidly developing countries in our study—is to ensure that it can realize the full long-term economic benefits of low-carbon development, without sacrificing short-term growth. Further, the challenge is to ensure that institutional and technological development in India, along with technology transfer, foreign aid, and investment from outside India, can continue to reduce the costs and increase the benefits of low-carbon development.

The policy challenge is confounded by the state of the Indian economy and the immature financial markets in India, by differences between the Indian states, by the democratic imperative to develop policy that is fair to all, while limiting opportunities for corruption. All of these challenges exist in a country that is eager to learn from international experience and technology and eager to accept foreign investment, even as a colonial legacy makes the country wary of undue outside influence

The key sectors driving emissions in India are power, industry, and agriculture. Both emissions and power generation have increased dramatically, more than doubling in 15 years. India's economy is very energy intensive, and coal accounts for 42% of consumption (EIA 2011). While the vast majority of the increase in power demand has been met through coal and natural gas generation, recently wind generation has increased significantly. And demand for power will continue to increase, as some 40% of Indians, mostly in rural areas, do not have access to electricity. In the industrial sector, productivity gains have outpaced emissions growth: Since the early 1990s, industrial productivity has tripled, but emissions have gone up only about 60%. Agricultural emissions have increased, driven mainly by an increase in fertilizer use.

Source: CPI Analysis

Low-carbon development in India faces four major challenges. First, the particulars of the Indian economy and financial markets change the way policy will act—and could make low carbon investment more difficult. Second, major differences between states require that Indian policymakers tailor policies to the state level. Third, there are overarching policy priorities that will guide the design of low-carbon growth policies. These include fundamental principles of fairness, as well as concerns about corruption. Finally, India balances its openness to foreign investment with the desire to avoid excessive foreign influence.

It is found that the biggest barrier to renewable energy in India is the inferior terms of debt – i.e., high cost, short tenor, and variable rate – which raises the cost of renewable energy in India by 24-32% compared with similar projects in the US. While a number of financing instruments that have been used elsewhere could contribute to solving the main problems in financing renewable in India, none are currently available.

6.3.2 Suggested Financing Technique: Climate Themed Bonds

Currently, renewable energy projects around the world, from the U.S. to India, and the European Union to Sub-Saharan Africa, are largely financed on a one-off basis. This leaves each individual project lender or investor to manage the unique risks that each project faces.

In response, governments, investors, and utilities have developed various policy and regulatory instruments to help reduce these risks. These include long-term contracts, government guarantees, currency agreements, and a set of technical measures such as the priority dispatch rules.

Despite these various measures, investors often remain exposed to a host of other less manageable risks, including political and economic risks, which are harder to hedge.

Given that the majority of renewable energy projects are smaller than US $50 million, many of the investors and fund managers that may want to finance these kinds of low-carbon assets simply *can't*: deals are too small, due diligence demands are too great, and the individual project risks are both too disparate and too high.

The result is that in almost every jurisdiction in the world, financing renewable energy projects is far costlier than it could be. Moreover, this means that these projects are more expensive for consumers, making the transition to a low-carbon energy system slower, costlier and more challenging to implement politically.

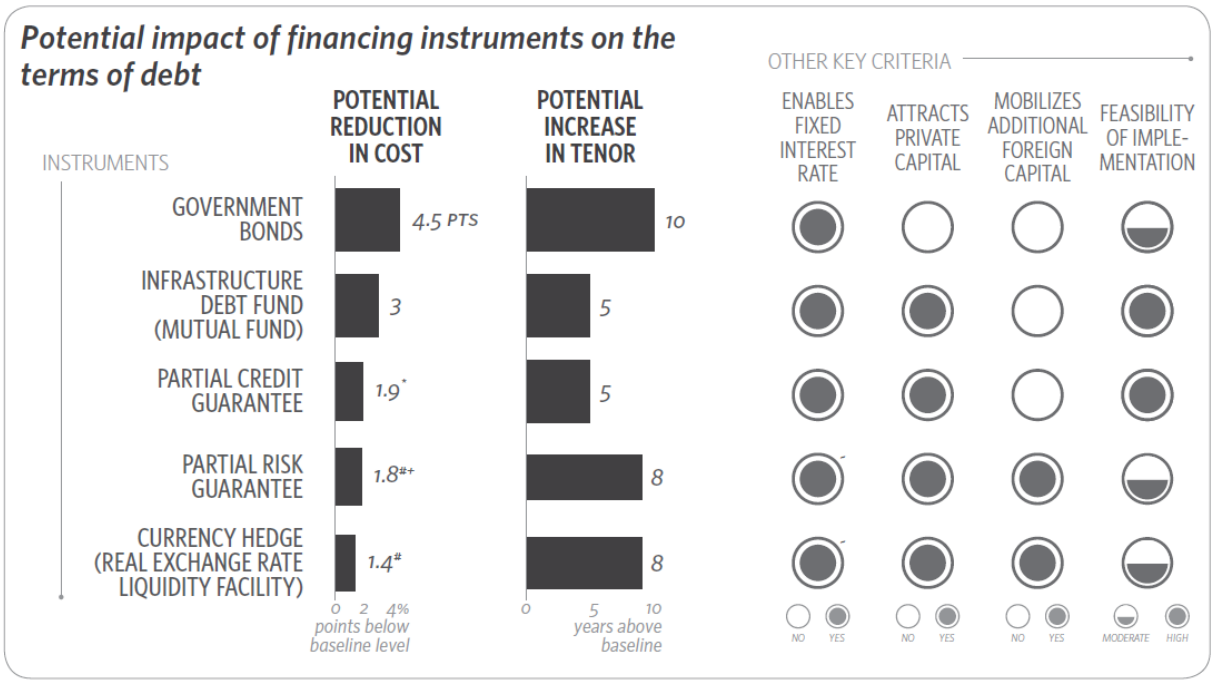
Climate bonds have the potential to change this.

They enable individual projects, with all their unique risks and exposures, to be pooled, reducing the cost of debt and making renewable energy even more competitive. This matters, because the cost of capital is one of the primary determinants of project costs.

Also, by pooling and effectively securitizing renewable energy projects, they create a recognizable product that investors can buy, and one that can be bundled into larger offerings, making it possible

for the largest funds to participate. This helps match investment flows to the scale of the challenge of creating a low-carbon future.

Government bonds: A direct government borrowing and lending program, compared with a typical domestic loan that is available at 12.3% for 10 years, would reduce the cost of debt by up to 4.5 percentage points and increase tenor by up to 10 years, ultimately decreasing the delivered cost of renewable energy by approximately 25%. However, a direct government borrowing and lending program may crowd out private financing if not designed carefully.



Source: CPI Analysis

Green bonds are fixed income instruments that could provide an avenue for mainstream investors to participate in socially responsible investing

The government may also issue bonds in the form of green bonds or climate bonds. Green bonds raise funds for environmental projects, while climate bonds focus specifically on projects that involve climate change mitigation or adaptation (UNEP, 2009). Both are fixed income financial instruments that offer returns similar to those on non-green bonds. The objective is to provide mainstream investors the opportunity to invest in climate-related projects. For example, the World Bank's Green Bond is a fixed income product that invests in projects that fulfill specific criteria such as tackling climate change issues, reducing poverty, and improving local economies (World Bank, 2009). Green/climate bonds would enable the government to combine financial leverage with its regulatory leverage and provide targeted support for renewable energy in the form of tax breaks (Climate Bonds Initiative, 2012). However, there would be a cost associated with performing due diligence to ensure

that the projects meet the specified criteria, which may lower the returns from such bonds. Furthermore, a stable project pipeline for creating investment grade offerings may be difficult in the initial years and risk diversification may prove to be a challenge.

6.3.3 Sell Side Perspective

- **Government:**

Government's role as an enabler of financing has been under-appreciated in discussions about climate investment. It has many options available to unlock private sector funding for climate change mitigation and adaptation.

Large-scale energy projects can become eminently fundable with institutional capital if steps are taken to reduce the risk profiles of projects and reduce the costs of making projects happen.

Government can reduce the risks of financing, either by issuing or guaranteeing bonds directly, by signing purchase contracts that allow companies to issue corporate bonds, or by providing implicit guarantees by being a cornerstone shareholder in a large renewable energy generation project. It could strategically use public procurement to boost mitigation efforts. And it could remove distortionary policies (such as hidden fossil fuel subsidies) that work against new projects.

Richer nations might be called on to fund, as per existing World Bank schemes, partial guarantees for Indian projects. Government can also reduce the costs of transactions for projects, by streamlining approvals processes for large renewable energy projects and cutting red tape; or designing energy efficiency schemes that collect whole cities into financeable projects, and facilitating the collection of loan repayments through utility bills or municipal taxes.

One such initiative taken by the Indian government is the issue of IREDA tax free bonds. The Government of India recently allowed 13 public sector institutions to raise nearly ($7.8 billion) in 2013-14 through tax-free bonds, to meet their infrastructure investment needs. The new scheme includes allowances for the Indian Renewable Energy Development Agency (IREDA) to raise $157 million by issuing such bonds - providing a much-needed new source of funding for the Agency and for the Indian renewable energy sector. Tax free bonds are an efficient way of raising funds for financing renewable energy projects. Green bonds and the climate bonds market are growing globally and several international institutions and banks are issuing such bonds to increase investment in climate change adaptation and mitigation projects. However, the Government's decision to issue bonds is just the first step forward. While an appropriate timing and design of these bonds is required to attract investors, a strong financial plan will be needed to ensure timely return of their funds.

- **Private Sector**

Corporate social responsibility remains a deeply controversial issue in business circles. Critics argue that CEOs who want to support social initiatives should use their own money, not that of shareholders. In their view, CSR is a stealth tax that starves the value-creation process of capital. If we want to redistribute wealth, they say, let's wait until the wealth has been created.

Proponents contend that CSR itself is a wealth-creating opportunity. A company with environmentally friendly practices, they believe, may take in extra revenue from consumers who applaud their position. It may attract idealistic employees who will work especially hard or accept lower pay. Its initiatives may generate subsidies or tax credits. And its capital costs may be lower than average because investors who value its environmental rating will be satisfied with more-modest returns.

However, it's hard to show that companies do generate new revenue or have lower labor costs because of any given CSR practice. There's also no conclusive evidence that capital costs are reduced, although this may be because the long-term data needed for a meaningful analysis are difficult to obtain. Indeed, one reason the debate rages on is that neither side can prove its case.

Rather than engaging in this unwinnable argument, managers should turn to innovative financing techniques and a new class of assets to fund CSR projects. Instead of requiring all shareholders to contribute to CSR investments, they should use capital only from investors who opt in, with the understanding that the objective is not simply to make money but also to do good. The prices of these assets would therefore be set by investors who are fully aware that they might see lower returns.

The suggested alternate source of financing could be the **Climate Themed Bonds**. Also the Ministry of Corporate Affairs has notified Section 135 and Schedule VII of the Companies Act 2013 as well as the provisions of the Companies (Corporate Social Responsibility Policy) Rules, 2014 to come into effect from April 1, 2014. With effect from April 1, 2014, every company, private limited or public limited, which either has a net worth of Rs 500 crore or a turnover of Rs 1,000 crore or net profit of Rs 5 crore, needs to spend at least 2% of its average net profit for the immediately preceding three financial years on corporate social responsibility activities.

Since **environmental sustainability** falls under the CSR initiatives, thus the hypothesis can be proposed, of issuance of climate themed bonds by corporation, and the funds raised to be used in green initiatives undertaken by them for environmental sustainability. However, the acceptance of this alternate financing technique would depend on investors' perception hugely.

6.3.4 Buy Side Perspective

To access the deepest pools of capital managed by institutional investors, climate bonds will need to be simple, transparent, comparable and liquid, and must hold an investment-grade credit rating.

The first climate bonds should target investors with a socially responsible investment mandate that may be willing to compromise on some financial aspects of the investment in return for assured environmental and social returns.

Adopting a tranche (i.e. segmented) structure would enable climate bonds to attract multiple types of investors at the same time, each with different requirements for risk, financial returns, and social and environmental returns. Governments of donor countries can incentivize investors by providing tax breaks on climate-friendly investments such as climate bonds.

Core considerations for prospective investors in climate bonds will mirror those for any other bond: returns, risk and liquidity. Different types of investors, however, will have different requirements in relation to those considerations, and some will include requirements for social and environmental returns on their investment in climate bonds. Ultimately, climate bonds should be mainstream and attractive to institutional investors. The early climate bonds, however, will need to target more niche investors.

- **Impact investing**

Impact investing is an emerging asset class that describes investors seeking to create positive social and/or environmental impact beyond financial returns. There are around 100 active impact investment funds, catalyzing a market that could grow to US$500 billion or more of assets under management in the current decade, which would provide a significant pool of finance that climate bonds could attract. As opposed to other investors, impact investors are often willing to compromise on the financial attributes of an investment in return for the social or environmental return they seek to create.

A brief survey of private investors' perceptions of climate bonds indicated that when considering investing in such bonds, they might be willing to compromise on the return, risk and liquidity of that investment compared to a benchmark. They are not willing to compromise on their preferred maturity or the assurance of environmental benefits.

FEATURE	PREFERENCE	COMPROMISE?
Maturity	≤ 10 years	No
Credit Rating	≥ A–	Yes
Interest Rate	Comparable to benchmark	Yes
Liquidity	Narrow daily spreads	Yes
Environmental Benefits	Assured	No

Private investors' desired features of a green bond and willingness to compromise on those features.

The two most important barriers for private investors' involvement in impact investing are low awareness of the investment opportunities and the short track-record of such products meaning the asset class is unproven in their eyes. The third most important barrier is high specific risks, such as emerging market risk.

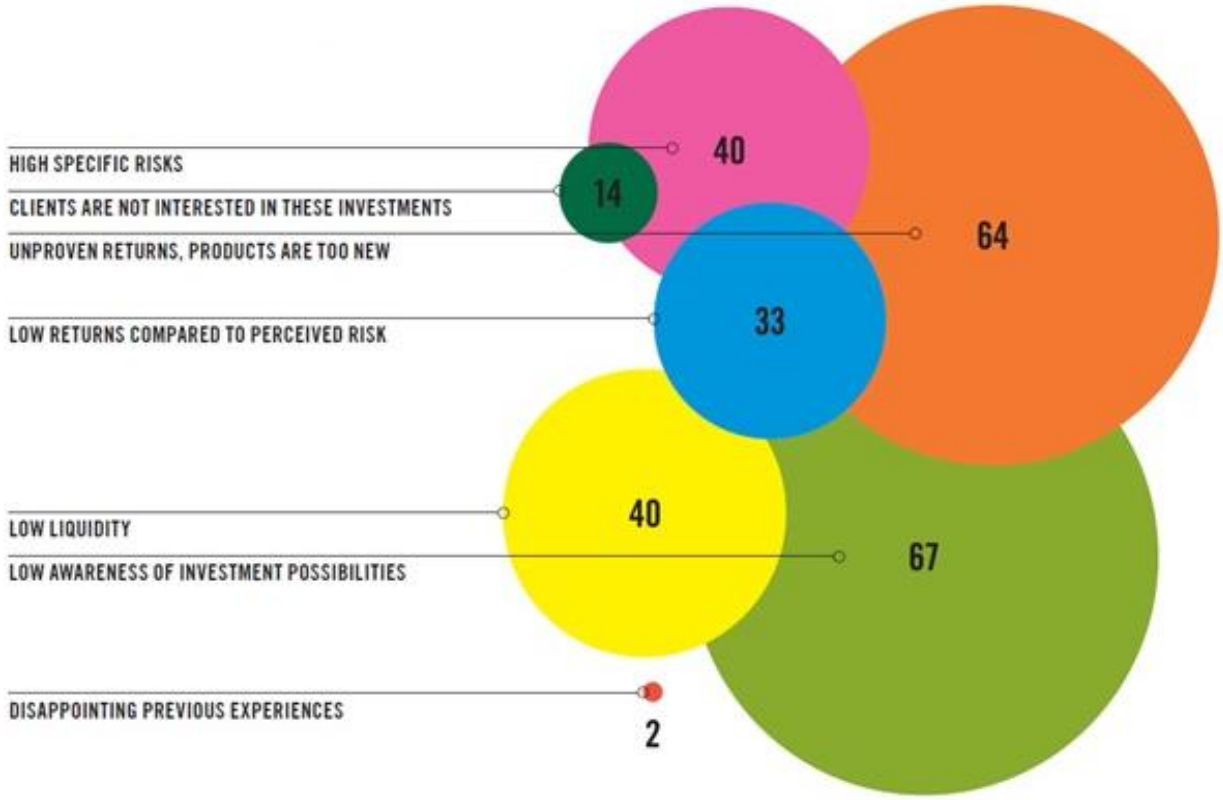
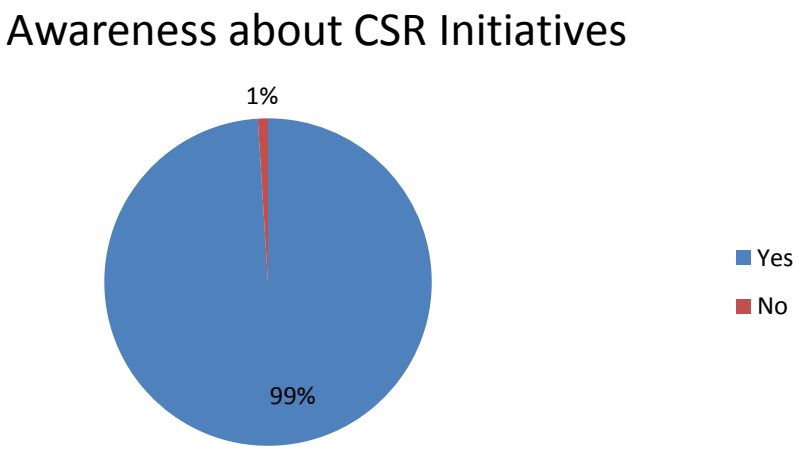


Figure: Barriers to private investors' involvement in impact investing (percent of respondents that ranked the importance of a given barrier as 4 or 5 on a 5-point scale)

- **Retail Investors:**

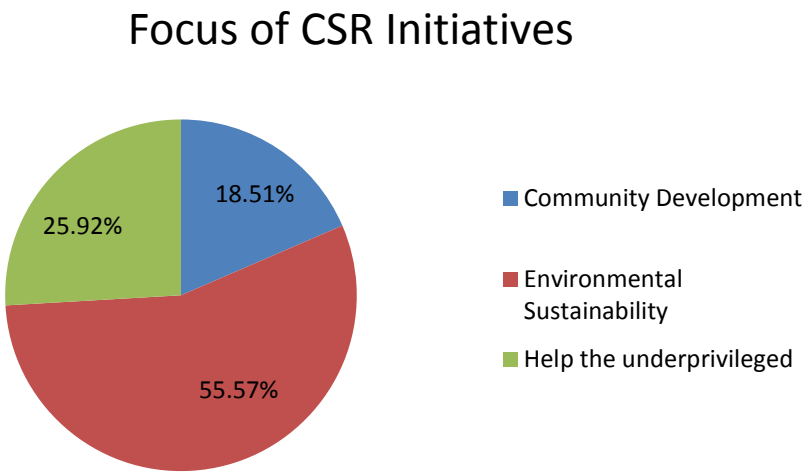
A survey, with sample size of 50 was conducted, as part of the study undertaken, and its analysis was done using percentage method. Based on the analysis, following inferences could be made:

- **Awareness and acceptance among investors, of the Corporate Social Responsibility (CSR) Initiatives undertaken by a firm:**



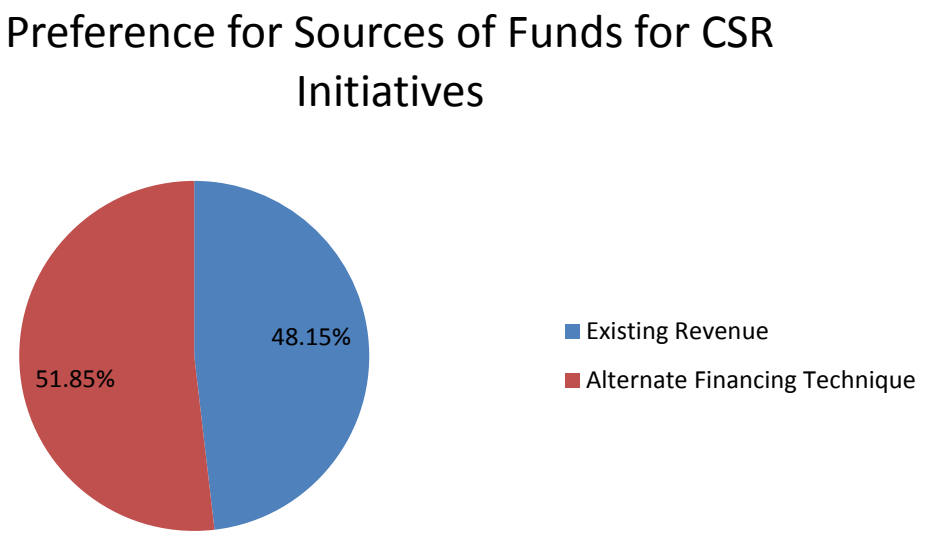
It shows the almost all investors are well aware of the CSR initiatives undertaken by the firms.

- **Main focus of the CSR initiatives should be:**



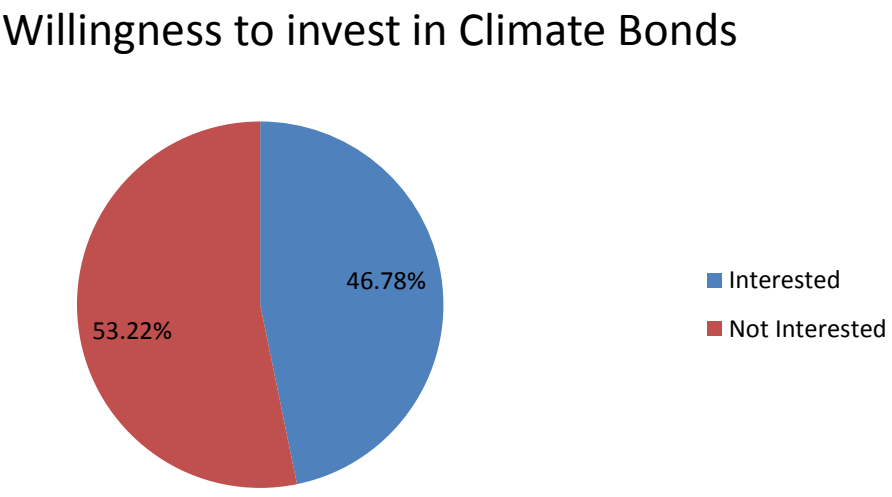
According to the sample, most emphasis must be paid to environmental sustainability, while the firms are undertake CSR initiatives. The emphasis on environmental sustainability focuses on investors' support on low carbon economy.

- **Preference between alternate financing techniques and utilization of existing revenues of the company for CSR initiatives:**



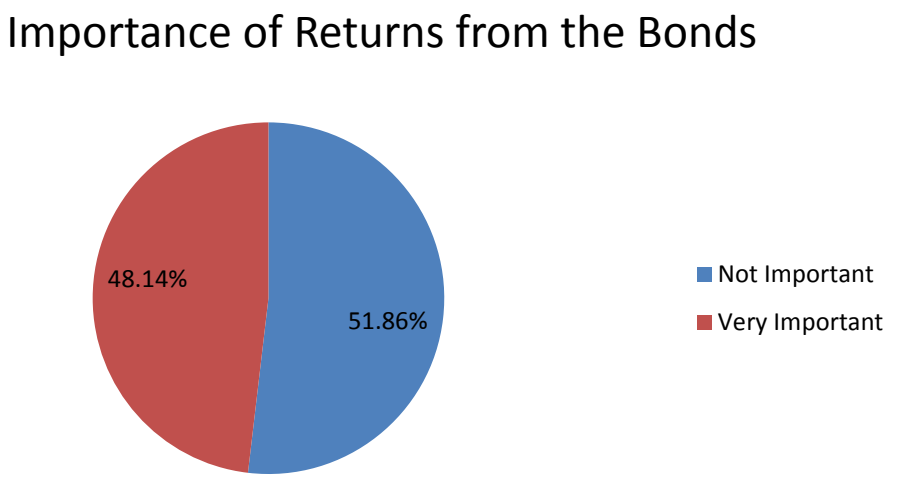
Most of the investors believe that alternate sources of financing should be used to fund the CSR initiatives. This can help us in proposing the new instrument, Climate Themed Bonds to the investor, as the alternative source of fund.

- **Investors willing to invest in bonds, issued for raising funds for CSR initiatives:**



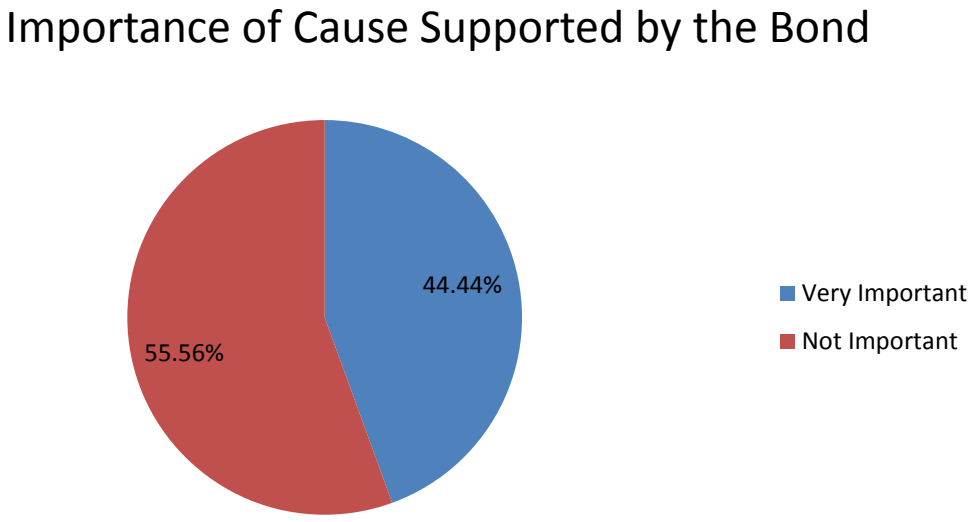
The analysis depict, a fair proportion of investors would be interested if given an alternative of Climate Themed Bonds, to raise funds for CSR initiatives. Since the instrument is new, and interest by almost half the sample, is a good indication for the niche market. It also depicts, with the bond's market development, the acceptability and liquidity would also increase.

❖ **Importance of returns from the bonds to investors:**



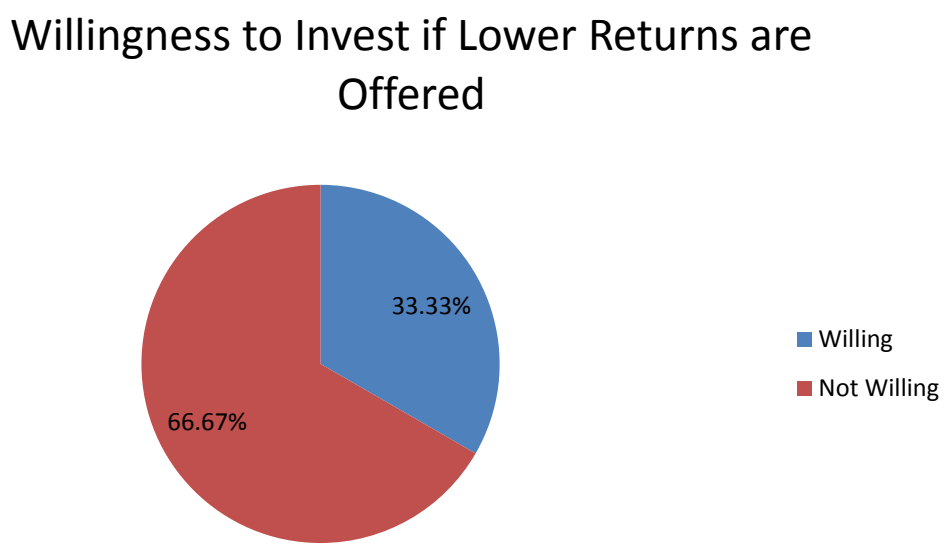
Unlike Impact Investors, the returns matter more to the retail investors, who perceive bonds as fixed income instruments.

❖ **Importance of the cause the bond being issued is supporting:**



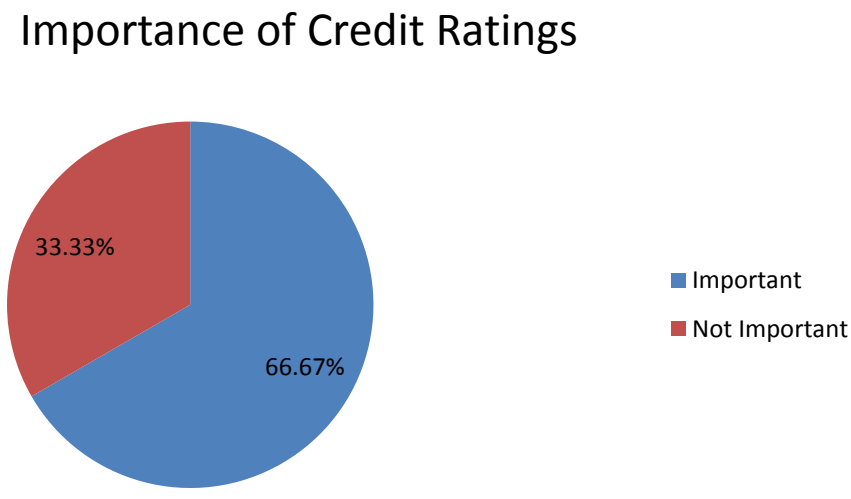
The retail investors are motivated by the cause to a great extent, which is indicative of willingness to invest in the initiative underlying the issuance of the bonds.

❖ **Willingness to invest if climate bonds offer lesser returns than other bond:**



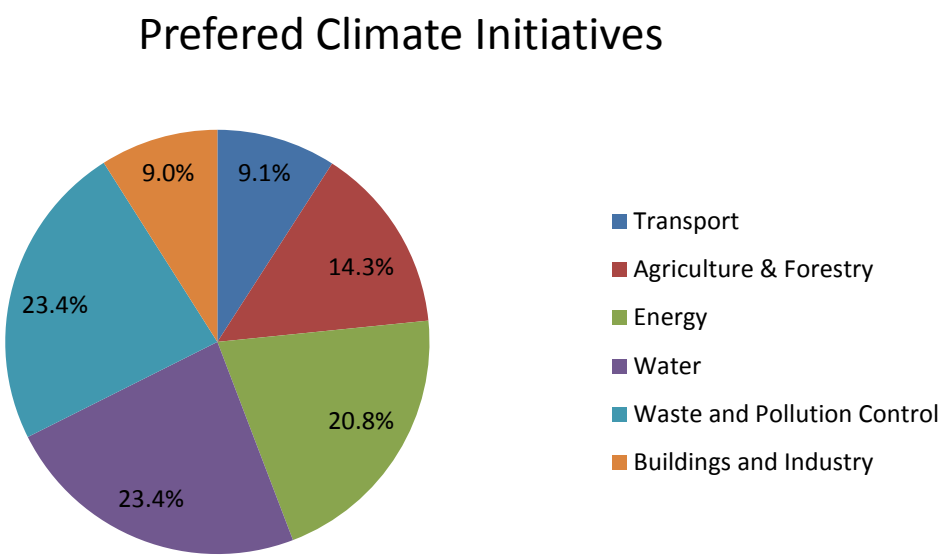
The responses indicates the mandate that must be embedded with Climate Bonds, for acceptance, as the bonds will be accepted by retail investors when it provides comparable returns like other bonds being issued by the corporations.

❖ **Importance of credit rating in making investment decision:**



Another mandate for success of the Climate Themed Bonds is the credit ratings assigned to it. The bonds should be investment grade bonds, which bear low risk of default, thus ensuring high credit quality, thereby gaining investors' confidence.

❖ **The preferred climate initiatives include:**



The responses depict that Water and Waste & Pollution Control are identified as areas of most concern of the investors. Thus debt rose to support these initiatives, could gain higher momentum as compared to others, and would attract more investors.

6. Suggestions and Conclusion

- Entrench Standards for what is climate or green as mainstream investors require both liquidity and commoditized products in order to participate in this market. The industry backed Climate Bond Standard has the potential to scale up the market by standardizing and commoditizing climate products.

- Green securitization of operating assets will help aggregate a fragmented renewable energy market to meet the needs of institutional investors. This will involve appropriate regulatory measures and support by developing banks to help kick start markets.

- Climate bonds should be simple, transparent, comparable and liquid, and must hold an investment-grade credit rating.

- The first climate bonds should target investors with a socially responsible investment mandate that may be willing to compromise on some financial aspects of the investment in return for assured environmental and social returns.

- Adopting a tranche (i.e. segmented) structure would enable climate bonds to attract multiple types of investors at the same time, each with different requirements for risk, financial returns, and social and environmental returns.

- Governments of donor countries can incentivize investors by providing tax breaks on climate-friendly investments such as climate bonds.

- The most important barriers for private investors' involvement in impact investing are:
    - Low awareness of the investment opportunities,
    - Short track-record of such products meaning the asset class is unproven in their eyes.
    - High specific risks, such as emerging market risk.

- Climate bonds should be mainstream and attractive to institutional investors. The early climate bonds, however, will need to target more niche investors.

Thus the issuance of bonds directly addresses the concerns of time and scale, enabling issuers to raise large-scale finance now that will be repaid by existing and anticipated future income. Importantly, bonds are also a familiar and proven mechanism for leveraging private-sector finance; they have been used to finance public-private partnerships around the world that have invested in infrastructure, development and health.

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8. Annexure: Questionnaire

Climate Themed Bonds: An initiative for low carbon economy

The survey evaluates customer's responsiveness and acceptance to new debt raising instruments, for funding various green initiatives, by the corporations.

* Required

Name *

Age *

Gender *

- Male
- Female

Profession *

Are you aware of various Corporate Social Responsibility (CSR) initiatives taken by firms? *

- Yes
- No

Do you think firms should undertake CSR initiatives? *

- Yes
- No

According to you what is most important aspect of CSR initiatives? *

- [ ] Community Development
- [ ] Environmental Responsibility
- [ ] Help underprivileged (poor) segment of society

What could be better financing techniques for the initiatives? *

- [ ] Revenues of the company
- [ ] Issuing specific debt instruments for the initiatives

How often do you invest in bonds? *

	1	2	3	4	5	
Very rarely	○	○	○	○	○	Very often

Would you like to invest in bonds, issued for raising funds for CSR initiatives? *

	1	2	3	4	5	
Most unlikely	○	○	○	○	○	Most likely

How important is the returns factor (income) from these climate themed bonds to you? *

	1	2	3	4	5	
Least important	○	○	○	○	○	Most important

How important is the cause (Green Initiative) supporting the issuance of the bond, to you as an investor? *

	1	2	3	4	5	
Least Important	○	○	○	○	○	Most Important

Would you invest in these bonds if they offer lesser returns compared to normal bonds, but support a Green initiative? *

	1	2	3	4	5	
Most unlikely	○	○	○	○	○	Most likely

How important is the credit rating of the bond, in making your investment decision? *

	1	2	3	4	5	
Least Important	○	○	○	○	○	Most impotant

Which green initiatives would you like to support by investing in these bonds? *

- ☐ Transport
- ☐ Agriculture and Forestry
- ☐ Energy
- ☐ Water
- ☐ Waste and Pollution Control
- ☐ Buildings and Industry