Bonds and Climate Change
The State of the Market in 2015

$597.7 Billion Climate-Aligned Bonds Universe

Prepared by Climate Bonds Initiative.
Commissioned by HSBC.

PLUS: Green Bond Market Update
Climate-aligned bonds total $597.7bn

LARGE LIQUID UNIVERSE OF CLIMATE MITIGATION AND CLIMATE RESILIENCE INVESTMENTS EXIST TODAY

Climate investment opportunity
1. Grabbing the upside: the investment opportunities in low carbon and climate resilient infrastructure are enormous.

The International Energy Agency estimates that the cumulative investment in energy supply and efficiency to get the world on a 2 degree track is $53bn.

When you add needed investments in climate resilience it is clear there are investment opportunities in all asset classes, sectors, industries, countries and currencies. The good news is that it is not a choice between investing for growth and investing for climate. Irrespective of the climate challenge, the next 15 years will not be business-as-usual: it is expected that the global economy will increase by 50%, a billion people will move to cities, mainly in emerging markets, and technology will continue to disrupt!

2. Avoiding the downside: climate risks
We must grab low carbon investment opportunities, not just because they are financial opportunities, but to avoid the alternative scenario of 4 degree warming by 2100.

For investors, climate change is no longer an uncertainty: they are not yet equipped to deal with, but a risk they can and should address.

3. Urgency of investment
The cumulative nature of the climate problem means investing now is crucial: the longer we wait to invest, the longer before emission reducing projects are on the ground, the more likely that we are not able to avoid the downside of climate risks.

We will then face natural tipping points, where changes in the climate system lead to further increases in emissions or temperature. This adds to the urgency.

Climate Bonds Taxonomy
www.climatebonds.net  July 2015

The largest theme in the $597.7bn climate-aligned universe continues to be Transport with $418.8bn bonds outstanding since January 1, 2005. Rail accounts for 95% of this, largely from state backed entities.

Energy ($118.4bn) is the second largest sector, with 20% of the universe. This theme is comprised of a range of renewable energy power producers including hydropower, wind, solar, bioenergy, geothermal and nuclear (ps). Buildings and Industry ($316bn) is the third main theme and has captured the attention of the labelled green bond market in the past year.

The remaining themes, Water ($2.2bn), Waste & Pollution ($7.1bn), and Agriculture & Forestry ($2.3bn), are crucial investment areas for climate adaptation. These will require scaling up if we are to address the climate risks of food supply, flooding, water scarcity, and health issues, such as pollution.

Multi-Sector ($28.2bn) are all labelled green bonds issued that finance a range of assets across the six themes. This is a change compared to previous years as such bonds had been classified in a separate Finance theme. In this report, entities financing one theme, such as Eurofima, which only finances rail, are classified to the relevant theme.

Bonds that finance a range of projects across the six themes and are not dominated by one theme remain in Multi-Sector.

The climate-aligned universe has increased by $95bn since the 2014 report. Almost a third (32%) of the increase came from the rapid growth of the labelled green bond market (additional $30.6bn of green bonds). Unlabelled climate-aligned bond financing rail in China, India, France, South Korea and the UK contributed another 40% of the increase.

The climate-aligned universe has a range of maturities. The majority of outstanding issuances have tenors over 10 years. This reflects the long-term nature of climate assets such as rail infrastructure bonds.

As in previous years the majority of climate-aligned bonds, $523.5m, are investment grade (BBB or above). Climate-aligned bonds are denominated in 37 different currencies. Chinese yuan (CNY) denominated bonds account for $197.7bn of the universe, due to Chinese rail and hydro bonds. Other currencies represented include US dollars ($124.8bn), Euros ($111.3bn) and Sterling ($51.9bn).

Over 400 issuers with bonds outstanding are fully aligned with the CBI taxonomy. To provide a snapshot view of the market we gathered all outstanding bonds (as of June 10 2015) issued after January 1 2005. We also identified unlabelled project bonds and asset backed securities backed by climate-aligned assets.

LABELED GREEN BOND UNIVERSE
In addition to those unlabelled bonds there are the labelled green bonds with a defined use of proceeds. Labelled green bonds earmark 100% of the proceeds of the bond sale for projects or assets that fit within the Climate Bonds Taxonomy.

These bonds are, by the fact of labelling, easier to locate. Climate Bonds Initiative tracks the bond sale for projects or assets that fit within the Climate Bonds Taxonomy.

Labelled green bonds issued that finance a range of projects or assets that fit within the Climate Bonds Taxonomy.

Climate-aligned bonds have long tenors, reflecting the length of climate projects, and offer a range of investment ratings

This fourth edition of the report continues to focus on sizing the climate investment opportunity in the $3100bn global bond market.

Since the first Bonds and Climate Change: State of the Market report in 2012 there has been a huge growth in labelled green bonds. Equally there remains a large unlabelled universe of climate-aligned bonds available for investment now. For the purposes of this report the total climate-aligned bonds are both labelled green bonds (with defined use of proceeds) and unlabelled bonds issued by climate-aligned entities.

We estimate the universe of climate-aligned bonds outstanding to be $597.7bn. The universe is made up of 2,769 bonds from 407 issuers. These bonds span across six climate themes; Transport, Energy, Buildings and Industry, Agriculture and Forestry, Waste and Pollution, and Water.

UNLABELLED CLIMATE-ALIGNED BOND UNIVERSE
We identified bonds with proceeds financing climate-aligned assets.

We screened the Bloomberg data universe and reviewed approximately 1400 companies to identify those with over 95% revenues from climate-aligned assets. The Climate Bonds Taxonomy provided the definition of climate-aligned used in the analysis.

Largest theme in the $597.7bn climate-aligned universe continues to be Transport with $418.8bn bonds outstanding since January 1, 2005. Rail accounts for 95% of this, largely from state backed entities.

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Transport and Energy remain the dominant themes in the climate-aligned bond universe

### Transport

<table>
<thead>
<tr>
<th>$19.6bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>55% Unlabelled</td>
</tr>
<tr>
<td>45% Labelled</td>
</tr>
</tbody>
</table>

83 Issuers  
Largest issuer China Railway Corp ($171.5bn)

Rail continues to dominate the Transport theme, with smaller issuances for electric vehicles and bicycle manufacturing. China Rail remains the largest issuer of any climate-aligned entity. European rail entities Eurofima ($4.6bn), France’s SNCF ($11.0bn) and UK’s Network Rail ($4.1bn) were also significant issuers. However, it’s not all rail — there are other sub-sectors to the Transport theme including finance for electric vehicles, buses and bicycles. Issuers like Tesla and Excon are developing electric cars while Chinese company Chauwei Power develops electric bike batteries. Push bicycle manufacturers such as Ideal Bike Corp, Sun Race and Xhejiz also make up a small part of the theme. Transport for London issued a labelled green bond in 2015 for a range of public transport infrastructure projects (rail, bicycle and bus).

### Waste and Pollution

<table>
<thead>
<tr>
<th>$7.1bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>87% Unlabelled</td>
</tr>
<tr>
<td>13% Labelled</td>
</tr>
</tbody>
</table>

19 Issuers  
Largest issuer European Investment Bank ($9.6bn)

Recycled material issuers account for 83% of the Waste and Pollution theme. Other large corporates are Darling Ingredients ($0.5bn), which recycles fat and cooking oil to make feed products and Swedish BillerudKorsnäs ($0.3bn), producer of fibre-based renewable packaging. The first ever labelled green bond in the Waste and Pollution theme was issued in 2015 by French recycling corporate Paprec ($0.5bn).

### Buildings and Industry

<table>
<thead>
<tr>
<th>$418.8bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>99% Unlabelled</td>
</tr>
<tr>
<td>1% Labelled</td>
</tr>
</tbody>
</table>

1012 Bonds  
Largest issuer China Railway Corp ($171.5bn)

Energy efficiency, energy efficient appliances and lighting, LEDs, Energy Service Companies (ESCOs) and low carbon buildings are the key sub themes in Buildings and Industry. LG Electronics, the largest issuer in this theme, has almost all of its product range certified with the Energy Star label. Labelled green bonds now account for 45% of the Buildings and Industry theme, with European real estate corporates and US State universities being the main issuers. The low carbon buildings have a certification from LEED, BREEAM or an equivalent. In 2015 Climate Bonds launched the standard for low carbon buildings. ANZ Bank was the first to issue a green bond ($0.5bn) certified under the property standard in late May 2015.

### Energy

<table>
<thead>
<tr>
<th>$118.4bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>81% Unlabelled</td>
</tr>
<tr>
<td>19% Labelled</td>
</tr>
</tbody>
</table>

205 Issuers  
Largest issuer Hydro Quebec ($15bn)

Energy is the most diverse theme with large hydro issuers adding size to the many smaller solar and wind issuers. Hydropower is the largest sub sector of the Energy theme with $40bn outstanding from a range of countries including China. Bonds financing nuclear power are $7bn of the total. Nuclear is included because it’s low carbon, though controversial for certain investors. Labelled green bonds contribute 19% to the theme with banks such as Bank of America Merrill Lynch ($1.1bn), NAB ($0.2bn) and DNB ($0.1bn) issuing green bonds to refinance renewable energy loan portfolios. The largest corporate green bonds so far in 2015 are both in the Energy theme: TenneT Holdings ($1bn) and Terraform ($800m).

### Agriculture and Forestry

<table>
<thead>
<tr>
<th>$3.2bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% Unlabelled</td>
</tr>
<tr>
<td>98% Labelled</td>
</tr>
</tbody>
</table>

16 Issuers  
Largest issuer Neder Waterschapsbank ($0.7bn)

Largely untapped Agriculture and Forestry theme is dominated by certified forests. Sustainable forestry, meaning the cultivation of certified forests, accounted for 82% of the theme. A secondary theme is sustainable paper production with 11%. This area remains largely untapped. Climate Bonds Standard for agriculture, land use and forestry is under development and will guide issuers in the area on how to issue climate-aligned bonds.

### Water

<table>
<thead>
<tr>
<th>$100.0bn Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Unlabelled</td>
</tr>
</tbody>
</table>

881 Bonds  
Largest issuer Hydro Quebec ($15bn)

The trend in the US of labelling municipal water bonds as green has dramatically increased the size of the water theme. Following the success of municipal water utility DC Water ($0.4bn) last year, other US municipalities have issued labelled green bonds under the Water theme. Proceeds from these bonds have been used for climate change adaptation purposes, such as widening storm water tunnels, as well as efficiency in wastewater treatment.

Issuers of unlabelled climate-aligned bonds have the potential to start issuing labelled green bonds.

A market leader here has been wind power company Vestas. Vestas has been part of the unlabelled climate-aligned universe in past years but in 2015, for its new issuance, it chose to label the general corporate purpose bond as green.

Solar energy, rail, water, forestry and many other companies with qualifying assets and projects could do the same in 2016, taking advantage of the marketing benefits of the green label, winning new investors, reinforcing investor loyalty, and being seen to be part of a larger, more liquid bond universe.

Companies just have to track and be able to report annually on qualifying assets, and get a certification or credible independent review. Simple.
Many opportunities for investors in the universe

This section examines investment opportunities within the climate-aligned universe. The key areas of opportunity are the mainstream index filtered universe, labelled green bonds and asset backed bonds.

**Labelled Green Bonds Market $65.9bn (see page 8)**

The size of the labelled green bonds universe has been growing rapidly since 2013. On June 10 2015 it stood at $65.9bn. This began as an issuer-labelled market, but rules and standards are gradually emerging through initiatives such as the Green Bond Principles, the Climate Bonds Standards and China’s central bank green bond guidelines.

**Project Bonds & Asset Backed Securities $13.9bn**

Climate-aligned asset backed bonds, such as project and securitised bonds, that provide investors with exposure to the performance of the underlying projects or assets, mainly consists of renewable energy projects.

In 2015, a series of solar and wind project bonds have been issued. One example is Solar Star Funding, which issued a $325m project bond, the second tranche of the $1bn 2013 bond, backed by 567MW solar projects in California. Other examples of project bonds are in the table below.

*S&P DJI Indices launched a Green Project Bond Index in 2014. This index enables investors to locate labelled green or unlabelled climate-aligned project bonds or ABS and improves the understanding of their performance.*

ABS and project bonds, though important, are on a much smaller scale than the corporate, municipal, bank and development bank bonds that comprise the rest of the climate-aligned universe.

Corporates account for 74% ($443m) of the climate-aligned universe. Other issuer types may have climate-aligned assets funded by some of the proceeds of their bonds as well, but without these issuers committing to use proceeds only for green and labelling the bonds as green accordingly, it is unknown to what extent these bonds are climate-aligned.

**Mainstream index filtered $266.3bn (see page 7)**

Rules for mainstream indices influence the investment options of mainstream investors. These indices have requirements on the ratings (investment grade only), size (minimum $200m) and currency denominations (mainstream currencies) of bonds. For more detail on the criteria for indices and analysis of this sub-section, which is 45% of the overall universe, see page 7.

**Mainstream indexes play an important role in investment management and determining what bonds mainstream investors invest in**

Investors use indexes extensively in managing funds on behalf of asset owners. In active mandates indices are used to measure performance, and passive mandates track indices. Typically, mainstream indices have rules for inclusion around the rating, currency and size of bonds. We have applied the following mainstream index filters to the climate-aligned universe:

- investment grade (BBB or above)
- currencies eligible for benchmarks/indices
- $200m minimum issuance size
- $266.3bn of the climate-aligned bond universe complies with these mainstream index filters. Looking within these filters, fund managers investing in mainstream indices can invest now in a range of climate-aligned bonds in the Transport, Energy, Buildings and Industry, Waste and Pollution, Water, and Multi-Sector themes. Agriculture and Forestry is the only theme that is not represented in the mainstream index filtered universe. The majority of bonds are investment grade in this theme, but too small to meet the $200m minimum.

**A mix of investment grade ratings are available within the mainstream index filter**

Similar to the composition of the full universe, Transport is the largest theme because of highly rated government-backed rail bonds (with the majority rated AA). This differs from the second biggest theme, Energy, which has a more even distribution across the investment grade ratings (AAA to BBB).

Development banks with AAA ratings account for the majority of the Multi-Sector, with the remaining bonds issued by municipalities with ratings of A or above. In contrast, the Buildings and Industry theme has more corporates and few government backed entities, and rating tends to sit lower at A or BBB. Waste and Pollution is also mainly corporate issuers with lower ratings.

The largest currencies represented in the mainstream index filtered universe are US dollars ($90.6bn) and Euros ($83.9bn). This reflects the denominations of indexes. Other currencies include British sterling, Canadian dollars, Russian rubles, Australian dollars and Swiss Francs—a total of 11 currencies. 

**Non-mainstream index currencies**

In addition to the 11 mainstream index currencies in the filtered universe, there are a further 26 currencies represented in the wider climate-aligned universe. This provides opportunity for investors seeking currency diversification or investors located in emerging markets that want to invest in domestic currencies. For example the Chinese yuan (CNY), which is not included in the mainstream index filter, has $197.7bn climate-aligned bonds outstanding for investment. These CNY climate-aligned bonds are predominantly financing rail and hydro power infrastructure projects. Similarly the State Railway of Thailand has $3.1bn outstanding in Thai Baht.

**Sub-investment grade**

5% of the full climate-aligned universe is sub-investment grade and 7% is not rated. These climate-aligned bonds are distributed across the main themes with the exception of Multi-Sector which only comprises investment grade bonds.

Examples from the sub-investment grade climate aligned universe are rail bonds from Metro Lisboa ($1.8bn, BB), and French labelled green waste bonds from Paprec ($522.6m, B). The Energy theme has a mix of project bonds (CRC Briere $389m, B), yieldcos (Abengoa $634.7m, B), and corporates (Infinis $543m, BB).

**Range of ratings available for climate-aligned bonds filtered by mainstream index-type rules**

<table>
<thead>
<tr>
<th>Rating</th>
<th>AAA</th>
<th>AA</th>
<th>A</th>
<th>BBB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>45.9</td>
<td>72.0</td>
<td>18.0</td>
<td>47.2</td>
</tr>
<tr>
<td>Energy</td>
<td>5.6</td>
<td>3.0</td>
<td>25.5</td>
<td>13.2</td>
</tr>
<tr>
<td>Multi-Sector</td>
<td>18.2</td>
<td>1.8</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Buildings &amp; Industry</td>
<td>0.4</td>
<td>1.6</td>
<td>2.9</td>
<td>6.5</td>
</tr>
<tr>
<td>Agriculture &amp; Forestry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste &amp; Pollution Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>70.1bn</td>
<td>79.4bn</td>
<td>47.4bn</td>
<td>69.4bn</td>
</tr>
</tbody>
</table>

**Over half of the index filtered universe is denominated in US dollars or Euros**

**Opportunities outside the mainstream index filter $331.4bn (see page 7)**

Investors are not only interested in bonds inside these mainstream index filters. Emerging market, private placement and high-yield investors are seeking bonds with different profiles.

**The climate-aligned universe is diverse and is accessible for all these types of investors.**

**Climate-aligned bonds universe $59.7bn**

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>SIZE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hallett Hill</td>
<td>$99m &amp; A3/7m</td>
<td>Open 34 wind turbines in Adelaide, Southern Australia. DNV GL second review.</td>
</tr>
<tr>
<td>Gwynt y Mor OFTO Plc</td>
<td>$325m</td>
<td>Transmission link for Gwynt y Mor the second largest offshore wind farm in the world. EIB project bond credit enhancement.</td>
</tr>
<tr>
<td>Energía Eólica S.A.</td>
<td>$204m</td>
<td>2 wind projects in north-western Peru with a combined capacity of 114 MW.</td>
</tr>
</tbody>
</table>
Green bond market continues to grow in size and diversity

Massive growth of the labelled green bonds market with $65.9bn outstanding by June 2015 - with greater diversification in issuance

- Total labelled green bonds outstanding were $65.9bn per June 10 2015. In 2014, the market grew rapidly, with issuance of $36.6 billion of green bonds - a tripling of the $11bn issued in 2013. So far in 2015, we have seen issuance of $14bn. Issuance is expected to ramp up to the second half of 2015 with the build up to the UN Climate Conference in Paris at the end of the year. The Climate Bonds Initiative expects total 2015 issuance to reach $70bn., with a stretch target for $100bn of issuance. Bloomberg New Energy Finance (BNEF) estimates $80bn of issuance, and Swedish bank SEB, estimates issuance to hit $70bn.

Broad range of yields and currencies

To a grow a deep and liquid green bond market we need to scale up issuance but also to diversify in currencies and ratings.

- 23 different currencies represented

The bulk of labelled green bond issuance continues to be in US dollars and Euros, but the development banks have increasingly been issuing smaller labelled green bonds in a range of currencies including Turkish Lira, Brazilian Reals and Indian Rupees. So far, labelled green bonds have been issued in 23 currencies.

High-yield green bonds

A subset of the market is high-yield (non-investment grade) green bonds. The first high-yield green bond was issued by NRG Yield in August 2014 for $500m. Since then, Abengoa Greenfield, Paprec and Terraform Power have also issued high-yield green bonds.

- Labelled green bond currencies

Corporate and municipal green bonds have become a key part of the market

- Corporate
- Municipal
- Development Bank

Types of issuers

- Development bank green bonds
  - The largest issuers of labelled green bonds to date are the European Investment Bank ($31.6bn) and the World Bank ($18bn), with German development bank KfW ($4bn) propelling to third place after several large issuances in 2014 and 2015.
  - Asian-based development banks have also issued labelled green bonds in the past year including the Asian Development Bank ($500m and $3.2bn) and the Development Bank of China ($250m).
- Municipal green bonds
  - The US municipal green bond market heated up in mid-2014 with two key themes; green property for universities and sustainable water projects.

- Corporate green bonds

Overall corporate issuance has increased, although early corporate bonds issued by GDF Suez (March 2014, $2.5bn) and EDF (November 2013, $1.4bn) have not been exceeded in size in the past year. More new issuers have entered, but they are bringing relatively smaller bonds (less than $1bn) to market.

In 2015, corporate bonds have moved beyond the utilities and real estate sectors to include transport and waste, with a €200m green bond from Transport for London and a €40bn issuance from French recycling company Paprec.

In May 2015, we have seen $8bn of issuances, including a $1bn issue from the Climate Bonds Initiative and supporting the green bonds market. In 2015 public pledges came from Zurich Insurance, Deutsche Bank treasury, ANZ, Barclays Treasury and ACTIAM to build €1bn green bond portfolios. This sends an important signal of investor demand to the market.

In December 2014 an investor statement brought together by Climate Bonds Initiative and supporting the green bond market, was signed by asset owners and fund managers with a combined $2.62 trillion assets under management. This was followed in 2015 with another investor statement setting out expectations for the green bond market by CARE, Investor Network on Climate Risk and signed by 26 investors.

Finally, there are increasing numbers of specialised green bond funds looking to invest in green bonds. Swedish insurance company SPP, SEB Asset Management, Nikko Asset Management, BlackRock, Calvert, Shotton Capital Management and State Street all manage green bond funds.

Majority of green bond proceeds are allocated to renewable energy and low carbon buildings

Green bonds make it easier for investors to identify climate-aligned bonds

- Comparative pricing to non-green bonds from the same issuer
- Easy to discover for green investors as labelled

FEATURES OF LABELLED GREEN BONDS

Earmarking proceeds for eligible green projects

Green bonds make it easier for investors to identify climate-aligned bonds

After private university Massachusetts Institute of Technology (MIT) issued its green bond ($370m) to refinance green buildings in September 2014, other public universities such as Cincinnati ($30m), Indiana ($59m), Arizona ($183m) and State of Virginia ($98m) issued green bonds with proceeds for green buildings.

Similarly, after the municipal utility DC Water’s $350m bond in June 2014, a number of states issued green water bonds including; Indiana ($204), Chicago ($225m) and Iowa ($321.5m).

- European cities and municipalities are also issuing green bonds. After Île-de-France and Gothenburg entered the market in 2012 and 2013, Europe has seen a steady growth in municipal green bonds, with repeat issuances and new entrants.

Commercial bank green bonds

Credit Agricole was an early issuer of green bonds responding to demand from the Japanese private placement market, and was the first bank to get a second review (p 11) on its green bond framework, in early 2015.

Other bank green bonds, such as DNB, Bank of America, NAB, Yes Bank and ANZ, are using proceeds to finance a mixture of renewable energy, such as solar, wind and hydropower projects, and energy efficient property. NAB (A$300m), ANZ (A$600m) and ABN AMRO’s (€500m) labelled green bonds were certified against the Climate Bonds Standard (p 11).

Investor demand is strong

The investor appetite for labelled green bonds is responding to demand from investors looking to invest in green bonds. Swedish insurance company SPP, SEB Asset Management, Nikko Asset Management, BlackRock, Calvert, Shotton Capital Management and State Street all manage green bond funds.

Green bonds use of proceeds

- Green bonds are use of proceeds
  - https://webapp.sebgroup.com/mbs/research.nsf/ alldoc...
Developments in the green bond market

The **Green Bond Principles** update in March 2015 emphasised the role of assurance of green credentials and annual reporting.

The Principles are voluntary best practice guidelines for labelled green bonds. They focus on transparency of use of proceeds, the process for project evaluation and selection, management of proceeds, and reporting on use of proceeds.

Launched in 2014, by Citi, JP Morgan, Credit Agricole and Bank of America Merrill Lynch, the International Capital Markets Association now hosts the Principles. The Principles are governed by a membership secretariat made up of green bond issuers, investors and intermediaries.

**Sustainability and ESG bonds**

We need non-green companies to grow their green assets. Labelled green bonds can help finance this transition.

A problem some issuers have is limited scale of existing green assets or pipeline of green projects. In this case, a first step towards the market is to issue a sustainability or ESG bond where proceeds finance green assets and non-green assets; similar to the Lloyds and the State of North Rhine-Westphalia mixed bonds. The next step for these issuers is to grow the green assets to the point of issuing fully green bonds.

Multiple green bond indices launched provide a benchmark for investors

Indices make it easier for investors to find green bonds and track performance. Investment products are starting to be designed to raise green bonds and track performance.

**Further growth of green Asset Backed Securities (ABS)**

Following the success in 2013 of Hannover Armstrong’s green ABS, the first municipal ABS came to market in November 2014. Issued by the Hawaii State Department of Business, Economic Development and Tourism (DBEDT), the $350m AAA-rated green ABS was issued in two tranches and backed by a Green Infrastructure Fee, which will be applied to the bills of electricity customers of the Hawaiian state utilities.

Proceeds will go to support the DBEDT’s Green Energy Market Securitisation programme, which will provide loans to consumers to fund the installation of solar PV panels and solar connectors such as storage, advanced inverters and monitoring devices.

First labelled green covered bond from BerlinHyp

The first labelled green covered bond, meaning a bond with dual recourse to the issuer and a cover pool of assets, was issued by real estate and mortgage bank BerlinHyp in May 2015. The €500m bond received a very positive reception, and was four times oversubscribed.

The covered bond market overall is sizeable, with €2,400bn outstanding, real estate accounts for the largest type of assets financed in this market. We expect to see more green covered bonds issued for mortgages for low carbon buildings over the next year.

**Additionality and green bonds**

Proceeds from green bonds can fund new green projects or refinance existing green assets. This has led to market wide discussions on whether additional projects or assets are financed as result of green bonds. This argument and definition of additionally is misleading and one that has spilled over from other asset classes; in particular carbon credits and equities.

Primary, bonds are refinancing tools that allow issuers to fully capitalise from existing assets. This role is crucial in the capital pipeline. In the higher risk structure phase of projects it is important for issuers, equity investors or banks providing loans to know that once operational the asset can be refinanced through bonds.

We need project developers to be confident when investing in the early high-risk stage of projects that green projects can be refinanced easily and potentially at a better price. That is the additionality green bonds can achieve.

**Climate Bond Certification of National Bank of Australia’s $300m green bond**

National Australia Bank (NAB) issued the first **Certified Climate Bond** from a bank. Compliance with the **Climate Bonds Standard** was verified by DNV-GL.

The bond closed in December 2014 after doubling in size on the back of strong investor demand. Proceeds of the $350m bond finance loans to a portfolio of 17 wind and solar energy farms. 14 of these are operational and 3 are under construction. The assets will total an aggregate installed capacity of 1.5 gigawatts of electricity across different states in Australia.

**Climate Bond Certification of Hannon Armstrong’s $100m green bond**

Hannon Armstrong issued the first labelled **Climate Bond** from a US issuer. The bond was verified by DNV-GL.

Proceeds of the $100m bond finance the installation of advanced inverters and other assets as an indicator of the Hawaiian state utilities.

**Second reviews on green credentials are an important intermediary step until standards are up and running**

US issuers reference certified assets (such as LEED rated buildings) as an indicator of the green credentials of the bond. The largest issuer in the market, the European Investment Bank, uses KPMG to provide an external review of allocation of proceeds. CICERO, Vigeo and DNV GL continue to be significant providers of second party reviews. Newcomers in the past year are Oekom, Sustainalytics and KPMG.

Independent second party reviews use a variety of approaches, from checking simple adherence to the Green Bond Principles to applying broader Environmental, Social and Governance (ESG) frameworks. These bespoke reviews help investors to understand green credentials.

As we look to scale the market there is a need for robust green bond standards that make comparisons between bonds easier and that can be assured against by a wide range of verifiers.

**Climate Bonds Certification is Simple ...**

Identify qualifying green projects & assets based on the climate bonds taxonomy.

Get independent verification from an approved verifier. See the full list at http://www.climatebonds.net/verifiers.

Track and report

The value of the assets or projects must stay equal to, or greater than, the amount of the bond. Report each year. For advice on specifics consult the Climate Bonds Initiative.

Approval from the Climate Bond Standards Board. Issue the certified green bond.
Emerging markets are kicking off their green bond markets this year

**INDIA AND CHINA ARE LEADING THE WAY**

Low carbon and climate resilient finance needs to grow fast in emerging markets with huge levels of investment required to ensure their immense demand for infrastructure and growth is aligned with global climate targets.

At the same time, it’s on the agenda for many emerging economies to grow their domestic capital markets, to reduce reliance on bank lending and international markets for their financing needs.

Green bonds allow emerging economies to hit two birds with one stone by facilitating climate investment and the growth of a robust domestic debt capital market.

Emerging market green bond markets need demonstration issuance and liquidity. Development banks like the IFC are expected to play a significant role in this area.

**Brazil: Green Bond Market Development Committee**

Brazil is so far preparing their role in the green bond adventure behind the scenes, waiting out the difficult domestic investment climate. In 2014/2015, they established a Green Bond Market Development Committee, led by FEBRABAN, the Brazilian Association of Banks.

Food producer BRF kicked off the labelled green market in Brazil with the first Brazilian green bond in June 2015. The €500m corporate issue was successfully placed in the European market.

**Mexico: Upcoming labelled green ABS issuance**

Mexico is getting ready to jump in with a green asset-backed securities deal underway. The planned $10bn deal will be backed by energy efficiency loans to small-medium enterprises, credit enhanced with partial guarantees from the Inter-American Development Bank.

**India: First labelled green bonds issued in 2015**

In India, the first corporate green bond emerged from Yes Bank in February 2015. The INR 10bn ($161.5m) bond will finance renewable energy projects.

Following the success of Yes Bank, the Export-Import Bank of India issued a larger $500m green bond. The green bond will finance renewable energy and transport projects.

We had expected China to be first out the gate of the biggest emerging economies, but India beat them to it. Expect a lot more in the coming year.

**South Africa**

South Africa has been a pioneer in green bond issuance, with IDC issuing a green bond in 2012 and Nedbank offering a green retail bond the same year.

June 2014 saw the first emerging market green municipal bond, when Johannesburg issued a R1.4bn ($136m) green bond.

We expect emerging market “Green City” bonds to be a big theme in the coming year, as municipalities seek new ways to finance and green their huge urbanization investment needs.

**China’s policymakers planning to grow a large green bonds market**

China’s State Council has announced it wants to see a labelled green bond market as part of the country’s shift to green development. In China, the world’s third largest bond market, labelled green bonds will be regulated.

In April 2015 ambitious policy proposals emerged from China’s central bank (PBoC). The proposals cover the development of green definitions; an evaluation system for allocation of funds and environmental impacts of green bonds; tax incentives; preferential risk weighting in bank capital requirements; and fast track issuance for green bonds.

The central bank’s green financial bond regulations have already been drafted and will be operational later in 2015. Other Chinese bond regulators will follow suit.

China Industrial bank issued a bond in the green bond style in late 2014. But we expect the first regulator approved green bonds in the second half of 2015.

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**Top 10 countries for climate-aligned bonds**

- **USA** = $51bn
- **India** = $15bn
- **Mexico** = $7bn
- **Brazil** = $3bn
- **South Korea** = $24bn
- **China** = $164bn
- **France** = $49bn
- **UK** = $58.5bn
- **Canada** = $25bn
- **Austria** = $13bn
- **Supranational** = $6bn
- **Others** = 14%

This map shows the $597.7bn climate-aligned universe by country. Supra-nationals represent a further $31.7bn and rest of the World accounts for the remaining $99bn.

**Footnote:** country categories have changed since our last report due to reclassification of bonds issued by development banks at data source to “Supra-national”. Loans of green bonds such as the World Bank, the European Investment Bank and the European Rail funder Eurofima are included in this category rather than their country of registration.

[www.climatebonds.net](http://www.climatebonds.net) July 2015
So what’s next?
How to grow green bond markets around the world

The rapid growth of the green bond market over the last year has proven that there is strong investor demand for financially competitive green bonds. However, while the growth rates of the green bond market are impressive, and volumes are starting to be significant, the market is still tiny compared to the overall $100 trillion bond market.

To address the climate change challenge we need continuing rapid growth in the market, especially in emerging markets. This is where the vast majority of investment needed to transition the world to a low carbon and climate resilient economy will be.

Many of these countries are also now reforming their capital markets, creating exciting opportunities to make sure reforms facilitate the growth of a labelled green bond market. In 2015 we’ve seen several labelled green bonds from emerging economies, notably India. This is a great development; now we need to speed up the process to ensure that the rapid expansion of infrastructure and growth in these countries is low carbon and climate resilient. The scale of the opportunity is immense: in India alone, the government has set a target of 165 gigawatts of new renewable energy capacity by 2022. According to Yes Bank, $70bn of debt investment is needed to achieve this goal – ample opportunity for green bonds.

There is a role for the public sector to create and develop a market for green bonds to tap into investor demand and ensure the market meets its potential. The public sector and different market actors – including investors, commercial banks and bond issuers – can work together to enable market creation. The main market development tool used so far has been green bond issuance by multilateral and national development banks. This has been essential to establish models and support market liquidity. But such issuance is only one of the options in the public sector toolkit.

10-point Agenda for the Public Sector
Issuer base

1. Strategic issuance from public entities
Public issuance can provide initial market deal flow and liquidity, engaging investors and educating them about the asset class.

2. Strengthening planning and pipeline transparency of green projects
This allows potential green bond issuers, investors and regulators to plan ahead. It gives these actors reason to develop improved expertise in the relevant investment areas.

3. Improving the risk-return profile of green bonds: credit enhancement
Credit enhancement should be selective, and aim to make green bonds fit institutional investors’ credit requirements.

4. Tax incentives
Tax credit bonds are being used to encourage the development of bond markets in various countries around the world, including, for example, the municipal bond market in the US and the infrastructure bond market in India. Specific green tax incentives are also used. The Obama Administration has put in place a number of tax credit schemes that support green investments. China is now examining opportunities to introduce tax incentives specifically for green bonds. There is also an opportunity for policymakers to tweak tax codes to encourage longer dated investments more generally. This would benefit low carbon investments and green bonds, as many of them are longer term.

5. Boosting demand: domestic fund mandates
Governments regularly provide guidance to public pension funds, sovereign wealth funds and the like about investment filters that will support a sustainable economy. The same can apply to green investments, including green bonds. For example, Norway’s sovereign wealth fund, one of the largest in the world, now includes green bonds in its fixed income portfolios through its environmental mandate.

6. Boosting demand and convening power: central banks
Central banks can use their balance sheets to purchase green bonds, including through quantitative easing, liquidity-providing operations and other mechanisms. They can also play a coordinating role in bringing together policymakers and advancing the green bond policy research agenda. How China’s central bank has advanced the green bond agenda in 2015 sets an example (see p13).

7. Market structure
Market integrity: Supporting standards development
The public sector can support efforts to establish common green definitions, standards, verification, certification and enforcement processes for the green bond market. One example is green bonds only qualifying for market incentives, such as tax incentives, if they comply with standards.

8. Market creation and development: aggregation of small-scale green assets
Facilitating aggregation of green assets is crucial, as many low carbon investments are small-scale – for example rooftop solar PV. Supporting the growth of a security market for small green assets is one way the public sector can do this. This includes encouraging deal flow of green loans suitable for subsequent securitisation; supporting financial warehousing of loans and providing credit enhancement for securitisation issuance. These supports can be made conditional on loans using standardized contracts. This would speed up the standardization process for low-carbon assets such as energy efficiency loans.

9. Financial regulatory measures are important
Regulatory measures can provide opportunities for positive incentives for green bonds. One example is the preferential risk weighting for green bonds in banks’ capital ratio requirements being considered by China’s central bank. But it is also crucial to ensure that other regulatory changes do not have unintended negative consequences for low carbon and climate resilient investments. This has been the case with Basel III and Solvency II, which has disincentivised the longer-term investments needed in renewable energy and other low carbon sectors.

10. International financial cooperation
International collaboration is crucial to avoid fragmenting the global green bond market, with countries e.g. having different tax incentives in different European countries. Liquidity benefits arise from such international cooperation on policy support, as it allows the creation of a global green bond market. An example here would be mutual recognition of standards for green bonds between governments. Of course idea-sharing is also useful. For more details on each action area see the Climate Bonds Initiative website. The Climate Bonds Initiative will publish an extended strategic policy guide for green bonds in October 2015.
Key Findings

OTHER KEY DEVELOPMENTS:

Investors managing $2.62trn declare support for green bonds

FIRST LABELLED GREEN COVERED BOND

First-ever Indian green bond

US municipal green bond market heats up

BNEF EXPECTS $80BN GREEN BOND ISSUANCE IN 2015

PLUS: policymakers can boost the market in 10 different ways

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The Climate Bonds Initiative is an investor focused not-for-profit, mobilizing debt capital markets for a rapid transition to a low-carbon and climate resilient economy.

Report written by Tess Olsen-Rong, Climate Bonds Initiative, with Katie House, Beate Sonerud and Sean Kidney, Climate Bonds Initiative.

Design: Godfrey Design.

All source data derived from Bloomberg.

All figures are rounded.

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