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LOMBARD ODIER
INVESTMENT MANAGERS

AIM Affirmative Investment Management

LO FUNDS – GLOBAL CLIMATE BOND

2018 Impact Report

Published 2019

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INVESTMENT MANAGERS

Environmental Finance
Green Bond Awards 2018
Winner

Green bond fund of the year managed by
AIM Affirmative Investment Management

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INVESTMENT MANAGERS

AIM Affirmative Investment Management

Management Commitment to Impact

Message from Lombard Odier Investment Managers (LOIM)

For more than two centuries, Lombard Odier has been using its imagination and innovative spirit to create a different perspective of the world. While sustainability has long been at the core of our investment approach, we now find ourselves on the cusp of a sustainability revolution, reshaping markets for generations to come.

A series of powerful forces are set to drive this revolution. Among them, climate change represents one of the greatest challenges of our time—it disrupts ecosystems, threatens entire populations, and puts at risk the sustainability of the global economy. As investment professionals, we have a role to play in directing investment towards companies which seek to provide climate mitigation and adaptation solutions.

This is not only a moral responsibility, it is also one of the best opportunities of our century. We believe the businesses that are implementing this transformation today will be the best performers of tomorrow, as the positive economic externalities they generate will be reflected in their long-term results.

Lombard Odier Investment Managers designed LO Funds – Global Climate Bond ('the Fund') to enable investors to benefit from this transition to a more sustainable economy and to deliver, in addition to financial performance, an authentic, clear and measurable environmental and social impact.

Our partnership with AIM, a world-renowned specialist in green bonds, is part of that commitment. Through our second Impact Report, we are pleased to present to you the positive impact that has been generated—thanks to your investment in the Fund.

Message from Affirmative Investment Management (AIM)

AIM is proud to release the second annual impact report for the LO Funds - Global Climate Bond. This time around, the report covers the entire calendar year 2018 and, in our view, again demonstrates how a pure play focus to investing, founded on deep analysis and engagement, can be beneficial to both investors, in terms of financial returns, and to society, in terms of environmental and social outcomes.

The report is a culmination of extensive engagement with all the underlying issuers in which the Climate Bond Fund invested during 2018. Every investment within the Fund, on a time-weighted basis, underwent rigorous verification, and over 95% of the portfolio is covered in this report.

One of the key highlights of 2018 was the increased weighting towards climate adaptation projects within the portfolio. In many green bond structures, adaptation receives far less allocation than climate change mitigation, but is also sorely needed. We are similarly pleased to note the alignment with all 17 of the United Nations Sustainable Development Goals, which were supported, to differing degrees, by the 900-plus projects financed by our bond holdings.

In compiling the report, AIM maintained a conservative approach for calculating the impact metrics. We believe that understating the potential impacts is preferable to a risk of overestimating outcomes. Transparency and positive impact are key objectives of the Affirmative Global Bond Fund and this report provides clear evidence of both.

We endeavour to continually expand our impact measurement and reporting capabilities—for instance, in 2018 we began an innovative partnership with industry leader, South Pole, to develop a TCFD-aligned physical risk assessment tool for green bonds, details of which can be found on page 29. We strive to improve our analysis to provide investors with greater visibility and information about the underlying portfolio. To this end, the LO Funds - Global Climate Bond Impact Report will continue to be both progressive and pioneering in the depth and quality of reporting.

LO Funds - Global Climate Bond Impact Highlights

LO Funds - Global Climate Bond 2018 Snapshot

68

Impact bond frameworks

911

Projects/initiatives partially or fully supported by impact bonds held in the portfolio

80

Countries receiving impact bond commitments and disbursements[1]

17/17

Sustainable Development Goals supported

6

Environmental sectors supported

5

Social sectors supported

2.48%

Portfolio absolute annualised net performance as of end of 2018[2]

Over 95%

Of the portfolio by average 2018 weights is covered in this report

US$220m

Assets under management as of end-December 2018

[1] Impact bond issuers may report on bond proceeds' commitments and/or disbursements. A project may receive a total commitment from an impact bond in 2018 which was/is disbursed over multiple time periods.
[2] LO Funds – Global Climate Bond unhedged USD share class.

Source: Annex 3

LO Funds - Global Climate Bond Impact Highlights

In 2018, the LO Funds - Global Climate Bond invested in 68 impact bond frameworks, including three unlabelled pure play impact bonds. AIM surveyed the issuers, collected data and conservatively estimated the impact highlights from the impact bond funded activities below, adjusted for 2018 LO Funds - Global Climate Bond holdings. These figures only begin to tell the story around the Fund's impact, as issuers were not always able to provide complete data on all their funded assets.

CARBON YIELD	**70,085** Tonnes of GHG avoided	**Equivalent to taking 14,880 passenger vehicles off the road in the US[1]**
CO_2	**54%** % of GHG Savings	**Compared to an estimated business as usual baseline**
	**66** MW clean energy capacity installed	**In 2018 171 GW of new renewable energy capacity was installed globally[2]**
	**233,114** Estimated MWh clean energy generated	**Equivalent to powering 19,740 homes in the US in 2017[1]**
	**30,751** Daily passenger capacity for low carbon transport	**At 11 million annually, equivalent to the population of Greece[3]**
	**250,625** m^3 of water treated daily	**Equivalent to over 100 Olympic-size swimming pools daily**
	**6,297** m^2 of green buildings by floor area	**Equivalent to over 90 average UK houses in 2018[4]**
	**17,790** students with access to green education facilities	**Equivalent to over 8,000 OECD average-size classrooms in 2016[5]**

[1] United States Environmental Protection Agency, 2018 (passenger vehicles are defined as 2-axle, 4-tire vehicles, including passenger cars, vans, pickup trucks and sport utility vehicles)
[2] *Renewable Capacity Statistics 2019,* International Renewable Energy Agency (IRENA), 2019
[3] UN World Population Prospects, 2017
[4] *What is the average house size in the UK?,* LABC Warranty, 2018
[5] OECD.Stat, Average Class Size, 2019

Source: Annex 3

The LO Funds - Global Climate Bond supported 17 out of 17 Sustainable Development Goals which aim to eradicate poverty, fight inequality and tackle climate change.

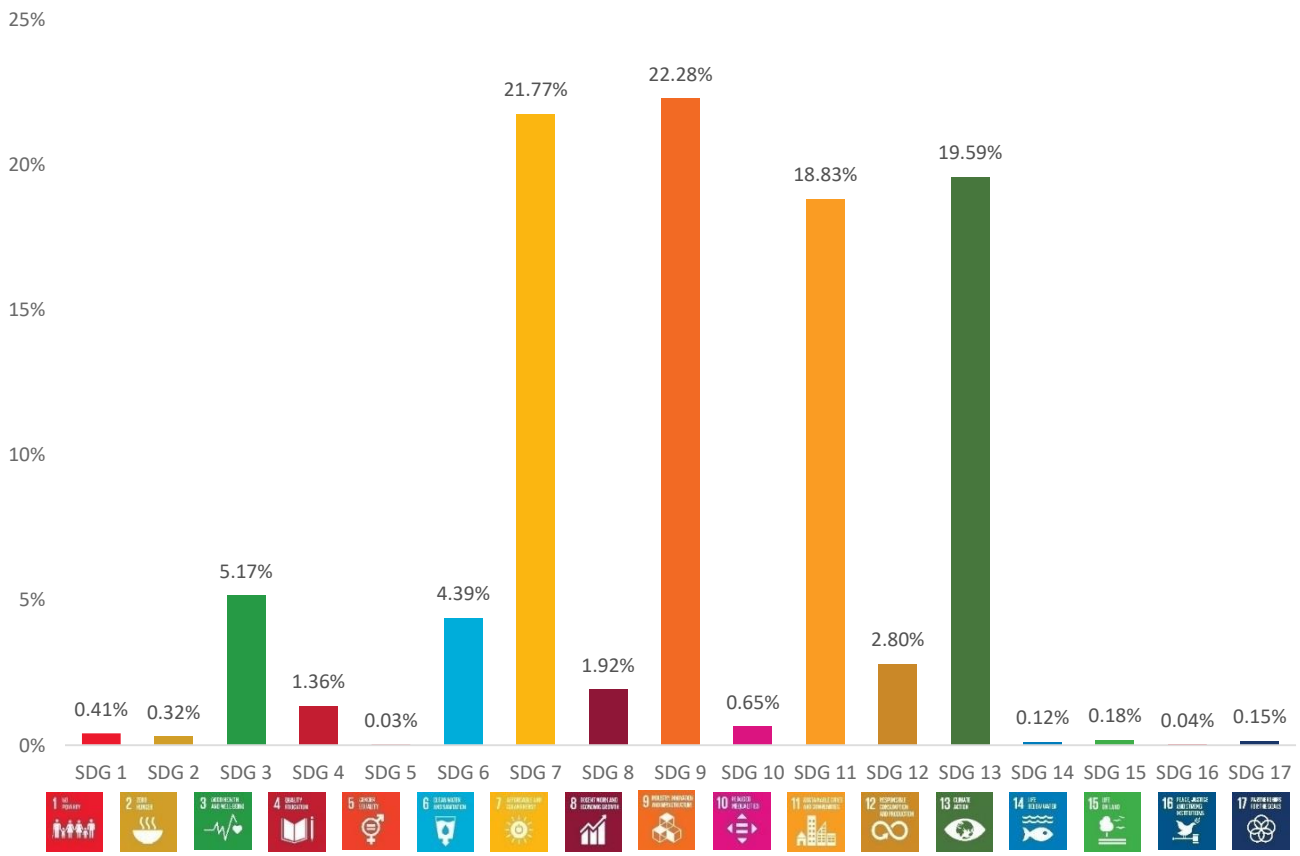
The portfolio-weighted impact bond commitments were most aligned with Goal 9: Industry, Innovation and Infrastructure; Goal 7: Affordable and Clean Energy; Goal 13: Climate Action; and Goal 11: Sustainable Cities and Communities. AIM is conservative in SDG mapping and we only map projects by their underlying SDG targets. As a climate bond fund, the heaviest concentrations fall, unsurprisingly, within clean energy and sustainable infrastructure but, as many projects often have multiple benefits, the portfolio supports all 17 Sustainable Development Goals.

Projects frequently support more than one goal—for example, a renewable energy project such as the ADB's Access to Clean Energy Programme (page 24) not only installs hydro and solar technologies, but also includes a social mission to expand access to energy in off-grid areas, targetting facilities supporting women and girls (SDG 5), such as maternal/antenatal primary care and girls' schools (SDG 3 and 4). The SDG-aligned case studies (pages 23-27) provide more examples of how projects often support more than one SDG, and illustrate some of the types of projects funded.

Although not included in the chart below, which accounts only for impact bond funded activities, the Lombard Odier and AIM partnership is aligned to Goal 17, which includes private sector engagement in sustainable development, particularly in developing countries.

LO Funds - Global Climate Bond 2018 SDG Alignment

(portfolio-weighted, USD equivalent)



Source: Annex 3

LO Funds - Global Climate Bond
PORTFOLIO SUMMARY

Affirmative Investment Management

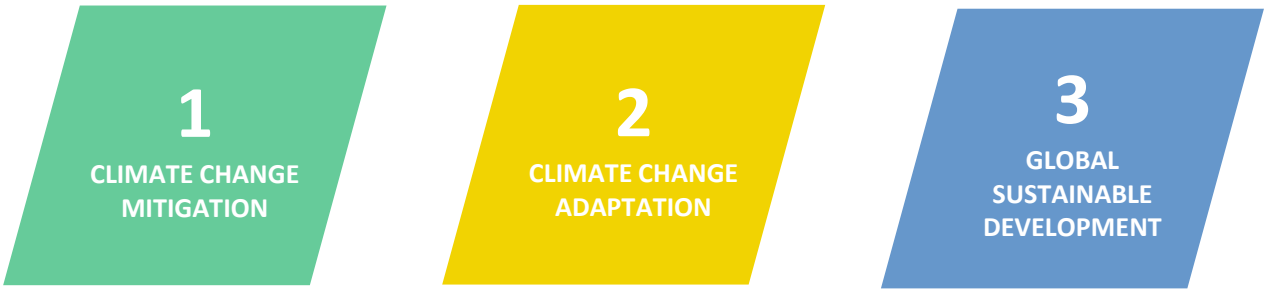
LO Funds - Global Climate Bond Impact Verification

LO Funds - Global Climate Bond was launched in March 2017, as a result of a strategic partnership between Lombard Odier Investment Managers (LOIM) and Affirmative Investment Management (AIM).

The Fund targets yields in excess of the broader investment grade bond market, with comparable credit quality, as well as environmental and climate impact, promoting a low carbon and climate resilient transition.

ABOUT AIM

AIM is a pure play impact bond fund manager, seeking to address the major challenges the world faces by mobilising mainstream capital. All of AIM's investments support the Paris Agreement and/or the UN Sustainable Development Goals.



AIM designed its proprietary SPECTRUM Bond® analysis framework to independently verify impact bonds, which include issuer self-labelled use-of-proceeds green, social and sustainability bonds, as well as unlabelled pure play bonds.

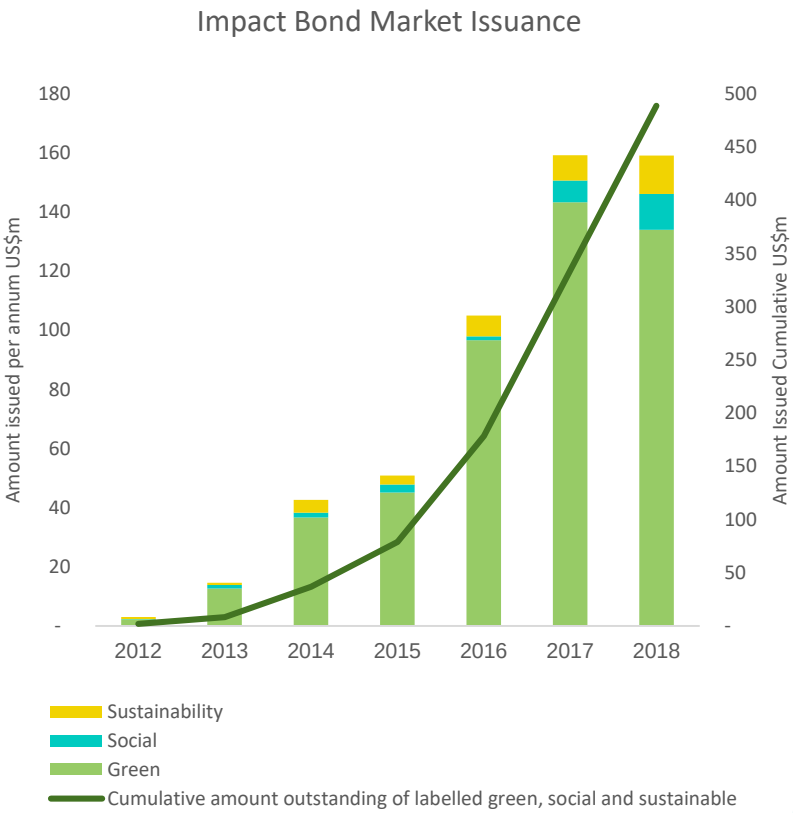
S	**Sustainable** Aligned with our purpose to support the UN SDGs and Paris climate agreement
P **E**	**Positive externalities** Positive environmental and/or social externality associated with their issuance
C	**Credit** Issuers must be credit-worthy from both a financial and broader environmental, social and governance perspective
T	**Transparent** Reporting and disclosure
R	**Responsible** Issuers with strong integrity and standards, as well as a clear commitment to a sustainable business model
U	**Use of proceeds** Ability to determine use of proceeds to assure funded activities meet the AIM criteria
M	**Material & measurable** Environmental and social impact

Labelled green bonds continue to account for the largest share of the impact bond market, at approximately 85% in terms of USD amount issued. Not all labelled impact bonds passed AIM's SPECTRUM analysis in order to be accepted into the investment universe. For example, even in addition to Chinese domestic bonds and US municipal bonds which are currently ineligible, some green bond frameworks don't satisfy our criteria.

AIM excluded 20% of green bonds outstanding in 2018.[1]

[1] *In addition to US municipals and Chinese domestic issues, both of which are categories excluded from our investable universe. By US$ amount outstanding.*

2018 Snapshot: A Diversifying Impact Bond Market

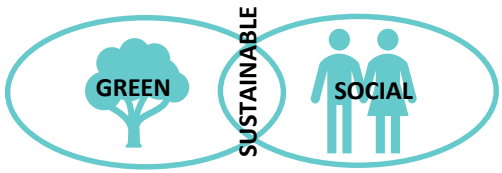


In 2018, the impact bond market continued to expand. New types of issuers emerged—for example, telecommunications companies and agricultural firms.

Climate Bonds Initiative[1] reported 204 new issuers in 2018, bringing the total to 625 out of 44 countries—of which 8 countries were new to the green bond market. Overall amount of annual green bond issuance fell slightly.

Social and Sustainability issuance continued to grow, particularly in Europe.

New sovereign green bond issuers appeared, including from emerging markets, such as Indonesia and Lithuania, as well as from Belgium.



A recap: what are impact bonds?

We define impact bonds as bonds with positive social and/or environmental externalities.

Labelled impact bonds are typically issuer self-labelled and follow a use-of-proceeds structure, which can be broadly summarised as per the Green, Social and Sustainability bond principles:

1. Having a framework with a defined use of proceeds, including eligible sectors and activities.
2. Process for project evaluation and selection.
3. Process for management of proceeds, such as ring-fencing.
4. Annual reporting on proceeds allocation and/or impact reporting related to impact bond portfolio.

There are three types of labelled use-of-proceeds bonds:

Green: permit investment in environmental sectors
Social: permit investment in social sectors
Sustainability: permit investment in environmental and social sectors

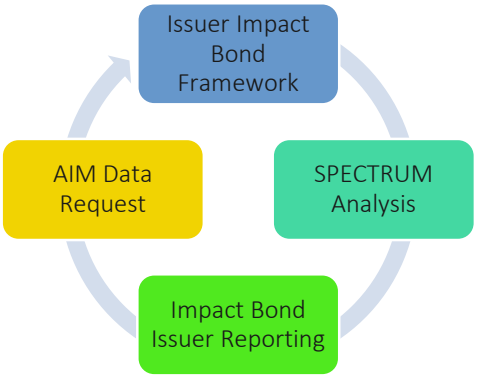
According to the CBI, approximately 30% of green bond use of proceeds in 2018 was channelled into Energy, a similar share into Buildings, followed by approximately 20% into Transport. Clean Energy and Infrastructure continue to be the dominant sectors funded by labelled green bonds—however, other sectors such as Waste and Water remain well supported, with approximately 10%.[2]

[1] *Green Bonds: The State of the Market 2018,* Climate Bonds Initiative
[2] *2018 Green Bond Market Highlights,* Climate Bonds Initiative

Source: Bloomberg, AIM data

Engagement Underpins Verification and Impact Reporting

AIM's engagement covered over 95% of issuers held in the reporting period—engagement forms the foundation of SPECTRUM analysis. AIM actively engages with potential and current impact bond issuers to promote the development and maintenance of standards that will ensure a high level of transparency and clear ongoing commitment. Our goal is to work with issuers to enhance impact reporting in the market and harmonise post-issuance disclosure.

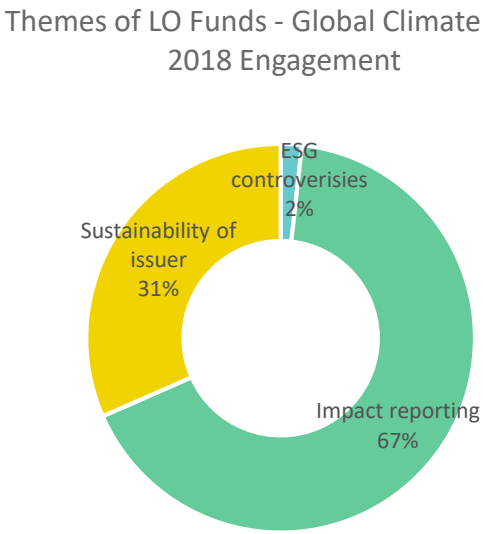


As part of ongoing monitoring, and to fulfil the LO Funds - Global Climate Bond impact reporting commitment, AIM collected information throughout the year, through issuer reporting and requests submitted in the first half of 2018, to gather impact bond allocation and impact performance data.

AIM was able to collect data representing over 95% of the portfolio, with several issuers providing preliminary figures ahead of their annual impact reports.

LO Funds - Global Climate Bond 2018 Engagement Summary

AIM actively engaged with issuers held in the Fund throughout the reporting period. The interactions ranged from in-person meetings to calls and email exchanges. The engagement covered topics such as credit updates, impact bond frameworks, ESG strategies and impact reporting. While a large proportion of engagements are reactive—with new issuers presenting new impact bonds—we are also proactively engaging with issuers to understand their use of proceeds and impact reports, and to identify and understand any low transparency or ESG controversies. Findings from AIM's engagement, including impact data collection, feed into ongoing SPECTRUM Bond® analysis.



Seeking to improve impact bond frameworks

AIM undertakes rigorous due diligence with issuers' green, social and sustainability frameworks. We also seek to give constructive feedback when concerns or issues arise.

An example is a Nordic bank, whose green bond framework had unclear eligibility criteria for its general purpose loans to companies. The issuer asserted that overall company sustainability credentials were appropriate for general purpose green lending but, in our view, it was not clear what constituted a *sustainable company* eligible for use-of-proceeds allocations.

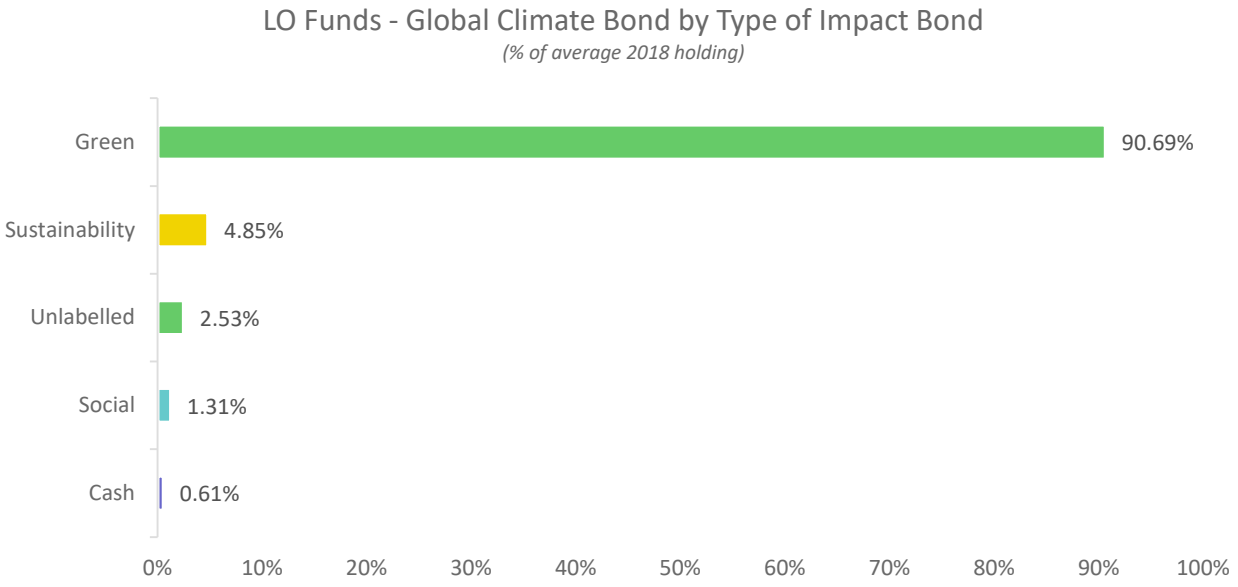
AIM provided feedback during the issuer roadshow and asked for more clarity on its lending criteria.

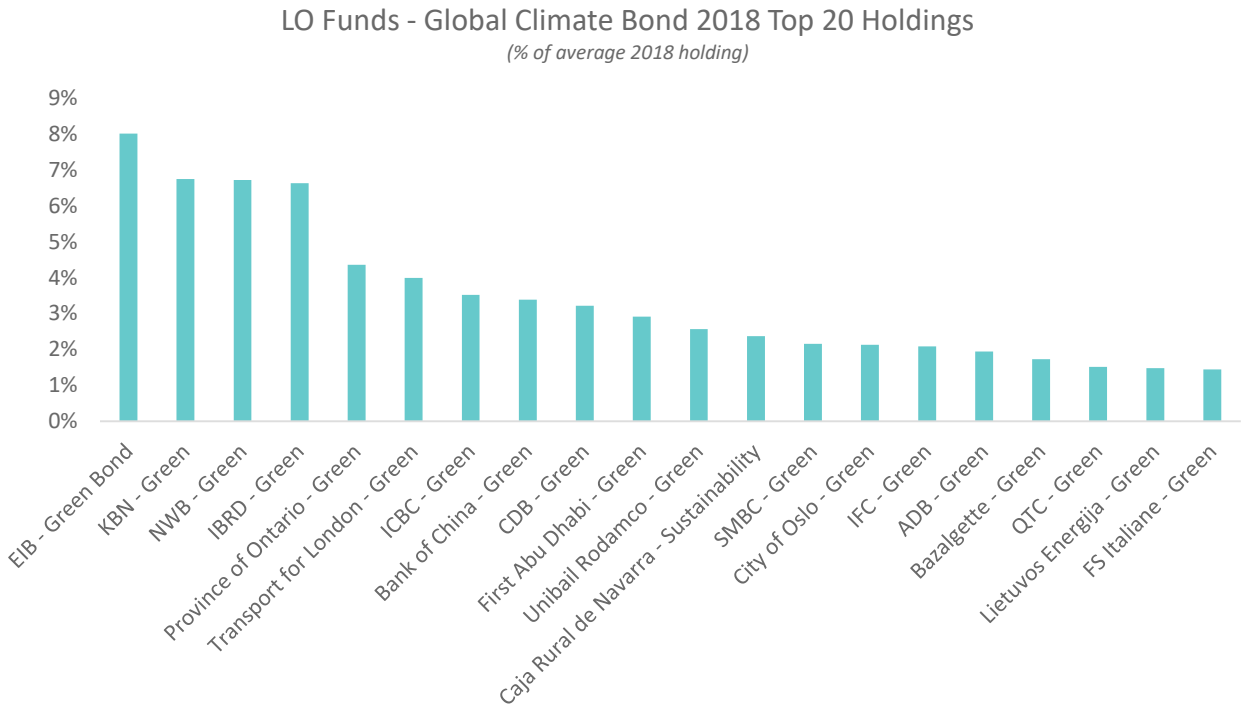
Following our feedback, the bank tightened the eligibility criteria for loans to green pure plays, with 90% of revenue originating from eligible sectors. This constitutes best-in-class practice and the framework was ultimately included in AIM's investable universe.

This illustrates an example of successful engagement with issuers, and how constructive feedback on green, social and sustainability bond frameworks can deliver positive outcomes both for the issuer and for the investor.

2018 Portfolio Composition

On average, from inception to December 2018, the LO Funds - Global Climate Bond was **99%** invested in impact bonds: **92%** in labelled and unlabelled green bonds; **1%** in labelled social bonds; and **6%** in labelled and unlabelled sustainability bonds, which typically refer to bonds supporting a blend of social and environmental sectors.





Holdings and/or allocations are subject to change. Full issuer names are available in Annex 3.

Source: Fund Holdings, AIM SPECTRUM Bond® universe

LO Funds - Global Climate Bond
PORTFOLIO IMPACT

Affirmative
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Management

Two Sides of Climate Change: Mitigation and Adaptation

Responses to climate change broadly fall into two areas:

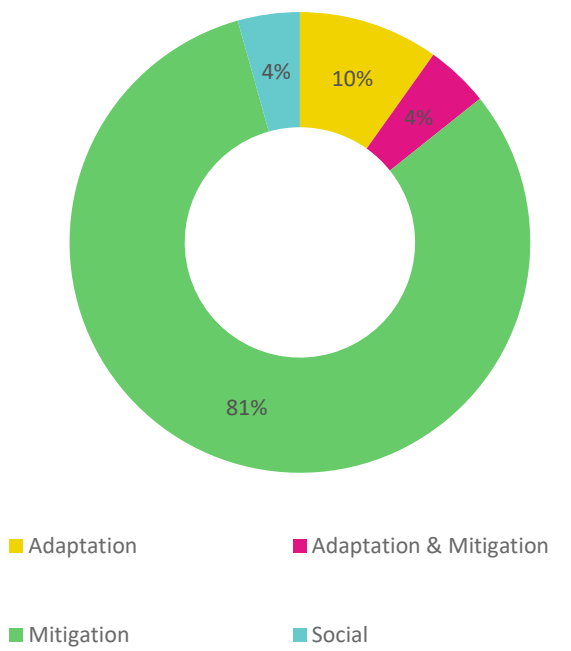
1. Mitigation—the reduction and/or avoidance of GHGs emitted into the atmosphere.
2. Adaptation—building community, economy and ecosystem capacity to respond to the effects of climate change and extreme weather events.

AIM actively seeks investments in both mitigation and adaptation, as a combination of the two strategies is considered necessary to respond to climate threats.

Both aspects are core to the landmark 2015 Paris Agreement, to:

"…strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to increase the ability of countries to deal with the impacts of climate change, and at making finance flows consistent with a low GHG emissions and climate-resilient pathway."[1]

LO Funds – Global Climate Bond 2018
Mitigation and Adaptation
(portfolio-weighted, USD equivalent)



Source: Bloomberg, AIM SPECTRUM Universe, Annex 3

Curbing global emissions

Mitigation efforts are largely focussed on decarbonising energy supply and managing energy demand—both are considered necessary to reduce GHG emissions and avoid global warming beyond potentially devastating levels of 2 degrees Celsius above pre-industrial temperatures.

Approximately 81% of projects supported by the LO Funds - Global Climate Bond portfolio are mitigation-oriented—for instance, investment in renewable energy generation and in efficient infrastructure, such as green buildings and low carbon transport solutions.

Energy from renewable sources is becoming increasingly competitive globally and energy efficiency measures are seen as effective cost management strategies—for example, improving energy efficiency can reduce energy consumption in buildings, yielding long-term financial savings, as well as GHG reductions.

Coping with climate change

As the effects of climate change emerge, the costs of adapting to changing weather patterns and global warming are expected to rise. The UNEP estimates that, globally, US$280-500 billion per year will be required by 2050[2] to help us adapt to catastrophic climate impacts, the majority for developing countries which would bear the brunt of—and have less capacity to deal with—climate change.

Adaptation-related projects are receiving more attention in the green bond space, but remain a small part of the market. Through engagement, AIM seeks to encourage greater investment in adaptation, such as in water management systems, flood management controls, climate-smart and resilient infrastructure, and hazard warning systems. On average, 14%—up from 8% in 2017—of the portfolio was in adaptation-focussed activities, including those with mitigation benefits, such as flood-resilient transport.

[1] Paris Agreement Progress Tracker, UNFCCC, 2018
[2] *Demystifying Adaptation Finance for the Private Sector*, United Nations Environment Programme (UNEP), 2016

2018 Sector Distribution

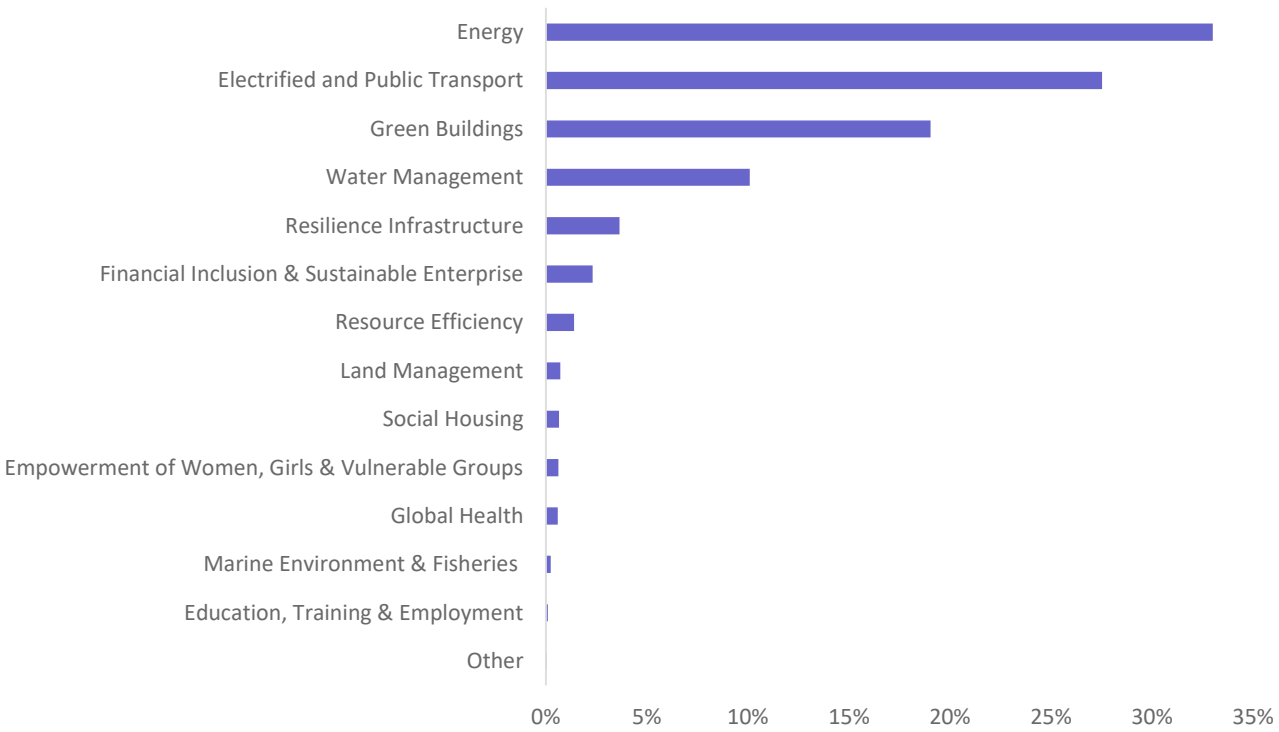
LO Funds - Global Climate Bond invests in a range of environmental and social sectors that support the Paris Agreement, climate resilience and the SDGs. (See Annex 1 for examples of AIM-eligible sectors.)

In 2018, the top three sectors that impact bond proceeds in the LO Funds – Global Climate Bond were allocated to were environmentally focussed:

33% ENERGY	Renewable energy generation, modern energy access, energy storage and energy efficiency technologies	**66 MW of renewable energy installed capacity**
28% CLEAN TRANSPORT	Low carbon and mass transport: urban rail rolling stock and networks, electric and hybrid vehicles, urban transport planning	**Over 11 million passenger capacity in low carbon transport supported annually**
19% GREEN BUILDINGS	Buildings constructed or retrofitted to higher efficiency standards in energy demand and consumption and/or other resource efficiencies	**Over 6,000m^2 of buildings (by floor area) constructed/refurbished to higher energy efficiency standards**

LO Funds - Global Climate Bond 2018 Sector Distribution

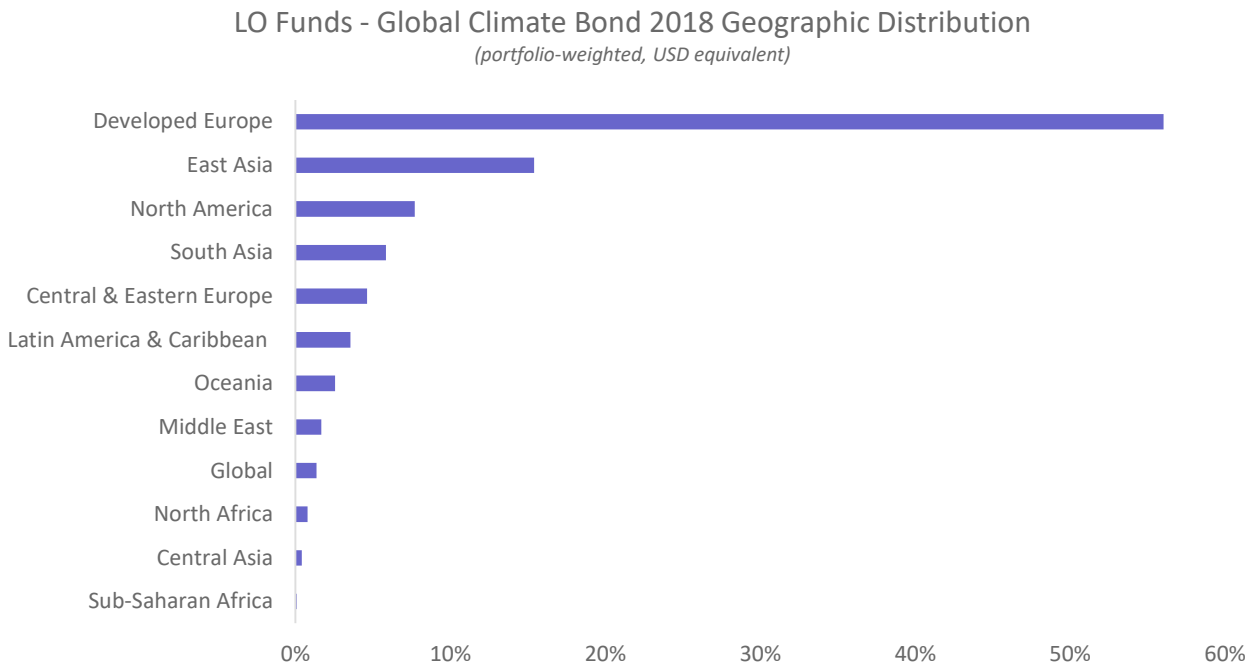
(portfolio-weighted, USD equivalent)



Source: Annex 3

2018 Geographic Distribution

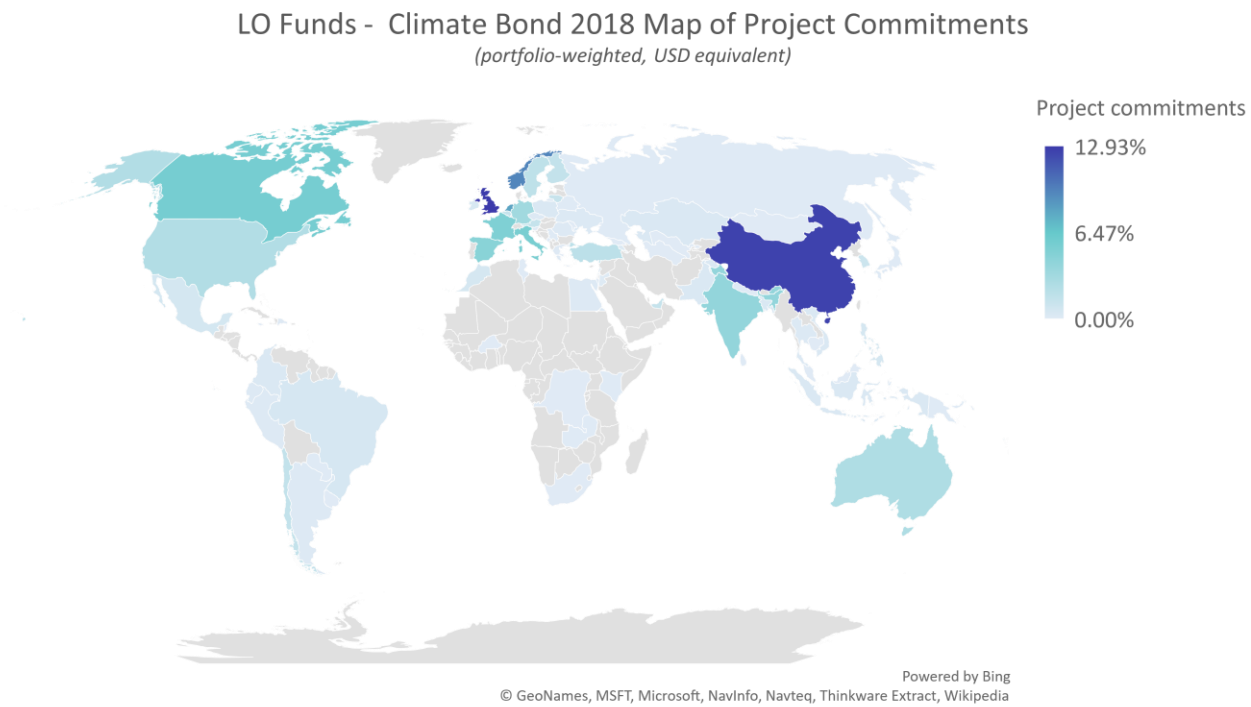
LO Funds - Global Climate Bond invested in impact bonds supporting activities in **80 countries**.



Over 60% of portfolio-weighted impact bond commitments were made within developed markets. The global category refers to projects/activities across developed and emerging markets combined.

56% of 2018 portfolio-weighted supported projects were in developed Europe, followed by over 15% in East Asia and 8% in North America.

The top three countries, however, by portfolio-weighted use of proceeds were United Kingdom, China and Norway.



Source: Annex 3

Where are we in the Global Energy Transition?

The world has made incredible progress in expanding renewables-based electricity generation: by the end of 2018, renewables accounted for over 25% of global power output and 45% of the world's electricity generation growth.[1]

According to the IEA[1], renewable energy generation increased at its fastest pace this decade. China led the clean energy revolution, with a 40% increase in renewable energy generation growth, followed by Europe (26%) and the US (7%). Solar PV, wind and hydro each represented about a third of global renewable energy generation growth.

Apace with these positive advancements, however, there has been a significant increase in global energy demand (+2.3%)—nearly twice the average growth since 2010—resulting in a rise of global CO_2 emissions by 1.7% in 2018. This followed three flat years and set a new global record.[2]

Energy demand will continue to rise as the global economy remains relatively robust, as digitalisation and electrification continue to expand and needs increase for heating and cooling in different parts of the world, due to record-breaking winter and summer temperatures. As demand rises, there is an urgent need to decarbonise power production and improve energy efficiency.

While renewable energy production grew at a double-digit pace in 2018, it was still not fast enough to meet the increase in demand for electricity around the world. 70% of this increase was provided for by fossil fuels. The need to continue to increase investment in clean energy—the most significant sector supported by the LO Funds – Global Climate Bond portfolio (33%)—remains critical.

Decarbonising our energy system is vital to the success of our global climate efforts—supply and demand measures must be considered and, increasingly, the green bond market provides opportunity to invest in the supporting infrastructure required to optimise the global clean energy potential.

[1] *World Energy Outlook*, IEA, 2018
[2] *Global Energy and* CO_2 *Status Report*, IEA, 2018
[3] *Tracking Clean Energy Progress*, IEA, 2018

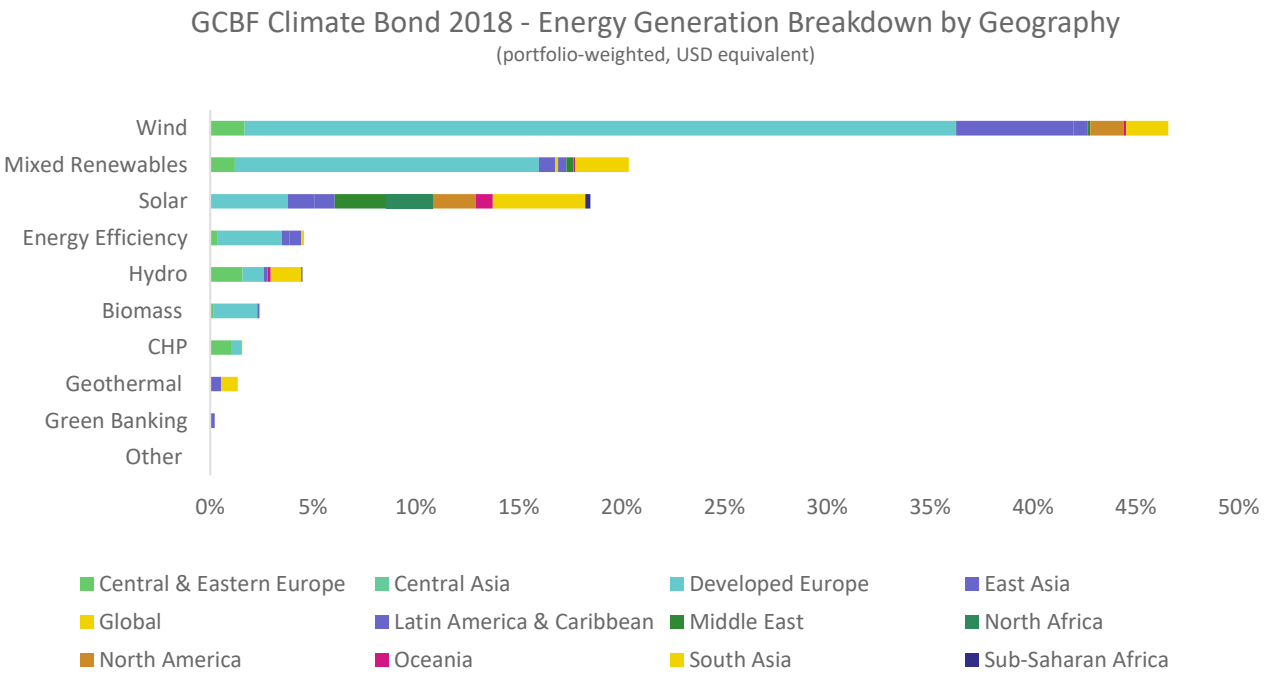
Source: Annex 3

LO Funds – Global Climate Bond Investing in Energy

In order to address the major objectives of the IEA's Sustainable Development Scenario—which supports the Paris Agreement—of clean air and increased access to modern electricity for areas with energy poverty, renewables need to rise from 25% today to 66% of electricity generation by 2040.[1]

Energy is the most significant sector supported by the LO Funds – Global Climate Bond portfolio, accounting for 33% of investment, with renewable power generation the main 2018 beneficiary within the energy sector, at ~29% overall.

The most significant portfolio-adjusted investments in Energy went towards wind, solar and mixed renewable energy generation in developed Europe. The European Union, as a bloc, is the third largest global emitter of GHGs, according to the World Resources Institute. The EU has ambitious targets to reduce emissions collectively by 40% versus 1990, with 32% of total energy consumption to come from renewable sources.[3] The European Parliament is discussing increasing the EU's 2030 reduction goal to 55%, which brings it closer, but still falls short of the level required for a 2-degree global warming pathway, according to Climate Action Tracker estimations.[4] It is evident that much more action and investment are required to decarbonise the system and improve energy efficiency.



As global renewable energy capacity continues to grow, solar PV is now cost competitive against new coal in many countries, particularly those with utility-scale facilities. However, with the growth of the wind and solar sectors comes the need to update energy transmission networks to enable connection and also to build in large-scale flexibility through enhanced energy storage. Conventional gas-fired peaking plants remain the primary solution to managing fluctuations in supply and demand. Improvements to battery storage systems are required if renewable energy potential is to be maximised. Investment in energy infrastructure is, therefore, becoming increasingly important with the expansion of our clean energy generation capability.

While projects supported by the LO Funds – Global Climate Bond portfolio in the energy sector were predominantly generation projects, the Fund also supported energy infrastructure (~4%), such as upgrades to transmission networks. For example, the Lietuvos Energija green bond funded the renewal and optimisation of electricity distribution networks across five regions in Lithuania. The Asian Development Bank (ADB) green bond funded a power transmission system that delivers electricity from wind and solar power to state and national grids through 1,850km of transmission lines in India's Rajasthan.

[1] *World Energy Outlook*, IEA, 2018
[2] CAIT Climate Data Explorer, World Resources Institute
[3] *Europe Climate Action Plan*, European Commission
[4] Climate Action Tracker

Source: Annex 3

LO Funds – Global Climate Bond Investing in Water

10%
Of the Fund use of proceeds was invested in water projects

Changing demographics and climate disasters are putting water infrastructure under increasing pressure: 4.5 billion people globally are without access to adequate sanitation, 2.1 billion lack access to clean drinking water and flood damage to urban property is estimated to cost US$120 billion annually.[1] These are compelling reasons for water efficiency and improved water management to be placed high on impact investors' agendas.

In 2018, the water sector gained significant traction following an increase in issuance of impact bonds funding improved water management. AIM has long included pure play bonds in its SPECTRUM-approved investment universe, such as UK water utility, Anglian Water and Severn Trent, and members of AIM's Verification & Impact team recently conducted site visits for water projects in the UK and the Netherlands.

Ten percent of LO Funds – Global Climate Bond portfolio-weighted use of proceeds were allocated to the water sector last year.

Water Innovation in the UK

UK water companies have been extremely proactive in driving sustainable solutions to the various challenges they're facing. AIM was able to witness some exciting new technologies first-hand during a visit to Anglian Water's Innovation Shop Window.[2]

Anglian Water is endeavouring to promote a culture of open innovation and collaboration across the supply chain. Located in Newmarket, Suffolk, the company's Innovation Shop Window showcases emerging technologies and various schools of thought to facilitate knowledge-building and the trialling of new concepts.

Anglian Water is currently working with more than 105 partners, on 101 projects designed to tackle challenges across the whole industrial water cycle. The most promising projects will subsequently be implemented on a large scale.

Some of the most successful innovations have already been rolled out across the business: state-of-the-art sewer robots and drones with thermal imaging cameras are deployed to locate hidden water leaks; smart meters have been installed at nearly 6,000 properties across Newmarket to help customers save water and money; and 3D models and virtual reality technology have been instrumental in the planning of large-scale engineering schemes. In support of the company's decarbonisation objectives, Anglian Water's new mobile sludge unit, installed at wastewater treatment plants, has allowed the company to reduce the number of tanker journeys required by more than 50%.

[1] *Financing Water: Investing in Sustainable Growth,* OECD, 2016
[2] *What is the Innovation Shop Window?,* Water Innovation Network, 2019

Source: Annex 3.
Images from Anglian Water

Investing in Water Resilience and Decarbonisation

Water risk and opportunities in Holland

AIM was one of a dozen investors invited to participate in seminars with water experts and visit water-related projects in the Netherlands. With 26% of land below sea level and over half of the country at risk of flooding, due to rising sea levels and changing weather patterns[1], effective water treatment and management is a national priority.

In 2018, AIM invested in the NWB Bank Green Bond framework, which provides low cost loans to Dutch water authorities, including Rijnland District Water (RDW).

Katwijk Waste Water Treatment Plant

Water authority, Rijnland District Water (RDW), manages the Katwijk Wastewater Treatment Plant (WWTP) near Leiden in the west. The WWTP processes water from the combined local sewage systems. Originally built 43 years ago, the site's ageing infrastructure made it one of the least sustainable water treatment plants in Rijnland.

Treatment of household water accounts for 3% of global electricity consumption. RDW's project addresses the high energy use in the water purification process at Katwijk, by first filtering out solids from sewage water, then transferring it to an aeration tank into which oxygen is injected.

RDW partnered with a local engineering company, WaterTechniek Twente, to determine the best new technology for improved efficiency in this process. The hybrid aeration solution reduced the energy required to pump oxygen through the tank by 40% and eliminated the use of chemicals by 100%.

The project is now complete, and the updated purification tank can be seen in the top image on the right.

Switching to solar

Half of the electricity generated by an RDW solar project on adjacent land will power the Katwijk WWTP, supporting its carbon neutral goal, with the remainder to be sold to the national grid.

The solar PV project, completed in 2018, is estimated to generate 1,365,000 kWh per year, enough to power 390 households.

[1] *Low probabilities – large consequences,* PBL Netherlands Environmental Assessment Agency

Source: Annex 3
Images from AIM

Understanding GHG Footprint and Avoided Emissions

In 2018, AIM included estimates on the portfolio GHG emissions footprint in our independent analysis, prepared in partnership with ISS ESG.

GHG Footprint

The GHG emissions footprint represents the estimated emissions resulting from an action taking place. GHG emissions are divided into scope 1, 2 and 3, as described in the Greenhouse Gas Protocol.[1] These standards represent best practice and are the most widely used GHG accounting standards in the world—they include the seven greenhouse gases as defined in the Kyoto Protocol, and were developed by the World Resources Institute and World Business Council for Sustainable Development.

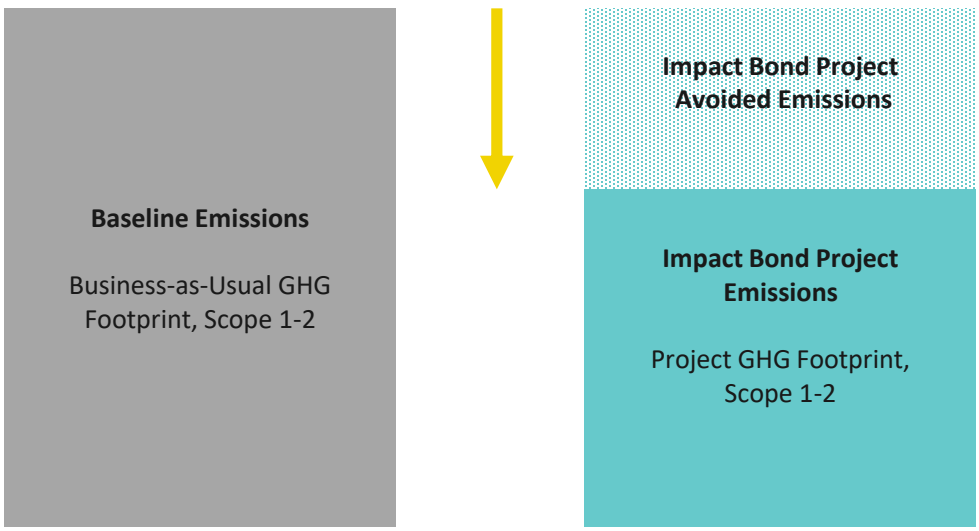
For impact bonds, scope 1 and 2 refer to the issuer's operational emissions and scope 3 refers to those generated by the operations of projects/activities financed by the impact bond.

Scope 1	Direct emissions from owned or controlled sources.	Impact Bond Issuer Operational Emissions
Scope 2	Indirect emissions from the generation of purchased electricity, heating and cooling.	
Scope 3	Other emissions that occur in the value chain (such as construction and material use).	Impact Bond Funded Project (Scope 1 & 2) Emissions

GHG Emissions Avoided

GHG emissions avoided estimates the emissions that have been avoided/reduced due to a funded project being implemented, compared to a reasonable business-as-usual baseline. (See page 36 for detailed examples.)

Currently, the calculation of GHG emissions avoided only considers the operation/use of the project and not the full value chain. For example, for a wind farm project, GHG emissions avoided are calculated based on the energy generated from the operation of the wind farm, excluding construction emissions, compared to the region/country's electricity grid emissions. (See page 37 for more detail.)



[1] GHG Protocol, https://ghgprotocol.org, WRI and WBCSD

Source: Annex 3, ISS ESG

2018 Portfolio Greenhouse Gas Emissions Results

82%
Coverage of portfolio

54%
Estimated portfolio GHG savings

The table below estimates the LO Funds - Global Climate Bond Fund's GHG impact over the expected lifetime of the investments and per annum.

On average, we were able to estimate GHG figures for 82% of the 2018 portfolio, covering about 78% of issuer disbursements per analysed framework (compared to our coverage of over 95% on total issuer disbursements).

Issuer frameworks were not included in the GHG analysis if they did not significantly fund climate mitigation assets (eg flood prevention infrastructure), or if issuers had not reported in time for AIM's annual impact data collection. Please see Annex 2 for our GHG analysis methodologies.

LO FUNDS - GLOBAL CLIMATE BOND INDEPENDENT GHG EMISSIONS FOOTPRINT ASSESSMENT[1] *(portfolio-weighted, tonnes of CO_2e)*	
Issuer operations emissions scope 1 & 2	13,010
Funded projects scope 1 & 2 (operational emissions)	58,679
Funded projects scope 1, 2 & 3 (operational, construction and material use emissions)	68,315

LO FUNDS - GLOBAL CLIMATE BOND INDEPENDENT GHG EMISSIONS AVOIDED ASSESSMENT[1] *(portfolio-weighted tonnes of CO_2e)*	
Funded projects lifetime GHG emissions avoided	2,724,526
Funded projects GHG emissions avoided per annum	70,085

LO FUNDS - GLOBAL CLIMATE BOND PORTFOLIO CARBON YIELD®

(portfolio-weighted)

CARBON YIELD

0.27 tonnes of CO_2e avoided per US$1,000 per annum

Equivalent to 660 miles driven by an average passenger vehicle in the US in 2016[3]

[1] The portfolio greenhouse gas emissions data was calculated with the assistance of ISS ESG. The Carbon Yield® was co-developed by AIM, ISS ESG and Lions Head Global Partners, with funding from Rockefeller Foundation. Information about the methodologies is found in Annex 2.
[2] Please refer to page 21 and page 38-38 for GHG emissions scope definitions and methodology.
[3] EPA, Greenhouse gas equivalencies calculator

Source: Annex 3, ISS ESG

SUSTAINABLE DEVELOPMENT GOALS Project Case Studies

SECTOR

WATER MANAGEMENT

Water and sanitation are critical to the survival of people and the planet.

More than 2 billion people globally are living in countries with excessive water stress, defined as the ratio of total freshwater withdrawn to total renewable freshwater resources above a threshold of 25%.[1]

UNESCO predicts that, with the existing climate change scenario, by 2030, water scarcity in some arid and semi-arid locations will displace between 24 million and 700 million people.[2]

Over 80% of the world's wastewater—and more than 95% in some of the least developed countries—is released untreated into the environment.[3]

PROJECT

Bazalgette Finance Green Bond
Thames Tideway Tunnel

The Bazalgette Tunnel—named after Sir Joseph Bazalgette who, in the 1860s, designed London's natural drainage system of 'lost rivers'—is a project aimed to reduce sewage overflow around London and improve the water quality of the River Thames. Bazalgette originally designed the system to overflow into the Thames once or twice a year, but overflows now take place weekly damaging the Thames' biodiversity and negatively impacting human health. A 25km self-cleaning tunnel will effectively divert sewage waste away from the Thames, protecting wildlife and the general public. The project will also promote inclusive employment and support the development of a range of skills within river transport.

CONTEXT

LOCATION

United Kingdom

- London's 150-year-old sewage system has insufficient capacity to meet the demands of today's capital and, as a result, millions of tonnes of raw sewage overflow into the Thames each year.
- Ammonia, contained in sewage, harms many of the Thames' natural inhabitants.
- With the city's population forecast to increase by up to 2 million by 2036, an upgrade of London's sewage network is critical.

AIM SUMMARY

London's Victorian sewage system—designed for a population of 4 million—is inadequate for a modern, and growing, city of over 8 million people. This landmark construction will divert the significant volume—tens of millions of tonnes—of raw sewage that overflows into the Thames annually, harming biodiversity, polluting waterways and posing risks to public health. The project is intended to create a boost for both the river economy and technology in London, creating inclusive jobs and apprenticeships. It has been designed as a self-cleaning system, to last for 120 years with minimal ongoing operational maintenance.

IMPACT

OUTPUT (ISSUER KPIs)

- Carbon footprint reduced from 840,000 t to 787,889 t of GHG emissions in effort to minimise major construction project emissions.
- Sustainable transport for tunnel spoil—90% (around 4.2 million tonnes) relocated by river, reducing both emissions and congestion on London's roads.
- Creation of 4,000 new jobs.

RELATED SDGs

PROJECT

The Export-Import Bank of Korea (KEXIM) Green Bond
Muharraq Wastewater

The project financed is the Bahrain Ministry of Works' Muharraq Sewage Treatment Plant, which represents the first public-private partnership in the wastewater sector in the Kingdom. The wastewater treatment site is located on reclaimed land in Bahrain and the plant is built on an area of 157,000m^2, allowing considerable room for future expansion. The construction connects existing pump stations and will divert wastewater flows via a deep gravity sewer pipeline, 16km in length. A sludge incineration facility will be incorporated into the plant, converting the sludge into fertiliser.

CONTEXT

LOCATION

Bahrain

- The Kingdom of Bahrain has the second lowest level in the world of renewable freshwater reserves per capita.
- The country's water stress ranking, according to WRI data, is at the highest possible level.
- Limited, erratic rainfall and high evapotranspiration rates characterise this arid country.

AIM SUMMARY

Bahrain is one of the most water-scarce countries in the world, frequently at the top of water stress indices. There is a critical need to address potential water shortages, from both a human health and an environmental perspective. The project will provide a landmark facility in Bahrain to significantly improve its ability to meet water demand by enabling greater reuse of water. With built-in scope for expansion, the project has been designed for long-term sustainability. Given Bahrain's scarce groundwater resources and irregular rainfall, improving wastewater efficiency is a key strategy for safeguarding the country's water supply.

IMPACT

OUTPUT (ISSUER KPIs)

- 16km depth of gravity sewer pipe constructed.
- Current intended capacity of 100,000m^3 per day, with the potential to increase to 160,000m^3 per day.
- Connection to 24 existing pump stations.
- Expected lifespan of 25 years.

RELATED SDGs

[1] *Coping with Water Scarcity,* UN-Water, 2007
[2] *World Water Development Report*, UNESCO, 2009
[3] *Wastewater: The Untapped Resource*, UNESCO, 2017

Source: World Bank, WRI, Annex 3

SUSTAINABLE DEVELOPMENT GOALS Project Case Studies

SECTOR

ENERGY

In an increasingly electrified world, decarbonising our energy systems is fundamental to meeting the Paris Agreement. Energy generation underpins the carbon performance of many other low carbon technologies, such as electric vehicles.

As of 2018, 25% of the world's energy output was from renewable energy—while we have made considerable progress, it is well below targets aligned with 2-degree scenarios[1].

According to the IEA WEO 2018, 97 million people worldwide were still without energy access in 2017—with a further 2.7 billion without access to clean cooking facilities, relying on biomass, coal or kerosene, which can be time consuming to obtain, carbon intensive and hazardous to health.

Wind power parks have a very low life cycle carbon footprint and the global wind energy potential exceeds human energy demand by more than x2.

PROJECT

Asian Development Bank (ADB) Green Bond
Access to Clean Energy Investment Programme

The project supports Pakistan's goals of enhanced energy security and sustainable economic development. It has three major objectives: expanding access to renewable energy, particularly in off-grid areas with energy poverty—to include decentralised solar for education and primary health facilities; providing women and girls with access to energy services and benefits; and promoting public sector energy efficiency and institutional capacity for sustainability. Over its five-year term, the programme will install 1,000 micro-hydropower plants and rooftop solar panels for 23,000 schools and 2,500 healthcare facilities, with targets that will provide 1.5 million people in rural Khyber Pakhtunkhwa (KPK) and Punjab provinces with electricity.

CONTEXT

LOCATION

Pakistan

- Pakistan has an extreme energy deficit with uneven energy access.
- KPK has an electrification rate of below 20%.
- 20% of schools in KPK and 10% in Punjab are not connected to an electricity grid.
- KPK—with a population of 28.3 million—is one of the poorest provinces in Pakistan.

AIM SUMMARY

The renewable energy capacity funded will reach low-income rural populations, many of which do not have access to reliable modern energy services. The project yields significant carbon savings, stimulates economic growth, supports stable and clean civic infrastructure (hospitals and schools) and targets greater inclusion of women and girls—from providing maternal care to reducing the burden of collecting firewood. Importantly, the solar panels increase the energy resilience of health care facilities, including delivery and antenatal centres, with improved round-the-clock electricity.

IMPACT

OUTPUT (ISSUER KPIs)

- Install 182 MW of renewable energy capacity.
- 74,800 t of GHG emissions avoided per annum.
- 6,900 girls' schools equipped with solar panels.
- 500 primary healthcare facilities—used by women for maternity/antenatal care—equipped with solar.
- 3,000 women trained to use powered facilities.

RELATED SDGs

PROJECT

Intesa Sanpaolo Green Bond
Eolic Plan Project

As part of Intesa Sanpaolo's eleven wind plan projects, the company funded a 10 MW capacity onshore wind farm built in the municipality of Bisaccia in Italy. Comprising five turbines, each with 2 MW energy capacity, the wind farm was completed in 2016 and successfully connected to the national electricity grid. Italy is currently carrying out a renewal of its existing wind farms—about 20% of the wind power capacity in Italy (approximately 2 GW) is over ten years old.

CONTEXT

LOCATION

Italy

- 21st highest GHG emitting country in the world.
- 17% of energy mix from renewables.
- 38th highest energy consumption per capita.
- As an EU member state, Italy has key climate and energy targets to meet by 2030: increase renewable energy share to 32%; reduce its GHG emissions from 1990 levels by 40%.

AIM SUMMARY

Italy has made significant progress in increasing its renewable energy capacity; however, it still has a long way to go in order to meet the EU's Climate and Energy Framework 2030 targets. The project adds energy from renewable sources to the national grid, supporting the country's decarbonisation efforts. Wind power is one of the least controversial renewable energy technologies available and the wind sector in Italy is currently undergoing renewal to increase operational efficiency.

IMPACT

OUTPUT (ISSUER KPIs)

- 10 MW of renewable energy capacity installed.
- 21,300 MWh of renewable energy generated per annum.
- 7,997 t of GHG emissions avoided per annum.

RELATED SDGs

[1] *World Energy Outlook 2018*, IEA
Adapting to the Impacts of Climate Change, OECD, 2015
[2] *Who are the poor in the developing world?* World Bank Group, 2016

SECTOR

TRANSPORT

According to the International Energy Agency, transport overall accounts for 24% of global energy-related GHG emissions. Road vehicles—cars, trucks, buses and two- and three-wheelers—account for nearly three quarters of transport CO_2 emissions. The good news is that the pace of growth for global transport emissions decelerated from 1.6% annually over the last decade to 0.6% in 2018.[1]

PROJECT

Asian Development Bank (ADB) Green Bond
Jaipur Metro Rail Project

An underground metro line to improve the mass rapid transit system in Rajasthan's capital, Jaipur. The underground location will minimize physical congestion in the busy central business district and preserve Jaipur's cultural heritage and historic architecture. The metro rail network is expected to provide mass rapid transit capacity for the city's major corridors, aiming to reverse the rising shift to private cars and improve mobility in the region. The project also supports local employment by providing additional job opportunities, including for women.

CONTEXT

LOCATION

India

- 10th largest city in India with a population of 3.1 million in Jaipur city in 2011, projected to increase to 8.1 million by 2031.
- Modal share for public transport was 19% in 2009 – one of the lowest in cities with more than 3 million inhabitants in India

AIM SUMMARY

Jaipur is a fast growing city of cultural importance. The project serves the growing population while reducing emissions, by providing an efficient public transport option for citizens. The metro lines are mainly elevated along the major arterial roads and, underground, beneath the city's busy central zone.

IMPACT

OUTPUT (ISSUER KPIs)

- Target of 126,000 passengers per average day.
- 2 new stations to be completed by 2018.
- Extension of rail infrastructure by 2018.

RELATED SDGs


PHYSICAL INFRASTRUCTURE

Buildings were responsible for 28% of global energy-related GHG emissions in 2018.[1] Significant decarbonisation potential remains in the sector due to the widespread use of inefficient technologies, dated building stock, and a lack of both effective policy and investment in sustainable buildings. Heating and cooling demands also rose in 2018, a year characterised by record weather events, such as heatwaves, resulting in an increase of GHG emissions to an all time high.

PROJECT

Kommunalbanken Norway (KBN) Green Bond
Bergheim Dementia Centre

This project funded a new green building in south-eastern Norway's Halden municipality: a residential dementia centre with 96 apartments and day care facilities for a further 24 people. Constructed from timber materials, the building is heated by an underfloor system utilizing geothermal wells. The structure requires 20% less energy than a TEK16 building under Norwegian building regulation.

CONTEXT

LOCATION

Norway

- While Norway has low grid carbon intensity, electricity makes up 70-80% of energy used for heating buildings; oil and coal account for the balance.[2]
- The Norwegian government predicts that the number of people with dementia in Norway will double over the next 30-40 years, partly due to longer life expectancy.[3]

AIM SUMMARY

The project yields both social and environmental impacts, through increasing the provision of specialist healthcare services for those with dementia, while saving energy and reducing carbon emissions. The Norwegian population is ageing, and investing in improvements in social care services is a prudent strategy.

IMPACT

OUTPUT (ISSUER KPIs)

- 96 apartments for dementia patients.
- Capacity to serve 24 additional day patients.
- 10,200m^2 of heated area.
- 122,041 kWh of energy saved annually.
- 46 t of GHG emissions avoided annually.

RELATED SDGs



[1] *Tracking Clean Energy Progress 2018,* IEA
[2] Energy Facts Norway, 2018
[3] Dementia Plan 2020, Ministry of Health and Care Services, Norway

Source: Annex 3

SUSTAINABLE DEVELOPMENT GOALS Project Case Studies

SECTOR

TRANSPORT

According to the International Energy Agency, transport overall accounts for 24% of global energy-related GHG emissions. Road vehicles—cars, trucks, buses and two- and three-wheelers—account for nearly three quarters of transport CO_2 emissions. The good news is that the pace of growth for global transport emissions decelerated from 1.6% annually over the last decade to 0.6% in 2018.[1]

PROJECT

International Bank of Reconstruction and Development (IBRD) Green Bond
Sustainable and Resilient Transport Infrastructure

The São Paulo State Sustainable Transport Project aims to improve the state's transport and logistics efficiency, increase the modal share of waterway transport, and promote resilience to climate change and natural disasters. It is progressing towards these objectives through measures such as zoning; developing disaster response plans for transport sectors; reviewing road design and operations; and preparing prevention and contingency plans.

CONTEXT

LOCATION

Brazil

- São Paulo state has a population of 44 million and the state capital >12 million.
- The state faces significant challenges, with a stressed road network prone to congestion and accidents, and which is vulnerable to natural disasters.
- The state's poorer areas are most heavily impacted by flash floods and landslides resulting from extreme climatic events.

AIM SUMMARY

Under its current Climate Change Action Plan, IBRD aims to mobilise US$2bn in lending for adaption and resilient transport in middle-income countries.

This project improves quality of life, safety and climate resilience. It will also increase the interconnectedness between the sprawling megalopolis that is São Paulo and the state's rural region, promoting social mobility. A shift from road to waterway transport is also expected to curb GHG emissions.

IMPACT

OUTPUT (ISSUER KPIs)

Expected outcomes

- 50% reduction in road fatalities across the 100 most critical sites.
- 6 million tons/year freight in the Tietê-Paraná waterway (400% increase).
- 39 additional municipalities with disaster risk mapping.

RELATED SDGs

PROJECT

Icade Green Bond
Green Buildings

Pulse is a green office complex developed by real estate specialists, Icade. Located in the densely populated Paris outskirts, the property is due to be completed in 2019 and encompasses 28,700 sq m of floor area. Pulse is a low carbon building in a very holistic sense: energy efficient features enable low heat and power consumption and, in addition, the project avoided carbon emissions even during construction, through the re-use of materials. Another noteworthy feature is its rooftop vegetable garden, which is designed for rainwater collection and producing compost.

PHYSICAL INFRASTRUCTURE

Buildings were responsible for 28% of global energy-related GHG emissions in 2018.[1] Significant decarbonisation potential remains in the sector due to the widespread use of inefficient technologies, dated building stock, and a lack of both effective policy and investment in sustainable buildings. Heating and cooling demands also rose in 2018, a year characterised by record weather events, such as heatwaves, resulting in an increase of GHG emissions to an all time high.

CONTEXT

LOCATION

France

- France is the 4th biggest emitter of greenhouse gases in the European Union (which is the 2nd largest emitter globally).
- In France, the real estate sector accounts for 25% of GHG emissions.
- France is subject to EU regulations that require all new buildings to be *nearly zero-energy buildings* (NZEBs) by the end of 2020.

AIM SUMMARY

Pulse is designed to mitigate emissions throughout its lifecycle, while targeting an ambitious energy performance. It is, therefore, well-positioned to support France's path to decarbonisation. In addition to its mitigation impact, the building offers additional well-being, education and ecology benefits.

IMPACT

OUTPUT (ISSUER KPIs)

Certifications and Labels

- **NF HQE: Excellent** (Construction)
- **BBCA** (low carbon building)
- **E+C-** (positive energy, low carbon building)
- **ISO 14001** certification (business park)
- **EcoJardin** label
- Icade's total green building portfolio avoided **141 t of CO_2** during the reporting period.

RELATED SDGs

[1] *Tracking Clean Energy Progress 2018,* IEA

Source: Annex 3

SECTOR

ADAPTATION

Climate change can present a wide range of risks to our planet, economies and ecosystems, such as floods and droughts, changing patterns of infectious diseases and increased risks to crop yields and food security.

Since the pre-industrial age, our planet has already warmed by approximately 1 degree Celsius.[1] The effects of climate changes are already being felt across the globe and the ability to adapt to changing weather patterns and a warming world is becoming all the more important.

As the OCED reports[2], developing countries will be particularly affected by climate change—environmentally, economically and socially.

According to the World Bank[3], approximately 65% of the world's poorest work in agriculture—a sector particularly vulnerable to climate change.

Building resilience into infrastructure is critical, as it will be vulnerable to climate risks and environmental hazards.

PROJECT

International Bank of Reconstruction and Development (IBRD) Green Bond
Fujian Fishing Ports

Fujian is close to the source of typhoons that frequent the south-eastern coast. The project aims to reduce the vulnerability of fishing communities in the coastal province to extreme weather events. The project includes upgrading ports, training fishers in necessary preparations against seasonal storms and improving emergency response systems. Under this project, six fishing ports are due for expansion and infrastructure upgrades, to include breakwaters, docks, seawalls and sheltered water areas. Early warning response systems will be enhanced and a training centre established for fishers. The project seeks to protect the fishing community while facilitating sustainable development of the fishing industry.

CONTEXT

LOCATION

China

- China is ranked 29th country most vulnerable to climate risk. The Chinese coast has the highest number of typhoon landfalls in the world.
- Fujian is a south-eastern coastal province heavily affected by typhoons—on average, 49 landing and 91 affecting typhoons per year.
- The fishing industry in Fujian province makes up 30% of the agricultural sector's GDP.

IMPACT

OUTPUT (ISSUER KPIs)

- 11,000 fishers and their families—an estimated 64,000 people—benefit from increased protection and resilience against extreme weather events.
- 3,000 fishing vessels protected in ports.
- Improved effectiveness of early warning and emergency systems.

AIM SUMMARY

Fishers in vulnerable coastal China are greatly exposed to weather and climate risks due to the lack of resilient infrastructure and recovery measures in place for natural disasters. In the Fujian province, approximately 420,000 families depend on fishing for a living and are exposed to the region's typhoon risks, which include significant damage and loss of life. The frequency and severity of seasonal storms are increasing, due to changes in climate patterns, making it harder to predict and prepare for adverse weather. The project improves both storm infrastructure and fisher training and equipment, to better manage climate risks and hazards.

RELATED SDGs

PROJECT

International Financing Corporation (IFC) Green Bond
Córdoba Infra II Project

The project funds drainage and flood management schemes as part of a major road transport improvement initiative between the city centre and the main intercity central bus station, as well as paving new roads to develop tourism in the Alpa Corral region. The province has experienced devasting floods, the worst of which, in 2015, destroyed homes and bridges. The province also suffers from heavy traffic congestion and air pollution, with unfinished parts of a ring road presenting a safety hazard. IFC will provide the province with assistance in a traffic study once the roads are completed.

CONTEXT

LOCATION

Córdoba, Argentina

- Argentina is ranked 47th most vulnerable country in the Climate Risk Index 2019.
- The province of Córdoba is the second most populous in Argentina, with 3.6 million people, 40% of whom live in the capital.
- Academic surveys show rising poverty rates in Argentina, with approximately one third of the population under the poverty line.

IMPACT

OUTPUT (ISSUER KPIs)

Incorporating flood management and drainage into a comprehensive infrastructure project providing:

- Expansion of the provincial capital's ring road through 17km of new roads, underpasses and bridges.
- 67.6km of new roads for the Alpa Corral river region.

AIM SUMMARY

Although Córdoba is a major urban centre, it has a high poverty rate (approx 36%) compared to other regions in Argentina. It is densely populated and improving urban-rural connectivity in the region has been deemed a priority. The large infrastructure project promises to significantly improve traffic safety and congestion, provide farmers with easier access to the city centre and enable social mobility. The area has been vulnerable to floods from heavy rainfall and rivers—building long-term, climate-resilient infrastructure is critical for safeguarding the local population and promoting economic prosperity.

RELATED SDGs

[1] IPCC Fifth Assessment Report, 2018
Adapting to the Impacts of Climate Change, OECD, 2015
[2] *Who are the poor in the developing world?* World Bank Group, 2016

Source: Annex 3

Partnerships for Impact Measurement

Since 2016, when AIM first co-developed an impact reporting methodology for green bonds with Rockefeller Foundation funding, AIM has continued to work with market participants to push for continued evolution in this area. A key focus in 2018 was testing our Taskforce for Climate-related Financial Disclosures (TCFD) climate scenario reporting capability.

Developing TCFD-Aligned Physical Risk Assessment Tool for Green Bonds with South Pole

In 2018, we embarked upon a project with leading climate data experts, South Pole, to test and develop a TCFD-aligned physical risk assessment tool. The prevailing assumption among green bond market participants tends to be that, as a low carbon transition funding tool, green bonds are protected from climate risks. The case study shows otherwise, however, and highlights some potential material risks that should be considered by green bond issuers when looking at financing of assets. An example of a green bond framework analysis can be seen in Table 1. The full *Assessing Physical Risks of Green Bonds: A Case Study* can be accessed via our website at http://www.affirmativeim.com/publications. Physical Risk is measured as a +/- X% change in output.

Focus of top-down screening	Risk	South Pole risk score		
		2°C	3°C	4°C
Issuer's overall risk profile	Issuer's overall risk based on its core business activities and the geographic distribution of annual revenue	-2%	-13%	-46%
Risk profile of issuer's energy generation assets	Overall risk assessed for the issuer's generation facilities (Generation segment)	-2%	-15%	-48%
Risk profile of issuer's green bond framework	Assessed for projects financed by the green bond use of proceeds	-2%	-18%	-53%

Table 1: Three levels of analysis carried out to assess issuer's level of exposure to physical climate risks.

We determined that an issuer's level of exposure can vary significantly with the modelling of different warming scenarios, and green assets can be vulnerable. For example, extreme flooding and drought may severely affect the performance of hydropower assets—one of the leading renewable energy technologies deployed globally.

The South Pole physical risk assessment tool is forward-looking and examines three forms of green bond issuers' exposure to physical climate risks under different global warming scenarios. It analyses the issuer's overall risk profile, as well as the risk profile of energy generation assets and that of assets funded by the issuer's green bond framework. The tool provides an indication of the issuer's exposure to risk and its projected financial stability, with additional insight into the soundness and adequacy of measures to address future climate challenges.

The physical risk assessment tool can be used to enrich reporting frameworks for green and sustainability bonds, and to assess the climate resilience of the green bond market. Improved information also facilitates more focussed engagement between issuers and investors on the resilience of investments. AIM will use findings from the pilot study to strengthen our engagement with issuers on the vulnerability of their investments and/or operations, while seeking to enhance our own reporting on the resilience of portfolios for our clients.

Other examples of impact measurement partnerships in 2018

Carbon Yield® Case Study

Launched at Sustainable Finance Forum, AIM and ISS ESG shared a case study summarising our experience of applying the Carbon Yield® on over 55 green and sustainability bond issuers over two years, as part of AIM's impact reporting. This included expanding our GHG analysis to include footprint emissions, to supplement the Carbon Yield®, a measure of emissions avoidance. This recommendation is to help mitigate some of the baseline effects found in the Carbon Yield®—for example, a Swedish green building project may have a low Carbon Yield®, resulting from a smaller differential between project and baseline emissions, as buildings are generally constructed to higher efficiency standards. However, the overall scope 1 and 2 emission levels may be lower compared with a project in another country with higher baseline emissions, resulting in a larger amount of avoidance.

Learning from Climate Scientists and Experts in Svalbard

In 2018, AIM participated in the annual Ny-Ålesund Symposium, which focussed on climate risks, and was timed just ahead of the release of the 2018 IPCC report. The 53 delegates of this high-level convention in the High Arctic included climate researchers, investors, green bond issuers and policy makers. They came together to discuss how, collectively, the financial system can navigate climate risks. The symposium was hosted in Svalbard at 79 degrees north, the northernmost permanent human settlement and gateway to the North Pole. Ny-Ålesund is a leading centre for international Arctic scientific research and environmental monitoring and, at this unique hub, AIM met some of the world's leading climate researchers to discuss how financial markets can help solve climate challenges.

AIM's Commitment to Sustainability

Pure Play

AIM's investment strategy is exclusively in fixed income and cash investments, which generate positive environmental and social externalities. Being a pure play asset manager allows AIM to focus on its core competencies in impact investing, without other distractions. AIM's approach is a fusion of mainstream portfolio management and strict sustainability criteria, with no compromise to either.

Carbon Neutral

AIM demands the same degree of responsibility from itself as from its invested issuers. One example of this is AIM's operational carbon neutrality. AIM annually calculates the operational footprint of the company's purchased office products, office energy use and business travel, and offsets them through an official UNFCCC project. The project chosen for this year's emissions was the *Bundled Wind Project by Sahyadri Industries Limited,* which generates electrical energy through sustainable means using wind power. The electricity is supplied to the Indian grid to replace energy that would have been generated by GHG-intensive fossil fuel-based thermal power plants.

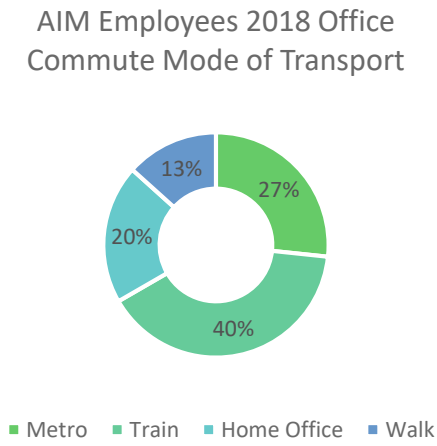
Source: UNFCCC

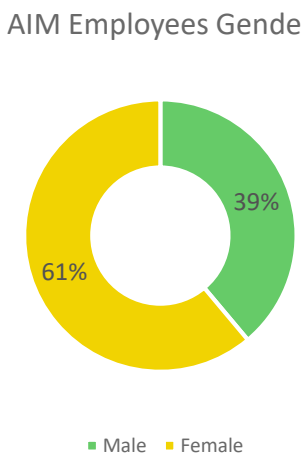
Employee Sustainability and Diversity

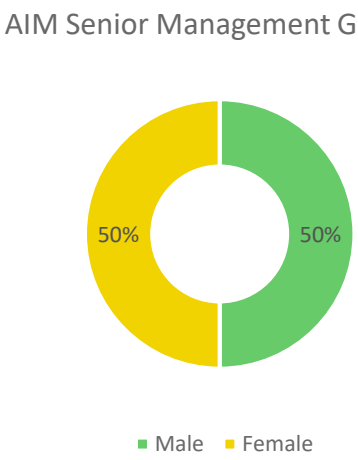
AIM's employees have a commitment to sustainability, which extends to their daily commute, as can be seen in the below chart. **100% of all their journeys to and from the office is low carbon travel.**

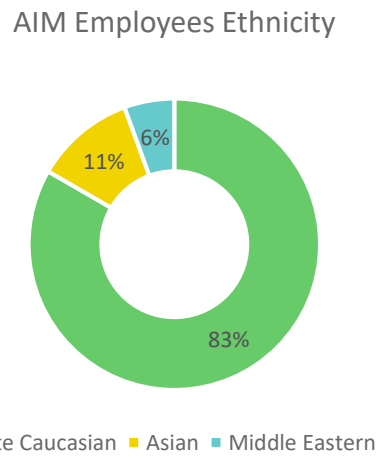
AIM recognises that a talented, skilled and diverse workforce is central to both our corporate ethos and our success. The diversity of our team promotes innovation, flexibility, business strength and strategic clarity. **AIM is pleased to report that, as of end-2018, our workforce was 61% female, and completely balanced at the senior level.**

AIM employees were of three major ethnic groups and six nationalities, as of end-2018. We speak eleven languages.









[1] UNFCCC, https://offset.climateneutralnow.org/bundled-wind-project-by-sahyadri-industries-limited

Source: AIM Internal Survey

Annex 1
AIM ELIGIBLE ENVIRONMENTAL AND SOCIAL SECTORS

Affirmative Investment Management

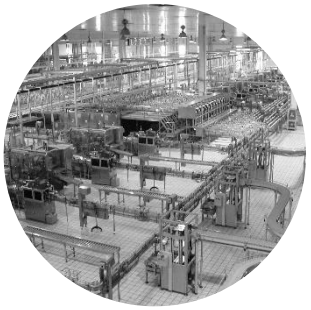
Eligible Environmental Sectors

Energy

- Renewable energy, such as solar, wind, wave, tidal, geothermal, hydropower and hydrogen (under certain conditions).
- Grid: transmission, distribution, and infrastructure efficiencies and resilience.
- Energy efficiency technologies, installations and systems design to reduce energy consumption.
- Clean energy access for underserved areas.

Land Management

- Sustainable agriculture and forestry.
- Integrated landscape planning, maximising carbon efficiency, sequestration and ecosystem resilience.
- Regulatory conditions to promote diverse and resilient communities and landscapes (zoning, easements, etc).
- Biodiversity conservation and ecosystem restoration.



Resource Efficiency

- Sustainable, green materials management and substitution, including in green buildings.
- Pollution prevention and remediation: air, water and soil.
- Waste management, reduction and recycling.
- Responsible supply chains.

Water Resource Management

- Watershed management and planning, including investment in catchments and aquifer recharge areas.
- Water use efficiency: new and retrofitted water supply and consumption infrastructure.
- Water restoration and water quality management, particularly with innovative materials and technologies, and practices.

Infrastructure

- Transport: sustainable mass transit infrastructure, efficient and low carbon public and private fleets.
- Water supply and sanitation infrastructure.
- Coastal zone and flood area protection.
- Resilient built environment and green building stock.
- Soft infrastructure: telecommunications and broadband connectivity, internet of things (IoT).

Marine Environment & Fisheries

- Pollution prevention and clean up in the marine environment.
- Biodiversity and fishing stock management and regulation.
- Environmentally sound coastal zone management.
- Chemical and biological restoration of critical marine areas.

Eligible Social Sectors

Global Health

- Access to immunisation and other medical resources and services, through financing, distribution infrastructure and training.
- Access to healthcare in the form of hospitals, clinics, trained healthcare workers and information.
- Innovation in healthcare products, financing, distribution and services.

Financial Inclusion & Sustainable Enterprises

- Access to microfinance and financial services in underserved communities through regulation, financial institutions and technology.
- Access to funding for SMEs.
- Technical, energy and resource efficiency capacity building for SMEs.

Education, Training & Employment

- Access to education, safe schools, teaching materials and teachers, food programmes and financial incentives for families.
- Employment training for new and re-entering job seekers in green and new economy sectors.

Food Security

- Crop insurance and risk sharing schemes to increase producer resilience to climate and other stresses.
- Water rights institutions to protect access by vulnerable groups.
- New cropping techniques and resilient crop varieties.
- Expanded market access through financial, regulatory and physical infrastructure.

Empowerment Of Women & Vulnerable Groups

- Activities promoting gender equality, eg education and training for women and girls.
- Access to improved maternal and child health services.
- Social and regulatory services to support protection and resilience of vulnerable and war ravaged groups.

Social Housing

- Affordable housing for vulnerable groups.
- Access to credit for housing for disadvantaged groups.
- Shelter/temporary housing facilities.
- Activities and initiatives addressing homelessness.
- Integrated community planning.

ANNEX 2
METHODOLOGIES

Affirmative
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AIM Impact Report Methodology

Issuer reporting is heterogeneous, utilising different methodologies, reporting formats and performance indicators. This often means that we cannot compare reported impact data accurately nor appropriately.

The impact metrics included in this report can be considered underestimates for two key reasons:

- Not all issuers are able to report on 100% of the portfolio. This may be due to a range of reasons, such as issuers having insufficient resources, or gaps in initial data collected to permit reasonable calculations, or lack of impact metric methodologies and expertise.
- AIM and our partners (eg ISS ESG) were not able to use the supplied/reported impact data. This will be the case if, for example, there are differences in issuer reporting methods or a lack of transparency exists in how the figures were calculated.

The aforementioned barriers to impact reporting persist in the market. However, AIM engages with issuers to encourage market consistency in reporting, including adoption of industry best practices, such as disclosing their reporting methodologies, appropriate references to baselines and higher levels of disclosure—for example, prorated project-specific information, where available. This report has attempted to standardise the diverse methodologies and metrics used by issuers, where possible.

The overall methodology by which we collected, evaluated and processed impact data to present in this 2018 report is as follows:

1. Verified issuers' reporting and transparency of proceeds commitments as part of our SPECTRUM Bond® analysis. (Issuers with poor reporting practices are excluded or placed on the watchlist.)
2. Collected impact bond issuer proceeds commitments and impact performance metrics. Issuers tend to report annually on the anniversary of the first impact bond issuance and use different reporting periods.
3. Engaged with all invested impact bond issuers requesting greater disclosure, targeting project specific data where possible. To limit double counting, AIM requests issuers to determine their financing share of projects, permitting calculation of impact bond issuer prorated project information.
4. Tagged and categorised issuer-reported impact bond data by AIM sectors, sub-sectors, region, country and SDG alignment at the project level per issuer. Projects and bonds can be aligned to more than one SDG and sector.
5. Estimated portfolio share of impact data as a percentage of portfolio holding amount to total relevant impact bond funding. For example, if the 2018 LO Funds - Global Climate Bond had an average time-weighted holding of US$1m of a US$500m green bond funding programme—the Fund will be allocated 0.2% of reported impact bond key performance indicators (KPIs).
6. Calculated portfolio time-weighted sector, geographic and SDG distribution in USD equivalent terms and portfolio-adjusted KPIs using the above data.

NOTE: Where the issuer reports at bond level, we included only projects associated with the bond held in our portfolio. Otherwise, as a general rule, AIM takes projects at the full framework level annually, or if annual reporting is not available, since inception.

7. Where relevant and possible, calculated independent portfolio metrics in adherence to international best practices, such as the Greenhouse Gas Protocol, with leading climate data specialists. Non-mitigation focussed activities and social bonds are excluded from GHG emissions estimates currently.

Independent GHG Emissions Footprint Methodology

AIM collaborated with leading climate data specialists at ISS ESG to estimate portfolio GHG emissions. GHG emissions are divided into scope 1, 2 and 3 as per the Greenhouse Gas Protocol Standards, developed by the World Resources Institute and World Business Council for Sustainable Development. They are the most widely used GHG accounting standards in the world and include the seven greenhouse gases, as defined in the Kyoto Protocol.

Emissions are calculated at both the impact bond issuer and framework levels. In the case of a green bond, scope 1 and 2 emissions are represented by the issuer's operational emissions. Scope 3 emissions are those caused by the specific activities financed by the bond. The estimated GHG emissions are proportional to the investment's share of total financing. It is important to emphasise that the bond itself does not yield these emissions; rather, this is a metric that is supposed to help illuminate the relative GHG share of investing in an issuer's debt. A conservative approach has been taken in the choice of assumptions and emission factors—in other words, when selecting data points, the value generating the highest amount of emissions has been chosen.

Impact Bond Issuer GHG Emissions:

1. ISS ESG uses an extensive database of 25,000 companies to gather the issuer's emissions. If the issuer credibly discloses the amount of GHG emissions from its operations, these numbers are used. If the issuer does not credibly disclose its greenhouse gas emissions—eg only discloses part of their total emissions—the emissions are calculated using an approximation model based on the ISS ESG data and its 800 sub-sector specific models.
2. The impact bond commitment/disbursement's share of the organisation's total outstanding debt is calculated to understand the percentage of emissions financed by the loans.
3. The results are presented as GHG emissions of the commitment/disbursement, ie total GHGs emitted during the financed year allocated to the bond framework.

Impact Bond Proceeds GHG Emissions:

1. Impact bond issuer and proceeds information is gathered: for example, type of technology financed, allocation of proceeds per technology, geographic location, and project specific information such as renewable energy capacity installed, green building certification achieved, or rail length constructed. If data gaps occur, AIM and ISS ESG engage with the issuer to gather further information.
2. If the issuer discloses project GHG emissions data of a high quality, these are used. If the issuer does not adequately disclose project emissions, estimates are made based on the best information available. ISS ESG makes a GHG estimate regardless of whether the company discloses project emissions or not and this is also used as a reference for quality checking emissions disclosures.
3. GHG estimates are made based on the best information available. If data is available, project level calculations are made. If project specific data is lacking, technology level information is used.
4. GHG estimates are allocated to the green bond framework, proportional to the investment's share of total project financing. The results are presented on an annual and lifetime basis.

About ISS ESG

ISS ESG is the responsible investment arm of Institutional Shareholder Services Inc, the world's leading provider of environmental, social and governance solutions for asset owners, asset managers, hedge funds and asset servicing providers. With more than 30 years of corporate governance expertise and 25 years of providing in-depth responsible investment research and analytics, ISS ESG has a unique understanding of the requirements of institutional investors. With its comprehensive offering of solutions, ISS ESG enables investors to develop and integrate responsible investing policies and practices, engage on responsible investment issues, and monitor portfolio company practices through screening solutions. It also provides climate data, analytics and advisory services to help financial market participants understand, measure and act on climate-related risks across all asset classes.

Carbon Yield® Methodology

The Carbon Yield® quantifies the environmental impact of a green bond in terms of GHG emissions avoided through the financed activities and was jointly developed by Lion's Head Global Partners, ISS ESG and AIM, with funding by the Rockefeller Foundation. Carbon Yield® is an open access methodology, available for issuers and investors to use. In 2018 AIM published a case study on our experience of applying the Carbon Yield®, which can be accessed at http://www.affirmativeim.com/publications

The impact is expressed in Potential Avoided Emissions (PAE) enabled by the use of proceeds of the bond in terms of tonnes of CO_2e/year/unit of capital.

Full details on the Carbon Yield® can be found at www.carbonyield.org

1. Projects and activities funded through the issuer's green bond framework are identified and categorised according to sector and technology.
2. Relevant baselines for each project/activity type are identified. To calculate the abatement potential of an activity, a reference emissions baseline is applied.
3. For each project (and/or activity), the potential annual GHG abatement is calculated. This metric is defined as the average GHG abatement for the underlying project's expected lifetime, or the operating GHG abatement, adjusted for the construction years (where relevant). Under the initial proposal, the Carbon Yield® is not adjusted for GHG emissions created during the construction phase, although in time and as disclosure improves, the market may move to demand such an adjustment. The number of construction years is accounted for within the total project lifetime, however, such that the average abatement is an average over the whole project lifetime, including the construction phase.
4. The capital cost of the project is inputted. Where the full capital cost is not known, it can be imputed from technology benchmarks, published by entities such as the International Renewable Energy Agency (IRENA) and other industry organisations.
5. By combining the annual abatement potential with the capital cost of the project, the annual potential GHG abatement per unit of invested capital can be derived.
6. Once the annual potential GHG abatement per unit of invested capital is known, an issuer can allocate that potential abatement to the quantum of capital that they have invested in or committed to the project.
7. By taking a weighted average of the potential abatement impact per capital invested for each activity in the framework, the issuer can calculate the Carbon Yield® per unit of invested capital of their green bond framework, ie the Carbon Yield® of the green bonds issued under such a framework. Alternatively, if the issuer does not provide a Carbon Yield® for their security, the investor can still use this approach to calculate the Carbon Yield®, as long as certain base information regarding the use of proceeds is provided (through the green bond framework).
8. Individual bond Carbon Yields® are then aggregated to determine the portfolio-weighted GHG emissions avoided per US$1,000 invested.

Independent GHG Emissions Avoided Methodology

The below elaborates on the Carbon Yield® methodology.

Avoided GHG emissions are defined as emissions that would have been released if a particular action or intervention had not taken place. The emissions avoided by using a more efficient product or service are often dependent on either consumer or market behaviour. This analysis does not make absolute predictions about behaviour or market developments. Consequently, the avoided emissions presented are not assured or verified by a third party and are conditional upon certain behaviours, but provide an estimate of the climate change mitigation impact of impact bonds.

To quantify an amount of potential avoided GHG emissions, a baseline must be established. The baseline describes what would have occurred if the product or service had not been made available. The avoided GHG emissions are made up from the difference in GHG emissions between the baseline level and the scenario where the product or service is made available.

The choice of assumptions and emission factors has followed a conservative approach. In other words, when selecting data points, the value generating the lower amount of avoided GHG emissions has been chosen. Conservative values and assumptions are those that are more likely to underestimate than overestimate GHG reductions, as recommended by the GHG Protocol for Project Accounting.

Methodologies are specific to the technology financed—the following example is used to calculate the avoided emissions of the leading sector supported by LO Funds - Global Climate Bond:

Energy – Renewable Energy Generation

1. The allocation of proceeds for the sector, and per project (where information is available), is acquired. Additionally, where project level information is available, the total cost of the project is ascertained to understand the percentage of emissions financed by the impact bond allocations.
2. Where available, the geographical location per project is used. Where this is not possible, the geographical distribution is used to allocate weightings to types of renewable energy projects.
3. Where available, the generation capacity (MW) is used. Where generation capacity cannot be obtained at project level, the financed capacity is estimated using the cost of MW per geographic location and the total proceeds allocated to the technology.
4. The annual generation (MWh) is calculated using geographical average capacity factors. Where information is available, country level average capacity factors are used—otherwise, average capacity factors at the regional level are used.
5. IEA 2018 grid emission factors per country, or per region, are used to calculate the emissions that would have been produced with grid-based electricity from equivalent annual generation. IEA grid emissions factors were chosen to promote consistency across countries, versus using national grid emission factors, for example.
6. In the case where the cleaner technology emits a substantial volume of GHGs, these emissions are calculated based on the annual generation (MWh) and the emission intensity of the technology. In the case of most renewable energy technologies, these emissions are considered negligible.
7. The resulting figure, which is the difference between the emissions from the use of grid-based electricity and those of electricity from renewable sources, equals avoided emissions—the potential amount of avoided emissions when substituting grid electricity with electricity from renewable sources.
8. The results are presented on an annual and lifetime basis.

ANNEX 3
RESOURCES

Affirmative
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Management

Acronyms

Please note issuer name acronyms can be found on pages 40-41.

AIM	Affirmative Investment Management
AUM	Assets Under Management
bn	Billion
bps	Basis Points
C	Celsius
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
EPA	United States Environmental Protection Agency
GHG	Greenhouse Gas
GW	Gigawatt
IEA	International Energy Agency
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Association
km	Kilometre
LO	Lombard Odier
m^2	Metres Squared
m^3	Cubic Metres
m	Million
ML	Megalitres
MW	Megawatt
MWh	Megawatt Hour
OECD	Organisation for Economic Cooperation and Development
SDGs	Sustainable Development Goals
TCFD	Task Force on Climate-related Financial Disclosure
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
WHO	World Health Organisation
WRI	World Resources Institute

Impact Data Sources

The underlying issuer impact data is sourced from the below:

Name of Issuer	Referenced Issuer Report	Independent GHG Analysis	AIM Engagement (Verification & Impact)	AIM Data Request Response Received
ABN Amro	Green Bond Impact Report 2017, Green Bond Assurance Report KPMG 2018	Y	Y	Y
ACS Servicios	Preliminary information received ahead of annual reporting	Y	Y	Y
Administrador de Infraestructuras Ferroviarias (ADIF)	Green Bond Annual Report 2017, 2018	Y	Y	Y
Alliander	Green Bond Report 2016	Y	Y	Y
Asian Development Bank (ADB)	Green Bond Eligible Projects 2018	Y	Y	N
Atrium Ljungberg	Green Bonds Investor Letter 2017, Green Bonds 2018	Y	Y	Y
Australia and New Zealand Banking Group (ANZ)	Interim SDG Bond Use of Proceeds and Impact Report 2018	Y	Y	Y
Bank of China	Annual Report on Bank of China's Green Bonds (as of 31st Dec 2017)	Y	Y	Y
Barclays	Green Bond Investor Report (2019)	Y	Y	Y
Bazalgette Finance	Green Bond Impact Report 2018	N	Y	Y
Berlin Hyp	Annual Reporting 2018/2019	Y	Y	Y
Caja Rural de Navarra	Preliminary information received ahead of annual reporting	N	Y	Y
Cassa depositi e prestiti (CDP)	Social Bond 17 - CDP Social Bond Report, CDP Sustainability Bond Presentation	N	Y	N
China Development Bank (CDB)	2018 Report on China Development Bank's 2017 Green Bond, Attestation of Use of Proceeds Report 31-12-2018, EY Post Issuance Attestation	Y	Y	N
City of Madrid	Project list 2018	N	Y	Y
City of Oslo	Side letter - use of proceeds 2016	Y	Y	Y
Commerzbank	Green Bond Presentation 2018	Y	Y	Y
Danone	Integrated Annual Report 2018	N	Y	N
Deutsche Kreditbank (DKB)	2017 Impact Report	Y	Y	N
Enel Group	Enel Green Bond Report 2018	Y	Y	Y
European Investment Bank (EIB)	2019 Climate Awareness Bond Newsletter, 2015 Climate Awareness Bond Newsletter, 2017 Climate Awareness Bond Allocation By Bond	Y	Y	Y
Ferrovie dello Stato Italiane	Preliminary information received ahead of annual reporting	N	Y	Y
Fingrid	Green Bond Investor Letter and Impact Report 2019	Y	Y	Y
First Abu Dhabi Bank (FAB)	Green Bond Report 2018, 2019	Y	Y	Y
Greenko	Investor letter for AIM, Green Bond Certification	Y	Y	Y
Hanjin International Corporation	Sustainalytics Second Party Opinion, LEED Certification	Y	Y	Y
Hera	Green Bond Projects 2017	Y	N	N
Hypo Vorarlberg	Impact Reporting Green Bond 2017-2022	Y	Y	Y
Iberdrola	2018 Sustainability Report	Y	Y	Y
ICADE	ICADE Green Bond Report 2017	Y	N	N

Impact Data Sources

The underlying issuer impact data is sourced from the below:

Name of Issuer	Referenced Issuer Report	Independent GHG Analysis	AIM Engagement (Verification & Impact)	AIM Data Request Response Received
Indian Railway Finance Corporation (IRFC)	Green Bond Framework documentation	N	N	N
Industrial & Commercial Bank of China (ICBC)	ICBC 2017 Green Bond Report	Y	Y	Y
International Bank of Reconstruction & Development (IBRD)	World Bank Green Bond Impact Report 2018	Y	Y	Y
International Finance Corporation (IFC)	Green Bond Report (2018)	Y	Y	Y
Intesa Sanpaolo	Green Bond Report 2018	Y	Y	Y
K-water	Green Bond Investor Presentation	N	Y	N
KBC Bank	Green Bond Investor Presentation 2018, Use of Proceeds Workbook for AIM	Y	Y	Y
Kommunalbanken Norway (KBN)	Impact Report 2018	Y	N	N
Korea Export Import Bank (KEXIM)	Use of proceeds workbook for AIM, Green Bond newsletter 2015, Green Bond newsletter 2017, Green Bond newsletter 2018	Y	Y	Y
Korean Development Bank (KDB)	KDB Investor Newsletter 2018	Y	Y	Y
Kreditanstalt für Wiederaufbau (KfW)	Green Bond Reporting 2018	Y	Y	Y
Lietuvos Energija	Green Bond Projects Portfolio, Green Bond Investor Letter 2017, Preliminary information ahead of annual reporting	Y	Y	Y
Metro de Santiago	2018 Annual Report	N	N	N
Mitsubishi UFJ Financial Group (MUFG)	Further use of proceeds breakdown fro AIM, MUFG Green Bond Reporting	Y	Y	Y
MuniFin	Green Bonds Impact Report 2018	Y	Y	Y
National Australia Bank (NAB)	Green Bond Report 2017	Y	Y	Y
Nederlandse Waterschapsbank (NWB)	Green Bond Newsletter 2018	N	Y	Y
Nordic Investment Bank (NIB)	Environmental Bond Report 2018	Y	Y	Y
Prologis European Logistics Fund	2018 Green Bond Report	Y	Y	Y
Province of Ontario	Green Bond 2018 Newsletter	Y	Y	Y
Queensland Treasury Corporation	Green Bond Report 2018	Y	N	N
Régie Autonome des Transports Parisiens (RATP)	RATP Green Bond Framework, 2018 Green Bond Impact Report	N	Y	Y
Severn Trent	Annual Report 2018	Y	Y	Y
Scottish and Southern Energy (SSE)	Green Bond Framework documentation	Y	Y	N
Sumitomo Mitsui Financial Group (SMFG)	Green Bond Investor Presentation, Annual Review 2018, 2018 Green Bond Monitoring Report	Y	Y	N
Swire Properties	Swire Properties Green Bond Impact Report 2018	Y	Y	Y
Toronto-Dominion	2017 Green Bond Use of Proceeds	Y	Y	Y
Transport for London	Green Bond Management Assertion 2016, Email to AIM	Y	Y	Y
Türkiye Sinai Kalkinma Bankasi (TSKB)	2019 Allocation Impact Reporting	Y	Y	Y
Unibail-Rodamco	2016 Annual Report	Y	Y	Y
Verbund	Green Bond Fully Allocatd (20198)	Y	Y	Y
Westpac	Westpac Climate Bond Impact Report 2018	Y	Y	Y

Resources

In addition to the referenced reports in the footnotes, data from the below were also used in the report.

Databases & Websites

Climate Action Tracker: https://climateactiontracker.org

ICMA Green, Social and Sustainability Bond Principles: https://www.icmagroup.org/green-social-and-sustainability-bonds/

IEA Energy Statistics: http://www.iea.org/statistics/statisticssearch/

UNFCCC, Interim, Nationally Determined Contribution (NDC) Registry: http://www4.unfccc.int/ndcregistry/

UNFCCC, Paris Agreement 2015 (updated 2016): http://unfccc.int/paris_agreement/items/9485.php

UN Department of Economic and Social Affairs, World Urbanization Prospects (2018): https://esa.un.org/unpd/wup/

UN Water: http://www.unwater.org/

Sustainable Development Goals: https://sustainabledevelopment.un.org

World Bank, Open Data: http://data.worldbank.org/

World Energy Council, World Energy Resources: https://www.worldenergy.org/data/

World Health Organisation, Health Topics: https://www.who.int/health-topics/

World Resources Institute, CAIT Climate Data: https://www.wri.org/resources/websites/cait

Reports

AIM, South Pole, Assessing Physical Risks of Green Bonds: A Case Study, 2019: https://tinyurl.com/y362hb7b

Climate Bonds Initiative, Green Bonds: The State of the Market 2018

Climate Bonds Initiative, 2018 Green Bond Market Highlights

Germanwatch e.V., Global Climate Risk Index 2019 Report: https://germanwatch.org/en/16046

IEA, World Energy Outlook 2018: https://www.iea.org/weo2018

IEA, Tracking Clean Energy Progress 2018: https://www.iea.org/tcep

IEA, Global Energy & CO_2 Status Report 2018: https://www.iea.org/geco

OECD, Financing Water: Investing in Sustainable Growth 2016

PBL Netherlands Environmental Assessment Agency, Flood Risks: http://themasites.pbl.nl/flood-risks/

United Nations Intergovernmental Panel on Climate Change (IPCC), Global Warming of 1.5 Celsius: https://www.ipcc.ch/sr15/

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