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INCOME WITH IMPACT

The Case for Green Bonds

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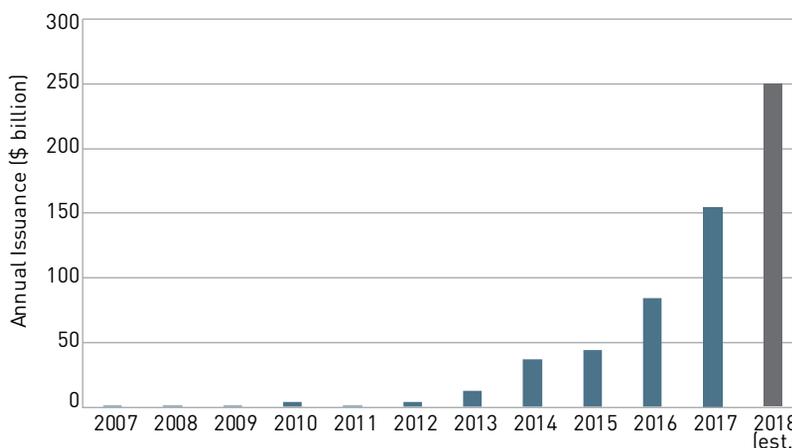
The size of the green bond market has increased significantly in recent years, with issuance nearly doubling from 2015 levels in 2016, from \$41 billion to \$82 billion; 2018 issuance levels are expected to come in at approximately \$250 billion (see figure 1).¹ The increased demand for green bonds has come from a range of investors including institutional pension and endowment funds with environmental, social, and governance (ESG) mandates and individual investors looking to add a green focus into their fixed income allocations.

Green bonds are simply conventional bonds with an environmentally friendly use of proceeds. Today the overall market resembles a core global fixed income benchmark, with similar yield, duration, and credit quality. Investors can allocate a portion of their global bond allocation to green bonds without significantly altering the risk and return profile of their portfolios. In other words, bond investors can structure more environmentally aware portfolios without having to compromise their investment goals.

Although green bonds represented only about 1 percent of total bond issuance in 2016,² there is tremendous potential for continued growth. We believe that the issuance of green bonds likely will scale up massively in a short amount of time to finance the projects needed to help transition to a low-carbon economy. This represents a significant opportunity for fixed income investors.

Figure 1

GREEN BOND ISSUANCES



Source: Climate Bonds Initiative

Table 1

COMMON GREEN PROJECT CATEGORIES

Energy	Buildings	Industry	Transport
Solar	Energy Efficiency	Energy Efficient Products	Rail
Wind	Smart Lighting	Cogeneration	Transport Logistics
Energy Storage	LEED (Leadership in Energy and Environmental Design) Buildings	Waste Heat Recovery	Electric Vehicle Loans
Information Technology	Waste and Pollution	Agriculture and Forestry	Adaptation
Smart Grid	Waste to Energy	Agriculture Efficiency	Resilience Infrastructure
Technology Substitution	Greenhouse Gas Capture	Reforestation	Flood Protection
Broadband	Recycling	Carbon Sequestration	Desalination

Source: Climate Bonds Initiative

WHAT ARE GREEN BONDS?

A bond is generally considered to be “green” if the issuance proceeds are used

solely to finance projects or activities that have a positive environmental impact. When issuers clearly indicate to

investors how a green bond's proceeds will be used, the bond receives a "green label." Carbon emissions mitigation to combat global warming often comes to mind when discussing green bonds (and some use the term "climate bonds" interchangeably), but green bonds also can be used to finance other objectives (see table 1).

WHAT DOES THE "GREEN LABEL" MEAN?

It should be noted that there is no market-wide, exhaustive list of green bond-eligible projects. Historically issuers have been able to assess whether a project is in line with climate mitigation or some other environmental goal and have self-labeled bonds as green. In many cases, such as building a solar or wind farm, this assessment is straightforward and a green label would not be ambiguous. However, as market size and investor interest have grown there has been growing demand for independent third-party evaluations to verify that a green bond is, indeed, green.

Although the green label has begun to attract investor attention as a way to identify bonds that have a clearly disclosed use of proceeds that aims to benefit the environment, there is also a much larger (approximately \$576 billion³) universe of unlabeled green bonds. Many infrastructure projects that might be considered green, for example municipal water projects, were financed through bond issuance long before the relatively recent development of the green bond market. Many issuers of unlabeled green bonds may not feel the additional disclosure or cost of verification is worth the expense. Or they simply may be unaware of the tremendous interest in labeled green bonds.

Another example of unlabeled green bonds relates to bonds issued for general corporate purposes by "pure-play"⁴ companies, such as manufacturers of solar panels or electric cars. Although the businesses of these firms are inherently environmentally friendly, market

participants do not consider these bonds to comply with best practices because the use of proceeds is not specified at the time of issuance, and therefore the bonds do not carry a green label. To be sure, proceeds may go toward activities or projects considered environmentally friendly. However, they also could finance non-green activities such as a dividend payment or share repurchase.

Given that the market is still in its early years, we believe that the green label is essential in providing confidence to investors that their investment is promoting environmentally sustainable projects and is needed to promote future market growth.

Under the agreement, signatories must submit and report on carbon emission targets, and developed nations agreed to supply \$100 billion to fund projects in developing countries. However, each country sets its own target and there is no guarantee that the carbon emissions targets set will be sufficient to meet the 2°C target.

THE CLIMATE CHALLENGE AND THE ROLE OF GREEN BONDS

Discussions about climate change and carbon emissions can elicit debate and rhetoric around both the causes of, and solutions to, global warming. However, some facts generally can be agreed upon. First, the concentrations in the earth's atmosphere of greenhouse gases such as carbon dioxide, methane, and nitrous oxide have increased since the Industrial Revolution, and they began to increase exponentially in the middle of the 20th century.⁵ Second, average

temperatures have been increasing, particularly in the past 30 years, and 2016 went into the history books as the warmest year on record since modern recordkeeping began in 1880.⁶ Lastly, as the effects of climate change have begun to have a more noticeable, more frequent impact all over the world, people are demanding action from their leaders. Governments around the world have begun to respond.

PARIS AGREEMENT SIGNALS REAL PROGRESS, DESPITE U.S. WITHDRAWAL

The most significant progress to date occurred at the December 2015 meeting of the parties to the United Nations Framework Convention on Climate Change, referred to as the Conference of the Parties (COP). At "COP 21" in Paris, an agreement to limit global warming to 2° Celsius from pre-industrial levels was reached. The agreement was ratified the following year when countries representing 55 percent of global greenhouse gas emissions signed on, including, importantly, the United States and China. Under the agreement, signatories must submit and report on carbon emission targets, and developed nations agreed to supply \$100 billion to fund projects in developing countries. However, each country sets its own target and there is no guarantee that the carbon emissions targets set will be sufficient to meet the 2°C target. Further, some believe that even if the target can be reached, it is insufficient to reverse the impacts and consequences of the damage that already has been done.

The June 2017 decision by the United States to withdraw from the Paris Agreement has brought uncertainty around the U.S. commitment to reach the 2°C target, at least at the federal level. However, these goals are necessarily long-term in nature, and even if the United States wavers in its obligation over the next few years, progress is expected to continue globally (see figures 2 and 3). Despite the decision to withdraw from the agreement, the

Figure
2

CLIMATE-RELATED GOALS ...

1992

Earth Summit,
Rio de Janeiro

- Creation of United Nations Framework Convention on Climate Change
- Framework for international cooperation to combat climate and adaptation

1995

Conference
of the Parties
(COP) 3, Kyoto

- Adoption of Kyoto Protocol
- Set carbon emissions targets
- Largest greenhouse gas emitters (United States and Canada) did not ratify

2005

COP 11,
Montreal

- Kyoto signatories extend agreement and seek deeper emissions cuts

2011

COP 17, Durban

- Participants agree to work toward legally binding deal
- Established Green Climate Fund to assist developing countries

2015

COP 21, Paris

- 195 countries commit to reducing greenhouse gas emissions
- Set goal of limiting global warming to below 2° Celsius

2016

Paris Agreement
Ratified

- Countries representing more than 55 percent of greenhouse gas emissions ratify agreement
- Includes United States and China

Source: S&P

Figure
3

... AND POLICIES TO ACHIEVE THEM, WHICH MAY PROMOTE GROWTH OF GREEN FINANCE

California

Passed legislation to reduce emissions to 40 percent below 1990 levels by 2030, with plans to increase renewable energy usage, cut emissions, and increase energy efficiency

China

Government introduced official green bond guidelines and proposed tax incentives

France

Adopted mandatory climate reporting for companies and institutional investors

Mexico

Adopted law to decrease greenhouse emissions by 50 percent by 2050

New York
City

City pension funds issued request for proposals calling for carbon footprint analysis and climate risk investment strategy consultant

Switzerland

Vote to implement a sustainable resource policy received 36 percent support

United
Kingdom

Bank of England called for more rapid development of green bond market to address climate change risks

Source: S&P

United States already has made significant progress in reducing greenhouse gas emissions in recent years and few expect that trend to reverse. In addition, many states and cities are pursuing ambitious emissions reductions programs, many in alignment with the goals of the Paris Agreement. These programs, as well as the necessary investment needed to upgrade aging U.S. infrastructure, will further highlight the need for additional green financing initiatives, including green bonds.

CLIMATE GOALS COME AT
A STAGGERING COST

Despite these hurdles, many governments around the world are making concerted efforts to slow down the effects of climate change through policies and regulations. Governments, municipalities, and companies in developed and developing countries must

make significant investments to achieve the goals that have been established. The amount of investment needed is staggering, estimated at \$53 trillion to \$93 trillion over the next 15 to 20 years.⁷ With ratios of debt to gross domestic product in developed economies already at or exceeding 100 percent,⁸ governments do not have the resources to make the needed investments to transition to a low-carbon economy. Private capital is therefore needed to fill this financing gap. The global-debt capital markets, with more than \$90 trillion currently outstanding,⁹ are expected to play a vital role.

For these reasons, green bonds have begun to receive the attention of both issuers and investors worldwide. Although green bond issuance has exploded in recent years, 2016 issuance was still only about 1 percent of total

bond issuance during the year.¹⁰ Issuance of green bonds will need to scale up massively in short order to finance the projects needed to transition to a low-carbon economy.

MARKET STANDARDS TO
PROMOTE GROWTH

Progress toward establishing a commonly accepted definition of a green bond standard against which green bonds can be evaluated is also contributing to the green bond market's rapid growth. In the first few years of the green bond market's existence, the self-labeled nature of the market led to concerns that issuers could apply proceeds of green bonds toward non-green purposes, sometimes referred to as "greenwashing." This "wild west" market environment led to the establishment of the Green Bond Principles in 2014 by the International Capital Market Association. Although

voluntary, the Green Bond Principles set out four core principles that have gained broad market acceptance by bond underwriters, issuers, and investors. In particular, having a clearly defined use of proceeds has become the *de facto* definition of green bonds: It provides a level of transparency needed to use a green label and gives investors confidence that they are financing green projects. Further the Green Bond Principles have become the foundation for policymakers and market participants seeking to establish detailed standards.

Multiple frameworks have been developed globally by governments, environmental groups, consulting firms, and research providers to identify the types of projects considered green. Issuers increasingly have sought opinions from independent external reviewers to verify that their green projects are, in fact, green and in line with one of these classification systems.

In addition, there has been progress in establishing common, detailed standards aligned with the Green Bond Principles. The Climate Bonds Initiative, an investor-focused nonprofit working to mobilize debt markets for climate change solutions, has developed a green bond project taxonomy, sector-specific technical criteria, and post-issuance requirements, known as the Climate Bonds Standard. Issuers can arrange to have their bonds independently reviewed and certified against this standard, providing additional assurance and transparency to investors.

The Green Bond Principles have the following four core components:

Use of proceeds: Proceeds should fund projects with clear environmental benefits, with clear disclosure in legal documentation.

Project evaluation and selection:

Issuers should outline a process to determine project eligibility and sustainability objectives.

Multiple frameworks have been developed globally by governments, environmental groups, consulting firms, and research providers to identify the types of projects considered green.

Management of proceeds: Proceeds should be ring-fenced or tracked through a formal internal process.

Reporting: Reporting should include annual disclosure of the use of proceeds and qualitative and quantitative performance measures.

The Climate Bonds Initiative works to mobilize the global bond market for climate solutions through the following:¹¹

Market research and tracking: It provides updates on industry and governmental developments, and tracks global issuance of labeled green bonds.

Develop trusted standards: The Climate Bonds Standard was developed to provide clear sector-specific eligibility criteria for assets and projects. Issuers can engage third-party verifiers to certify pre- and post-issuance requirements are met.

Policy models and advice: This group works closely with governments, issuers, underwriters, and investors to develop policy proposals.

The green bond market is young and it is important that policymakers are not overly prescriptive, because this could increase the cost of issuance and stifle the market's growth potential. However, investors need assurance that a bond issued in compliance with the Green Bond Principles is in fact going toward a green project, and green labeling is an

excellent way to provide that assurance. There is room for multiple frameworks until market participants can agree upon a single set of criteria. We believe the work of the Climate Bonds Initiative is vital to establish market-wide standards, which will promote further market growth.

THE GREEN BOND MARKET TODAY

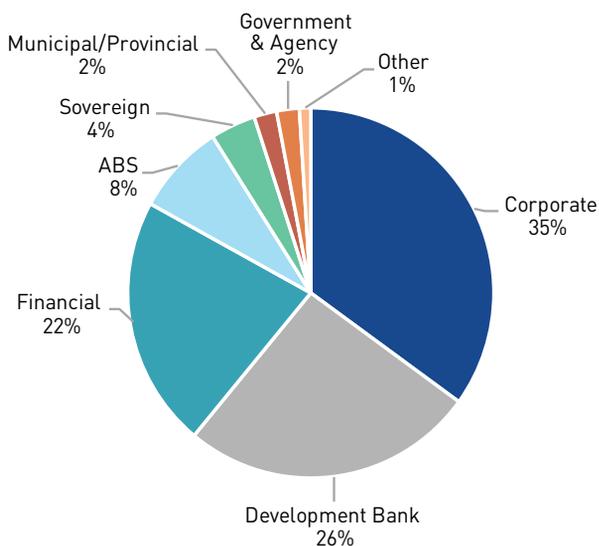
The first green bond was issued in 2007 by the European Investment Bank in response to an institutional investor's request to finance environmentally friendly projects. It was followed shortly thereafter by a green bond issued by the World Bank. In fact, in the first five years of the market's existence, the green bond market consisted almost entirely of supranationals. The high credit quality of these issuers, as well as the ability to issue bonds large enough in size to attract institutional interest, has resulted in supranational issuers having a dominant role in the green bond market. This continues today. In addition, green bond issuance programs developed by these entities include clearly defined projects and governance requirements.

Corporate issuers such as Bank of America and Électricité de France (EDF) began entering the market in 2013 with benchmark-sized deals. These brought the green bond market into its current phase of growth. Following the adoption of the Green Bond Principles in 2014, which provided process and reporting guidelines for the use of green bond proceeds, issuance has surged. Since then, other household-name corporate issuers such as Apple increasingly have become a larger part of the green bond market, and high yield corporate issuers also have had successful issuances, bringing increased diversity into the market (see figures 4 and 5).

In late 2016, Poland became the first sovereign issuer to bring a green bond to market, which was issued to finance various green projects within the country. The bond was three times

Figure
4

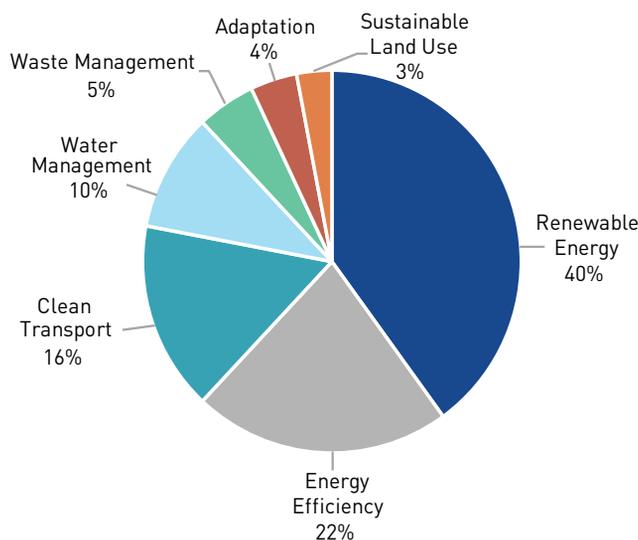
TOTAL GREEN BONDS ISSUED BY ISSUER TYPE



Source: Climate Bonds Initiative as of December 31, 2017

Figure
5

TOTAL GREEN BONDS ISSUED BY USE OF PROCEEDS



Source: Climate Bonds Initiative as of December 31, 2017

oversubscribed.¹² Shortly after, in January 2017, France came to the market with a €7 billion green bond issue, which was notable for its size as well as its 22-year maturity, the longest maturity green bond issued to date.¹³

Increased use by sovereign and municipal issuers, as well as a potential increase in securitization, is helping to bring added diversity and liquidity to the green

bond market. Further, issuers are exploring innovative financing structures such as guarantees and other credit enhancement mechanisms that may open up debt capital markets for issuers who otherwise may not have access or may not be able to afford green bond issuance. This is particularly important for issuers in emerging markets, where significant green investment is needed but little financing has been made available.

GOVERNMENT INCENTIVES TO BOOST ISSUANCE

The rapid growth seen across the green bond market, however, may not be enough to meet the climate goals set out by governments globally. In addition to creating clear definitions and standards to promote market confidence and transparency, government incentives also may be needed to spur further growth. Tax advantages for investors, similar to the benefits individual investors in U.S. municipal bonds receive, may be one option governments can explore. Alternatively, direct subsidies to issuers, preferential treatment for green bonds that are held on bank balance sheets, or preferential withholding tax rates are other avenues worth exploring. A massive increase in issuance, as well as a robust secondary market and additional ways for investors to access green bonds, are essential for continued market growth.

GREEN BONDS: THE ISSUER PERSPECTIVE

Before we can discuss why investors may want to hold green bonds in their portfolios, it's important to consider an issuer's standpoint. An entity may issue a green bond to achieve environmental goals that it has adopted. Green bond issuance also may create goodwill by promoting a green public image. From a treasurer's perspective, issuing green bonds may allow an issuer to diversify its funding profile by attracting new types of investors.

Despite the increased disclosure necessary to issue a green bond, it is important to remember that, from a legal standpoint, a green bond ranks equally in seniority with a conventional bond, all else being equal. The vast majority of green bonds are senior unsecured instruments, backed by the balance sheet of the issuer. Although proceeds are used to finance specific projects, investors generally have full recourse to the issuer rather than to specific assets (although it should be noted that project bonds, securitizations, and revenue bonds do exist, but in much smaller amounts).

However, when the additional costs associated with obtaining independent verification, ongoing reporting, and auditing of the use of proceeds are considered, some issuers may choose to refrain from placing a green label on their bonds. This may explain why a much larger unlabeled green bond universe currently exists. Further, given the lack of clear definitions and standards for green bond issuance, some issuers may have liability concerns if the issuer's definition of green does not coincide with that of an investor. Regulators have begun to take note, however, given government efforts to promote green finance as a way to combat climate change. For example, the governor of the Bank of England and chairman of the G20 Financial Stability Board, Mark Carney, recently called for establishing standard terms for the issuance of green bonds to promote market growth.¹⁴

Given the costs and concerns around potential liabilities, one might expect a lower cost of financing for issuers of green bonds as an incentive to participate in the market. However, this is not necessarily the case. Green bonds generally are priced the same as conventional bonds at issuance. There are a few reasons for this. First, green bonds are the same as conventional bonds, other than having a disclosed use of proceeds versus the more typical bond issuance from which proceeds often are used for general corporate purposes. From a credit standpoint, there is no justification for a different interest rate, all else being equal. Second, the majority of investors, even those seeking green bonds, typically are not willing to sacrifice return to achieve their environmental investing objective. Third, many green bonds are purchased by traditional bond investors who may not even be aware of the green label.

There has been anecdotal evidence of a slight "green premium," particularly in secondary markets. When this occurs, it is likely due to the high demand for green bonds from ESG-focused

investors relative to the supply available. Further, this premium may exist in certain markets, such as Europe, where there is higher demand for green bonds, rather than being a global phenomenon. To the extent that such a premium may exist, additional issuance to satisfy demand may remove any yield differential. On the other hand, if governments introduce subsidies or tax advantages, permanent pricing differentials may emerge.

Figures 6 and 7 show examples that compare a green bond with a conventional bond from the same issuer.

Currency of issuance is the same, and maturities are within a few months of each other.

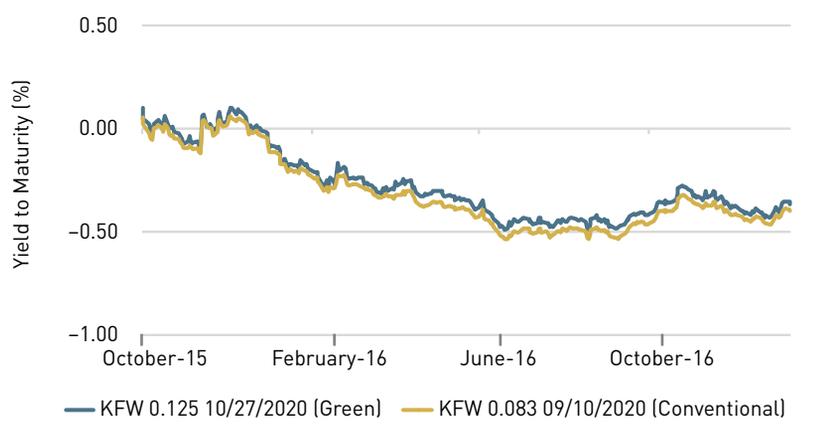
Of course, a more analytical comparison must account for all differences between issuances, including liquidity, optionality, investor base, benchmark inclusion, and other significant differences that may exist in the bond indenture. Such analysis is beyond the scope of this simple comparison. However, it is clear that the pricing levels of green and conventional bonds have been very close and highly correlated. Further study is recommended to determine the potential

Figure 6 APPLE: YIELD-TO-MATURITY COMPARISON



Source: Bloomberg as of January 31, 2017. Past performance is no guarantee of future results.

Figure 7 KFW: YIELD-TO-MATURITY COMPARISON



Source: Bloomberg as of January 31, 2017. Past performance is no guarantee of future results.

effect on bond pricing of being green, both in primary and secondary markets.

THE INVESTMENT CASE FOR GREEN BONDS

Beyond the desire to do good is there an investment rationale for holding green bonds in an investor's portfolio? Given that there is no clear systematic pricing difference between green bonds and conventional bonds, the case for holding green bonds begins with the rationale for holding any fixed income investment: primarily, income and relative safety versus other portfolio holdings.

WHERE DO GREEN BONDS FIT WITHIN A PORTFOLIO?

The green bond market, as measured by the S&P Green Bond Select Index, which represents the investable global green bond market and includes all issuer types (excluding tax-exempt U.S. municipal bonds) across countries and currencies, generally resembles a high-quality, core global bond allocation. With more than 50 percent of its holdings rated AA and above, and nearly

40 percent of its holdings in U.S. dollars, as well as a yield and duration profile similar to the Bloomberg Barclays Global Aggregate Bond Index, the green bond market has risk and return characteristics comparable to the broad global bond market. As a result, replacing a portion of a core global bond allocation may have minimal impact to an investor's portfolio, as shown in figure 8. Because of the differences in sector exposures, adding green bonds may increase the diversification of a global bond allocation. For example, supranational issuers represent approximately 20 percent of the green bond universe versus only 2 percent of the Global Aggregate Index.

Given the overall high quality of the green bond universe, the primary risks to an investor are interest rate risk and foreign currency risk. In addition, green bonds have exhibited low historical correlation to the broad U.S. fixed income market, suggesting potential diversification benefits within a U.S.-focused portfolio.

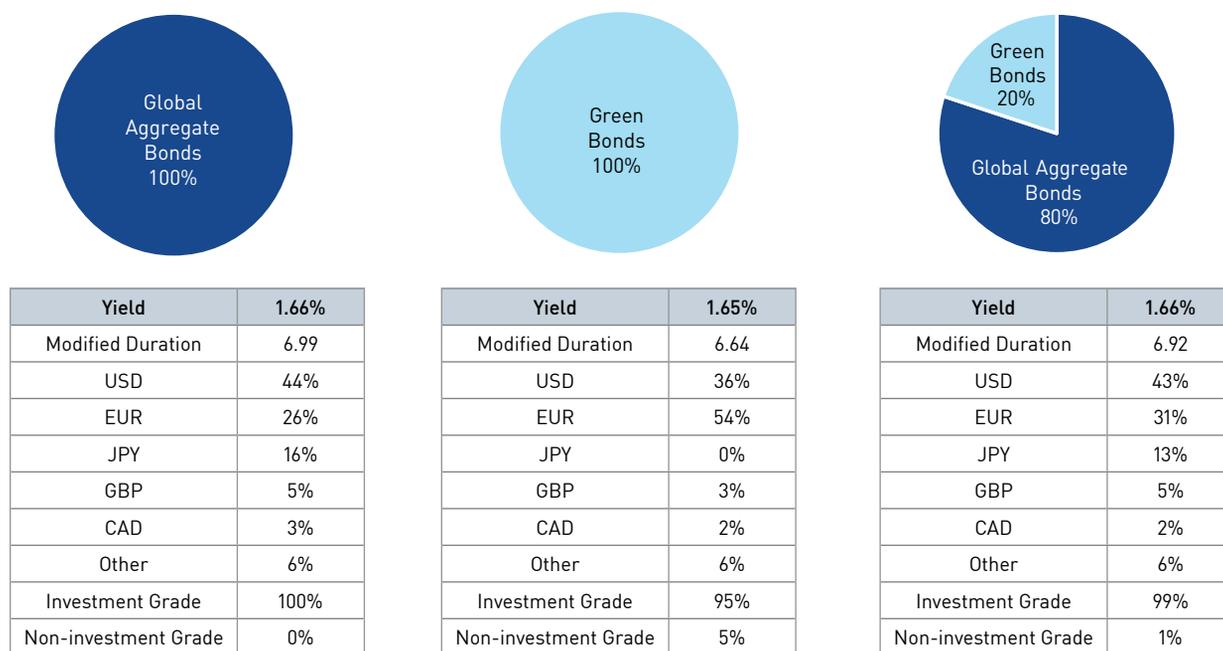
A POTENTIAL HEDGE AGAINST CLIMATE RISK

Lastly, for those who recognize the potentially significant effects that climate change may have on companies and governments in the future, the idea that adding exposure to green bonds may have minimal immediate impact to a portfolio's risk and return profile may represent a "free option" to hedge climate-related risks. Green bond issuers are addressing these risk factors, and in the case of project or revenue bonds, bond payments are tied directly to a green project. In a world where investors start to place a significant price on environmental risks, green bonds may provide protection versus a bond portfolio that does not take these factors into account.

CONCLUSION

As debt-burdened governments grapple with the enormous challenges of addressing climate change, private capital must play an integral role in financing the infrastructure needed to transition to a low-carbon economy. Government

Figure 8 BUILD A GREENER BOND PORTFOLIO



Source: S&P Dow Jones Indices, Bloomberg Barclays and Morningstar, as of December 31, 2017. Green Bonds are represented by the S&P Green Bond Select Index. Global Aggregate Bonds are represented by the Bloomberg Barclays Global Aggregate Bond Index. Correlation based on monthly returns between the S&P Green Bond Select Index and the Bloomberg Barclays U.S. Aggregate Bond Index, December 2008 to December 2017.

actions to promote green finance and continued development of green bond market standards likely will drive the growth that's needed. As a result, we expect green bonds to make up an increasingly larger share of the overall global debt market, and consequently, investors' core fixed income portfolios. The significant growth already experienced in the green bond market has started to attract interest from ESG-focused investors as well as traditional fixed income investors. With green bonds, fixed income investors are finding that they can fulfill their investment objectives and make a positive impact. ◆

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ENDNOTES

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Charts herein are for illustrative purposes and are not indicative of future results; current data may differ from data quoted.

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Correlation measures the degree to which two securities move in relation to each other. Yield to Maturity is the total return anticipated on a bond if the bond is held until the end of its lifetime. Diversification does not assure a profit or protect against loss. The S&P rating scale is as follows, from excellent (high grade) to poor (including default): AAA to D, with intermediate ratings offered at each level between AA and C. Anything lower than a BBB rating is considered a non-investment-grade or high-yield bond.

Index returns are not Fund returns and do not reflect any management fees or brokerage expenses. Investors cannot invest directly in the Index. Returns for actual Fund investors may differ from what is shown because of differences in timing, the amount invested and fees and expenses. Index returns assume that dividends have been reinvested.

Bloomberg Barclays Global Aggregate Bond Index tracks investment-grade debt from twenty-four local currency markets, and is comprised of treasury, government-related, corporate, and securitized fixed-rate bonds from developed and emerging markets issuers.

S&P Green Bond Select Index tracks bonds issued globally to finance environmentally friendly projects. To be eligible, the bond issuer must clearly indicate the intended use of proceeds and be flagged as "green" by the Climate Bonds Initiative, and meet minimum size requirements based on currency. The index includes treasuries, government-related, corporate and securitized issues.

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