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GROWING THE U.S. GREEN BOND MARKET

Volume 1: The Barriers and Challenges



RENEWABLE ENERGY SUSTAINABLE WATER LOW CARBON TRANSPORT WASTE AND POLLUTION
POLLUTION INFRASTRUCTURE RENEWABLE ENERGY SUSTAINABLE WATER
CARBON TRANSPORT WASTE AND POLLUTION INFRASTRUCTURE RENEWABLE ENERGY

**IN 2008, THE WORLD BANK ISSUED THE FIRST
FIXED-RATE BOND CARRYING A GREEN LABEL.
IN LESS THAN A DECADE, THE MARKET HAS
GROWN TO \$118 BILLION IN OUTSTANDING
BONDS LABELED GREEN. IN ADDITION, ANOTHER
\$576 BILLION IN UNLABELED BONDS FUND
CLIMATE-FRIENDLY PROJECTS.**



JOHN CHIANG
TREASURER
STATE OF CALIFORNIA

January 23, 2017

Dear Fellow Californians:

"It's not easy being green."

The line, familiar to parents and children of all ages, is from a ballad sung by Kermit the Frog, one of the main characters in television's long-running "Muppet Show." When Kermit sings the tune, he is recounting his struggle for a sense of self-worth.

But, Kermit's lament could also describe a more significant existential quandary: How to come up with billions or even trillions of dollars to pay for cleaner and greener buildings, transportation networks and energy grids to prevent climate change from ravaging our planet in decades to come.

One financial tool I am looking at is so-called green bonds. Can we use state and local borrowing to economically and efficiently raise billions of dollars in capital to build climate-friendly infrastructure? It seems likely that in order to provide our fellow citizens essential services and simultaneously reduce or eliminate emissions of carbon dioxide and other greenhouse gases that contribute to global warming, we must find a way to pivot from our old way of doing things to a newer, more environmentally-sensitive way.

The international green bond market is growing quickly. But, even as it is growing, it is important to understand that this market still accounts for less than one percent of all bond sales worldwide. While the United States is the single largest issuer, its volume is lagging the issuance levels seen elsewhere in the world. The United States share of outstanding green bonds is even smaller when measured as a percentage of the \$3.8 trillion of state and local government bonds outstanding in mid-2016.

I am determined to boost green bond issuance and acceptance both here in California and across the country. The challenge is to find a way to make the bonds equally attractive to investors and environmentalists.

To solve that puzzle, I and my staff at the State Treasurer's Office have embarked on a three-step journey. The first was a series of meetings in 2016 with bond underwriters, brokers and investors in Sacramento, San Francisco, Los Angeles, New York and Boston.

The hours of wide-ranging discussions and pending questions were distilled into this report, the second step of the process.

Finally, I plan to host a symposium this fall where I will challenge participants to identify practical solutions to the issues raised in this report in order to make green bonds a reality here in California and across the globe.

Hopefully, this conclave of experts will reach the same conclusion as Kermit when he sang:

"I am green and I'll do fine. It's beautiful! And I think it's what I want to be."

Sincerely,

A handwritten signature in black ink, appearing to read "John Chiang". The signature is stylized with large, sweeping loops and a cursive script.

JOHN CHIANG
California State Treasurer

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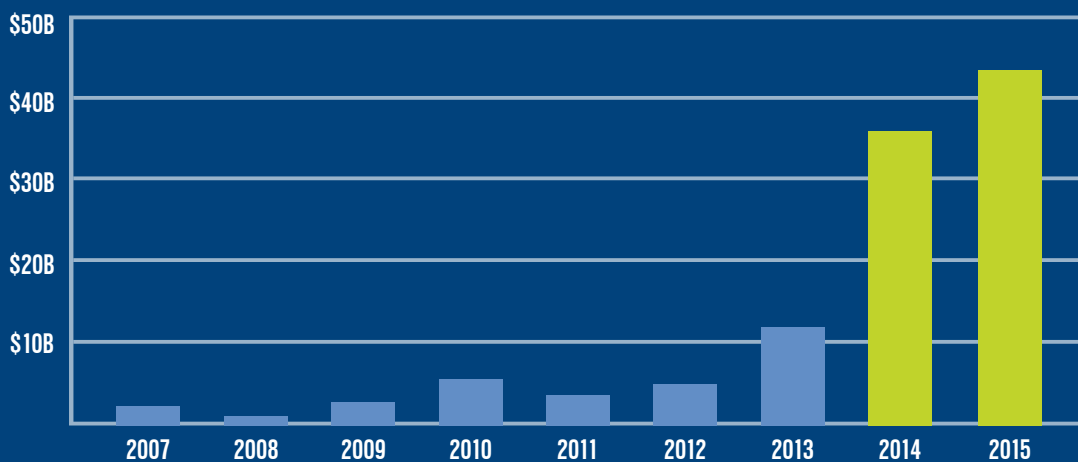
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TOTAL GLOBAL GREEN BONDS ISSUANCE BY YEAR



NUMBERS BY YEAR

2007 - \$806 Million

2008 - \$414 Million

2009 - \$909 Million

2010 - \$3.9 Billion

2011 - \$1.2 Billion

2012 - \$3.1 Billion

2013 - \$11 Billion

2014 - \$36 Billion

2015 - \$42.2 Billion

(Source: Climate Bonds Initiative, 2016, Bonds and Climate Change: The State of the Market in 2016.)

In Paris in 2015, representatives of 195 countries meeting under the auspices of the United Nations agreed that climate change is the greatest threat humanity faces. The draft Paris Agreement warns that rising temperatures could melt icecaps, flood coastal areas, alter weather patterns, and disrupt social, political, and economic institutions across the globe. To prevent this, signatories to the agreement committed themselves to replacing infrastructure powered by fossil fuels with low-carbon alternatives. Worldwide, the price tag for this conversion is pegged at \$93 trillion, including an estimated \$8 trillion in the United States, enormous sums that demand a full range of financing tools.

In the past few years, a specialized green bond market has emerged as a critical source of funds for building a low-carbon infrastructure. The green bond market has grown rapidly in Europe and Asia, but lags in the United States, the world's second-largest emitter of greenhouse gases. Less than one-tenth of one percent of bonds outstanding in the United States are green, well below the percentage in Western Europe, China, India, and South Africa. There are many reasons for the slow takeoff of green bonds in our nation, including the immaturity of the U.S. market and the unique tax exempt status of municipal bonds, which makes them unsuitable for investors not subject to U.S. taxes. But the fundamental explanation lies in a lack of policy consensus among political and business leaders, which inhibits action on climate change.

In an effort to learn the views of market participants and pinpoint obstacles to the development of the U.S. green bond market, California State Treasurer John Chiang met with investors and bond underwriters in Sacramento, San Francisco, New York, Boston, and Los Angeles in 2016. The treasurer's listening tour examined a wide range of issues, including green bond activity levels and

developing steadily, driven primarily by individual investor demand, but is still at a low level. Issuance is sporadic, especially in the corporate sector. Potential issuers feel less pressure than their European and Asian counterparts to go green. At the same time, lack of familiarity with green bonds, the perceived extra cost of green issuance, and potential legal and public relations risks if green claims are

LESS THAN ONE-TENTH OF ONE PERCENT OF BONDS OUTSTANDING IN THE UNITED STATES ARE GREEN.

growth rates, and measures that could spur expansion. This report presents listening tour findings in five areas: (1) market function, including supply, demand, liquidity, and issue size; (2) bond pricing; (3) market standardization, external review, and disclosure; (4) refinancing existing projects versus designating proceeds for new projects; (5) policy issues, including regulation, subsidy, tax treatment, legislation, and public education.

The message from market participants is that the U.S. green bond market is

challenged are disincentives. Although the market is maturing, some listening tour participants felt that green bonds need policy support and a vigorous public education campaign to reach the next level.

The treasurer's listening tour was the first part of a three-step process aimed at accelerating green bond market development. The second step will be a symposium convened by Treasurer Chiang later this year to consider ways to overcome obstacles identified in this report. The third step will be an action program to work with other market participants to put in place solutions. There is every reason to believe that a vibrant green bond market is within reach. But the need for action is urgent. Green bonds are an essential link in the chain that will finance the nation's transition to a sustainable future.

“THERE IS EVERY REASON TO BELIEVE THAT A VIBRANT GREEN BOND MARKET IS WITHIN REACH. BUT THE NEED FOR ACTION IS URGENT.”

Taking action to limit global warming and climate change is the paramount environmental challenge of our time. In December 2015, representatives of 195 countries meeting in Paris signed an accord committing themselves to reduce emissions of greenhouse gases responsible for raising temperatures around the world. The draft Paris Agreement declared that “climate change represents an urgent and potentially irreversible threat to human societies and the planet,” and that “deep reductions in global emissions” must be achieved in order to forestall the most severe effects.¹ Those effects include melting ice packs, rising sea levels, and increasingly extreme weather events, with potentially catastrophic ecological, social, and economic consequences. The Paris Agreement sets a goal of keeping any increase in average global temperatures since the preindustrial era below 2 degrees Celsius and urges countries to aim for a more ambitious 1.5 degrees Celsius target, a level that scientists say is needed to avert the direst effects of climate change.

Under the leadership of President Obama and Secretary of State Kerry, the United States played a key role in shaping the Paris Agreement, committing this country to cut its emissions of carbon dioxide, methane, and other greenhouse gases 26–28% below 2005 levels by 2025.² California has also been a leader in climate action. In 2006, AB 32 required the state Air Resources Control Board to ensure that greenhouse gas emissions be reduced to 1990 levels by 2020.³ SB 32, enacted in 2016, set a more ambitious target of 40% below the 1990 level by 2030. In 2015, California Gov. Brown proposed and the legislature approved a goal that 50 percent of the state’s electricity be derived from renewable sources by 2030.⁴ Gov. Brown also called for a 50% cut in motor



vehicle petroleum use and a doubling of the energy efficiency of existing buildings over 15 years.⁵

The Paris Agreement sets an aggressive goal that requires concerted across-the-board action going beyond existing policy. Large-scale investment in low-carbon infrastructure is central to this effort. Worldwide, an estimated \$93 trillion in infrastructure spending is needed through 2030 to support economic growth while meeting Paris Agreement emissions targets.⁶ Estimates of the cost of decarbonizing the U.S. economy vary widely, but by all accounts massive expenditures are essential. One recent analysis concluded that reaching U.S. Paris Agreement greenhouse gas emissions targets by 2050 carries an \$8 trillion price tag.⁷

In the United States, underinvestment in infrastructure has emerged as an increasingly critical public policy issue. Some \$3.6 trillion must be spent by 2020 on transportation, energy, school, water, and other facilities to bring the nation’s infrastructure up to acceptable standards, according to the American Society of Civil Engineers.⁸ In California, \$853 billion in public funds are needed over the next 10 years just for transportation, water, and K-12 school construction.⁹ The urgent need for California and the nation as a whole to upgrade infrastructure offers an opportunity to address two pressing problems simultaneously by spending our dollars on climate-friendly projects.

Broadly speaking, infrastructure investments include public and private projects that fall into several categories:

- **Transport.** Rail networks, roads, airports, ports and waterways, bicycle routes.
- **Energy.** Alternative and renewable energy facilities, power grids.
- **Water.** Safe drinking water, flood protection, water storage and transport, wastewater treatment, habitat protection.
- **Construction.** Residential, commercial, industrial, and public building construction.
- **Telecommunications.** Fixed and mobile telephone networks, broadband networks.
- **Waste Management.** Landfills and recycling facilities.
- **Recreation.** Public parks, wilderness areas, wildlife refuges.

Paying for these investments is a challenge of the first order. **California, for example, faces a \$359 billion funding gap** over the next ten years in public infrastructure projects.¹⁰ Finding the necessary funds requires a range of financing tools. Private sector initiatives sometimes use equity capital, and public

sector projects often draw on tax or fee revenue. Still, the long-term nature of infrastructure investments, their extended depreciation schedules, and the revenue streams these investments often generate make bond financing a critical part of the funding mix for both the private and public sectors. “The bond market is ... an essential tool to finance the transition to a low carbon economy,” according to the Climate Bonds Initiative.¹¹

Green bonds are public sector, private sector, or multilateral institution debt issuances used to finance climate-friendly or other environmental projects. Such initiatives include renewable energy and energy efficiency projects; clean transportation projects, such as light rail facilities; construction of energy efficient buildings; reforestation, and other investments. Green bonds can raise money for any environmental purpose, including projects that don't directly reduce greenhouse gas emissions—for example, water management, pollution control, toxic waste cleanup, or climate adaptation such as seawall construction. But from a practical point of view, green bonds and climate bonds are essentially synonyms as far as use of proceeds is concerned. All green bonds incorporate the principle of environmental sustainability, which by definition includes action to address climate issues.

Clearly, the extraordinary challenge posed by climate change is the driving force behind the rapid growth of the global green bond market. Unfortunately, green bond market share lags in the United States compared with Europe, China, and other places. Anecdotal information and measures of market activity confirm that the gap between what is needed and what is taking place is greater in this country than elsewhere.

This report, based on discussions held by California Treasurer John Chiang and green bond market participants, examines why the U.S. market has been slow to develop and what can be done to accelerate it. Treasurer Chiang and members of his staff met with the principal institutional investors and underwriters active in the taxable and municipal green bond markets in Sacramento, San Francisco, New York, Boston, and Los Angeles between February and August 2016. Participants were granted anonymity to encourage full and frank discussion. The listening tour considered green bond activity levels and growth rates, obstacles to market development, and measures that could spur expansion. Listening tour participants addressed such questions as supply and demand, pricing, issue size, use of proceeds, external review, reporting, public policy, and other critical issues.

The treasurer's listening tour may be the first time the U.S. investment community has been systematically canvassed on the state of the market in order to identify barriers to development. Treasurer Chiang sought the perspectives of these investors and underwriters because they hold the purse strings controlling how investible funds are allocated. In that respect, this report should be seen as the first step in a three-part process. The second step will be a symposium convened by the treasurer later this which will use the report's findings to devise approaches to overcoming obstacles to market development. The third step will be to work with other market participants to implement concrete measures for accelerating green bond market growth. The overall goal is to lay the groundwork for a mature and robust green bond market in California and the United States.

WHAT IS A GREEN BOND?

Green bonds are public sector, private sector, or multilateral institution debt issuances used to finance climate-friendly or other environmental projects.

Section II of this report examines the state of the U.S. green bond market quantitatively and qualitatively, analyzing why the market has developed more slowly in this country than elsewhere. Section III presents findings of the Treasurer's listening tour, summarizing comments of market participants. The report concludes in Section IV with a series of questions that must be addressed to move the U.S. green bond market forward.

A massive, vibrant green bond market is within reach. There is every reason to believe that a combination of education, sound public policy, financial innovation, and natural maturation will allow the green bond market to reach its potential in a relatively short time. But the need for action is urgent and patience is a virtue we can't afford. It's essential we act quickly.

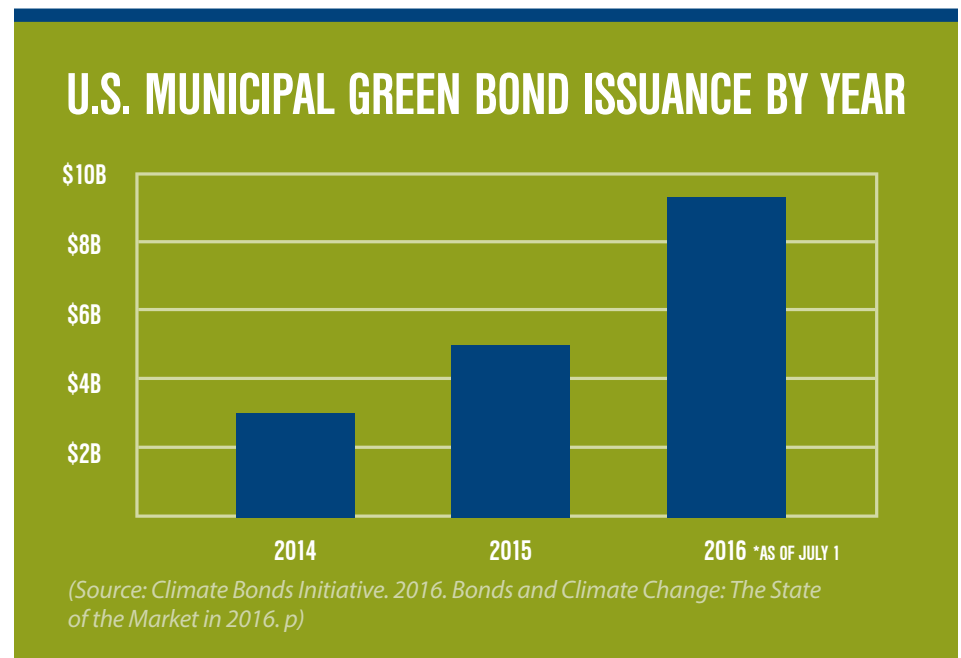
Both worldwide and in the United States, the green bond market is expanding. Nonetheless, the market is still small and immature. The global green bond market started in 2007 with an issue from the European Investment Bank (EIB).¹² In 2008, the World Bank issued the first fixed-rate bond carrying a green label.¹³ In less than a decade, the market has grown to \$118 billion in outstanding bonds labeled green. In addition, another \$576 billion in unlabeled bonds fund climate-friendly projects.¹⁴

Despite this impressive progress, green bonds still represent less than 1% of the worldwide bond market. The United States is the world's leading issuer, with more than \$24 billion in green bonds outstanding in mid-2016, according to the Climate Bonds Initiative. However, that figure should be seen in perspective. The U.S. bond market, with \$40 trillion outstanding, dwarfs those of other countries.¹⁵ Green bonds comprise a mere 0.061% of the total U.S. bond market, a significantly lower percentage than in China, India, and South Africa, and an order of magnitude below the share in the Nordic countries, Germany, the Netherlands, and France. Moreover, China is poised to overtake the United States as the leading issuer in 2016.¹⁶

In the United States, green bonds should be viewed as subsectors of two distinct markets with different characteristics and customer bases: municipal and corporate. The \$3.7 trillion U.S. municipal bond market is unique because interest income is generally exempt from income taxes at the federal level and in the state where bonds were issued. The muni market is supported primarily by individual investors seeking to shield income from taxes. Tax exemption allows issuers to offer lower yields than those carried by comparable taxable debt offerings. For green muni bonds, this feature

offers advantages and disadvantages. On the plus side, green munis have a ready-made investor base of individuals attracted to environmentally friendly products. But on the minus side, lower yields keep green munis out of the hands of investors who can't take advantage of tax exemption, including individuals with tax-protected accounts such as IRAs and 401(k)s and international markets in which investors don't owe U.S. taxes.

in 2014 when it sold just under \$300 million in green bonds, with proceeds earmarked for water and public transit projects.¹⁸ Nationwide, municipal green bond issuance hit \$4.7 billion in 2015, up 47% from the previous year, including a \$1 billion offering by the State of Washington. By mid-2016, the labeled U.S. municipal green bond market had grown to \$9.7 billion outstanding, with another \$20.6 billion in unlabeled bonds



In particular, U.S. munis aren't suitable for many major green bond buyers such as foreign insurance companies and pension funds. Despite these limitations, the municipal bond market plays a vital role in lowering the cost of capital for state and local governments. Any proposals to expand the green muni market must preserve the tax exemption advantages conferred on issuers.

In the United States, green munis were the first green bonds to come out, starting in 2013 with a \$100 million issuance by the Commonwealth of Massachusetts.¹⁷ The State of California entered the market

earmarked for climate-friendly projects.¹⁹ By early 2016, state and local governments in California had issued just under \$800 million in green munis.²⁰ Nonetheless, market participants say overall state and local green bond issuance in the United States remains low relative to the overall size of the muni market, which is on a pace to exceed \$400 billion in issuance in 2016. Many municipal bond offerings financing environmentally friendly projects do not use a green label, hindering market development.

The U.S. private sector green bond market, which includes financial institution and

asset-backed issues, has developed more slowly than the muni market. An important milestone was reached in 2016 when Apple Computer issued \$1.5 billion in labeled green bonds to fund renewable energy, energy efficiency, and other initiatives.²¹ Some U.S. banks have also been active, including Bank of America, which has issued two green bonds totaling \$1.1 billion to finance renewable energy and energy efficiency projects. But overall U.S. corporate and financial institution issuance has been sporadic.

Globally, the market's immaturity is evident in a lack of standardization in two areas: first, a universally accepted definition of what constitutes a green bond; second, methods for verifying how proceeds are used. In a 2016 report, the Institute for Climate Economics noted that "so far there has been no consensus on common definitions and standards."²² The green bond market has been described as a "Wild West" in that no enforceable code ensures the environmental integrity of bonds labeled as green.²³ Greenwashing—issuance of bonds labeled as green that lack genuine environmental benefits—remains a concern for investors, while issuers worry about reputational and legal risks if green claims can't be substantiated.

However, the market has been moving toward greater standardization and common sets of criteria and procedures. A key breakthrough was the release in 2014, since updated, of Green Bond Principles (GBP), voluntary guidelines created by a consortium of banks covering four areas: use of proceeds; project evaluation and selection; management of proceeds; reporting.²⁴ The launch in 2014 of Climate Bonds Initiative certification based on CBI's Climate Bonds Standard and third-party verification was another important development.²⁵ In addition, at least four green bond indexes have been created, an essential step that provides institutional

THE GREEN BOND MARKET HAS BEEN DESCRIBED AS A "WILD WEST" IN THAT NO ENFORCEABLE CODE ENSURES THE ENVIRONMENTAL INTEGRITY OF BONDS LABELED AS GREEN.

investors benchmarks for measuring performance.²⁶ Analytic support from Bloomberg, BlackRock, and other data providers is becoming more sophisticated. External review remains fragmented, with a number of nonprofit and for-profit agencies offering third-party analysis at a wide range of prices.²⁷ Reviewing methods include consultant second-party opinions, verification using Climate Bonds Initiative standards, rating agency green bond assessments, and auditor examination of issuer declarations.

LAGGING DEVELOPMENT IN THE UNITED STATES

The relatively slow pace of U.S. green bond issuance is a significant obstacle to this country's efforts to address climate change. Many market participants contend that the problem in the United States is lack of supply, not demand. Green bond issues are typically oversubscribed. Those who take this view maintain that demand is strong in part because socially responsible investment (SRI) funds and asset owners, the natural buyers of green bonds, represent a fast-growing constituency. In 2014, money managers, institutional investors, and community

investment institutions applying various environmental, social, and governance criteria held \$6.2 trillion in assets in the United States, equaling approximately one in six dollars under management, according to The Forum for Sustainable and Responsible Investment (US SIF).²⁸

Other market experts believe this view overstates demand for green bonds in the United States. Only a fraction of the U.S. SRI universe is committed to green investments, which means that in practice green bond demand may not outstrip supply. In other words, the U.S. green bond market may be nearly balanced at a relatively low level of activity. Moreover, oversubscription of U.S. green bond offerings may simply reflect intense demand for bonds of any color at a time when the U.S. fixed income market offers excellent returns relative to other markets. By contrast, green bond demand significantly exceeds supply in Europe, Canada, and Australia.²⁹

Why is U.S. green bond activity comparatively weak? Part of the answer lies in the market's lack of maturity. A combination of sporadic deal flow, small offering size, index ineligibility, illiquidity, and lack of standardization limits market activity. But these factors are becoming

less constraining as the market grows. The more fundamental explanation for green bonds' slow takeoff in the United States lies not in the bond market itself, but in the broader cultural, political, and legal environment that holds back action on climate change.

In many parts of the world, broad public and institutional support exists for

Official support for green bonds is fragmented. As a result, U.S. corporations, public agencies, and local and state governments feel less pressure to practice environmentally sustainable investment than their counterparts in other countries. Even when bond issuers are committed to action on climate change, they may

Thus, any public or private sector organization considering issuing green bonds must overcome inertia and the internal skepticism of legal, public affairs, and finance staff. Even when an organization is financing a climate-friendly project, the easiest policy may be to issue unlabeled bonds that carry no extra cost and raise no potential green liability issues.

“...WE WANT TO SHOW WHAT'S POSSIBLE AND PAVE THE WAY FOR OTHERS TO FOLLOW.” – APPLE COMPUTER IN ITS \$1.5M GREEN BOND OFFERING

measures to counter climate change. A wide consensus encourages both institutional buyers, such as pension funds and insurance companies, and bond issuers, including governments, financial institutions, and corporations, to incorporate environmental sustainability into their financial activity. Governments and public agencies lend official support to the green bond market and take concrete steps to promote it. In plain terms, climate science is integrated into finance. As a result, demand for green bonds may exceed supply by a factor of two or more. And some evidence suggests that green bonds occasionally trade at a premium.³⁰

By contrast, in the United States, there is no policy consensus on climate. A significant share of political leadership questions whether human-caused climate change is a problem or even real.

hesitate to issue green bonds in the absence of a groundswell pushing them into the market.

Several factors might dissuade a U.S. issuer from seeking a green label, but the crux of the problem is the widespread perception that green issuance adds cost and complexity without providing a demonstrable benefit in pricing. External review and additional underwriting and reporting requirements are seen as adding to the expense and administrative burden of issuing green bonds. On the pricing side, U.S. market participants report little evidence that green bonds command a premium in the marketplace, particularly for new issues.³¹ In addition, labeling a bond as green could subject an issuer to negative publicity if environmental claims are challenged.

The slower pace of development of the green bond market in the United States compared with Europe and other regions can best be understood in terms of different concepts of fiduciary responsibility. In the United States, such responsibility is generally viewed in narrow, short-run financial terms. A bond issuer is expected—and may be legally required—to seek the best price and the lowest cost of execution. In other parts of the world, the concept may be defined more broadly to include social and environmental dimensions and long-term sustainability. The future costs of inaction on climate change may be part of the equation. Such a reinterpretation of fiduciary responsibility is just beginning to take place in the United States.³²

U.S. green bond issues are often seen as statements of longer-term fiscal and environmental commitment that go beyond the scope of short-term fiduciary responsibility. For example, when the New York Metropolitan Transportation Authority issued \$500 million in labeled green bonds in February 2016 for upgrading its rail network, it emphasized carbon emissions reduction and long-term climate benefits of mass transit.³³ Similarly, Apple Computer in its \$1.5 green bond offering stated “... we want to show what's possible and pave the way for others to follow.”³⁴

The following section is an in-depth review of comments on critical green bond market questions by participants in Treasurer Chiang's listening tour.

Treasurer Chiang met with green bond market participants in Sacramento, San Francisco, New York, Boston, and Los Angeles between February and August 2016. A total of 57 market participants from 27 firms representing the SRI community, traditional investment organizations, and bond underwriters met with the treasurer and his staff in person or took part via teleconference. Listening tour sessions examined the full range of issues confronting the green bond market. The purpose of these conversations was to identify key issues affecting market development and consider ways to speed its progress. The State Treasurer's Office followed up these meetings with a survey asking listening tour participants their positions on a number of questions including preferred issue size, index eligibility, pricing, and third-party review. This report presents listening tour findings in five areas: (1) market function, including supply, demand, liquidity, issue size; (2) pricing; (3) standardization, third party review, disclosure, reporting; (4) refunding



and additionality, that is, financing new projects; (5) policy issues, including regulation, subsidy, tax treatment, legislation, and public education.

Supply and demand, liquidity, and issue size are measures of the maturity of the green bond market. In a well-functioning bond market, supply and demand are approximately balanced at a high level of activity, offerings are fully subscribed, buyers and sellers are able to execute transactions quickly on the secondary market, bid/offer spreads are narrow,

issuance is frequent, and deal sizes are ample enough to support overall market liquidity and allow creation of benchmark indexes. The U.S. green bond market is not at that point yet. Listening tour participants described a steadily developing market still in its infancy. At its current level of development in the United States, green bonds face a classic chicken-and-egg dilemma: Many offerings are too small and illiquid to attract institutional buyers; in turn, weak institutional support keeps deals small and illiquid. Participants reported signs that institutional interest



MARKET FUNCTION KEY FINDINGS

- Although the U.S. green bond market is developing, activity is still at a low level, driven largely by retail demand.
- Some market participants say the market is constrained by inadequate supply, while others maintain that supply and demand are nearly balanced.
- Liquidity is weak and many issues are too small to attract institutional support, but the maturation of the market is improving conditions.

is picking up and liquidity is improving as more product comes onto the market. However, several argued that the market needs policy support and a vigorous public education campaign to reach the next level.

SUPPLY AND DEMAND

Listening tour participants generally agreed that bond supply has not reached a critical mass that would support a dedicated institutional investor base and permit normal market functioning.

There was less consensus on demand. Some participants cited oversubscription of new offerings as evidence of robust demand. “There is more appetite than there is product,” one said. They reported that green bonds are easy to sell but hard to buy on the secondary market. But other participants viewed specific demand for green bonds as limited and a constraint on market growth. They noted that green offerings don’t perform noticeably better than other bond offerings and pricing is generally the same for green and non-

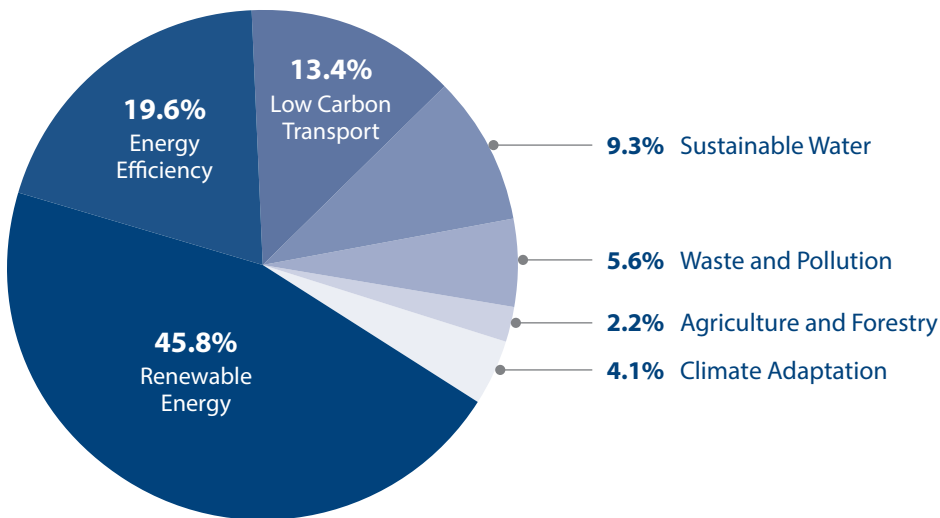
green credentials, but are in the market for yield, credit quality, and duration. “We were going to buy Apple bonds regardless,” one institutional investor said.

The U.S. green bond market remains largely retail-driven through SRI funds and wealth management channels, listening tour participants noted. Individual muni bond investors seeking tax-exempt income are key market drivers. Although some U.S. pension funds have begun to nibble, the market doesn’t yet have the level of institutional support evident in Europe, where major insurance companies and pension funds have invested in green bonds at scale. The inability of many investors to take advantage of green munis’ tax-exempt status is an important hindrance.

The quickest way to build demand would be to educate individual investors about green bonds, most participants thought. “The way we can get to scale is by generating greater visibility in the retail world,” an asset manager said. “(Retail investors) will go to money managers and say, ‘This is how I want my money invested.’” Several participants said their firms were actively exploring the creation of green bond funds or other vehicles for clients who want to invest in the market.

Some participants noted that green bonds stand to gain in the long run from a generational shift. “Millennials seem to have an outlook on social responsibility,” a broker/dealer said. The rise of younger investors and an eventual intergenerational transfer of wealth promises to invigorate SRI investment, including the green bond market. However, from the standpoint of lifecycle investing, bonds—especially tax-exempt municipals—are not generally a suitable product for this group. For that reason, the short-term impact of younger investors on the market is likely to be limited.

BREAKDOWN OF TOTAL 2015 GREEN BOND PROCEEDS



(Source: Climate Bonds Initiative: 2015 Green Bond Market Roundup)

“We’re not at a point where you can build a whole portfolio based on green bonds,” an asset manager said. For example, labeled green bonds represent a minority of the holdings of some recently created green bond funds. And a significant portion of those holdings consists of dollar-denominated bonds from issuers outside the United States. “Supply has been the biggest hurdle,” said a broker-dealer. “There is not enough product for funds.”

green issues at given maturities and risk profiles. The secondary market imbalance reflects the tendency of green bond buyers to hold product rather than trade it. “Actual demand isn’t there yet, not to the scale that many expect,” a fixed-income strategist said. Participants agreed though that green bonds are benefitting from strong global and domestic demand for dollar-denominated fixed-income products. A significant fraction of U.S. green bonds buyers are indifferent about

LIQUIDITY AND ISSUE SIZE

Listening tour participants emphasized that improving liquidity is a major hurdle for green bonds from U.S. issuers—both in terms of market function and investor perception. “There is still a myth that green bonds are expensive, exotic, and illiquid—and that hasn’t been fully rebutted,” said the head of environmental, social, and governance (ESG) investing at an asset management firm. Small supply and infrequent secondary market trades make it hard to find product at an attractive price, contributing to a sense in some quarters that green bonds aren’t a fully legitimate asset class. And some thinly traded bonds are hard to sell, which can be a problem for private clients who need to raise cash quickly. Survey respondents ranked liquidity just behind credit quality and yield as a factor influencing their green bond portfolio decisions. Poor liquidity reinforces the green bond market’s tilt toward buy-and-hold investors and away from active traders. “We’re not trading actively and if you’re holding to maturity, you don’t care about liquidity,” a portfolio manager said.

The most important factor impairing liquidity is offering size. “We need to see issue size come up,” an asset manager stressed. Smaller offerings put less product

WILL INVESTORS ACCEPT LOWER YIELD IN EXCHANGE FOR DEMONSTRABLE ENVIRONMENTAL BENEFITS?

in the marketplace. In addition, issues must reach a \$250 million threshold to be eligible for index inclusion and trade on-the-run as an issuer’s newest bond—two hallmarks of bond liquidity. Some participants cited \$250–500 million as the minimum offering size for a corporate green bond to achieve wide distribution and acceptable liquidity. However, many corporate issuers aren’t able to initiate enough green projects to support an offering on that scale. Moreover, corporate issuers typically must aggregate projects since few green initiatives are big enough to support a large offering on their own.

Liquidity is not as severe a problem in the municipal green bond market, which has always featured smaller offerings. Retail investors dominate the muni market and

they tend to hold bonds until maturity. Still, some listening tour participants voiced support for state-level aggregating agencies empowered to package diverse green projects from a variety of sources into single offerings that meet buyer size thresholds. “There is a role for an aggregator to deal with the problem of critical mass,” an underwriter said.

While expressing concern about liquidity, some participants said green bonds’ steady development is improving market tone and the overall trading environment. Recent large offerings, including those of Apple Computer and the New York MTA—have been important factors. “The second quarter (of 2016) was very strong,” a portfolio manager said.



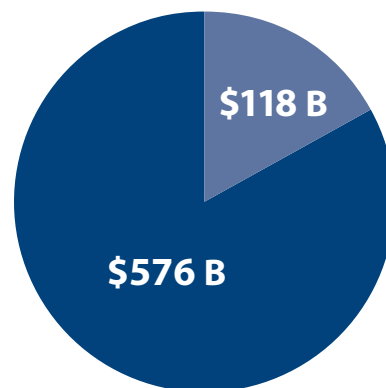
PRICING KEY FINDINGS

- In the United States, green bonds trade at a premium only under exceptional circumstances and almost exclusively in the secondary market.
- U.S. institutional investors unanimously say they are not currently willing to sacrifice yield for green bonds.
- Some market participants say a green bond premium may eventually emerge as market development draws in new buyers.



LABELED VS. UNLABELED CLIMATE-ALIGNED GREEN BONDS

- LABELED GREEN BONDS
- UNLABELED CLIMATE-ALIGNED GREEN BONDS



(Source: Climate Bonds Initiative)

One of the keenest questions in the market has been whether labeled green bonds might command a premium price. Put another way, will investors accept lower yield in exchange for demonstrable environmental benefits? This point is crucial because a pricing benefit could spur the market by compensating issuers for the added cost of a green offering. Internationally, green bonds sometimes trade at premiums on the secondary market, especially issues denominated in second-tier currencies such as the Canadian and Australian dollars. In the United States, anecdotal evidence suggests that green bonds trade at a premium only under extraordinary

circumstances and, with rare exceptions, only in the secondary market. Listening tour participants emphasized that in the U.S. market green bonds generally trade “on the curve,” with no pricing distinction from non-green bonds with similar characteristics. “The market is not yet mature enough to be able to put a premium on environmental impact,” a fixed-income analyst noted. Moreover, participants responding to the treasurer’s survey unanimously said their firms would not accept a lower yield for a green bond. And yield is second in importance only to credit quality when analyzing a bond offering, survey respondents said.

Both SRI and traditional fund managers were adamant that they have no room to give on pricing. “We have to show people that going green does not mean sacrificing yield,” a fund company officer said. “When I speak to clients, people say, ‘Green is great but I’m saving for retirement and I can’t do it if the yield is not there.’” The head of ESG investing at an asset management firm said, “The mass of investors is not willing to pay a premium. We felt it was important not to have a premium to grow the market.” Similarly, brokerage firms and underwriters stressed that institutional clients are unwilling to pay up for green bonds.

Nonetheless, lower yields may be possible in some circumstances, listening tour participants reported. One area is in portfolios of individual wealth management clients. Some clients specify they will pay extra for social or environmental investments. “It’s high-net-worth individuals, not institutional investors,” one participant said. “Some of my investors would pay a premium, but most won’t.”

Still, it is possible—perhaps even likely—that persistent premiums will eventually emerge as the U.S. green bond market matures, several participants said. Pricing reflects supply and demand, and any developments that fuel demand could cause green bond yields to fall. As in Europe, market maturation could draw in new buyers, including institutions purchasing in volume. “Over time, as the market develops, we may see better pricing,” an SRI fund manager said. “If you get all the structure, guidance, and better reporting around green bonds, you may get targeted money, and they may pay a little more.” In addition, cultural change in the United States and the growing clout of younger investors could stimulate across-the-board demand for ESG products, including green bonds, participants said.

Of course, bond issuers are eager to see a green premium. “They ask about it all the time,” a broker/dealer representative said. Even in the absence of a premium though, some issuers see advantages to green offerings, participants noted. First, green issues draw in new buyers to the bond market, diversifying the investor base. Beyond that, green bonds send a signal that an issuer has a credible sustainability strategy and is taking steps to limit environmental risk, and that could ultimately benefit the issuer’s credit profile. “What does this tell us about the credit risk of the issuer,” a listening tour participant asked. “It’s not just a premium for that green bond, but there could be one for all bonds from that issuer.”

The green bond market is new and it is sometimes not easy to say what a green bond is. Greenness depends on how proceeds are used, of course. But there is not always agreement about whether a particular project is green. For example, is a LEED Silver parking garage green? Similarly, can a major polluter or fossil fuel company issue green bonds to fund climate-friendly projects? Green bonds are

“SOME OF MY INVESTORS WOULD PAY A PREMIUM, BUT MOST WON’T.”

still in their “100 Flowers” period when the market lacks broadly accepted standards and caveat emptor is the rule for investors.

STANDARDIZATION

In the treasurer’s survey of listening tour participants, respondents were about equally divided on whether a standard definition of green bond and an enforceable set of guidelines for conducting offerings and using proceeds are needed. To some participants, the absence of ground rules is a significant obstacle. “It’s all voluntary,” an institutional investor said in the listening tour. “There is no definition, no standardization, no

quantification of good beyond calling it green, and it’s hard to track.” An SRI investor said: “Without standards, it is hard and slow to get green bonds issued, and the price point for investors can be slightly off what they are looking for.”

To others, such heterogeneity is normal in a market’s early stages of development. They believe a maturation process is taking place in which market standards are emerging. Listening tour participants cited the release of Green Bond Principles (GBP) as a milestone providing guidance on use of proceeds and procedures for administering and monitoring



STANDARDIZATION, VERIFICATION/ CERTIFICATION, REPORTING KEY FINDINGS

- The green bond market’s lack of enforceable, widely accepted definitions and ground rules raises costs and slows market development. However, Green Bond Principles, Climate Bonds Initiative certification, and other steps toward standardization show that the market is making progress.
- Most market participants want some form of third-party verification, but believe that external review raises issuance costs.
- Good disclosure and reporting is the best way to ensure market integrity, allowing investors to perform their own due diligence.

bond issues. Others pointed to project taxonomies created by the World Bank, Climate Bonds Initiative, and other organizations as important contributions. “A single, absolute standard is not realistic, but, at the same time, we need reference frameworks,” an institutional investor said. “It is good for the market that we have two or three or four credible standards.” Another investor questioned whether overly strict standards might chill the

acceptance. Several important institutions have embraced GBP, including Climate Bonds Initiative and Moody’s Investors Service. Survey respondents cited GBP as the green bond standard they trust most. “Green Bonds Principles is the clearest guidance right now,” an SRI investor said. Listening tour participants noted though that GBP’s strength is bond issue process and procedure, not the environmental benefits of underlying

For example, in the muni market, issuers “know their project is green and they may not feel the need to pay the extra money for certification,” an institutional investor said. “Initially we advocated for that third-party opinion, but now we understand why they wouldn’t want to pay the extra money.” Another institutional investor said: “When it’s a cut-and-dried green use of proceeds, people don’t want to pay the money.” Several participants agreed that well-known issuers may be able to avoid external review if their disclosure is thorough.

Participants expressed a wide range of views on preferred providers and review methodology. Some favored NGOs and nonprofit agencies, such as CICERO second opinions which use a “shades of green” framework to grade green bonds.³⁵ Those favoring NGOs argued that such organizations have fewer conflicts of interest and are better qualified to evaluate environmental projects. “I would like an environmentally centered entity at arm’s length from the financial industry,” an ESG officer said.

Others said they liked the bond-market experience of rating agencies and accounting firms. “Issuers already work with rating agencies,” an institutional investor said. However, some participants said they were concerned whether for-profit reviewers might hesitate to criticize clients. And several questioned whether some review methodologies place too much emphasis on process and not enough on substance. “The first question an analyst should ask is what are they using the money for,” an SRI investor said. Several participants said they hope that consolidation will make the reviewing field less crowded: “At some point, I want it to be more uniform,” an institutional investor said.

“DISCLOSURE IS MORE IMPORTANT THAN VERIFICATION. THAT IS WHERE YOU MAKE OR BREAK THE MARKET.”

market: “Sometimes you will have projects that are not clearly green, but do you want to exclude them?” Another institutional investor said: “What is green to some is not green to others. American corporations aren’t going to play if you make it too prescriptive.”

Tour participants emphasized that uncertainty about green credentials and fear of greenwashing are the driving forces behind the movement toward standardization and the proliferation of green bond external review options. “Third-party auditing is going to bring confidence to the market,” an SRI investor said. An institutional investor said: “The market will only scale if issuers that don’t have great green credentials get reasonably strong third-party verification. It’s important for market development.”

Currently, GBP, updated in 2016, is the closest thing the market has to a generally recognized set of guidelines and the principles appear to be gaining wider

projects. GBP recommends external review to confirm the green status and procedural soundness of bond issues. It cites consultant opinion letters; claims verification; certification of conformity with an external green assessment standard; and third-party bond ratings as potentially useful review methodologies.

EXTERNAL REVIEW

Listening tour participants generally agreed that third-party review is valuable, particularly for investors lacking the resources to perform their own due diligence. Most survey respondents answered positively when asked if they wanted issuers to seek independent verification of bond greenness. “The market will only be credible if there is verification from a third party,” an institutional investor said. But some participants stressed that review expenses are a damper on the market and that review costs need to come down.

Some market experts have proposed an “investor pay” rather than an “issuer pay” model for covering external review costs. Listening tour participants did not address this question. It is unclear whether investors would accept such a model, which would lower the effective yield on a bond.

DISCLOSURE AND REPORTING

Participants disagreed about whether external review should be the prime method of confirming green status or secondary to investor due diligence. “We don’t rely on it. We do our own verification. We’ll decide what’s green,” an SRI fund manager said. All participants stressed that issuer transparency and detailed disclosure are the most important factors in verifying bond greenness. “Disclosure is more important than verification,” another institutional investor said. “That is where you make or break the market.”

Listening tour participants had strong opinions about what disclosure should consist of. Transparency requires in-depth disclosure in offering documents plus detailed post-issuance reporting at regular intervals. “We’re very concerned about greenwashing,” an SRI investor

HOW A BOND BECOMES CERTIFIED AS GREEN

1. Identify qualifying green projects and assets based on climate bonds taxonomy.
2. Get independent verification from an approved verifier.
3. Track and report each year.
4. Get approval from the Climate Change Standards Board.

(According to Climate Bonds Initiative)

said. “Any issuer that develops robust reporting will have an advantage.” Several participants stressed that issuers should provide qualitative descriptions of each project plus quantitative estimates of greenhouse gas reduction. “I would want it as granular as you can get,” an institutional investor said. “I want to see the impact described quantitatively.” Respondents to the treasurer’s survey unanimously agreed assessment should include measurement of greenhouse gas reduction when available.

High-quality post-issuance reporting is critical, participants added. Most survey respondents rated reporting as extremely or very important. “I don’t want to see a picture and a few lines,” an ESG manager said in the listening tour. “Make it as specific as you can at reasonable expense.” Several participants said they want issuers to practice impact reporting, a method enterprises use to communicate how they are achieving philanthropic and social goals. Survey respondents said they wanted to receive reports annually



REFUNDING/ADDITIONALITY KEY FINDINGS

- Market participants are divided over whether issuing green bonds to finance existing projects is acceptable.
- Some participants say refinancing smacks of greenwashing, while others argue it raises awareness and boosts green bond supply, helping the market scale up.
- In refinancings, disclosure is especially important because investors want extra assurance about project environmental benefits.

or at most semiannually. “I don’t have any interest in reading a quarterly report,” the ESG manager said. They were divided on whether reporting should continue until funds are spent or until a bond matures.

Among the more sensitive issues in the green bond market are the related questions of refinancing and additionality. Refinancing, sometimes called refunding, involves labeling bond offerings as green when existing projects seek additional money; additionality concerns whether a green bond is financing a new project that would otherwise not be funded. In practice, these questions can be complicated because a green bond issue typically supports a number of projects, some of which may be new and others not. That is especially the case for larger bond offerings.

Refinancing and additionality divide green bond market participants into purists and pragmatists. The former tend to be associated with the SRI community, while the latter are more often traditional investors or broker-dealers, though a full range of views is represented in all these market segments. The treasurer’s listening tour survey found participants evenly split on whether it is acceptable to label a refinancing as green.

The fundamental objection to refinancing is that relabeling existing projects smacks of greenwashing. “Investors want to believe that when they’re doing a green bond, they’re doing incremental work,” an SRI investor said. “The amount of flak you’d get from investors would be huge.” Several participants said they didn’t personally oppose refinancing, but that many clients are squeamish. “It raises concerns when you put the word green on something,” another SRI investor said. An institutional investor said: “Doing high speed rail as a green bond doesn’t add anything. It just recharacterizes an existing project.”

The counterargument is that limiting green bonds to new projects restricts them to a small niche market. Refinancings raise awareness and boost green bond supply, which helps the market reach a critical mass that supports liquidity, smooth functioning, and strong price performance. “To get the market

a green label, then on the margin green bonds don’t allow projects to go ahead that otherwise wouldn’t be funded: “As long as we as investors are not willing to pay a premium for a green bond, there will be no additionality.” Several listening tour participants said they viewed refinancing as a matter of image, not substance. “It’s

REFINANCING AND ADDITIONALITY DIVIDE GREEN BOND MARKET PARTICIPANTS INTO PURISTS AND PRAGMATISTS.

to grow to scale, we have to do it,” one broker-dealer said. An institutional investor said: “If the goal is to help the market mature, refunding is a great way to increase supply.”

Other participants argued that the more important question is not whether underlying projects are new, but whether they genuinely promote environmental goals, noting that unlabeled climate-friendly bonds outstanding significantly exceed labeled green bonds. “At the end of the day, you have things that are green and need to be financed,” an institutional investor said. “You might as well do it through a green bond.”

The investor argued that additionality is an erroneous concept if green bonds aren’t offered at a premium. If an issuer can raise money at the same price with equal ease whether or not a bond carries

more cosmetic—just preference,” another institutional investor said. “If there are two bonds, one a refinancing and another new bond, I’ll choose the new bond.”

Several participants emphasized that refinancing puts a premium on disclosure. Investors want an extra level of assurance of a project’s benefits if it originally was financed without a green label. “Disclosure can help ameliorate concerns about refunding,” an institutional investor said. “The more reporting and transparency you have regarding the underlying projects, if you have some impact metrics that can be presented, it may mitigate any concerns,” another investor said. Some listening tour participants noted that more sophisticated investors ask which projects funded by a green bond issue are refinancings and which are new. GBP recommends that

issuers estimate the share of proceeds earmarked for refinancings and which projects are being refinanced, questions which should also be addressed in external review.

In Europe, Asia, and other parts of the world, governments are providing vital support to the green bond market—one of the most important reasons development is faster than in the United States. Policy action includes supportive regulation, mandated investment, subsidies, and adjustments to tax treatment. For example, China jump-started its green bond market by creating a regulatory framework that sets issuance parameters and fast-tracks the approval process. In addition, several countries require state pension funds to invest in green bonds. In this country, some state governments and public agencies have been active green bond issuers. Other than that, despite federal endorsement of green bonds, the U.S. and state governments have taken only limited steps to promote the market.

Listening tour participants were generally enthusiastic about state and federal action to promote green bonds, although a few said they worry about potential market



distortions. Some measures, such as tax code changes, would require legislation. Others, such as public education, can be undertaken without legislative approval. “The greater you incentivize, the better,” an SRI investor said. Another SRI investor said: “If you want to have a premium, you need regulatory help to get there.”

SUBSIDIES, TAX INCENTIVES

Not surprisingly, participants favored subsidies to support the market. Several suggested green bond tax preferences, such as income tax exemptions on interest payments. The subsidy question

was of special interest to those active in the municipal market. Many listening tour participants agreed that the unique tax treatment of muni bonds in the United States impedes green bond market growth because tax exemption is limited to U.S. taxpayers. Specifically, most backed federal or state government interest subsidies that would allow municipal issuers to offer taxable green bonds with yields competitive with non-green taxable bonds. Such a program would boost demand by expanding the market to institutions and international investors that don’t benefit from current muni tax exemptions. Participants cited



POLICY SUPPORT KEY FINDINGS

- The federal and state governments should take concrete steps to support the green bond market, including favorable regulatory frameworks, subsidies such as tax benefits, and public education.
- An initiative similar to the federal Build America Bonds program would subsidize green municipal bond interest rates and expand the market for state and local government green offerings.
- State governments can aggregate local and agency green projects into large bond offerings that fuel market development.



the model of the Build America Bonds (BABs) program, authorized by the 2009 American Recovery and Reinvestment Act, which provided federal tax credits or direct payments to bondholders and state and local government issuers.³⁶ “We would be in heaven. You’re checking every box for me,” an SRI investor said about a green bond program modeled on BABs.

AGGREGATION

State governments can support green bonds by establishing programs to combine green projects from different

agencies into single offerings large enough to be liquid and index eligible, thereby attracting institutional buyers. Listening tour participants generally favored aggregation, but stressed that states would have to provide guarantees and administrative support, such as managing the reporting process.

PUBLIC EDUCATION

The federal and state governments can play a key role by carrying out public education to raise awareness of green bonds in the investment community, and

among potential issuers and the general public, listening tour participants said. Participants noted that green bonds have a low profile in the United States and that many potential issuers and buyers are unfamiliar with the market. “The state has a bully pulpit to make it more attractive,” a broker-dealer said when asked what California can do to stimulate the green bond market.

Participants suggested a variety of measures governments can take to promote green bonds, ranging from encouraging public agencies to initiate green bond programs to organizing conferences, advertising, and disseminating information online and in print. In addition, governments can actively take part in efforts to improve market functioning, using their legal, administrative, and moral authority to promote effective standards and regulation.

Beyond that, public sector leaders are in positions to foster a sense of urgency about climate change and create momentum for action. Exercising leadership to help overcome attitudinal barriers to climate action is one of the most fundamental ways to promote the green bond market, listening tour participants emphasized.

THE FEDERAL AND STATE GOVERNMENTS CAN PLAY A KEY ROLE BY CARRYING OUT PUBLIC EDUCATION TO RAISE AWARENESS OF GREEN BONDS IN THE INVESTMENT COMMUNITY.

The treasurer's listening tour highlighted the challenges in building the green bond market in the United States. The next step is to develop concrete proposals to address those challenges—an action plan involving investors, underwriters, issuers, and public officials. A U.S. green bond action agenda should consider the following questions:

- 1. Market Function.** What measures can be taken to speed maturation of the green bond market? How can liquidity be improved, supply and demand increased, issue size raised, and overall activity levels boosted? How can issuers be persuaded to use a green label? How can more institutional buyers be drawn into the market? How can the ranks of environmental investors be enlarged to fortify demand?
- 2. Pricing.** What is needed to establish a green premium? How can issuance costs be brought down? Can institutional investors adopt sustainability mandates? Can fiduciary responsibility be redefined to embrace climate action? Will the market reward issuers that practice sustainability? What would it take to create an “on the run” benchmark pricing model for green bonds?
- 3. Standardization.** What level of standardization is optimum in the green bond market? Are multiple definitions of green bonds appropriate? Should Green Bond Principles be further accepted as a market standard? What are the best forms of external review and is consolidation needed among providers? Can review costs fall? What are best practices in disclosure and reporting?
- 4. Refinancing/Additionality.** Is market consensus on refinancing realistic? What can issuers do to make refinancing more acceptable to investors? Should



THE TREASURER'S GREEN BONDS SYMPOSIUM WILL OFFER AN OPPORTUNITY TO EXAMINE THESE QUESTIONS AND DEVELOP PROPOSALS TO BUILD THE GREEN BOND MARKET.

there be different verification and disclosure standards for refinancing or for confirming additionality?

- 5. Policy Support.** What can the public sector do to promote the green bond market? Should subsidies, including tax preferences, be part of the mix? Would a program at the state or federal levels similar to Build America Bonds be feasible? Should states set up formal green bond project aggregation programs? What public education steps can governments take to broaden the market? Can public officials foster changes in attitude about climate

change that would stimulate the green bond market?

The treasurer's green bonds symposium will offer an opportunity to examine these questions and develop proposals to build the green bond market. We call on environmentalists, market participants, and public officials to join us Fall 2017 as we to consider how to take the U.S. green bond market to the next level. Green bonds have a critical role to play in financing the transition to a sustainable economy. Building the market is an essential part of the broad global project to limit the impact of human-caused climate change.



Additionality

Using green bonds to finance new projects that would otherwise not be funded.

Asset management

Management of client investments by a financial services company.

Benchmark

A standard such as a bond index used to measure a bond's performance.

Bond issue

A sale of bonds to investors by a corporation or government agency.

Broker-Dealer

A firm that buys and sells securities both for clients and its own account.

Community investment institutions

Organizations such as community development banks that direct money to disadvantaged communities.

Credit quality

The likelihood that the principal of a loan or debt security will be repaid.

Duration

The period expressed in years to recover the cost of a bond based on interest payments and return of principal.

ESG investing

Short for Environmental, Social and Governance, three factors that influence the sustainability and ethical effects of an investment.

External review

Examination of the environmental claims of a green bond by an outside party such as a consulting firm, ratings agency, accounting firm, or environmental group.

Greenwashing

Labeling bonds that lack genuine environmental benefits as green or exaggerating a bond's green credentials.

Index

An imaginary bond portfolio whose performance is tracked to serve as a benchmark for measuring the performance of similar bonds and bond funds.

Index eligibility

Bonds that meet the criteria for inclusion in an index based on such factors as issue size, credit quality, and maturity.

Institutional investor

An investment organization such as a pension fund or insurance company that trades securities in large quantities.

Issuer pay vs. investor pay

Whether the green bond issuer or investors pay external review costs.

Issue size

The total value of a bond issue.

Liquidity

How easy or hard it is to sell a bond at a reasonable price after it has been issued.

Maturity

The period of time until a bond's principal is repaid.

Premium

A green bond price higher than those of comparable non-green bonds.

Rating agency

Companies such as Standard & Poor's, Moody's, and Fitch that evaluate bond credit quality.

Reporting

An issuer's release of periodic statements providing information on use of green bond proceeds.

Secondary market

Bond buying and selling among investors rather than purchases of bonds directly from issuers.

Spread

The gap between the price of buying and selling a bond on the secondary market.

Socially responsible investing

An investing strategy that considers social effects as well as financial performance.

Thinly traded

A bond that trades infrequently on the secondary market which makes it hard for an investor to sell it.

Third-party review

See external review.

Underwriter

A firm that manages a bond issue by buying bonds from an issuer and selling them to investors.

Yield

The income generated by a bond expressed as an annual percentage of the purchase price.

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