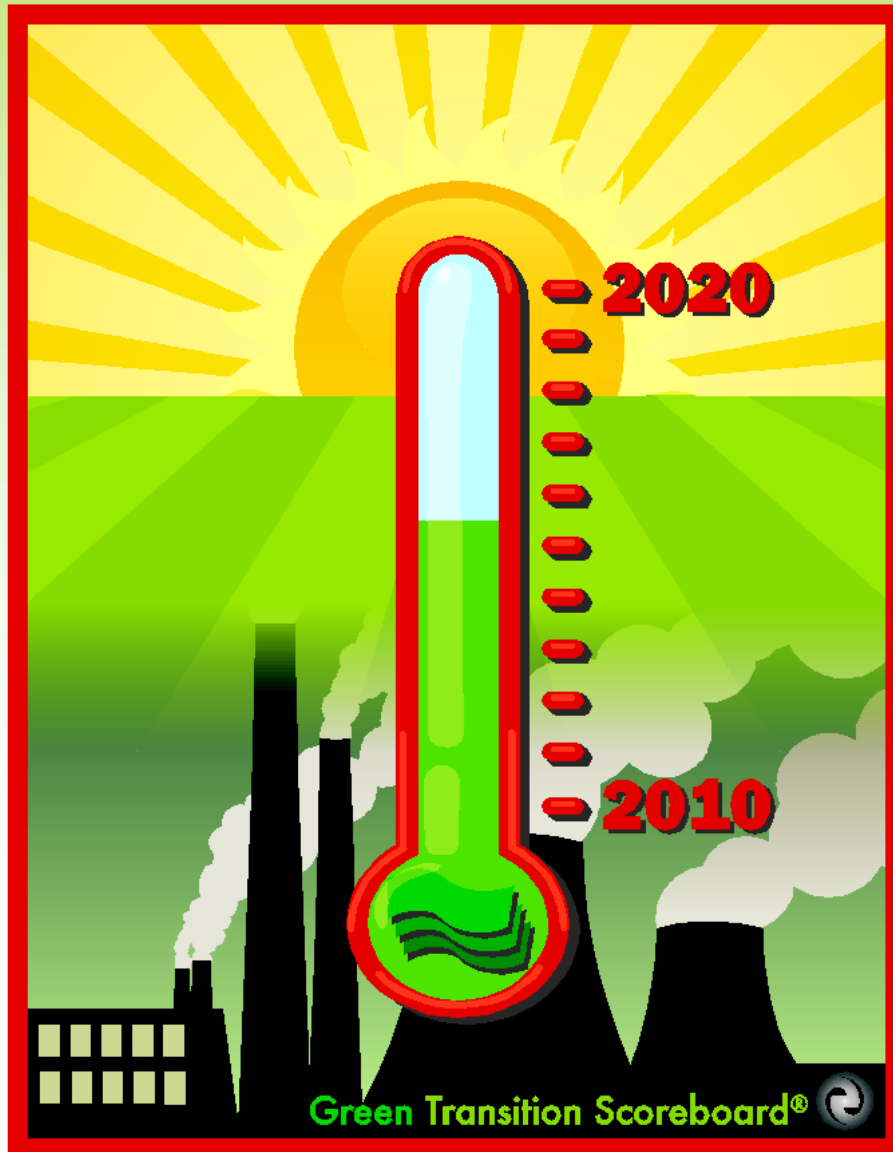


Green Transition Scoreboard® 2014 Mid-Year Update



**Green Bonds
Growing
Green
Infrastructure**



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2014 Mid-Year Update: Green Bonds Growing Green Infrastructure

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Adding Green Bonds to the Mix

By Hazel Henderson

In this 10th anniversary year of Ethical Markets Media (USA and Brazil), we review our five years of research in our Green Transition Scoreboard® (GTS). Since 2009, when we released our first totals of private green investments at \$1.2 trillion since 2007, we drew attention to the huge opportunities for all countries meeting in Copenhagen at the Climate Summit. Instead of that deadlock between Tier 1 and Tier 2 countries, still constrained to arguing within the Kyoto Protocols, which only cover 12% of global CO2 emissions, our GTS illustrated the fact that all nations would need to shift away from fossil fuels toward low-carbon, more inclusive green economies. Progress outside formal agreements is evidenced by US president Obama's [new initiative](#) on forging a sweeping international agreement to “name and shame” countries on climate change, without Congress.

Today, our GTS model has proven predictive. By 2012, our \$3.3 trillion total was presented at the [Rio+20 Earth Summit](#) in Brazil where 191 countries agreed to phase out fossil fuel subsidies and accelerate their progress in this green transition. Our GTS focuses on market-based, private finance because new financial models are also needed to transition away from the distortions, mis-pricing and mal-investments and the influences of incumbent 19th and 20th century fossilized sectors. London-based Carbon Tracker Institute (CTI) estimates a \$91 billion risk in 20 high-cost oil projects of major oil companies. As our GTS private investment totals continued at our projected US\$1 trillion annually, governments and political leaders remained hamstrung by their legacy fossil fuel sectors. Leadership continued growing among NGOs and private investors. Pension funds and groups joined in, including [CERES](#), Clean Trillion Investor Network and [IGCC](#) (Investor Group on Climate Change), UNEP-FI, [UN Global Compact](#) and [PRI](#), as well as [Social Investment Forums](#) in the USA and UK.

Sector	Amount (USD)
Renewable Energy	\$2,656,216,368,345
Energy Efficiency	\$1,308,489,638,055
Green Construction	\$575,611,879,757
Water	\$527,074,639,018
Corporate R&D	\$377,756,631,136
Cleantech	\$267,753,088,873
Grand Total	\$5,712,902,245,185

The growth of the sustainable sector investments GTS tracks shows a positive picture. Take the new explosion of investments in green bonds, the subject of this report. The total issued in Q2 of 2014 of \$10 billion jumped by \$1 billion over Q1 total, reports London-based [Climate Bonds Initiative](#). Two recent reports summarize this new asset class: The Climate Bonds Initiative and HSBCs 2014 [Bonds and Climate Change](#) reports \$503 billion now invested in bonds covering renewable energy, transport, waste and pollution control, water, buildings, industry, agriculture, forests and climate finance. Bloomberg's [Green Bonds Market Outlook](#) details bonds at the international level (World Bank, European Investment Bank and Africa Development Bank); national and municipal levels; corporate “self-labeled” bonds; green asset-backed securities and project bonds for infrastructure. For example in the USA, [\\$384 billion](#) is required just to ensure safe drinking water over the next 20 years. Infrastructure investments over the next 20 years are estimated at [\\$35 trillion](#) – whether or not they are more sustainable depends on implementing new metrics and green bonds, as advocated by groups including [Infrastructure-Basel](#). Lead underwriters are often insurance companies, pension funds and countries such as Sweden, with private banks, Citi, Bank of America ML, Morgan Stanley, JP Morgan, Credit Agricole, Unicredit, DZBank and Rabobank leading the pack. Use of proceeds of these international bond issues is largely for renewable energy, efficiency, transmission lines, transport, water and climate change. The ICLEI white paper on [Financing the Resilient City](#) brilliantly inverts traditional “top down” approaches to climate

mitigation and adaptation by reframing a more local demand driven approach to financing urban infrastructure systemically for long term resilience. The [China Greentech Report 2014](#) calls for fundamental redesign of cities, transportation, efficiency, distributed renewable energy and production methods to shift toward a circular economy. The International Energy Agency's [Medium-Term Renewable Energy Market Report 2014](#) forecasts to 2020, and their [Energy Technology Perspectives 2014](#) tracks similar trends toward green transitions globally.

We predicted the scale-up of renewable energy as GTS totals mounted to our current \$5.3 trillion and efficiency technologies began approaching grid parity. We reported how central electric utilities' efforts have failed to counter their shrinking demand due to the inroads of solar photovoltaic and centralized power projects, wind generation and widespread efficiency gains. In Europe, utility stocks plummeted and in the US, their bond issues faltered due to misgivings of asset managers and the array of new instruments: ETFs, mutual funds, yieldcos, REITs, MLPs and even crowdfunding such as MOSAIC became more attractive than new investments in coal and nuclear power. New leasing models pioneered by SunEdison are now applying to energy efficiency, transport and agriculture as founder Jigar Shah details in his [Creating Climate Wealth](#) (2013). These leasing models which expanded the solar PV market are leading the new growth in ownership as well, tracked by [ILSR](#). While cheap gas from the shale boom fills the gap, we warned of coming price hikes as constraints (opposition to fracking's environmental damage, methane leaks, lack of pipelines) and rapid depletion of gas wells become evident in the [25,000 new wells](#) dug annually in the Bakken, North Dakota. [EPRI](#), the utility industry association, advises massive purchase of EVs to bolster sagging demand, as well as shifting to promoting solar by colonizing its customers' roofs. While [EV markets are exploding](#), we favor charging only with renewables. US utilities lobby extensively at federal, state and municipal levels to maintain their obsolete demand-expanding business models and CWIP (construction work in progress) billed to customers. Therefore, consumers, NGOs and ethical investors need to demand full disclosure of their lobbying activities and funding of political campaigns, while encouraging new thinking on integrated supply management and reframing energy storage as a new type of [asset](#).

The pioneering exposé of company carbon and water use by [CDP](#) and explosive reports of [Carbon Tracker](#) were released in 2012 and 2013 on massive over-investment in "proven" fossil reserves. As a result, the scale of "stranded assets" that needed writing down reached mainstream media and finance. The [IMF's 2014 report](#) on externalities which should be internalized on company balance sheets illuminates the mispricing problem. The World Bank launched its carbon pricing statement: [Putting a Price on Carbon](#) in June 2014, now open for business and investor support. The fatal flaw in economic models I exposed in [The Politics of the Solar Age](#) is that it ignores the primary role of energy underlying their factors of production (land, labor and capital). This is further clarified by modeling "exergy" (energy actually applied to production, not wasted), developed by economist and Ethical Markets advisor [Dr. John "Skip" Laitner](#). Obsolete models persist, notably by economist Charles R. Frank, Jr., reported in [The Economist \(July 26, 2014\)](#) that solar and wind were more expensive than nuclear. Rebuttals by Amory Lovins of RMI and Prof. Michael Grubb of University College, London, appeared in [The Economist \(August 16, 2014\)](#). However, to soothe worried asset managers, rather than writing down stranded fossil fuels, I propose that their value can be modestly re-assessed as "in situ" reserves for future possible use as chemical feedstocks. The debate over the global energy transition rages on, with think tanks funded by the fossil fuel and nuclear industries still sowing doubt about climate change and claiming that low-carbon energy will hurt the poor. A recent effort to criticize solar thermal power plants as killers of birds was soon countered with facts on the [1.4-3.7 billion birds killed annually by cats](#).

Pioneer asset managers began offering fossil-free portfolios such as that managed by [Shelton](#) for the Sierra Club's mutual fund, and others who attended our [Finding Ethical Alpha](#) conference, May 2014. Government agencies began taking note of these growing renewable energy and resource investments, guided by London-based Climate Bonds Initiative; US-based [Green America](#), the [American Sustainable Business Council](#); [CERES](#) and other groups.

These initiatives were buttressed by all the broader accounting protocols of European-based [GRI](#), [IIRC](#), [ICAEW](#), [Tomorrow's Company](#) and those in the USA promoting ESG socially responsible and so-called "impact investing." The [SASB](#) (Sustainability Accounting Standards Board), and founder Jean

Rogers, emerged as a leader, recruiting Michael Bloomberg (now back with his company Bloomberg L.P.) and Mary Schapiro, former SEC chief as SASB's Chair and Vice Chair. Ernst & Young's 2014 survey [Tomorrow's Investment Rules](#) of global institutional investors on non-financial performance added gravitas to IRRC's six forms of capital: financial, social, intellectual, physical, human and environmental and other intangible and non-financial values material to investors. The survey found that US asset managers lagged far behind those in Europe, Latin America, Africa and Asia – indicating need for more Wall Street reforms!

At last, financial models (based on 200 year old economic theories) are changing. Risk is being rethought, beyond financial risk to all the real-world risks humanity faces: climate change, desertification, fresh water shortages, pandemics, ocean acidification, declining fish stocks, social and ethical conflicts driven by globalization of IT, corporate expansion, energy and food speculation, depletion of global commons. All these require innovation in global governance, treaties and reforms of financial systems, now pursued by the [UNEP-FI Inquiry](#) into Design of Financial Systems for Sustainability, launched in mid-2014 in which I am a participant.

The good news is that financial models are rapidly evolving – enriched by capturing new data. Just as asset-managers investing in oil, coal and minerals had to learn the basics of geology, today's portfolios need managers to crank in ever more science beyond economics, as I describe in [Mapping the Global Transition to the Solar Age](#). Today, beyond biomimicry and the promise of [desert-greening](#) covered in previous GTS reports, asset managers need to take into account real-time data from the 120 Earth-observing satellites now reporting on atmospheric and geophysical conditions worldwide, such as the new Orbiting Carbon Observatory-2 satellite ([OCO-2](#)) which reports on how much CO2 is acidifying oceans, sequestered in land and biomass and still building up in Earth's atmosphere. Are asset managers up for this re-tooling? We think so (see Ethical Markets' forthcoming Green Money Directory). Retraining is offered by UN PRI's [Academic Network](#), OECD's [Green Growth Knowledge](#), [Frankfurt School-UNEP Centre](#), offering courses for asset managers to widen their knowledge-bases and overcome their cognitive capture by defunct economic models.

Although our GTS focus is still on private investments, many of these green bonds issued by governments for green infrastructure are underwritten by private sector insurance companies, banks and institutional investors. Thus in this GTS update, we highlight these green bonds worldwide and hope to apply our GTS criteria to help assess whether their proceeds actually will assist vital green infrastructure and genuinely sustainable technologies. We will track the emerging Climate Bonds Standard; Green Bond Principles and other third-party evaluations and add our own best judgments going forward.

For further details, read on.

Sector Data

The Green Transition Scoreboard® tracks private investment in six sectors: Renewable Energy, Green Construction, Water, Energy Efficiency, Corporate R&D and Cleantech. Demonstrating the strength of the market in these and complimentary sectors, adding reports on green bonds signifies that this new asset class has broken into mainstream finance. For example, growth in assets managed by impact bond manager SNW Asset Management grew from \$5 million to nearly \$97 million in a 20 month period, starting January 2013. While any given bond may not raise the bar on the scoreboard significantly, most still being linked to government programs, each serves as an example of the demand for additional investment vehicles funding the green transition beyond the growth of securitization, ETFs and yieldcos in our last report.

Focusing on the institutional level, we recommend investing at least 10% of institutional portfolios directly in companies driving the global Green Transition both as opportunity and as risk mitigation. The

current shifting from fossilized sectors includes increasingly stranded assets as low-carbon regulations are implemented and oil and coal reserves become harder and more expensive to exploit. This transition strategy was recognized in the 2012 report by Mercer which suggests 40% of portfolios should be in Green Transition sectors. Today, it is adopted more widely, even in China and India.

Companies, organizations and the sources of financial data included in the GTS are screened by rigorous social, environment and ethical standards as well as the latest auditing standards for sustainability, including [SASB](#), [ICAEW](#) and others. Data is gathered from green and sustainability indexes, financial media, UN and other international studies, and the Climate Bonds Initiative.

Government funded projects and initiatives are purposefully omitted. When government funding is part of a larger project, the research team removes, in as far as is transparent, the portion of investments from government funds. In sectors for which separating out government investments is a challenge, an appropriate amount of the capital expenditure is left out of the total.

Our definition of 'green' is quite strict, omitting clearly unsustainable sectors as well as certain technologies having unsubstantiated claims, negative EROI or unexplored or untested consequences. For example, we omit coal carbon sequestration (CCS) due to its major government subsidies, huge costs, unproven technology and lower efficiency of energy production. Reporting on green bonds, each will need to be evaluated case by case with sector specific criteria and compared with evolving third party evaluators and standard setters.

International investments are reported in US dollars, subject to fluctuating exchange rates. For the early quarters of 2014, currency changes dampened the report's grand total, with the US dollar getting stronger against most global currencies (especially the Euro).

Renewable Energy

Investments in **Renewable Energy** include private technology development, equipment manufacturing, project finance and M&A activity. The sector is divided into current investments by year of funding and future commitments. This is the largest sector in this report increasing from \$ 2.58 trillion in Q4 2013 to \$2.66 trillion in Q2 2014. As a rule, Corporate R&D is omitted here and reported in Green R&D to avoid double-counting.

RENEWABLE ENERGY	Amount (USD)
2007	\$ 170,200,000,000.00
2008	\$ 224,200,000,000.00
2009	\$ 209,500,000,000.00
2010	\$ 267,300,000,000.00
2011	\$ 334,700,000,000.00
2012	\$ 282,100,000,000.00
2013	\$ 281,000,000,000.00
2014 (Q1+Q2)	\$ 111,300,000,000.00
Commitments	\$ 775,916,368,345.48
Total	\$ 2,656,216,368,345

Applying specific criteria to emerging green bonds helps not only identify “greenwashers” but also those bonds which are “unlabeled.” For example, [Greenko](#), an Indian clean energy producer, issued a \$550 million, 5 year, high-yield corporate bond to re-finance its portfolio of wind farms. The offering was 3x oversubscribed. Greenko did not label the offering as a “green” bond but the pure-play nature of the company qualifies it as such.

Energy Efficiency

Investments in **Energy Efficiency** include conservation efforts and initiatives and products focused on lowering energy needs or using less energy than a comparable product. Widely considered the lowest hanging fruit for investors, efficiency provides ROI in less than 2 years in most cases. Though definitions are in flux, energy efficiency broadly counts: heat, power, waste to energy; improvements in construction materials such as windows, insulation, lighting and other demand-side management (DSM) companies' methods; hybrid vehicles and charging stations; select biomass and waste management, and smart grid. Investments in energy efficiency comes in at \$1.3 trillion for Q2 2014.

ENERGY EFFICIENCY		Amount (USD)
2007	\$	73,675,781,343.98
2008	\$	81,140,728,352.40
2009	\$	89,362,035,630.40
2010	\$	98,416,338,800.00
2011	\$	100,283,850,000.00
2012	\$	113,653,500,000.00
2013	\$	127,731,200,000.00
2014 (Q1+Q2)	\$	66,937,500,000.00
Commitments	\$	58,074,315,855.07
SMARTGRID	\$	349,214,388,073.12
Supply Chain Efficiencies	\$	150,000,000,000.00
Total	\$	1,308,489,638,054.97

Just as sustainability metrics for green bonds differ sector by sector, financing tools vary as well. In the US, [PACE](#) (property assessed clean energy) is a financing tool which allows property owners to gain upfront financing for 100% of the costs of energy efficient retrofits. Local governments issue the municipal bond to investors and then use the proceeds to make loans to building owners for renewable energy or energy efficiency upgrades and installations. The loan is then repaid through a property tax assessment.

Green Construction

The term **Green Construction** continues to evolve from green construction investments broadly including new building construction and existing building retrofits to many reports now only counting LEED building. We calculate using the value of the green construction market, defined as construction built to LEED standards or that incorporate multiple green building elements. Since public-sector information is not recorded, the Q2 2014 total of \$575 billion includes some government buildings.

GREEN CONSTRUCTION		Amount (USD)
2007	\$	50,464,262,053
2008	\$	56,701,418,037
2009	\$	63,709,458,468
2010	\$	71,583,661,200
2011	\$	80,431,080,000
2012	\$	90,372,000,000
2013	\$	98,600,000,000
2014 (Q1+Q2)	\$	63,750,000,000
Total	\$	575,611,879,757

According to a [July 2014 report](#) from HSBC and the Climate Bonds Initiative, over \$13.5 billion has been issued in “Buildings & Industry” green bonds. While this figure includes green property bonds and energy efficient appliance manufacturers, green product manufacturers and green building projects are also included with 16% of the total coming from the latter. The HSBC figures count municipal bonds separately, at only 8%, making the case for the importance of corporate green bonds.

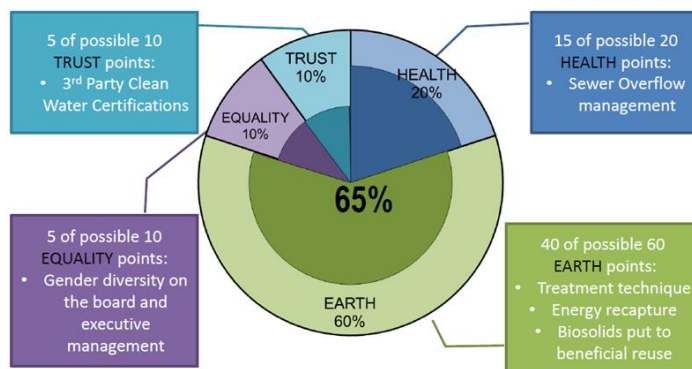
An easy baseline for green construction bonds is LEED certification at any level. One may have to dig deeper, however, as retrofits of buildings may garner significant improvement in pollution emissions, energy efficiency, water conservation while not being LEED compliant.

Water

Water is the single most important commodity for life on this planet, with [Global Water Intelligence](#) finding the global water market worth more than \$500 billion annually. We include pipes, valves, filters, membranes, meters, and even biological systems. We omit anything involved with bottled water, privatization, large-scale hydroelectric dams, and chemicals used by dirty industries to clean up their mess, limiting our tally to investments by utilities in water and wastewater systems. Since so many utilities are owned and operated by various levels of government, a 60% discount has been applied. As we pointed out in earlier reports, virtually all these investments focus on the planet’s 3% of fresh water, while still ignoring the potential of food, fiber and biofuel production from seawater agriculture and aquaculture from the 97% of [saltwater](#).

WATER	Amount (USD)
2007	\$ 58,102,067,200
2008	\$ 61,548,800,000
2009	\$ 65,200,000,000
2010	\$ 68,851,200,000
2011	\$ 72,706,867,200
2012	\$ 76,778,451,763
2013	\$ 81,078,045,062
2014 (Q1+Q2)	\$ 42,809,207,793
Total	\$ 527,074,639,018

As an example of sector specific green bond criteria, those specific to water used by asset managers such as HIP and SNW Asset Management include metrics such as management of health concerns, use of natural disinfection methods, recapture, managing bio-solids, diversity in management positions, transparency in metering and 3rd party certification.



Sample scoring analysis for wastewater utility bond used by HIP Investor, Inc., 2014

Green R&D

The data collected for the GTS on Green R&D is the most comprehensive assessment of corporate green R&D available. Scouring press releases, sustainability reports, and financial statements, we have identified nearly 200 companies responsible for the green R&D tallied in this report. We believe \$363 billion understates by half actual global Green R&D, considering how much is kept as corporate secrets, how much of international R&D does not reach mainstream media, and tens of thousands of middle-market and smaller companies with R&D budgets below our \$1 million reporting threshold. Significant investments in green R&D show that a company has integrated sustainability into its core strategy, serving as a strong indicator for investors betting on increasing consumer demand for green products. This data helps identify innovative companies who are ahead of the curve in responding to heightening environmental risks and regulations.

Green R&D		Amount (USD)
2007	\$	30,286,252,527
2008	\$	30,535,700,657
2009	\$	33,607,460,867
2010	\$	33,509,100,069
2011	\$	47,032,005,378
2012	\$	63,011,660,708
2013	\$	59,759,754,584
Q1 & Q2 2014	\$	29,677,377,292
Commitments	\$	50,337,319,053
Total	\$	377,756,631,136

The Climate Bond Initiative has found development of green bonds lagging in the Corporate R&D sector.

Cleantech

Cleantech is a broad sector which includes companies in the following areas: agriculture; air quality and environment; energy efficiency, lighting, infrastructure and storage; materials; recycling and waste; transportation; and water/wastewater. This sector is divided into Venture Capital, Initial Public Offerings and Mergers & Acquisitions, avoiding overlap with the Green Construction and Energy Efficiency sections which only count revenues. Where VC, IPO and M&A investments are included in the Renewable Energy category, they are omitted here.

CLEANTECH		Amount (USD)
Venture Capital (2007 - 2014 Q2)	\$	39,516,825,940
Initial Public Offerings (2007 - 2014 Q2)	\$	26,055,429,284
Mergers & Acquisitions (2007 - 2014 Q2)	\$	202,180,833,649
Total	\$	267,753,088,873

Green Bonds are being seen in the cleantech world as a potential bonanza. Headlines such as [Growth in Green Bond Market Set to Fuel Cleantech Revolution](#) from Natural Capital News and [Green Bonds are the New Black for Cleantech](#) from CleanTechIQ predict a hopeful future as Bank of America Merrill Lynch, Citi, Crédit Agricole Corporate and Investment Banking, JPMorgan Chase, BNP Paribas, Daiwa, Deutsche Bank, Goldman Sachs, HSBC, Mizuho Securities, Morgan Stanley, Rabobank and SEB agree to the Green Bond Principles, voluntary guidelines for issuing green bonds.

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