

AI infrastructure meets energy reality: why green bonds are critical

Artificial intelligence is driving a structural increase in global electricity demand, pushing power generation and grid infrastructure to their limits. As renewables emerge as the fastest and most economical solution, green bonds are becoming an increasingly important source of capital—connecting long-term digital growth with scalable, low carbon energy investment.

By Steve Williams, Head of EMEA Global Fixed Income

March 2026

AI's paradigm shift

Artificial intelligence (AI) is now shaping the global economy at a speed that is hard to overstate. Its influence now extends far beyond software. AI depends on a vast physical infrastructure spanning computing, data and power, each expanding at a pace that is already testing today's capacity.

The computing side is the most visible. More than a billion people are now using AI-enabled platforms in some form, from search interfaces to productivity tools. This surge has driven intense demand for advanced chips. The race for processing capability is shaping investment plans across major technology companies and influencing supply chains and global trade policy.

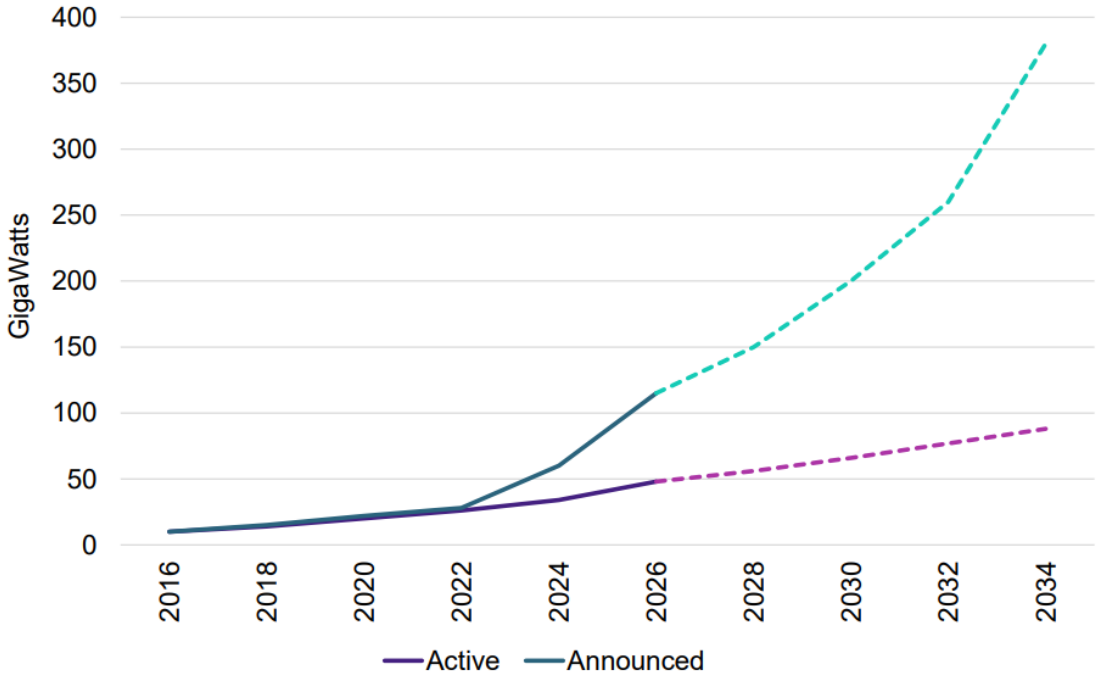
Behind the scenes, the data footprint is growing even faster. Each new model increases the load on data centres. McKinsey estimates that supporting global AI workloads may require about US dollar (USD) 5.2 trillion in capex by 2030, much of it from hyperscalers already expanding rapidly. The biggest bottleneck, however, is power generation. AI demands vast and steady electricity supply. Forecasts suggest global electricity consumption could rise by more than 40% over the next decade, with data centres accounting for a growing share. Meeting this need requires major investment in new transmission lines and grid upgrades. These pressures are already visible, and the gap between current and future capacity is widening.

Surging energy demand from data centres

The steep rise in US data centre construction shows how quickly AI is reshaping the energy landscape. Goldman Sachs expects installed capacity to reach around 46GW by October 2025, an annual increase of 36% (see Chart 1). Much of this growth is concentrated in regions boasting proximity to end users and reliable access to large volumes of power. Around 70% of the 12.4GW of new capacity expected in 2025 is clustered in locations that can offer both.

Developers are planning for a data-driven future. A further 63GW of new projects has already been announced, reflecting the long-term investment cycle underpinning AI infrastructure. Hyperscalers continue to build at pace, and are competing for land, grid connections and electrical supply.

Chart 1: US data centre capacity



Source: Amova AM, Goldman Sachs, Alterio, as of 8 October 2025

All of this depends on meeting the demand for power. After two decades of flat demand, electricity consumption projections point to a 40% rise over the next decade driven by AI, digitalisation and new manufacturing. Current infrastructure cannot absorb this easily. Our analysis suggests that meeting future demand will require a sixfold increase in the rate at which new generation and transmission capacity is built.

Alongside this physical build-out, financing activity is accelerating. Debt issuance linked directly to AI infrastructure continues to grow as utilities, developers and technology companies raise capital for new power supply, storage and data centre construction. This further reinforces the connection between AI expansion and long-term energy investment.

The US grid exemplifies the scale of the challenge. Connecting the projects already in the transmission queue is estimated to require about USD 4 trillion. This represents one of the largest infrastructure build-outs in modern history. It also presents a substantial opening for private capital, particularly for investors who can support renewable energy, storage solutions and grid modernisation at scale.

China's leadership in power production

Any discussion of electricity demand must consider China. As living standards rise and industrial capacity expands, its long-term energy needs will continue to grow. The transition away from coal toward renewables therefore represents one of the largest decarbonisation opportunities in the global system.

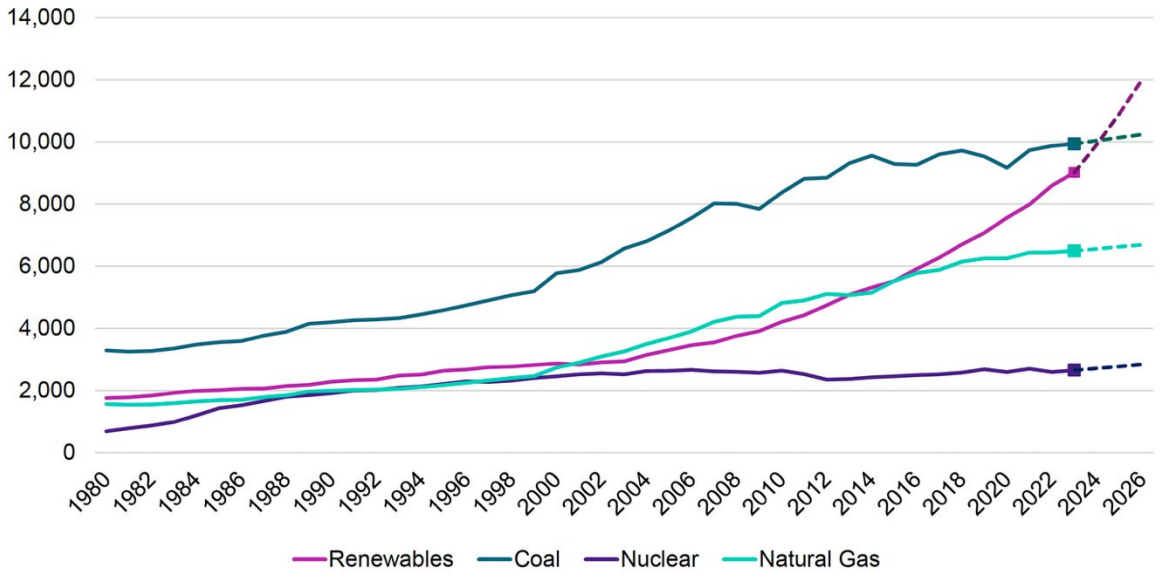
China's approach to power generation also illustrates how quickly national strategies can shift when energy security and economic priorities align. Nuclear power is a clear example. After beginning to scale capacity around the turn of the century, China accelerated development sharply after 2010. By 2024, its nuclear output had reached roughly 450TWh, more than three times Germany's peak generation before its phase-out. Germany's withdrawal from nuclear followed post-Fukushima politics. China faced different pressures, seeing nuclear as a way to strengthen energy independence and support its industrial strategy. The result is a power system undergoing rapid diversification.

Alongside nuclear, China continues to add record volumes of solar and wind capacity each year, even as it builds new coal plants to meet short-term demand and stabilise the grid. This combination highlights the global challenge: countries are trying to expand low-carbon power at speed while maintaining economic growth. For investors, it reinforces the scale of the infrastructure build-out required worldwide and the importance of financing tools that can accelerate renewable deployment without adding fiscal strain.

Renewables: the fast, cheap path forward

As electricity demand accelerates, the economics of generation are shifting decisively toward renewables. Wind, solar, hydro, bioenergy and geothermal now form the largest single source of global electricity production (see Chart 2). This shift has been driven by falling costs, better technology and a growing global project pipeline.

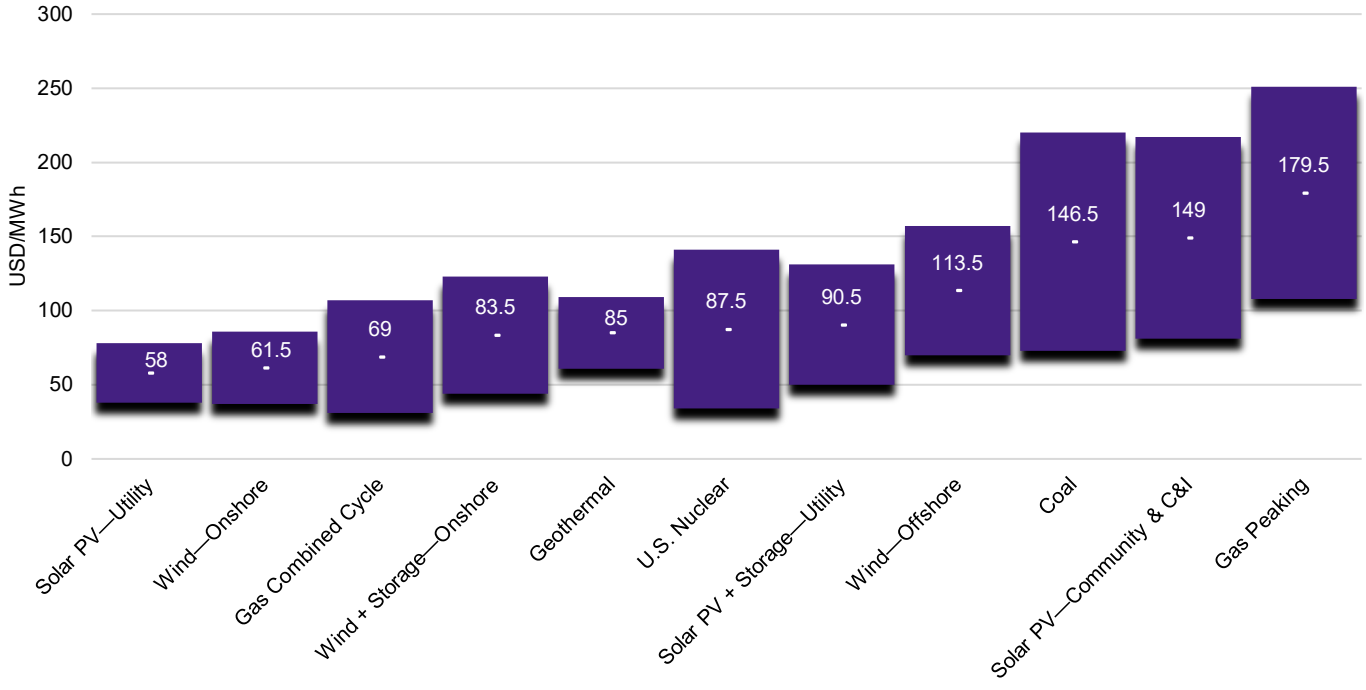
Chart 2 – Global electricity generation by source (TWh)



Source: Amova AM, EIA September 2025

The cost advantage is evident. Levelized cost of energy analysis (chart 3) shows that, under the right conditions, many renewable technologies remain competitive with conventional generation. In regions with strong solar resources or consistent wind patterns, costs have declined to the point where renewables are often the cheapest new source of power. Their modularity also allows capacity to scale quickly, crucial in markets facing structural increases in demand from AI, electrification and new forms of industrial production.

Chart 3: Levelised cost of energy comparison



Source: Lazard's 2025 LCOE+ report

The challenge is that the AI boom may outpace even this rapid expansion. Computing power is becoming the defining input for the global economy, and the capital intensity required to support it is rising. Analysts estimate that AI companies could require around USD 2 trillion in combined annual revenue simply to fund the infrastructure needed to meet projected demand for compute. That level of investment is only viable if the power underpinning AI becomes cheaper, cleaner and more abundant.

This only compounds the case for renewables that can offer the speed, scalability and cost profile needed for long-term energy security. But turning potential into capacity requires vast amounts of capital and a financial system capable of directing it into projects at scale. That is where green bonds begin to play a central role.

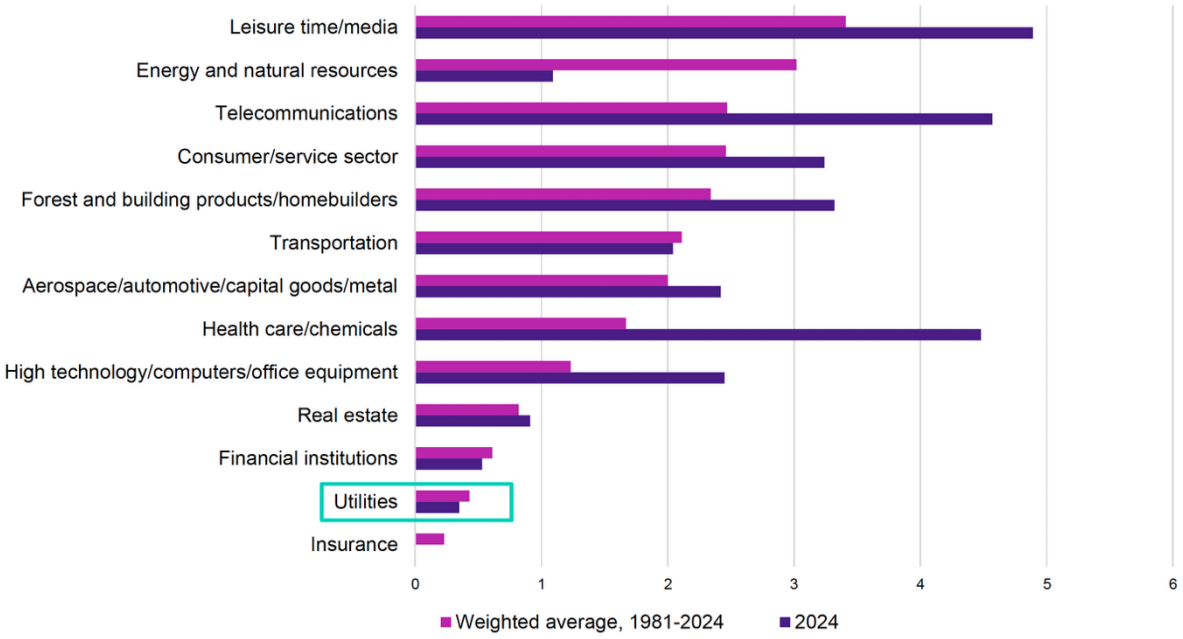
Green bonds: financing the transition

Meeting AI-era energy demand will require capital far beyond traditional funding sources. Green bonds have therefore become one of the most important tools for financing the shift toward cleaner, more resilient power systems. Issuance reached its high point in 2021, led by Europe, but volumes are once again approaching those levels. The rise of anti-ESG sentiment has arguably forced sustainability to evolve beyond virtue signalling, driving a more comprehensive market-based approach. The market has matured, with clearer standards, stronger disclosure and deeper participation from institutional investors seeking predictable, asset-backed exposure to the energy transition.

Europe's progress in digital infrastructure is following a similarly maturing path. According to the European Data Centre Association, more than EUR 100 billion is expected to be invested in data centres across the region by 2030. Crucially, these facilities are now operating on a power mix that is about 94% renewable, making Europe the greenest data centre market globally. This alignment between clean power and digital expansion shows how green financing can accelerate growth while supporting climate goals.

The broader point is that green bonds offer a practical way to channel capital into the infrastructure that underpins both AI and decarbonisation. They give investors clarity over use of proceeds, help issuers lower funding costs and support the build-out of renewable capacity that global electricity systems now urgently require. Utilities also remain one of the most stable sectors in global credit markets, with low default rates (see Chart 4) and long-term revenue visibility. This makes them well suited to finance large-scale renewable projects through green bonds, as investors gain exposure to essential infrastructure with predictable cash flows.

Chart 4: S&P global default rates



Source: Amova AM, S&P as of December 2024

Europe's ability to power its digital expansion with such a high share of renewables reflects the diversity of its energy mix. Different regions contribute in different ways. The Nordics provide abundant wind and hydro, offering some of the most stable and low-carbon electricity anywhere in the world. Southern Europe's solar resources support fast, cost-effective development, whereas legacy hubs such as Frankfurt and Dublin rely more on battery storage and grid flexibility to manage variable loads.

Across the region, investment in smart grids and new access agreements is helping to speed up deployment. New approaches, including phased and non-firm connections, are helping to reduce connection timelines from seven to ten years to roughly one year in some markets, unlocking capacity while longer-term upgrades are completed. These improvements allow faster renewable connections and give operators better control over electricity flows. Together, they can help realise a cleaner and more resilient power system capable of meeting rising demand from AI and digital services.

Policy is another important factor. The EU's focus on digital sovereignty has strengthened the case for developing more local compute capacity. Rather than relying on US-based cloud platforms, European institutions and corporates are being encouraged to build and store data within the region. The scale of interest is already visible. Around 170GW of data centre connection requests have been submitted across Europe, equivalent to almost one-third of the continent's peak power demand. This underlines both the speed of digital expansion and the size of the opportunity for investors who can support the energy and grid infrastructure needed to keep pace.

Summary

As AI accelerates, the real bottleneck lies in power generation. Meeting future energy demands will require a concerted shift toward renewables, which remain the most economical and scalable option. Green bonds are poised to play a pivotal role in financing this transition, enabling infrastructure that supports both AI growth and climate goals. Green bonds offer a strategic counterbalance, directing private capital into clean energy and grid infrastructure at the scale required to support both AI-led economic growth and long-term environmental resilience.

About the author

Steve Williams, Head of EMEA Global Fixed Income



Steve Williams is the Head of EMEA Global Fixed Income and a Managing Director in Amova Asset Management's London office. He is a member of the fixed income and foreign exchange investment committee as well as the portfolio manager with oversight for the firm's investment grade, municipal, global green bond, global mortgages and global bond business.

He joined Amova AM in 2007 and took over co-management responsibility for the firm's flagship global sovereign bond strategy as well as launching the first dedicated Danish mortgage bond strategy into Japan in 2016 and has managed Amova's Global Green Bond strategy since 2015.

Steve, previously served as a Credit research analyst with New York Life Investment Management in corporate bonds and structured finance as a senior analyst. He has over 20 years of investment experience and holds an MBA from Duke University's Fuqua School of Business. He received his undergraduate degree from the University of Michigan and is a certified FRM.

Important information: Important information: This document is prepared by Amova Asset Management Co., Ltd. and/or its affiliates（hereinafter referred to as" the Group"）and is for distribution only under such circumstances as may be permitted by applicable laws. This document does not constitute personal investment advice or a personal recommendation and it does not consider in any way the objectives, financial situation or needs of any recipients. All recipients are recommended to consult with their independent tax, financial and legal advisers prior to any investment.

This document is for information purposes only and is not intended to be an offer, or a solicitation of an offer, to buy or sell any investments or participate in any trading strategy. Moreover, the information in this document will not affect the Group's investment strategy in any way. The information and opinions in this document have been derived from or reached from sources believed in good faith to be reliable but have not been independently verified. The Group makes no guarantee, representation or warranty, express or implied, and accepts no responsibility or liability for the accuracy or completeness of this document. No reliance should be placed on any assumptions, forecasts, projections, estimates or prospects contained within this document. This document should not be regarded by recipients as a substitute for the exercise of their own judgment. Opinions stated in this document may change without notice.

In any investment, past performance is neither an indication nor guarantee of future performance and a loss of capital may occur. Estimates of future performance are based on assumptions that may not be realised. Investors should be able to withstand the loss of any principal investment. The mention of individual securities, sectors, regions or countries within this document does not imply a recommendation to buy or sell.

The Group accepts no liability whatsoever for any loss or damage of any kind arising out of the use of all or any part of this document, provided that nothing herein excludes or restricts any liability of the Group under applicable regulatory rules or requirements.

All information contained in this document is solely for the attention and use of the intended recipients. Any use beyond that intended by the Group is strictly prohibited.

Japan: The information contained in this document pertaining specifically to the investment products is not directed at persons in Japan nor is it intended for distribution to persons in Japan. Registration Number: Director of the Kanto Local Finance Bureau (Financial Instruments firms) No. 368 Member Associations: The Investment Trusts Association, Japan/Japan Investment Advisers Association, Type II Financial Instruments Firms Association

United Kingdom: This document is communicated by Amova Asset Management UK Limited, which is authorised and regulated in the United Kingdom by the Financial Conduct Authority (the FCA) (FRN 122084). This document constitutes a financial promotion for the purposes of the Financial Services and Markets Act 2000 (as amended) (FSMA) and the rules of the FCA in the United Kingdom, and is directed at professional clients as defined in the FCA Handbook of Rules and Guidance.

United States: This document may not be duplicated, quoted, discussed or otherwise shared without prior consent. An offering of any investments, securities or investment advisory services with respect to securities may only be made by receipt of relevant and complete offering documentation and agreements, as applicable. Any offering or distribution of a Fund in the United States may only be conducted via a licensed and registered broker-dealer or a duly qualified entity. Amova Asset Management Americas, Inc. is a United States Registered Investment Adviser.

Singapore: This document is for information to institutional investors, accredited investors as defined in the Securities and Futures Act 2001, and intermediaries only. Amova Asset Management Asia Limited (Co. Reg. No. 198202562H) is regulated by the Monetary Authority of Singapore.

Hong Kong: This document is for information to professional investors as defined in the Securities and Futures Ordinance, and intermediaries only. The contents of this document have not been reviewed by the Securities and Futures Commission or any regulatory authority in Hong Kong. Amova Asset Management Hong Kong Limited is a licensed corporation in Hong Kong.

New Zealand: This document is issued in New Zealand by Amova Asset Management New Zealand Limited (Company No. 606057, FSP22562). It is for the use of wholesale clients, researchers, licensed financial advisers and their authorised representatives only.

Kingdom of Bahrain: The document has not been approved by the Central Bank of Bahrain which takes no responsibility for its contents. No offer to the public to purchase the Strategy will be made in the Kingdom of Bahrain and this document is intended to be read by the addressee only and must not be passed to, issued to, or shown to the public generally.

Kuwait: This document is not for general circulation to the public in Kuwait. The Strategy has not been licensed for offering in Kuwait by the Kuwaiti Capital Markets Authority or any other relevant Kuwaiti government agency. The offering of the Strategy in Kuwait on the basis a private placement or public offering is, therefore, restricted in accordance with Decree Law No. 7 of 2010 and the bylaws thereto (as amended). No private or public offering of the Strategy is being made in Kuwait, and no agreement relating to the sale of the Strategy will be concluded in Kuwait. No marketing or solicitation or inducement activities are being used to offer or market the Strategy in Kuwait.

Kingdom of Saudi Arabia: This document is communicated by Amova Asset Management UK Limited, which is authorised and regulated by the Financial Services and Markets Act 2000 (as amended) (FSMA) and the rules of the Financial Conduct Authority (the FCA) in the United Kingdom (the FCA Rules). This document should not be reproduced, redistributed, or sent directly or indirectly to any other party or published in full or in part for any purpose whatsoever without a prior written permission from Amova Asset Management UK Limited.

This document does not constitute investment advice or a personal recommendation and does not consider in any way the suitability or appropriateness of the subject matter for the individual circumstances of any recipient. In providing a person with this document, Amova Asset Management UK Limited is not treating that person as a client for the purposes of the FCA Rules other than those relating to financial promotion and that person will not therefore benefit from any protections that would be available to such clients.

Amova Asset Management UK Limited and its associates and/or its or their officers, directors or employees may have or have had positions or material interests, may at any time make purchases and/or sales as principal or agent, may provide or have provided corporate finance services to issuers or may provide or have provided significant advice or investment services in any investments referred to in this document or in related investments. Relevant confidential information, if any, known within any company in the group or Sumitomo Mitsui Trust group and not available to Amova Asset Management UK Limited because of regulations or internal procedure is not reflected in this document. The investments mentioned in this document may not be eligible for sale in some states or countries, and they may not be suitable for all types of investors.

Oman: The information contained in this document nether constitutes a public offer of securities in the Sultanate of Oman as contemplated by the Commercial companies law of Oman (Royal decree 4/74) or the Capital Markets Law of Oman (Royal Decree80/98, nor does it constitute an offer to sell, or the solicitation of any offer to buy non-Omani securities in the Sultanate of Oman as contemplated by Article 139 of the Executive Regulations to the Capital Market law (issued by Decision No. 1/2009). This document is not intended to lead to the conclusion of any contract of whatsoever nature within the territory of the Sultanate of Oman.

Qatar (excluding QFC): The Strategies are only being offered to a limited number of investors who are willing and able to conduct an independent investigation of the risks involved in an investment in such Strategies. The document does not constitute an offer to the public and should not be reproduced, redistributed, or sent directly or indirectly to any other party or published in full or in part for any purpose whatsoever without a prior written permission from Amova Asset Management UK Limited. No transaction will be concluded in your jurisdiction and any inquiries regarding the Strategies should be made to Amova Asset Management UK Limited.

United Arab Emirates (excluding DIFC): This document and the information contained herein, do not constitute, and is not intended to constitute, a public offer of securities in the United Arab Emirates and accordingly should not be construed as such. The Strategy is only being offered to a limited number of investors in the UAE who are (a) willing and able to conduct an independent investigation of the risks involved in an investment in such Strategy, and (b) upon their specific request.

The Strategy has not been approved by or licensed or registered with the UAE Central Bank, the Securities and Commodities Authority or any other relevant licensing authorities or governmental agencies in the UAE. This document is for the use of the named addressee only and should not be given or shown to any other person (other than employees, agents or consultants in connection with the addressee's consideration thereof).

No transaction will be concluded in the UAE and any inquiries regarding the Strategy should be made to Amova Asset Management UK Limited.

Republic of Korea: This document is being provided for general information purposes only, and shall not, and under no circumstances is, to be construed as, an offering of financial investment products or services. The Company is not making any representation with respect to the eligibility of any person to acquire any financial investment product or service. The offering and sale of any financial investment product is subject to the applicable regulations of the Republic of Korea. Any interests in a fund or collective investment scheme shall be sold after such fund is registered under the private placement registration regime in accordance with the applicable regulations of the Republic of Korea, and the offering of such registered fund shall be conducted only through a locally licensed distributor.

Canada: The information provided herein does not constitute any form of financial opinion or investment advice on the part of the Company and it should not be relied on as such. It does not constitute a prospectus, offering memorandum or private placement memorandum in Canada, and may not be used in making any investment decision. It should not be considered a solicitation to buy or an offer to sell a security in Canada. This information is provided for informational and educational use only.