

Both Sides, Now: The Disruptive Power of Energy Efficiency

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When discussing energy as part of the environmental component of ESG,¹ people often focus on the types of energy used, as we did in *Will Schumpeter's Gale Clear the Air?*² But that is only one side of the story, and both sides need to be examined. The other side—how that energy is used—is equally important.

Halving energy use through efficiency

The levelling of greenhouse gas (GHG) emissions in recent years has been driven more by improvements in energy *efficiency* than the shift in energy *types* being used. Strides in energy efficiency are disrupting traditional patterns of capital expenditures and consumption, with significant implications for sectors across the economy.

The International Energy Agency (IEA) forecasts that by 2040, global energy usage is going to grow by 30%. In the absence of energy efficiency improvements, that increase would be 60%. Most of this growth will come from emerging markets, especially in India, where rapid population growth and greater access to technology will drive energy demand higher. In developed markets, energy efficiency improvements will drive reductions in energy use—even as economic growth continues.

AUTHOR



ANDREW HARMSTONE
Managing Director

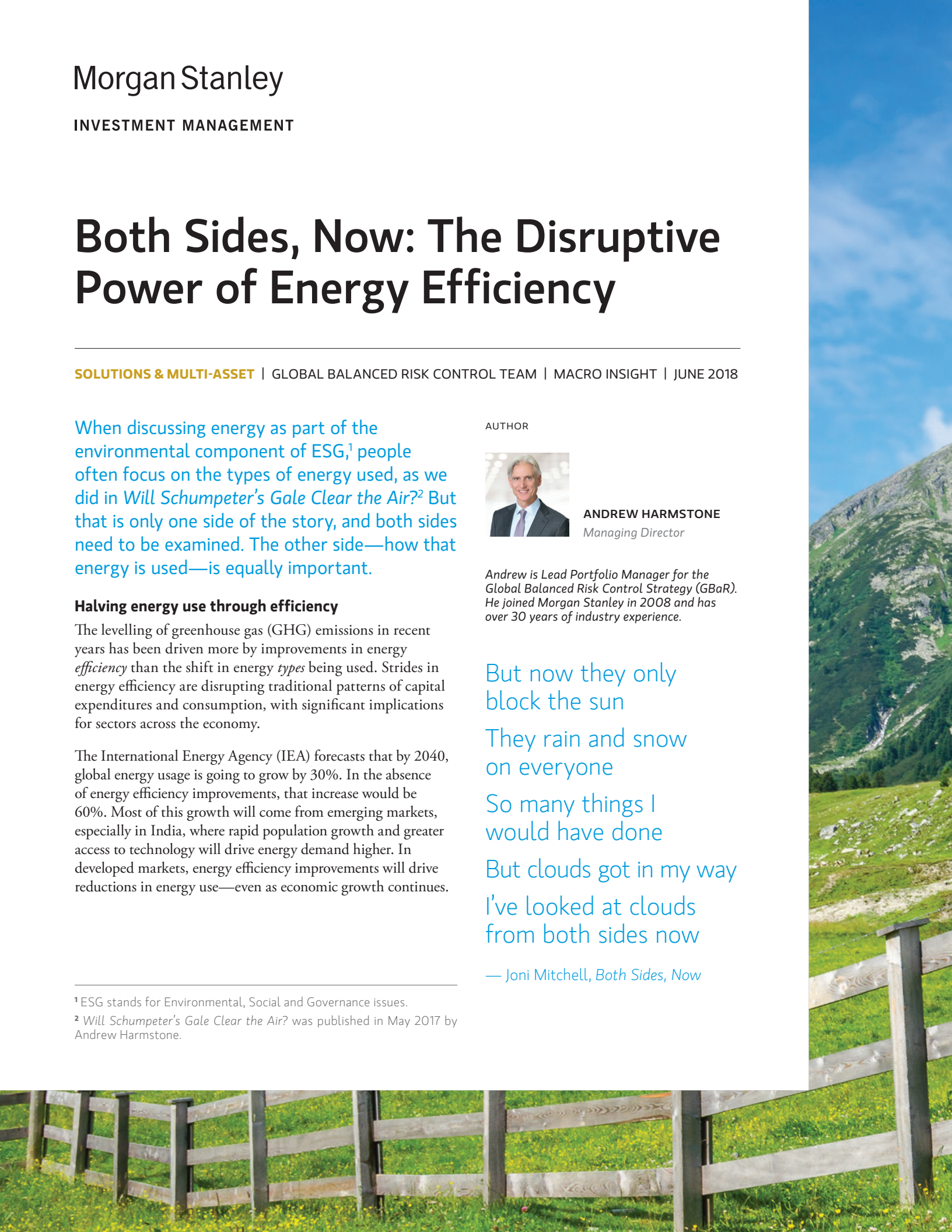
Andrew is Lead Portfolio Manager for the Global Balanced Risk Control Strategy (GBaR). He joined Morgan Stanley in 2008 and has over 30 years of industry experience.

But now they only
block the sun
They rain and snow
on everyone
So many things I
would have done
But clouds got in my way
I've looked at clouds
from both sides now

— Joni Mitchell, *Both Sides, Now*

¹ ESG stands for Environmental, Social and Governance issues.

² *Will Schumpeter's Gale Clear the Air?* was published in May 2017 by Andrew Harmstone.



Carrots and sticks

Both carrots (incentives) and sticks (penalties) are driving energy efficiency. Except for the U.S., regulations to meet commitments under the Paris Climate Agreement are largely in place. Therefore, what is needed from the “stick” side is better enforcement.

On the enforcement front, Europe is establishing a carbon trading programme. China—now the largest emitter of fossil fuel carbon gases (*Display 1*)—is also planning a carbon-trading market, potentially the world’s largest. Other enforcement initiatives in China include steeper penalties for pollution, consolidating energy policymaking in a newly formed Ministry of Ecological Environment, closing inefficient coal and steel plants, and banning waste imports.

Recent data from the IEA indicates Chinese energy demand growth has already slowed a great deal, “from an average of 8% per year from 2000 to 2012, to less than 2% per year since 2012”, and is forecast to average 1% per year through 2040. Globally, over the last decade there has been an increase in energy efficiency regulations which has undoubtedly contributed to the slowdown, and this includes China. However, if new regulations do not continue to be put in place the IEA predicts that “end-use consumption in 2040 would be 40% higher”.³

Globally the regulatory stick is thus fairly obvious. The carrot is the boost in productivity resulting from efficiency. For each unit of energy, businesses in industries across the world can increase their profitability and competitiveness by improving energy efficiency.

Indeed, CO₂ emissions are produced by nearly every sector globally: industry, transportation, building, agriculture and forestry, electricity and heating

(*Display 2*). All of these companies have an incentive to reduce emissions, but there are still many that may not make major changes in their sources of energy. Instead, they will shrink their carbon footprints—and improve profitability—primarily through capital investments aimed at increasing the efficiency with which they use energy.

We discuss three key areas of the economy where energy efficiency is driving capital investment and reduced CO₂ emissions.

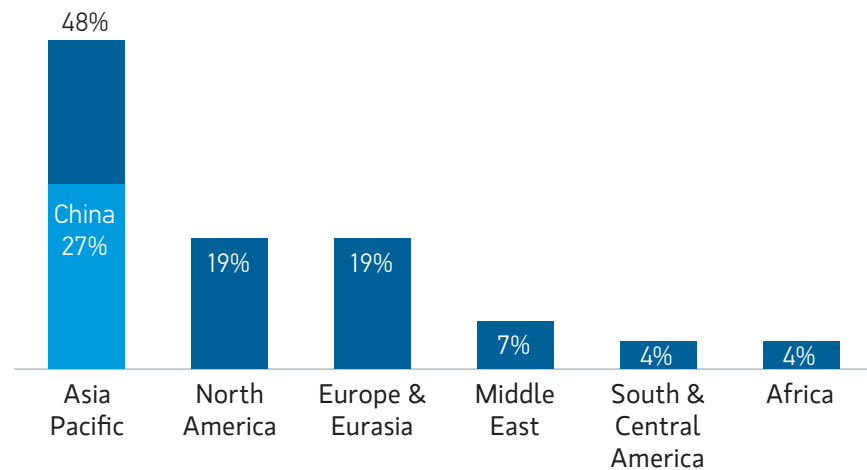
1. STEEL PRODUCTION

The steel sector, which accounts for 6.7% of total worldwide CO₂ emissions,⁴ provides a good example of the implications that energy efficiency can have for business fixed investment. To meet the Paris Climate Agreement objectives by 2050, the sector needs to reduce emissions by over 70% per tonne of steel produced.

A straightforward approach would be to shift from traditional basic oxygen furnaces to electric arc furnaces (EAFs),

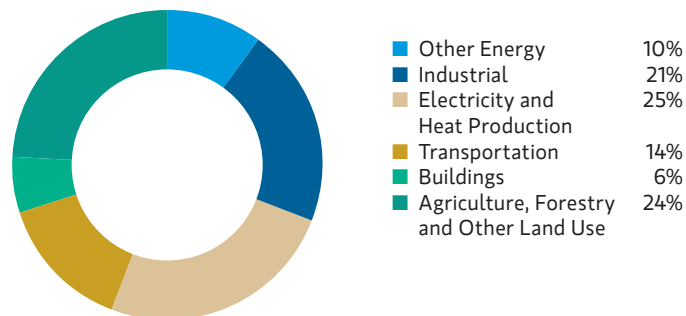
**DISPLAY 1
China is the largest CO₂ emitter**

Carbon dioxide emission by region for the year ended 2016



Source: BP Statistical Review of World Energy June 2017.

**DISPLAY 2
Entire global economy produces CO₂ emissions**



Source: Intergovernmental Panel on Climate Change. Climate Change 2014 Synthesis Report. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

³ <https://www.iea.org/weo2017/>

⁴ The International Energy Agency (IEA)

which produce half the CO₂ emissions per tonne of steel. Electric arc furnaces also entail lower capital costs and more flexibility in production volumes. They tend to work mostly using scrap steel, whereas basic oxygen furnaces tend to work using iron ore. So it is natural for a country that is just developing its infrastructure—and does not yet have much scrap steel—to use basic oxygen furnaces. But once a country starts to amass scrapped automobiles, appliances and obsolete infrastructure, it is logical for steel producers to transition to EAFs.

In China, nearly 95% of steel production is through oxygen furnaces (*Display 3*). If the country transitioned a meaningful percentage of its steel production to electric arc furnaces, the benefits of lower emissions and significant new business fixed investment would be striking. This transition requires available scrap and regulatory support, and on both these fronts the signs are encouraging.

The World Steel Association estimates China's steel scrap availability will reach 220 million tonnes in 2020 (from 145 million in 2015), as the country's products and infrastructure enter the replacement phase.⁵ On the regulatory side, the government is aiming to cut steel capacity, requiring that 1.25 tonnes of old capacity be closed for every one tonne of new capacity added in environmentally sensitive regions. If a steelmaker replaces its old capacity with an EAF, however, it can do so at a 1:1 ratio,⁶ creating a structural incentive to switch to EAFs.

2. COMMERCIAL: FOOD RETAIL

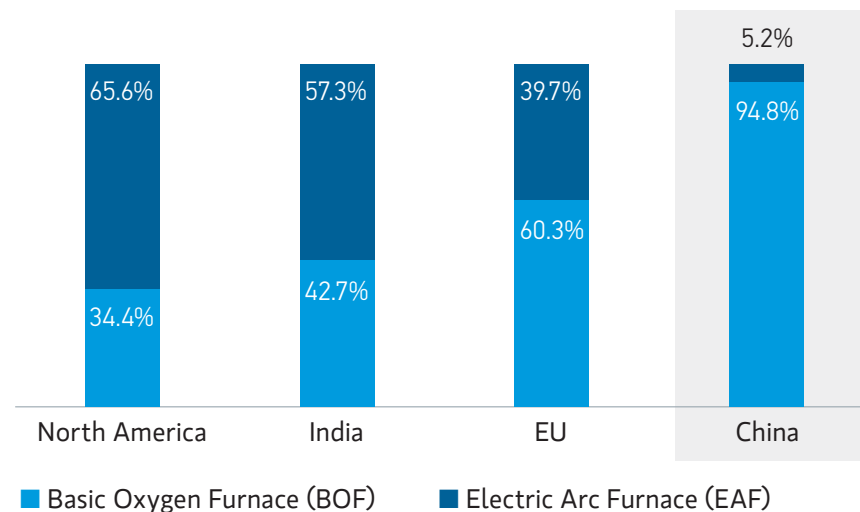
The implications of energy efficiency are not confined to heavy industry. In the food retail sector, we found examples in

a leading UK supermarket group that cut back on electricity use by 11.6% since 2005, despite growing its floor space by 54.2%, and in a pure online supermarket that distributes its groceries directly to individual customers using electric vehicles—eliminating the need for chilled cabinets in a centrally heated store.

Since energy consumption accounts for about 7% to 10% of a traditional food retail store's total cost,⁷ using less energy is likely to have long-term benefits for their profitability. Energy efficiency is not only a direct competitive advantage: It also yields intangible benefits—improved brand image and greater demand—as consumers seek “greener” choices and low-cost alternatives.

**DISPLAY 3
China steel production: Ripe for transition**

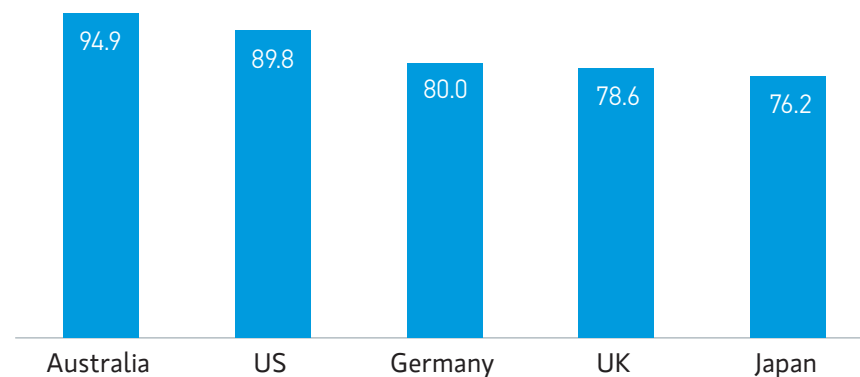
Steel production by process



Source: World Steel Association. <https://www.worldsteel.org/en/dam/jcr:0474d208-9108-4927-ace8-4ac5445c5df8/World+Steel+in+Figures+2017.pdf> World Steel in Figures 2017 Report. Crude steel production process, 2016.

**DISPLAY 4
Residential energy is becoming more efficient, too**

Display per dwelling energy intensity (index=100 as of 2000)



Source: Based on IEA data from the IEA Energy Efficiency Indicators Database (2017 edition) © OECD/IEA 2017. www.iea.org/statistics, Licence: www.iea.org/t&c; as modified by Morgan Stanley Investment Management.

⁵ Source: The World Steel Association. Blog: Is it time for China to Switch to Electric Arc Furnace Steelmaking? 13 February 2018. <https://www.worldsteel.org/media-centre/blog/2018/Is-it-time-for-China-to-switch-to-EAF-steelmaking.html>

⁶ Source: Reuters, China's Ministry of Industry and Information Technology.

⁷ Source: Morgan Stanley Research

3. RESIDENTIAL: ENERGY EFFICIENCY RENOVATIONS

Improvements in residential energy efficiency are changing household budgets. In Europe, where 97% of the building stock is not energy efficient, energy expenditure accounts for on average, 10% of household income. And heating accounts for 65% of average household energy use.⁸ Energy efficiency renovations include improved fixtures for heating, cooling and lighting, as well as insulation and water efficiency.⁹ Those with older homes in colder climates are leading the transformative shift toward greater energy efficiency.

Improved residential energy efficiency could lead to more disposable income and higher property values, along with jobs, growth, innovation and consumer spending benefits. Unfortunately, the payoff period can be quite long, especially for the most robust energy efficiency improvements. Further, with regulations mainly focused on businesses, individuals have fewer sticks (penalties) to incentivise them to action.

Nevertheless, improvements in household energy efficiency have reduced residential energy costs (*Display 4*). California's recent requirement that all new homes include solar panels shows how regulations can be used to improve residential sustainability. Amsterdam

has taken an even larger step with its Sustainable Amsterdam Agenda. By 2020, they want to generate 20% more renewable energy, use 20% less energy per inhabitant, improve air quality by switching to zero-emissions vehicles, and ensure that 65% of household waste is collected efficiently for recycling.

This waste collection is part of their emphasis on a "circular economy," which seeks to reuse all their outputs and includes the Amsterdam Waste to Energy Company (AEB). AEB recovers household waste and other raw materials such as separated fruits and vegetables, and generates electricity from the heat produced by incinerating this waste. The biomass would release the same amount of carbon if it were to rot; therefore this source of energy is carbon neutral. AEB already generates enough energy for 300,000 households.¹⁰

Amsterdam expects to phase out natural gas by 2050. It provides both incentives and financing at the individual and business level, with low-interest loans for sustainability investments and grants to homeowners wanting to accelerate the process of going gas-free. It is a model of how cities can use carrots and sticks to improve their overall energy efficiency at the local municipal level rather than waiting for global or multi-country solutions.

Investing with a forward-looking lens

Now we see both sides of the environmentally-friendly energy trend: the choice of energy, as well as the efficiency with which it is used. The shift towards energy efficiency has the potential to disrupt virtually every economic sector. It has the potential to cut projected energy-use growth in half, improve corporate earnings and spur investment across the industrial, retail and residential sectors.

In our portfolio construction process, we look at environmental, social and governance ratings for each company using data from Sustainalytics.¹¹ We also acknowledge a fourth "climate change" category, which doubles the scrutiny we give to the 'E' in ESG. Within the ESG framework, energy efficiency is an issue that falls in the environmental category. Our goal is to ensure that the average rating of the companies in each of our country and sector baskets falls within the top quartile in these four categories.

We believe that ESG factors, broadly, are transforming the global economy. By considering these factors in our investment process, we aim to be on the forward-looking side of energy efficiency and other disruptive trends.

⁸ Source: University of Cambridge Institute for Sustainability Leadership (CISL). (2018). *Renovation Roadmap: Making Europe's homes fit for the 21st century*, Cambridge, UK: The Price of Wales's Corporate Leaders Group.

⁹ https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial+institutions/resources/energy+efficient+renovation

¹⁰ <http://www.aebamsterdam.com/about/>

¹¹ Sustainalytics is an independent ESG and corporate governance research, rating and analysis firm supporting investors around the world with the development and implementation of responsible investment strategies.

Risk Considerations

There is no assurance that the strategy will achieve its investment objective. Portfolios are subject to market risk, which is the possibility that the market values of securities owned by the portfolio will decline and that the value of portfolio shares may therefore be less than what you paid for them. Accordingly, you can lose money investing in this portfolio. Please be aware that this strategy may be subject to certain additional risks. There is the risk that the Adviser's **asset allocation methodology and assumptions** regarding the Underlying Portfolios may be incorrect in light of actual market conditions and the portfolio may not achieve its investment objective. Share prices also tend to be volatile and there is a significant possibility of loss. The portfolio's investments in **commodity-linked** notes involve substantial risks, including risk of loss of a significant portion of their principal value. In addition to commodity risk, they may be subject to additional special risks, such as risk of loss of interest and principal, lack of secondary market and risk of greater volatility, that do not affect traditional equity and debt securities. **Currency fluctuations** could erase investment gains or add to investment losses. **Fixed-income securities** are subject to the ability of an issuer to make timely principal and interest payments (credit risk), changes in interest rates (interest-rate risk), the creditworthiness of the issuer and general market liquidity (market risk). In a rising interest-rate environment, bond prices may fall. In general, **equities securities'** values also fluctuate in response to activities specific to a company. Investments in **foreign markets** entail special risks such as currency, political, economic, and market risks. Stocks of **small-capitalisation companies** carry special risks, such as limited product lines, markets and financial resources, and greater market volatility than securities of larger, more established companies. The risks of investing in **emerging market countries** are greater than risks associated with investments in foreign developed markets. **Exchange traded funds (ETFs)** shares have many of the same risks as direct investments in common stocks or bonds and their market value will fluctuate as the value of the underlying index does. By investing in exchange traded funds ETFs and other Investment Funds, the portfolio absorbs both its own expenses and those of the ETFs and Investment Funds it invests in. Supply and demand for ETFs and **Investment Funds** may not be correlated to that of the underlying securities. **Derivative instruments** can be illiquid, may disproportionately increase losses and may have a potentially large negative impact on the portfolio's performance. A **currency forward** is a hedging tool that does not involve any upfront payment. The use of **leverage** may increase volatility in the Portfolio. **Diversification** does not protect you against a loss in a particular market; however, it allows you to spread that risk across various asset classes.

DEFINITIONS

Amsterdam Waste to Energy Company (AEB) provides waste solutions for a clean society. They are converting waste into sustainable electricity, district heating and high-quality construction materials. **Capital expenditure, or CapEx**, are funds used by a company to acquire, upgrade, and maintain physical assets such as property, industrial buildings, or equipment. **EBITA is an acronym for earnings before interest, taxes and amortization.** To calculate a company's EBITA, start with its earnings before tax (EBT), which can be found on the income statement, and add interest and amortization expenses back in. **Electric Vehicle (EV) Charging Company** produces electric vehicle charging stations, also called EV charging station, electric recharging point, charging point, charge point and EVSE (electric vehicle supply equipment), is an element in an infrastructure that supplies electric energy for the recharging of electric vehicles, such as plug-in electric vehicles, including electric cars, neighborhood electric vehicles and plug-in hybrid. **"ESG" investment: Environmental Social and Governance** based investment is an investment approach which takes explicit account of the environmental, social and corporate governance aspects of all proposed investments. The **European Union (EU)** is a political and economic union of 28 member states that are located primarily in Europe. Real yield is the nominal yield of a bond minus the rate of inflation. **Greenhouse gas emissions** are any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere. By increasing the heat in the atmosphere, greenhouse gases are responsible for the greenhouse effect, which ultimately leads to global warming. **International Energy Agency (IEA)** is the Paris-based energy forum established in 1974. It is linked with the Organisation for Economic Cooperation and Development to enable member countries to take joint measures to meet oil supply emergencies, to share energy information, to coordinate their energy policies, and to cooperate in the development of rational energy programs. The **Paris Agreement (French: Accord de Paris), Paris climate accord or Paris climate agreement** is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gas emissions mitigation, adaptation, and finance starting in the year 2020. The **Sustainability Amsterdam Agenda** was agreed upon by the city council in Amsterdam on 11 March 2015. As part of this new motion, the number of households using locally-generated sustainable electricity needs increase, plans have been drawn up for energy saving efforts and accelerating the process of connecting existing houses to district heating systems, the construction market will be challenged to build greener properties. Air quality in the city will be improved through continued efforts to encourage the use of electric transport and schools to make them greener and healthier places to work. **Volatility** is measured by calculating the standard deviation of the annualized returns over a given period of time. It shows the range to which the price of a security may increase or decrease.

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